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Talks

Necessary Free Choice and its theoretical significance · **Sam Alxatib (CUNY GC)**

An influential line of research, beginning with Fox 2007, derives the Free Choice (FC) inference of e.g. (1) as a scalar implicature (SI); the "exhaustification" of (1), it is proposed, entails FC (2).

(1) Kim is allowed to eat salad or soup. $\Diamond(p \vee q)$

a. Kim is allowed to eat salad. $\Diamond p$

b. Kim is allowed to eat soup. $\Diamond q$

(2) a. $\text{Exh}(\text{Exh}(\Diamond(p \vee q))) \vDash \Diamond p \,\&\, \Diamond q$. (Fox 2007)

b. $\text{Exh}(\Diamond(p \vee q)) \vDash \Diamond p \,\&\, \Diamond q$ (Bar-Lev and Fox 2020)

In this talk we draw attention to sentences like (3), and their significance to views of FC as an SI.

(3) Chris needs to allow Kim to eat salad or soup, but I don't.

It is possible to understand (3) to say that Chris needs to give Kim permission to eat salad and permission to eat soup ($\Box_{Chris}\Diamond p, \Box_{Chris}\Diamond q$), and at the same time that I can forbid Kim from eating either ($\neg\Box_{speaker}\Diamond(p \vee q)$). In other words, (3) can mean that Chris needs to give Kim free choice, but I have the option of allowing Kim *neither* salad nor soup. On this reading, then, FC is calculated in the first part of (3), but not in the second part. Focusing on the first part, we can imagine its FC inference coming from exhaustification below *needs* and above *allow*, as in (4)…

(4) Chris needs to Exh allow Kim to eat salad or soup, … $\Box(\text{Exh}\Diamond(p \vee q))$

… but then the elided VP in the second part, which is clearly anaphoric to [*need to allow* …], is predicted have FC as part of its meaning. This is not the reading noted above. On that reading, FC is not calculated in the meaning of the elided VP, so it follows that FC in the first half of (3) can't come from exhaustification below *need* — it must come from exhaustification above it: The same point can be made with (4), this time with (the neg-raising verb) *want* instead of *need*:

(5) Chris wants to allow Kim to eat salad or soup, but I don't.

In parallel to (3), (5) can be understood to say that Chris wants to give Kim free choice, and that I want to deny Kim both options ($\neg \textit{want}(\Diamond(p \vee q)) \rightsquigarrow \textit{want}(\neg\Diamond(p \vee q))$). Therefore, and again in parallel to (3), the antecedent VP in (5) can't have the form [*want* Exh allow…], because if it did, the elided VP would be understood to say that I want to deny Kim free choice. In sum, a theory of FC as an SI must derive FC from "global" exhaustification of [*need/want to allow p or q*]:

(6) Desideratum 1: $\text{Exh}(\textit{need/want}(\Diamond(p \vee q))) \vDash \textit{need/want}(\Diamond p)$ & $\textit{need/want}(\Diamond q)$

Theoretical significance. Another important goal for SI-based views of FC (and of inferences of disjunction generally), is to capture the "distribution" inference of sentences like (7):

(7) Chris needs to eat salad or soup. $\Box(p \vee q)$

a. Chris does not need to eat salad. $\neg\Box p$

b. Chris does not need to eat soup. $\neg\Box q$

As noted in the literature (e.g. Crnič et al. 2015), distribution under *need* and similar operators is obligatory; (7) is not felicitous in contexts that do not support the distribution inference (7a,b).

(8) Desideratum 2: $\text{Exh}(\textit{need/want}(p \vee q)) \vDash \neg\textit{need/want}(p)$ & $\neg\textit{need/want}(q)$

The problem is to achieve (6) and (8) with one account of Exh. Achieving (8) on its own is straightforward: $\textit{need}(p)$ and $\textit{need}(q)$ can be negated (aka "excluded") on the grounds that their simultaneous negations do not contradict Exh's prejacent. But this is also true of $\textit{need}(\Diamond p)$ and $\textit{need}(\Diamond q)$, so we predict $\text{Exh}(\textit{need}(\Diamond(p \vee q)))$ to produce $\neg\textit{need}(\Diamond p)$ & $\neg\textit{need}(\Diamond q)$, i.e. the opposite of (6). The two desiderata together present a challenge to Fox, as the predictions just described remain the same with recursive exhaustification (details not shown). The desiderata are also challenging for Bar-Lev and Fox's view of exhaustification. They distinguish excludable formal alternatives from

includable ones, as follows: a proposition ψ is excludable given prejacent ϕ and set of alternatives C iff $\neg\psi$ is an element of every *maximal exclusive enrichment* (MEE) of ϕ from C, where:

(9) B is a *maximal exclusive enrichment* of ϕ from C iff (i) $B \subseteq \{\neg\xi : \xi \in C\}$, (ii) $\bigwedge B$ is consistent with ϕ, and (iii) no proper superset of B satisfies both (i) and (ii).

Let $\underline{\text{Exc}(C)(\phi)}$ be the conjunction of the negations of ϕ's excludable elements of C. We now say (following Bar-Lev and Fox – B&F) that a proposition ψ is includable given ϕ and C iff ψ is an element of every *maximal inclusive enrichment* (MIE) of $\underline{\phi \,\&\, \text{Exc}(C)(\phi)}$ from C, where:

(10) B is a *maximal inclusive enrichment* of ϕ from C iff (i) $B \subseteq C$, (ii) $\bigwedge B$ is consistent with ϕ, and (iii) no proper superset of B satisfies both (i) and (ii).

Take $\phi = \Diamond(p \vee q)$ as an example. Let $C = \{\Diamond p, \Diamond q, \Diamond(p \wedge q)\}$. From (9), we get $\Diamond(p \wedge q)$ to be the only excludable element of C, and $\text{Exc}(C)(\phi) = \neg\Diamond(p \wedge q)$. From (10) we predict that $\Diamond p, \Diamond q$ be includable; they are jointly consistent with $\Diamond(p \vee q) \,\&\, \neg\Diamond(p \wedge q)$. Let $\underline{\text{Inc}(C)(\phi)}$ be the conjunction of ϕ's includable alternatives from C. In this example, $\text{Inc}(C)(\phi) = \Diamond p \,\&\, \Diamond q$. We now write:

(11) $\text{Exh}(C)(\phi) = \phi \;\&\; \text{Exc}(C)(\phi) \;\&\; \text{Inc}(C)(\phi)$

(11) correctly produces (2b), as desired, and achieves Desideratum 2 if $\phi = \Box(p \vee q)$ and $C = \{\Box p, \Box q, \Box(p \wedge q)\}$; everything in C is predicted to be excludable. However, the account inherits Fox's unwanted prediction concerning Desideratum 1; the elements of $C = \{\Box\Diamond p, \Box\Diamond q, \Box\Diamond(p \wedge q)\}$ are excludable given $\phi = \Box\Diamond(p \vee q)$. B&F may propose expanding the set of alternatives, perhaps optionally, to $C = \{\Box\Diamond p, \Box\Diamond q, \underline{\Diamond}\Diamond p, \underline{\Diamond}\Diamond q, \Box\Diamond(p \wedge q)\}$, i.e. permitting simplification of the disjunction and simultaneously replacing the necessity modal with its dual (underlined). Such a move would make $\Box\Diamond p, \Box\Diamond q$ *in*cludable, and therefore fulfill Desideratum 1. However, the parallel expansion in the case of $\Box(p \vee q)$ eliminates distribution, and fails Desideratum 2; with $C = \{\Box p, \Box q, \underline{\Diamond} p, \underline{\Diamond} q, \Box(p \wedge q)\}$, $\Box p, \Box q$ are no longer excludable, and we predict incorrectly that examples like (7) become felicitous when one of the disjuncts is known to be required/desired.

Proposal. We propose to separate exhaustification of scalar (σ-)alternatives from domain (D-)alternatives (Chierchia 2013), to treat disjunction as an indefinite whose domain is the disjuncts (Rooth and Partee 1982), and whose domain alternatives are indefinites over subsets of the original domain. For $\phi = \Diamond(p \vee q)$, the set of domain alternatives is $C_D = \{\Diamond p, \Diamond q\}$, and the set of scalar alternatives is $C_\sigma = \{\Diamond(p \wedge q)\}$. Likewise, for $\phi = \Box(\Diamond(p \vee q))$, $C_D = \{\Box\Diamond p, \Box\Diamond q\}$ and $C_\sigma = \{\Box\Diamond(p \wedge q)\}$, and for $\phi = \Box(p \vee q)$, $C_D = \{\Box p, \Box q\}$ and $C_\sigma = \{\Box(p \wedge q)\}$. Finally, we propose that domain alternatives are by default *included*, unless their inclusion contradicts the scalar enrichment of the prejacent. In detail: let $\text{Exc}_\sigma(C)(\phi)$ be the conjunction of the negations of ϕ's excludable alternatives from C_σ. This gives us the "exclusive" inferences $\neg\Diamond(p \wedge q)$, $\neg\Box\Diamond(p \wedge q)$, $\neg\Box(p \wedge q)$ for our three cases. Let $\text{Inc}_D(C)(\phi)$ be the conjunction of ϕ's includable alternatives from C_D. These are the elements of C_D that appear in every MIE of $\underline{\phi \;\&\; \text{Exc}_\sigma(\phi)}$ from C_D. Notice that (10) applies as is; the difference is that inclusion must be consistent with ϕ and its *scalar* exclusions only. When $\phi = \Diamond(p \vee q)$, $\text{Inc}_D(C)(\phi) = \Diamond p \,\&\, \Diamond q$. When $\phi = \Box\Diamond(p \vee q)$, $\text{Inc}_D(C)(\phi) = \Box\Diamond p \,\&\, \Box\Diamond q$. (These are basic FC and Desideratum 1.) When $\phi = \Box(p \vee q)$, $\text{Inc}_D(C)(\phi)$ is vacuous because $\Box p, \Box q$ jointly contradict the scalar exclusion $\neg\Box(p \wedge q)$. It is only in such cases (we propose) that D-alternatives are (possibly) excluded. We define $\text{Exc}_D(C)(\phi)$ as the conjunction of the negations of ϕ's excludable alternatives from C_D. These are the elements of C_D that appear in every MEE of $(\phi \,\&\, \text{Exc}_\sigma(C)(\phi) \,\&\, \text{Inc}_D(C)(\phi))$ from C_D. $\text{Exc}_D(C)(\phi)$ is vacuous in the cases of $\Diamond(p \vee q)$ and $\Box\Diamond(p \vee q)$; when $\phi = \Box(p \vee q)$ it produces distribution (Desideratum 2). We define Exh as in (12).

(12) $\text{Exh}(C)(\phi) = \phi \;\&\; \text{Exc}_\sigma(C)(\phi) \;\&\; \text{Inc}_D(C)(\phi) \;\&\; \text{Exh}_D(C)(\phi)$

We compare the predictions of this proposal to B&F's, in particular with respect to their discussion of Universal Free Choice, ability expressions, and disjunctive antecedents of conditionals.

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Putting plural definites into context.

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Overview Plural definites exhibit two main properties. Firstly, while *λx.Phoebe opened x* tends to be predicated of all individual presents in (1), the same is true of its negation *λx.Phoebe didn't open x* in (2), a property referred to as 'homogeneity.' Secondly, they exhibit what is called 'non-maximality': they may allow for exceptions, e.g. (1) can be judged true even if Phoebe didn't open a few of her presents (Löbner 2000; Schwarzschild 1994; Krifka 1996; Križ 2015, Breheny 2005 a.o.). We experimentally tested competing explanations of these phenomena.

(1) Phoebe opened her presents. → *Phoebe opened all of her presents*
(2) Phoebe didn't open her presents. → *Phoebe didn't open any of her presents*

Two approaches A variety of accounts of non-maximality and homogeneity have been proposed in the literature. For our purposes, we divide them into two main approaches, one involving implicatures and the other not. The implicature approach captures the homogeneity pattern by appealing to a basic existential semantics for plural definites, which immediately accounts for the reading in (2) provided this existential definite takes scope under negation. This basic existential semantics can be strengthened by an implicature to account for the universal reading in (1). Under this approach, non-maximality is assimilated to the contextual modulation of implicatures (Magri 2014, Bar-Lev 2021). The non-implicature approach is either based on families of interpretations or trivalence and involves a pragmatic mechanism for contextual modulation (Kriz 2015, Kriz 2016, Kriz and Spector 2021). To illustrate, the trivalent approach accounts for homogeneity by analysing sentences like (1) and (2) as receiving a truth-value gap unless Phoebe opened all or none of her presents. When the sentence receives such a gap as its basic meaning, it can nonetheless be judged as effectively true or false, depending on what is relevant in the context, thus accounting for non-maximality (Kriz 2016).

Divergent predictions The two approaches cover similar empirical grounds, but make important divergent predictions. The implicature approach predicts an inherent asymmetry between positive and negative sentences. Since non-maximality is linked to the mechanism for contextual modulation of that implicature, only positive sentences are predicted to allow for non-maximality. The non-implicature approach, on the other hand, is symmetric and does not predict any difference between positive and negative sentences with regard to the availability of non-maximality. More concretely, both approaches predict that in an (existential) context where Phoebe is not allowed to open any of her presents and she opened some but not all, (1) should be acceptable on a non-maximal reading by providing information about Phoebe's non-compliance with the rule. Conversely, in a (universal) context where Phoebe is required to open every single one of her presents and she, again, opened some but not all of them, (2) is straightforwardly predicted to be acceptable on a non-maximal reading, but only by the non-implicature approach.

Previous studies Tieu et al (2019) tested pre-school aged children with sentences like (1) and (2) in 'mixed contexts' (i.e. a context in which Phoebe opened only some of her presents). Children were adult-like with (2), but appeared to interpret (1) existentially. Given the well-known tendency of not computing implicatures at this age (Noveck 2001 a.o.), the pattern of

results is in line with the implicature approach. In a series of experiments with adults, Kriz and Chemla 2016 (K&C) control for a potential worry regarding sentences like (1) and (2). The observed asymmetry effects could, in principle, be attributed to an analysis of (2) where the plural definite takes scope over negation. K&C extend the design to quantificational environments like (3) and (4), which better control for the intended scope of the definite with respect to negation by binding. In their results, K&C found non-maximal readings with (3) and close to none with (4), again in line with the predictions of the implicature approach.

(3) Every boy opened his presents. (4) No boy opened his presents.

While both studies provide suggestive evidence for the asymmetry predicted by the implicature approach, neither of them control for the role of context directly. It is possible, therefore, that participants accommodated different contexts (different implicit Questions under Discussion or Current Issues) in the positive vs negative cases thereby giving rise to the difference in responses, in a way that would also be compatible with the non-implicature approach.

The experiment We report on a web-based experiment using a picture-sentence verification task. It builds upon K&C, but crucially tests the effect of context manipulation. Target sentences involved embedded plural definites such as in (3) and (4). Each picture showed four boys with nine presents each, and there were three picture types (all presents open, all closed, mixed). To control for context effects, we additionally introduced a secondary task that established an overall context that was either existential or universal. This context was about the particular rules in the boys' family, and it was introduced in detail in the practice session. For instance, in the universal context, the boys were instructed by their parents to open their presents before their neighbours arrive, so that the apartment would be in an orderly state by then. In the existential context, in contrast, the boys were instructed to wait until their grandparents arrived, so that they all could open their presents together. In order to ensure that participants pay attention to these family rules, the secondary task was to judge in each trial whether these rules (*Opening the presents is prohibited/required before the guests arrive*) were respected or not by clicking *yes* or *no*. Figure 1 shows an experimental display for one trial of the experiment. The experimental factors we manipulated were Context (existential, universal), Truth Value (mixed, true, false) and Polarity (positive (*every*), negative (*no*)). Context was realized as a between factor, and the ordering of *yes*/*no* and *true*/*false* answers as well as the gender of the families' children (male, female) was counterbalanced. The experimental sentences were spread over 8 lists. Each list contained 24 experimental items with 4 items per condition, and the experimental items appeared in a randomized order for each participant. 192 native speakers of English were recruited from Prolific Academic and were paid £1.50 for their participation. Figure 1 shows percentages of "true" answers for the different experimental conditions. The mean accuracy of the unambiguously "true" and "false" cases was 98.3%. For statistical analysis, we carried out a logit mixed effects model analysis on mixed conditions with the factors Context and Polarity, showing significant main effects of Context ($\chi2(1) = 63.7$; $p < .001$), and of Polarity ($\chi2(1) = 10.1$; $p < .01$), as well as an interaction between Context and Polarity ($\chi2(1) = 7.8$; $p < .001$). Bonferroni-corrected paired comparisons showed significant differences for the positive and negative cases in the existential condition, for the positive existential vs. positive universal condition, as well as for the positive existential vs. negative universal condition (all p values $< .001$).

Conclusion In our results we find evidence for an asymmetry between positive and negative cases like (3) and (4): presented with a mixed picture participants accepted the former more often when in an existential context than when in a universal one, whereas overwhelmingly rejected the latter in both contexts. This is in line with the implicature approach, which predicts contextual modulation and thus non-maximality with (3) but not with (4). It is, in contrast,

more challenging for the non-implicature approach, which makes symmetric predictions. We discuss possible directions for the non-implicature approach, and how our method could be extended to investigate similar debates on related phenomena (e.g. donkey anaphora, counterfactuals …).

Truth value	Context	Decision	lower	upper
false	Existential	1.6	0.5	4.6
mixed	Existential	1.1	0.3	3.8
true	Existential	98.9	96.2	99.7
false	Universal	5.4	2.9	9.6
mixed	Universal	7.0	4.1	11.6
true	Universal	98.4	95.4	99.4

Truth value	Context	Decision	lower	upper
false	Existential	1.6	0.5	4.6
mixed	Existential	84.0	78.1	88.6
true	Existential	98.4	95.4	99.4
false	Universal	0.5	0.0	3.0
mixed	Universal	26.9	21.0	33.7
true	Universal	99.5	97.0	100.0

Bonferroni-corrected pairwise comparisons for the mixed cases

Contrast	*p*
Pos E - Neg E	<.001
Pos E - Pos U	<.001
Pos E - Neg U	<.001
Neg E - Pos U	1.0
Neg E - Neg U	1.0
Pos U - Neg U	1.0

Figure 1. Experimental display of one trial and results

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ON THE SEMANTICS OF MULTIPLE WH-EXCLAMATIVES IN BANGLA

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Introduction. Although exclamatives have been studied since Elliott (1974), Grimshaw (1979), and the study has been cross-linguistically extended to Paduan (Zanuttini & Portner, 2003), Hungarian (Lipták, 2005), Catalan (Villalba, 2001; Miró, 2006) and so on, the phenomenon of multiple wh-exclamative structures is rarely cited. This paper aims to cite and propose a unified syntacto-semantic analysis for multiple wh-exclamatives, with a focus on Bangla (*aka.* Bengali; Indo-Aryan). On the onset of analysing wh-exclamatives there are two dominating approaches *viz. the proposition-set theory* approach (D'Avis, 2002; Zanuttini & Portner, 2003; Chernilovskaya, 2010) that views wh-exclamatives as having a question based semantics, and *the degree approach* (Miró, 2006; Rett, 2008, 2011) that claims wh-exclamatives bear a degree component in its domain which is responsible for the surprising element of the clause. The degree approach (Rett, 2008, 2011) on wh-exclamatives rejects the idea of exclamatives with multiple wh-clauses. However, this paper shows cross-linguistic evidence in favour of multiple wh-exclamative clauses, and while analysing them we embrace the *widening* approach by Zanuttini & Portner (2003) (ZP, henceforth).

Observing the multiple wh-exclamatives. While English wh-exclamatives are restricted to '*what-a*', '*what*' and '*how*'- exclamatives, Bangla is flexible. It allows a wide range of wh-words to form exclamatives. Therefore, Bangla exhibits a long list of different combination in forming multiple wh-exclamative clauses, a few of which are cited below:

(1) *kon loke kothae gache!*
which people where go.PRF.PRS.3
'Who went where!'

(2) *kara kishob khacche!*
who.PL what.PL eat.PROG.3
'Who(pl) are eating what(pl)!'

(3) *koto loke koto khawar khacche!*
how many people how much food eat.PROG.PRS.3
'How much food how many people are eating!'

(4) *ki baje ekta bari koto daam-e bikocche!*
what bad one house how much price-at sell.PROG.PRS.3
'What a bad house is being sold at how much price!'

Let us explain the contexts in which the above sentences can be uttered. (1) expresses speaker's surprise at the unexpectedness of someone visiting some place. (2) is felicitous where the phenomenon of some people having some food is itself unexpected. (3) expresses speaker's surprise towards a situation with a large number of people eating a large quantity of food. And in (4), the speaker is surprised that a terribly bad house is being sold at a high price. Our aim is to provide a suitable formal explanation for these exclamative structures.

Modification of ZP's widening. Since Bangla shows a variety of wh-exclamative structures, the existing widening approach cannot account for all. As pointed out by Balusu (2019), the ZP account is based on Karttunen's (1977) set of true answers. Hence, in ZP's account the domain 1 or D_1 cannot undergo widening with respect to a data like, *Rishi kake biye koreche!* 'Intended: You won't believe whom Rishi married!'. Suppose the alternatives denoted by *kake* 'whom' are $\{$Kavya, Ruhi, Arushi$\}$ and the true answer is $\{$Kavya$\}$. Since the initial domain already has the true answer (here, Kavya), the widening from D_1 to D_2 collapses ($D_2 - D_1 = ???$). Another problem occurs along the line of ZP (as per which, widening acts on wh-operators) while we try to formulate an ordering scale for wh-words like *kake* 'whom', *kothae* 'where' that are particularly non-scalar. To resolve these two problems, we base our analysis on Balusu's (2019) rendition of widening which acts over set of propositions, but not on wh-words. Balusu suggested that instead of following Karttunen alternatives (*i.e.*, set of *true* answers) if we follow Hamblin (1973) alternatives (*i.e.*, set of *possible* answers), the widening account works uniformly for all readings of exclamative clauses. Working out on the second problem, he used the notion of *Expectation Set* (ES) (cf. Rett, 2011; Rett & Murray, 2013) which encodes speaker's

expectations as sets of possible worlds. Now, the widening acts on the entire wh-clause. As per Balusu, for any exclamative clause *S* widen the initial domain ES to a new domain D_2 such that: (i) $[\![\text{S}]\!]_{w,D_2 \prec_{likelihood/degree}} - [\![\text{S}]\!]_{w,D_{\text{ES}} \prec_{likelihood/degree}} \neq \varnothing$, (ii) $\forall x \forall y[(x \in D_{\text{ES}} \,\&\, y \in (D_2 - D_{\text{ES}})) \rightarrow x \prec_{likelihood/degree} y]$, (iii) $\exists p \in [\![S]\!]_{w,D_2 \prec_{likelihood/degree}} - [\![S]\!]_{w,D_{\text{ES}} \prec_{likelihood/degree}}$ is presupposed to be true. The last condition accounts for factivity.

Our analysis for multiple wh-exclamatives. Since Rett's degree approach rejects the idea of multiple wh-exclamatives, we base our analysis on question-approach. Let us take (1) as an example. The LF of it is shown in Figure 1. Since Bangla is a wh-*in situ* language, we can feasibly follow Hamblin semantics where movement of wh-phrase is not required (à la Shimoyama, 2001; Kratzer & Shimoyama, 2002). Following Beck (2006); Beck & Kim (2006), we argue that the Q-operator is liable for the interrogative semantics. This Q-operator is placed in the position of the interrogative complementizer (cf. Beck & Kim, 2006). Now coming to the semantics, the crucial compositional steps are as follows:

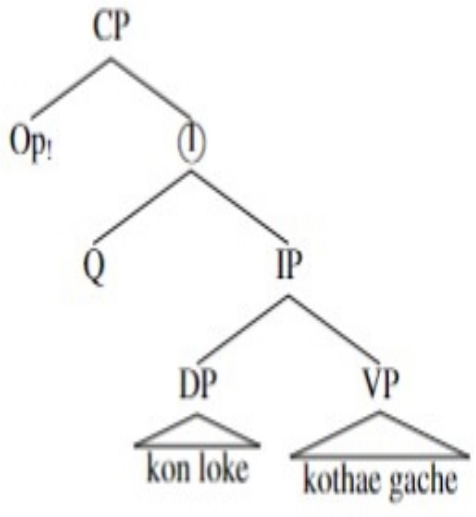

Figure 1: Anatomy of (1)

(5) a. $[\![\text{kothae}]\!]^f = \{y : place(y)\}$; $[\![\text{kothae}]\!]^o =$ undefined

b. $[\![\text{VP}]\!]^f = \{\lambda x \lambda w.\ \text{went}_w(x, y) : place(y)\}$ (via PFA)

c. $[\![\text{kon loke}]\!]^f = \{x : person(x)\}$; $[\![\text{kon loke}]\!]^o =$ undefined

d. $[\![\text{IP}]\!]^f = \{\lambda w.\ \text{went}_w(x, y) : person(x) \wedge place(y)\}$ (via PFA)

e. $[\![\text{Q IP}]\!]^o = [\![\text{IP}]\!]^f$; $[\![\text{Q IP}]\!]^f = \{[\![\text{Q IP}]\!]^o\}$

f. $[\![①]\!]^o = \{\lambda w.\ \text{went}_w(x, y) : person(x) \wedge place(y)\}$

The above LF stands in favour of a question semantics. The Q operator takes the focused value of IP and return us the ordinary value of it. Now let us assume, we have the corresponding ES for ① - {Raghu went to Barren Island, Rajiv went to Barren Island, Ravi went to Barren Island, Raghu went to Sahara Desert, Rajiv went to Sahara Desert, Ravi went to Sahara Desert}. Now, the exclamatory operator $\text{Op}_!$ will act on this ES, widening it (cf. Roberts & Sasaki, 2021).

(6) $[\![\text{Op}_!]\!]^{c,w} = \lambda Q_{\langle st,t \rangle} : \exists p[p = ans_1(K(Q_c^+)(w)) \wedge p \notin \text{ES}_c \wedge p(w) = 1].\{p : p = ans_1(K(Q_c^+)(w)) \wedge p \notin \text{ES}_c \wedge p(w) = 1\}$ where $Q_c^+ =$ widened ES_c ; $c =$ context

The operator, K in (6) is defined as Karttunen operator which takes a set of Hamblin alternatives and returns us the set of true answers, *i.e.,* Karttunen alternatives ($K = \lambda Q_{\langle st,t \rangle} \lambda w_s \lambda p_{st}.p \in Q \wedge p(w) = 1$). Now, Heim's (1994) ans_1 can apply to the set of true answers in order to get us the maximal true answer. With respect to the contextually relevant ES defined for ①, we get the following Q_c^+ set: {Raghu went to Barren Island, Rajiv went to Barren Island, Ravi went to Barren Island, Raghu went to Sahara Desert, Rajiv went to Sahara Desert, Ravi went to Sahara Desert, **Raghu went to Everest, Rajiv went to Everest, Ravi went to Everest**}. The propositions written in the bold face denote that they are beyond the expectation of the speaker in the context c. Now assume that the maximal true answer is 'Rajiv to go to Everest'. Therefore w.r.t. ①, CP will denote the following:

(7) $[\![\text{CP}]\!]^{c,w} = \exists p[p =$ Rajiv went to Everest $\wedge p \notin \text{ES}_c \wedge$ Rajiv went to Everest in $w].\{$Rajiv went to Everest$\}$.

It is evident that factivity is encoded in (7). Note, one can also make use of the Ans-D (Dayal, 1996) operator to get the maximal informative true answer.

Summary. To sum up, there are cross-linguistic evidence in favour of multiple wh-exclamatives. The degree approach fails to capture the readings of multiple wh-exclamatives (cf. Rett, 2008, 2011), hence we base our analysis on the question approach where the $OP_!$ operator scopes over the Q, yielding us the exclamative semantics by widening the ordinary value of the question.

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Strict readings of logophors and the LF of anaphoric dependencies

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Overview. We offer a solution to a semantic puzzle regarding the reference profile of logophoric pronouns: on the one hand they must be internally bound to an attitude holder, on the other they do not have to be bound to it for the purpose of the 'strict/sloppy' ambiguity. Our solution is based on the novel idea that the relationship between an attitude holder and a logophor is encoded at the presuppositional level of meaning and does not require formal binding.

Background. Logophoric pronouns (henceforth LOGP) in West-African languages, such as Ewe, are designated anaphoric elements which occur in attitude contexts and must co-refer with the attitude holder (Clements 1975). Ewe's LOGP **yè** cannot pick out just any antecedent:

(1) Kofi$_1$ súsú/gblɔ/dʒi/... be Afi a ɖe **yè**$_{1/*2}$ **Ewe**
Kofi$_1$ think/say/want/... COMP Afi will marry **LOGP**$_{1/*2}$
'Kofi thinks/says/wants that Afi will marry him.'

Current theories of the syntax-semantics of logophoricity bake this fact into a well-formedness condition on LFs. In von Stechow (2003) and Pearson (2015), for instance, LOGP is treated like a standard pronoun in being interpreted as a simple variable, but its syntactic feature [LOG] requires by stipulation that the variable be 'checked' in the syntax by a matching λ-binder at the edge of the embedded clause; if there is no matching binder, the LF crashes.

(2) a. LF: Kofi says that [$\boldsymbol{\lambda x_1} \lambda w$ Afi will marry $\boldsymbol{x_{1/*2,[LOG]}}$] (after Pearson 2015)[1]

b. $[\![\text{say}]\!]^g = \lambda P_{\langle e,\langle s,t\rangle\rangle} \lambda x \lambda w. \forall \langle w', y\rangle \in \text{SAY}_{x,w}, P(y)(w')$, where $\text{SAY}_{x,w} := \{\langle w', y\rangle :$ what x says in w is true in w' and x identifies themselves as y in $w'\}$

c. $[\![(2a)]\!]^g \approx$ *In each of Kofi's* SAY *worlds, Afi marries the person Kofi identifies as himself.*

Strict-identity. The stipulation that LOGP must be λ-bound makes an incorrect prediction with respect to the strict/sloppy ambiguity in ellipsis- and association with *only*-contexts. Assuming as standard that the free/bound distinction is what underlies the strict/sloppy ambiguity, LOGP is falsely predicted to only allow a sloppy reading. The point was made in Bimpeh and Sode 2021 using a version of (4); (3) comes from original fieldwork. We found that Igbo and Yoruba speakers also allow strict readings with LOGPs, at least under some attitude predicates.

(3) Eli (le) mɔ-kpɔ-m be **yè** a ɖe Abla. Yao hã. *Ellipsis*; Ewe
Eli be path-see-PROG COMP **LOGP** will marry Abla. Yao too.
'Eli hopes that he will marry Abla. Yao too ~~hopes that~~ ✓**Eli**$_{\underline{strict}}$/ ✓**Yao**$_{\underline{sloppy}}$ ~~marries Abla~~.'

(4) Eli ko yé súsú be **yè** ɖu-dzi (le awu-dodo ƒe hoʋiʋli me). *only*; Ewe
Eli only FOC think COMP **LOGP** eat-top (in dress-wear.REDU POSS contest inside).
'Only Eli thinks that he won (the costume contest).'
Possible: No x other than Eli thinks ✓**Eli**$_{\underline{strict}}$/ ✓$\boldsymbol{x}_{\underline{sloppy}}$ won.

(5) LogP's Dilemma: If LogPs have to be internally λ-bound, how are strict readings possible? If they don't, how to ensure LogP's obligatory coreference with an attitude holder?

Proposal. We provide a route to the coreference requirement of LogPs without the λ-binding stipulation, and thus a solution to (5). The core proposal is that the [LOG] feature contributes a presupposition to the semantics, rather than enforcing a 'checking' operation, and the link to the

[1]The semantics in (2) produces the so-called *de se* reading of logophors, on which they pick out the atttiude's "self" in the relevant worlds. Pearson claimed that Ewe LogPs also allow *de re* coreference, but original fieldwork of ours suggests that *de re* coreference is unavailable. We assume that LogPs only allow a *de se* reading.

attitude holder is taken care of by presupposition projection. The LF is in (6), where a 'LOGP' realizes a structure consisting of an individual-concept variable pro_i, which can be free, and the LOG feature (7). LOG takes a concept f and returns the 'self' concept, presupposing that f's value is identified with the 'self' (Center) of the evaluation world. LOG is thus treated much like a pronominal ϕ-feature, following the presuppositional analysis of the latter in Cooper 1979 and subsequent literature. The modal base of an attitude predicate, (10), is a set of centered BEL(IEF) worlds (Lewis 1979 a.o.). Technical details: s is the type of world-individual pairs; 'w_x' abbreviates the pair $< w, x >$; variables of type s are syntactically present, and saturate argument positions in both verbal and nominal predicates (though are omitted on 'Eli' and 'think' in (6)). The composition of all the pieces yields (11), given presupposition projection.

(6) LF: $\lambda w^*_{x^*}$ [Eli thinks [λw_x [$_{\text{LOGP}}$ **[LOG** $\boldsymbol{pro_i}$**]**$_{w_x}$] won$_{w_x}$]] (pro_i of type $\langle s, e\rangle$)

(7) $[\![\text{LOG}]\!]^g = \lambda f_{\langle s,e\rangle}\lambda_{w_x} : \boldsymbol{f(w_x) = x}.\ x$ (8) $[\![\text{LOGP}]\!]^g = \lambda w_x : \boldsymbol{[\![pro_i]\!]^g(w_x) = x}.\ x$

(9) $[\![\text{think}]\!]^g = \lambda p_{\langle s,t\rangle}\lambda y : \boldsymbol{\forall w_x \in \text{BEL}_y,\ w_x \in dom(p)}.\ \forall w_x \in \text{BEL}_y,\ p(w_x).$ (Heim 1992)

(10) $\text{BEL}_y := \{w_x \mid$ w is compatible with y's beliefs and x is the 'Center' of w—-the individual in w who y perceives as y's 'self' in $w\}$.

(11) $[\![(6)]\!]^g : \boldsymbol{\forall w_x \in \text{BEL}_{Eli}, [\![pro_i]\!]^g(w_x) = x}\ .\ \forall w_x \in \text{BEL}_{Eli},\ x\ won$

Formula (11) contains a free pro_i, whose value is the Center due to LOG's presupposition. The assertive part is the intuitively correct truth conditions (cf. (2c)). Note that 'x' in the assertive part could be replaced with '$[\![pro_i]\!]^g(w_x)$' with an equivalent result, given the presupposition.

Deriving strictness. The last crucial assumption needed relies again on the idea that LOG is a presuppositional ϕ-feature. It has been argued that ϕ-feature presuppositions can disappear from focus alternatives (Sauerland 2013 a.o.), and we assume the same for LOG. We take the LF of (4) to involve F(ocus)-marking on the matrix subject, triggering alternatives as in (12b).

(12) a. LF: Only [Eli$_{[\text{F}]}$ thinks λw_x [[$_{\text{LOGP}}$ **[LOG** $\boldsymbol{pro_i}$**]**$_{w_x}$] won$_{w_x}$]]

b. Alt's: { Kofi thinks λw_x [[$_{\text{LOGP}}$ **[~~LOG~~** $\boldsymbol{pro_i}$**]**$_{w_x}$] won$_{w_x}$] ,
Koku thinks λw_x [[$_{\text{LOGP}}$ **[~~LOG~~** $\boldsymbol{pro_i}$**]**$_{w_x}$] won$_{w_x}$] , ...}

c. Possible values for pro_i: λw_x. *the individual that* x *knows by the name "Eli"*;
λw_x. *the individual that* x *knows as the 45-year old who lives on 9 Oak Street*; ...

The prejacent is interpreted as earlier, so LOGP must pick out Eli's 'self' in Eli's belief worlds; but since LOG's presupposition is absent from alternatives, and the variable-part itself of LOGP can remain free, LOGP's reference across the alternatives does not shift along with the reference of its alternative-antecedent, and is resolved to whatever can be contextually accommodated as the value of pro_i, for example the values in (12c). This obtains a strict reading. The sloppy reading can be derived by λ-binding pro_i to the matrix subject. The account of the ambiguity in ellipsis (3) works analogously, if ellipsis-Parallelism ignores ϕ-features (Ross1967).

New Prediction. Our thoery makes a correct novel prediction about a reading which can be dubbed **'strict-mistaken identity'** reading: the alternatives to Eli (though not Eli himself) can be mistaken about the identity of LOGP. Consider a costume-contest scenario. Eli, a participant who was wearing a red costume, overhears the judges of the contest debating, and concludes from what he hears that he is going to be declared as the winner. Koku and Kofi, who watched the costume show, are wrong about the identity of the man with the red costume; they don't know it was Eli (they might as well even disagree among themselves who it was). (4) is judged felicitous and true in this context if Koku and Kofi don't think that the man with the red hat

will win. Our analysis in (12a)-(12b) allows for such a context to license the use of LOGP, because the context makes salient the **concept** $[\lambda w_x$. *the man (who* x *knows as) wearing the red costume in* $w]$ as the value for *pro*$_i$—it does not matter that the referential value for this concept is different in Kofi and Koku's BEL-worlds than it is in Eli's.

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UM2: A Generalization over Determiner Denotations

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1. Introduction

This paper is concerned with the question of whether there are any restrictions on the monotonicity properties of determiners as far as their second argument is concerned. On the face of it, it seems that determiners exhibit all types of monotonic behavior in their second argument: They can be upward monotone (e.g. *every, some, many, most, at least three*), downward monotone (e.g. *no, fewer than five, at most 5*) or non-monotone (e.g. *every … but John, almost every, (exactly) three*). Against this background, we claim that, despite appearances, UM2 holds:

(1) **UM2: Every determiner is Upward Monotone in its 2nd argument.**

Following earlier research (Takahashi 2006; Romero 2015; Crnič 2018 a.o.), we suggest that the contribution of sentential operators like *Neg* and *Exh* should be severed from the denotation of determiners. As a result, (1) emerges as a valid generalization over determiner denotations.

2. *Neg* as the source of Downward Monotonicity

The standard GQT treatment of the determiner *no* takes it to be a negative existential determiner ($||no|| = \lambda P.\lambda Q.\neg\exists x\ P(x) \ \&\ Q(x)$, Zanuttini 1991; Haegeman & Zanuttini 1991; Dahl 1993). There is, however, reason to believe that the negative component and the existential component of *no* can take scope at distinct positions (giving rise to the so-called split-scope readings).

(2) The company need fire no employees. (Potts 2000)
'It is not the case that the company is obligated to fire employees' split
'There are no employees x such that the company is obligated to fire x.' de re

In a scenario where the company must fire at least one employee but can choose which employee to fire, the first reading comes out as false but the second reading is true. A similar ambiguity arises with *few*:

(3) Ze hoeven weinig verpleegkundingen te onslaan (Dutch, De Swart 2000)
They need few nurses to fire
'It is not necessary for them to fire more than a small number of nurses' split
'For a group Y containing few nurses y, they are obliged to fire each y.' de re

In a scenario where a hospital must fire a large number of nurses but there are only a couple of nurses in particular that must be fired, the first reading is false but the second reading is true.

In analyzing the split readings of the negative determiner, it is commonly assumed that *no* is semantically equivalent to an existential determiner (4a) and that it must be licensed in the scope of a (sometimes silent) Neg operator (see Jacobs 1980; Rullmann 1995; Penka 2010; Iatridou & Sichel 2011 and Zeijlstra 2011 a.o.) as, for example, in (4b). The split-scope behavior of *few* is accounted for on the assumption that this determiner decomposes into the (parametrized) determiner MANY (5a) and Degree Negation ($\lambda d.\lambda D.\ \neg D(d)$), which split up during derivation for interpretability (Takahashi 2006; Romero 2015) as in (5b). (The analysis of *few* as MANY + D.NEG + POS (the positive operator) and *fewer than 5* as MANY + D.NEG + COMP (the comparative operator) will be discussed in the talk.) Crucially, the parametrized determiner MANY, both as a cardinal and as a proportional determiner, is Upward Monotone in its second argument once its degree argument is saturated by some arbitrary d (6).

(4) a. $||no_{UNEG}|| = \lambda P.\lambda Q.\exists x[P(x) \ \&\ Q(x)]$
b. [NEG [The company [need fire [no_{UNEG} employees]]]]

(5) a. $||many_{CARD/PROP}|| = \lambda d.\lambda P.\lambda Q.\ |P \cap Q|\ (/|P|) \geq d$
b. [POS λd_2 [[d_2 D.NEG] λd_1 [they need fire d_1-many nurses]]]

(6) $\forall d\ ||many_{CARD/PROP}||(d)$ is Upward Monotone in its second argument.

The status of *at most n* is less clear. Penka (2014) suggests that, similar to what we have seen with *few*, *at most* decomposes into *at least* and Degree Negation, where these operators take scope at distinct positions. Krifka (1999) argues that *at most* is better analyzed as a focus-sensitive sentential adverb, in which case *at most n* is not really a constituent. Hackl (2001) and Nouwen (2010), on the other hand, propose analyses in which *at most n* is a degree quantifier but not a determiner. Lastly, there are approaches that capitalize on the superlative form of this determiner (Solt 2011; Coppock 2016). It seems fair to conclude that the analysis of *at most n* as a determiner has not received general acceptance.

3. *Exh* as the source of the absence of Monotonicity

Building on Keenan & Stavi (1986), von Fintel (1993) argues that there are two components to the denotation of an exceptive determiner such as *every … but John*. The subtraction component is responsible for restricting the domain of quantification of the determiner. The exhaustivity component requires that the set that consists of the excepted entities be the smallest set whose exclusion renders the sentence true.

(7) || Det P but X Q || ⇔ Det(P \ X)(Q) (Subtraction)
& ∀X': X' ⊈ X → ¬Det(P \ X')(Q) (Exhaustivity)

Building on Gajewski (2013) and Hirsch (2016), Crnič (2018) claims that that subtraction, but not exhausitivity, is encoded in the meaning of exceptives. Crnič's analysis relies on *Condition on VP-Ellipsis*, which is the claim that if a quantificational expression is interpreted in the antecedent VP, a semantically equivalent expression must be interpreted in a parallel position in the elided VP.

Crnič suggests that VP-ellipsis constructions like (8b), where ~~strikethrough~~ represents the elided material, pose a challenge for approaches that take the exhaustive inferences associated with exceptives to be integral to the denotation of such determiners.

(8) a. In the exam, John solved every exercise but the last one.
b. (To get an A), he really had to ~~solve every exercise but the last one~~.

(9) (To get an A), John had to not solve the last exercise.

Due to *Condition on VP-Ellipsis*, an intergral approach to exceptives predicts (8b) to entail (9). (The details of this claim will be discussed in the talk). This prediction is not borne out: (8b) does not entail (9). On the basis of this observation, Crnič argues that exceptives, as well as approximatives, which are identical to exceptives in their behavior in the context of VP-ellipsis, have subtractive analyses as shown in (10):

(10) a. ||every … but John||(P)(Q) ⇔ P \ {j} ⊆ Q
b. ||almost every||(P)(Q) ⇔ ∃X: P \ X ⊆ Q (Presupposition: X is a relatively small set.)

Under these analyses, both *every…but John* and *almost every* are Upward Monotone in their second argument. The exhaustive inferences associated with exceptives and approximates come not from the denotation of these determiners but from the obligatory presence of the *Exh* operator at the sentence level. That is, (8b) has the structural analysis in (11a), which explains the absence of an entailment relation between (8b) and (9). Spector (2013) notes that the *Exh* operator is also responsible for strengthening the basic Upward Monotone *at-least* interpretations of numerals into *exactly* interpretations.

(11) a. [*Exh* [John had to solve every exercise but [the last one]$_F$]]
b. [*Exh* [John solved three$_F$ questions]]

4. Conclusion There is independent evidence suggesting that the contribution of operators like *Neg*, *D.Neg* and *Exh* should be severed from the denotation of determiners. Once this is done, we find that *UM2* is a valid empirical generalization after all.

SEL. REFERENCES: Crnič, L. 2018. A note on connected exceptives and approximatives. JoS. Penka, D. 2011. Negative Indefinites. OUP Romero, M. 2015.The conservativity of many. In Proc. of the 20th AC. Takahashi, S. 2006. More than two quantifiers. NLS.

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Absolute context-sensitivity: the puzzle of *mildly positive adjectives*

Mildly Positive Adjectives (**MPAs**) – e.g., *decent*, *acceptable*, *adequate* – present a hitherto undocumented empirical puzzle, as they simultaneously share properties with relative, absolute, and extreme adjectives. I analyze them as a special kin of minimum-standard adjective, requiring individuals to exceed a zero degree situated along an open-ended scale of value.

Property 1. Context-sensitivity. Similar to vague predicates, MPAs' have context-dependent truth-conditions, as shown by modifiability by *for-phrases*; (1); absolute adjectives are generally infelicitous with these modifiers (#*wet for being a bath towel*; S 1979; K 2007).

(1) For a US pizza, this pizza is *decent/acceptable*; but for an Italian pizza, it wouldn't be.

Property 2: Minimum-like effects. MPAs also share properties with minimum-standard predicates. First, they fail to license a zone of indifference (2): negating the adjective entails that the individual has nothing positive (cf. *# my hands aren't wet, but there's some water on them*; K&McN 2005); and yield a contradiction in "neither Adj nor ¬ Adj" constructions (see (3); cf. *neither* {*# wet nor not wet/✓tall nor not tall*}). The same holds for morphologically derived antonyms, when available (4). *Good* doesn't feature either property; small caps indicates focal stress to prevent negative strengthening, which would hinder the intended contrast. Second, MPAs can be modified by endpoint oriented modifiers targeting scalar minima – e.g. *just barely* in (5) (cf.*just barely* ✓wet vs. # tall) and *slightly* (see (7)).

(2) This p. isn't #DECENT#ACCEPT./#ADEQ./✓GOOD, but still has something positive.

(3) #This p. is neither {DEC/ACC/AD} nor not DEC/ACC/AD(✓GOOD nor NOT GOOD)

(4) #This pizza is neither {acceptable nor unacceptable/adequate nor inadequate}.

(5) This pizza is *just barely* {✓decent/✓acceptable/✓adequate/#good}.

Property 3. Constrained gradability. MPAs resist some degree modifiers – e.g., *very* or *slightly*; but their status improves when negative evaluations are made salient in discourse, sometimes together with domain wideners like *even*. Similar discourse constraints on degree modification have been observed for *extreme adjectives* (e.g.,*excellent*; M 2012; P&R 2016).

(6) Pizza A is {*?very/??slightly*} {*decent/adequate/acceptable*}.

(7) The only thing that makes 2010 look even *slightly* decent is that 2009 was truly wretched.[1]

(8) People threw it away for years. Now catfish is being farmed and is *very* acceptable.[2]

The core idea. I follow W (2019) in positing the following: (**i**) *good* encodes a scale of *value*, tracking the relationship between individuals and a contextually specified *purpose*; (**ii**) this scale is partitioned in two segments, corresponding to the degrees to which an individual *serves* vs. *thwarts* this purpose respectively; (**iii**) value can be mapped onto a scale of real numbers between +/-∞, with 0 being the divide (Fig.1). Two implications follow. On the one hand, the value scale has no lower/higher endpoint. On the other, it crucially has a *natural transition point* (W 1992, K 2007), corresponding to the switch from serving to thwarting the purpose (=0). I argue that this point supplies the standard for MPAs, explaining their overlap with min. standard predicates; yet, because the computation of value is itself context-dependent, the extension of MPAs crucially depends on context, similar to vague ones.

Value. I posit that individuals are assigned a value via a measure function similar to those encoded by ordinary gradable adjectives, but different in one crucial respect. While measures of height etc. are invariable, measures of value are themselves contingent on a comparison class – i.e., on what individuals are available to serve the same purpose – even before the standard for a value-measuring adjective is introduced: that is, given the purpose of enjoying dinner, the same pizza can have greater

value with respect to a comparison class (US pizzas) than another (Italian pizzas). I represent this function as μVALUE$_{C\langle e,d\rangle}$, where C represents a domain restrictor specifying the comparison class. That value measures are context-sensitive is shown by the fact that an individual's value, but not its physical dimensions, can be assessed relative to explicit comparison classes introduced by *for-phrases*.

(9) a. For x=a specific pizza: μVALUE$_{Italy}$(x)=5; μVALUE$_{US}$(x)=8

b. This p.za has greater {value/??diameter/??size} for an US pizza than an Italian one.

Good vs. MPAs. I propose that both *good* and MPAs encode μVALUE$_{C\langle e,d\rangle}$, but that their positive form is mapped onto different standards. As a vague predicate, *good* requires that x' value exceeds a contextual standard S$_{Good}$, located somewhere variable along the positive values of the scale. MPAs introduce a weaker requirement: that x' value merely exceeds 0 – i.e., the transition point beyond which the individual can be considered as purpose-serving. I assume the standard is introduced via the silent morpheme POS (i.a., K 2007).

(10) $[\![$POS good $]\!]_{\langle e,t\rangle}=\lambda x.\mu$VALUE$_c(x)>\mathbf{S}_{Good}$ (11) $[\![$POS MPA $]\!]_{\langle e,t\rangle}=\lambda x.\mu$VALUE$_c(x) >0$

Deriving the properties. MPAs' mildness emerges via a scalar inference: as MPAs introduce the weakest possible standard to ascribe a positive evaluation, it's inferred that higher standards are not met. This captures the asymmetric entailment between *good* and MPAs.

(12) a. The pizza is not GOOD; it's decent/acceptable/adequate though.

b. #The pizza is not DECENT/ACCEPTABLE/ADEQUATE; it's good though.

MPAs' combinability with *just barely* and the patterns under negation observed in (2-4) follow from the fact that MPAs' standard introduces the lowest possible degree of purpose-serving value: going below zero effectively means being off the positive scale and onto the negative one, thus eliminating any room for a positive evaluation. But because the measurement of value itself hinges on a comparison class (9), evaluating MPAs depends on context in a way in which evaluating absolute predicates doesn't: the same object can be assigned different values in different contexts; hence its value could exceed 0 in one context but not another. Finally, MPAs' limited modifiability by modifiers compatible with minimum standards (e.g., *very*, *slightly*) can be captured via the idea that most degree modifiers are felicitous only if they target degrees within a contextually relevant range – a proposal outlined by M (2012) to capture the constrained degree-modifiability of extreme adjectives (e.g., *excellent*). Applied to our case, one could assume that, in a default context, the contextually relevant range includes the central segment of the positive value (i.e., around the standard of *good*), to the exclusion of the highest (around/above *excellent*'s standard, following M 2012) and the lowest segments (around 0). Hence, these modifiers improve once the lower region is made salient– e.g., when the surrounding linguistic context invokes (much) lower values (7-8).

Implications. The proposal carries three implications: (**i**) context-sensitivity in adjectives can be introduced by measure functions, even in the presence of absolute standards; (**ii**) as long as a natural transition point is available, absolute adjectives can take this point as their standard, even if the point doesn't correspond to the scalar minimum proper (see also Q 2021 on *profitable*); (**iii**) the degree-modifiability of gradable adjectives anchored to low and extreme regions on the scale – i.e., mild and extreme – is subject to similar constraints, and can be rescued via similar discourse-based mechanisms.

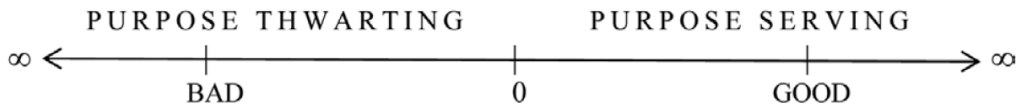

Figure 1: Wolfsdorf (2019): Positive (purpose serving) vs. negative (purpose thwarting) value

Examples sources:

1 `https://www.inquirer.com/philly/business/personal_finance/20100425_Grim_economy_sets_students__eyes_on_start-ups.html`

2 COCA. Source: Chicago Sun-Times; Date:1994; Author: Bev Bennett

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Adversative *only* is only *only*

Ido Benbaji, Omri Doron (MIT)

Background. Jespersen noticed that *only* can be used as a sentential connective, indicating "a limitation of what has just been said" (1). Following von Fintel and Iatridou (vF&I 2019) we call this *adversative only* (AO). vF&I observe that intuitively, AO sentences 'ϕ, *only* ψ' convey that $[\![\psi]\!]$ *contrasts* with a salient proposition p which $[\![\phi]\!]$ *supports*, and point out that AO shares this meaning with other adversative connectives like *but* (cf. Winter and Rimon 1994). What sets AO sentences apart, according to vF&I, is that they further convey that no proposition other than $[\![\psi]\!]$ contrasts with p. Note that in (1), $p = [\![\phi]\!]$. Yet (2) shows that this is not required; there, p is a proposition conveying, roughly, that the car is worth buying. **Puzzle.** The exclusivity component of AO sentences is familiar from regular uses of *only* (3) (Horn 1969), yet it is unclear what contributes the contrastive component. Furthermore, AO does not seem to associate with a focus-marked constituent in its prejacent. Given Rooth (1985), we might expect that in the absence of narrow focus association, *only* associates with the entire prejacent proposition, thus asserting that any other salient proposition is false. That leads to a contradiction in (1-2) where another proposition has been made salient before the use of AO. **Core argument.** We argue that AO is just regular *only* that associates with a full CP and can therefore take scope above CP-level operators that effectively restrict its alternatives. In particular, we argue that AO scopes above an *informativity* operator at LF which adjoins to CPs, determines their rhetorical function in discourse and enforces a non-triviality condition. Finally, we show how the rhetorical functions *support* and *contrast* can be cashed out in a probabilistic QUD-based model of discourse.

(1) He is a nice man, *only* he talks too much. (Jespersen 1954: 95)

(2) The car is reasonably priced, only its motor is small.

(3) $[\![\textit{only}]\!] = \lambda p.\lambda w : p(w) = 1.\ \forall p' \in \mathcal{ALT}(p)\ [p \not\subseteq p' \rightarrow p'(w) = 0]$

The meaning of INFORM. In QUD models (Roberts 1996), every utterance is made wrt a salient *question under discussion* $\mathcal{Q}$, and a non-triviality condition demands that each utterance will constitute a (possibly partial) answer to $\mathcal{Q}$. We suggest that a version of this condition is enforced via the LF operator in (4), that adjoins to CPs. INFORM takes a (contextually valued) polarity index $i \in \{1, -1\}$ and a proposition p, and requires that p *support* or *contrast* A, a salient answer to $\mathcal{Q}$, depending on the value of i. We formalize these notions below, but for now, all we need to assume is that *support* and *contrast* are relations weaker than *entail* and *contradict*, respectively. Realizing the non-triviality condition this way has two added benefits. First, it correctly predicts that answers to polar questions do not always entail a direct answer to the question. For instance, *The light in Adele's office is on* is a felicitous answer to *Is Adele in her office?* even if the light being on is compatible with both a *yes* and a *no* answer to the question, as our constraint on answers is weaker than strict entailment. Second, (4) allows us to capture an intuition expressed in the discourse-relations literature that the connective *but* indicates that one of its conjuncts *denies* a proposition that the other one *confirms*, while both are asserted as true (cf. Umbach 2005). This can be captured by allowing *but* to manipulate the value of the polarity variable of its arguments as in (5).

(4) $[\![\text{INF(ORM)}]\!]^{A,\mathcal{Q}}(i) = \begin{cases} \lambda p\text{: } p \textit{ supports } A.\ p & \text{if } i = 1 \\ \lambda p\text{: } p \textit{ contrasts } A.\ p & \text{if } i = -1 \end{cases}$

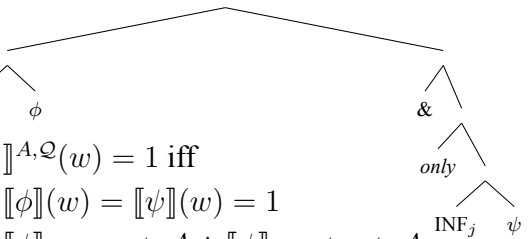
(5) $[\![\textit{but}]\!]^{A,\mathcal{Q}} = \lambda p.\lambda q\text{: } \exists i \in \{1, -1\} \text{ s.t. } [\![\text{INF}]\!]^{A,\mathcal{Q}}(i)(p) \wedge [\![\text{INF}]\!]^{A,\mathcal{Q}}(-i)(q).\ p \wedge q$

Adversative *only*. We argue that AO associates with a CP based on Hebrew and Greek, where it precedes an overt C^0 (6-7). Like regular *only*, AO is focus sensitive, but it takes the whole CP as its

focus associate. Given that our INF adjoins to CPs, we ascribe to AO sentences the implicit coordination structure (8), where *only* outscopes INF on the second conjunct. In general, presuppositions in *only*'s scope restrict the alternatives *only* negates. For instance, *Only Tanya stopped smoking* conveys that of the people who used to smoke, only Tanya quit. Thus, we expect that when *only* outscopes INF, the presupposition of INF will effectively restrict the alternatives *only* negates, while we remain agnostic wrt the mechanism by which presuppositions project from *only*'s scope. The INF operators in (8) require values for their polarity indices i and j. Yet, if it were the case that $i{=}j{=}1$, (8) would derive a contradiction, conveying that $[\![\phi]\!]$ *supports* the salient QUD answer, while denying that any proposition but $[\![\psi]\!]$ does so. The same holds if $i{=}j{=}0$. Thus, to avoid contradiction, i must differ from j. Assuming $i{=}1$, we derive the truth conditions in (9). Given the QUD *Is the car worth buying?* and a salient affirmative answer, (2) conveys that the car being reasonably-priced *supports* that answer, and that the only true proposition that *contrasts* with it is that the motor is small. These truth conditions are essentially those we gave *but* in (5), with an additional exhaustivity inference contributed by *only* – capturing vF&I's intuitions. ***Not only.*** Given that the polarity indices i, j in (8) are forced to be different to avoid contradiction, we predict that when the two conjuncts in CP-taking *only* constructions can be assigned uniform polarity, this should be allowed. As far as we know, the only other case of CP-taking *only* is in sentences of the form '*not only* ψ, *also* ϕ'; in these sentences in Hebrew *only* precedes an overt C (10), and their English translation involves subject-aux inversion, assumed to require aux-to-C movement (cf. Adger 2003).

(6) hu neχmad, ʁak ʃe- medabeʁ yoteʁ midai
he nice only COMP- talk too much

(7) ine kalos anthropos, mono pu milai poli
is good person only COMP talks much
'He's a nice person, only he talks too much.'

(8)


(9) $[\![(8)]\!]^{A,\mathcal{Q}}(w) = 1$ iff
a. $[\![\phi]\!](w) = [\![\psi]\!](w) = 1$
b. $[\![\phi]\!]$ *supports* $A \wedge [\![\psi]\!]$ *contrasts* A
c. $\forall p$: $([\![\psi]\!] \not\subseteq p \wedge p$ *contrasts* $A) \rightarrow p(w) = 0$

(10) lo ʁak ʃe- haʔoto bematsav tov, (gam) hameχiʁ ʃelo hogen
NEG only COMP- the.car in.condition good also the.price of.it fair
'Not only is the car in a good condition, it's also fairly priced.'

We thus posit that in (10) *not only* outscopes INF. In this case, assuming uniform polarity values does not lead to contradiction: such sentences convey that $[\![\psi]\!]$ is true and supports the salient QUD answer, but is not the only proposition that does so; $[\![\phi]\!]$ does so too. This use of *only* in (10) does not convey contrast between the conjuncts. On the contrary, it conveys that both support the salient answer (i.e. that the car is worth buying), as predicted by our analysis. In fact, this uniform-polarity reading seems to be the only one available for (10), which suggests a general dispreference for diverging polarity values in conjunctions. Further evidence for this comes from conjunctions like (11), in which the conjuncts have diverging rhetorical functions

(11) (Q: Should we buy the car?) A: #It's reasonably priced, and its motor is small.

Support* and *contrast. Our two rhetorical functions can be cashed out given a probabilistic QUD (PQUD) model (Winterstein 2015), i.e. a tuple $\langle c, \mathcal{Q}, P\rangle$, where c is a context set, $\mathcal{Q}$ a partition of c, and P a probability function over propositions s.t. $P(c) = 1$. Here, the non-triviality condition requires that for every utterance ϕ, there be a salient $A{\in}\mathcal{Q}$ s.t. uttering ϕ alters the likelihood of

A given c (cf. van Rooij and Schulz 2019). INF can thus be recast as in (12). Given this change, $[\![\text{INF}]\!]^{A,\mathcal{Q}}(1)(p)$ indicates that p *supports* A, and $[\![\text{INF}]\!]^{A,\mathcal{Q}}(-1)(p)$ indicates that p *contrasts* with A.

(12) $[\![\text{INF(ORM)}]\!]^{A,\mathcal{Q}}(i) = \lambda p.\lambda w : i{\cdot}P(A|p,c) > i{\cdot}P(A|c).\ p(w) = 1$

Conclusion. We argue that AO can be analyzed as only *only*, as long as a LF operator that *only* can outscope enforces the non-triviality condition on utterances. This operator represents the rhetorical relation of its argument with a given A in QUD. This way of conceptualizing the condition opens the road to a further exploration of the interaction of discourse constraints and other CP-level operators.

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The logic of Hindi co-compounds

Ido Benbaji, Filipe Hisao Kobayashi and Yash Sinha

Overview. Hindi co-compounds typically denote predicates of pluralities whose atoms are in the denotation of each of the compounded nouns (Walchli 2005). They do not form a uniform class, however: some compounds enforce a relatedness condition on the elements in their denotation, a fact reflected in how they interact with numerals. We offer an account in which the basic meaning of compounding is disjunctive and the differences that exist among compounds are due to the application of different independently motivated semantic operations. **Data.** Compounding applies to both non-relational and relational nouns: NRNs (1), RNs (2)-(4) (where, SIL=son-in-law). *Prima facie*, (1)-(4) do not allow for a disjunctive meaning, e.g. (5). However, in downward-entailing (DE) contexts this seems to change, e.g. the antecedent of a conditional in (6).

(1) kʊtta-bɪlli (2) ma-beṭa (3) ma-bap (4) beṭi-damad
dog-cat mom-son mom-dad daughter-SIL

(5) #vəhã koi kʊtta-bɪlli hɛ. (6) ✓əgər vəhã koi kʊtta-bɪlli hɛ…
there some dog-cat be if there some dog-cat be
Intended: 'There is a dog or a cat.' 'If there is a dog or a cat…'

RN and NRN compounds interact differently with numerals. *Four dog-cat* (1) can only refer to pluralities of four individuals, consisting of both dogs and cats. (2)-(4) with a numeral n are ambiguous between a $2n$ and a n reading. However, on their $2n$ reading, they impose a relatedness requirement on their denotation: *four mom-son* can only refer to four pairs of moms and sons of each other, *four mom-dad* to pairs of moms and dads who co-parent a child, and *four daugter-SIL* to pairs of daughters and *their* husbands. Finally, under the $2n$-reading, (3)-(4) differ from (2) in that they have a syntactically accessible internal argument, whereas (2) has only an external one. This is diagnosed by the fact that in HAVE-constructions a possessor of (3)-(4) appears in the bare genitive case, an option only available for internal arguments of RNs like *brother*.

(7) ria=ke {bhai / ma-bap / beṭi-damad / *ma-beṭe / *ghər} hɛ̃.
Ria=GEN brothers / mom-dad / daughter-SIL / mother-son / houses be

The meaning of compounding. We propose that the semantics of compounding is uniformly as in (8): it disjoins the two compounded nouns and interprets them under the scope of a distributive operator. We thus predict a compound like *dog-cat* to denote not only mixed dog-cat pluralities, but also singularities (and pluralities) of just dogs or just cats (if $[\![\text{dog}]\!] = \{d\}$ and $[\![\text{cat}]\!] = \{c\}$, then $[\![\mathcal{C}]\!]([\![\text{cat}]\!])([\![\text{dog}]\!]) = \{c, d, c \oplus d\}$). This captures the meaning of compounds in DE contexts.

(8) $[\![\mathcal{C}]\!] = \lambda f_{et}.\lambda g_{et}.\lambda x_e.\ [\![\textit{Dist}]\!](f \cup g)(x)$ (9) $[\![\textit{Dist}]\!] = \lambda f_{et}.\lambda x_e.\ \forall y \leq_{sg} x(f(y))$

Strengthening the meaning of compounds. In upward entailing environments, however, compounds do not have the weak disjunctive reading our analysis yields. We propose that this is due to a *scalar implicature*, a type of strengthening mechanism with a signature property of disappearing in DE contexts. The proposal is framed within the the grammatical approach to scalar implicatures (Chierchia et al. 2013): a silent *only* operator $\mathcal{O}$, defined in (10), derives them. The distribution of $\mathcal{O}$ is constrained in such a way that it can't appear in downward entaling environemnts. Assuming that the compound *dog-cat* has the alternative in (11), the application of $\mathcal{O}$ to *dog-cat* will yield the meaning in (12), which only allows for mixed pluralities of dogs and cats.

(10) $[\![\mathcal{O}\ \phi]\!] = \lambda x_\sigma.\ [\![\phi]\!](x) \wedge \forall f \in \textit{Alt}(\phi)(f \subseteq [\![\phi]\!] \rightarrow \neg f(x))$

(11) $\textit{Alt}(\textit{dog-cat}) = \{\lambda x_e.\forall y \leq_{sg} x([\![\textit{dog}]\!](y)), \lambda x_e.\forall y \leq_{sg} x([\![\textit{cat}]\!](y))\}$

(12) $[\![\mathcal{O}\ \textit{dog-cat}]\!] = \lambda x.\ \forall y \leq_{sg} x(\text{dog}(x) \vee \text{cat}(x)) \wedge \neg\forall y \leq_{sg} x(\text{dog}(x)) \wedge \neg\forall y \leq_{sg} x(\text{dog}(x))$

Counting pairs. (7) shows that (3) has a syntactically accessible internal argument under the $2n$ reading. This internal argument is shared among the compound as a whole and its constituent RNs. We achieved this by saturating the RNs' internal argument with a variable abstracted over at the edge of the strengthened compound (17). Given an argument x, (17) then denotes the set of pluralities consisting of x's mom and x's dad. In *four mom-dads*, the internal argument is closed via the operator in (13) motivated in Barker (2019), resulting in the set of pluralities consisting of moms and dads who share a child (strengthening ensures that co-parenting mothers or co-parenting fathers are not in that set). This is then combined with the numeral. Like Krifka (1989), we take numerals to combine with semantically singular nouns. We offer a subsective semantics for numerals in which the noun provides the unit of counting, but add a restriction that requires the noun to provide a stable way of counting (14) (cf. discussion of the mass-count distinction, e.g. Deal (2017)). This restriction blocks numerals from combining with sets containing pluralities of different sizes. The set derived from (17) only contains pairs of co-parenting moms and dads. Therefore, the numeral can count these pairs, and *four mom-dad* denotes the set containing all pluralities consisting of four pairs of moms and dads. Other compounds with the $2n$ reading which behave like (3) include, *maternal.grandfather-maternal.grandmother*, *mother.in.law-father.in.law*. Crucially, all give rise to sets with elements of equal sizes via a structure like (17).

(13) $[\![Ex]\!] = \lambda R_{eet}.\lambda x_e.\ \exists y(R(y)(x))$

(14) $[\![n]\!] = \lambda f_{et}.\lambda x_e : \exists n(\forall y \in f(|\{y' : y' \leq_{at} y\}| = n)).\ \exists f' \subseteq f(|f'| = n \wedge \bigoplus f' = x)$

This way of combining with a numeral is not possible for *dog-cat* (1), as the elements in that compound's denotation are of varying sizes). The same holds for compounds with RNs like *son-daughter*, where for each individual x there can be a different number of people who bear the relations in the compound to x. We assume that when the compound does not meet the requirement of the subsective semantics ((14)), it can only combine with a numeral with intersective semantics, i.e. $[\![n]\!] = (\lambda x_e.\ \#x = n)$ resulting, as desired, only in a $1n$ reading.

***Mom-son* compounds**. Compounds like *mom-son* only contain pairs of individuals such that one is the son of the other: the internal argument of the first noun is satisfied by the external argument of the second, and vice versa. We draw a parallel between these compounds and a known alternation of relational nouns: *friends*, though relational (e.g. *Ann is friends with Beth*), also has intransitive uses with a reciprocal semantics (e.g. *Ann and Beth are friends*). We follow Chatain (2019) in assuming that this is due to a silent reciprocation operator *Recip*, defined in (15) (this operator corresponds to Dalrymple et al.'s (1998) notion of *Strong Reciprocity*). If we abstract over the internal argument of *mom* and *son*, compound the two, and apply *Recip* to the resulting set, we get a structure that derives a set of mother-son pairs as in (18) (since *Recip* already quantifies over singularities, the distributivity of *Dist* is superflous and can be ommitted). Since this set contains only pairs, we correctly predict these compounds to also have the $2n$ reading of the numerals.

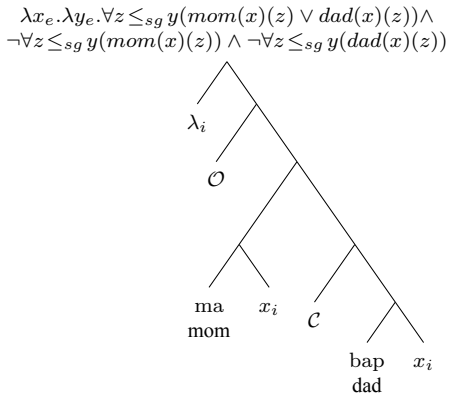
(15) $[\![\textit{Recip}]\!] = \lambda R_{eet}.\lambda x_e.\ \forall y, z \leq_{sg} x(y \neq z \rightarrow R(y)(z))$

***Daughter-SIL* compounds**. Pairs in the denotation of *daughter-SIL* compounds (4) must be related by marriage. Like *mom-son* the compound involves reciprocity, but *SIL* is a relation between a man and the parent of their partner. We propose to account for such pairs in a similar way to *mom-son* by assuming that RNs like *SIL* have a complex internal structure (16). At the lexical level, these RNs denote three-place relations, with one argument never syntactically accessible. This is supported by a morphological fact about certain compounds that behave like *daughter-SIL*. For instance, the two elements in the compound caca-caci ("father's.brother-father's.brother's.wife") share a root,

suggesting that the two are derivationally related. We claim that this is because the semantics of caci is constructed from that of caca. We provide structure (19) for (4).

(16) $[\![\textit{son-in-law}]\!] = \lambda x.\lambda y.\lambda z.\ y$ is the child of $x \wedge z$ is the husband of y

(17)



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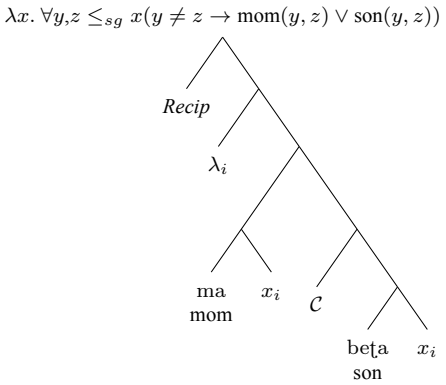

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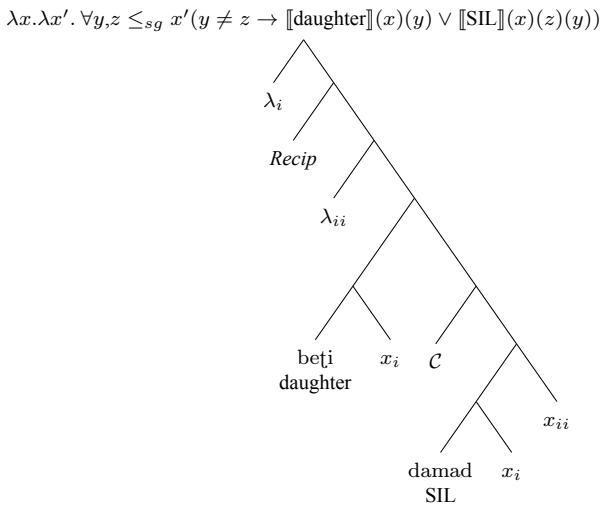

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Higher order ignorance in Kipsigis epistemic indefinites

Madeline Bossi

1. Introduction Epistemic indefinites are indefinite pronouns or determiners that convey speaker ignorance with respect to the witness to the indefinite. These ignorance effects come in two flavors cross-linguistically: strictly first order ignorance (the speaker doesn't know which individual witnesses the indefinite) and higher order ignorance (the speaker is ignorant about some salient property of the witness, including identity). Dawson (2018) proposes that these different types of ignorance correlate with the scope of the epistemic indefinite and, by extension, its semantics; she suggests that higher order ignorance is tied to the choice functional nature of some epistemic indefinites, while strictly first order ignorance is tied to domain widening semantics. Here I draw on original field data to show that epistemic indefinites in Kipsigis (Kalenjin; Kenya) can convey higher order ignorance but don't warrant a choice functional analysis. I offer a new type of domain widening account for Kipsigis, according to which the epistemic indefinite is only licensed when there's variation in the salient properties that hold of the member(s) of the indefinite's restrictor.

2. Data Kipsigis is a number-marking language that lacks determiners. Yet for many nouns, the final syllable of the singular citation form can be replaced by the morpheme *-yan*, which builds epistemic indefinites. *-Yan* forms require ignorance—either first order (1a) or higher order (1b). These forms are only ruled out when neither type of ignorance holds (1c).

(1) Kibet and Chepkoech are playing hide-and-seek. K. is the seeker and C. is hiding. K. says:
unye-gɛɛ Chɛɛpkɔɛch ɛɛn rʊʊm-ɪ-yan.
hide-REFL C. in room-TH-YAN
'Chepkoech is hiding in some room.' (context adapted from AO & MB 2010)

a. ✓ K. knows that C. is in the house, but he doesn't know which room she's in.
b. ✓ K. knows that C. is in the living room, but he doesn't know where in the house the living room is, so he can't find her.
c. # K. cheated, so he knows that C. is in the living room. He also knows exactly where in the house the living room is, so he can find her.

In (1a), K. is ignorant as to which room witnesses existential quantification over rooms. In (1b), K. is knowledgeable about this basic fact, but still lacks some relevant piece of information about the witness. Only in (1c) does K. lack ignorance with respect to both the identity of the witness and its properties salient for his goals (i.e. winning the game).

The ignorance effects seen with Kipsigis *-yan* forms are reinforceable and cancellable and disappear in downward-entailing contexts, like in the scope of negation (2) where the *-yan* form no longer conveys ignorance but instead has a domain widening effect reminiscent of an NPI.

(2) Your mom's upset because your brother Kibet didn't do any of his chores. She says:
mɑ-i-buch Kibeet rʊʊm-ɪ-yan.
NEG-3-sweep K. room-TH-YAN
'Kibet didn't sweep any room' $\neg > \exists$

These facts challenge a view in which ignorance is lexically encoded (Aloni & Port 2015), suggesting instead that *-yan*'s ignorance effects arise pragmatically as conversational implicature (Kratzer & Shimoyama 2002; Alonso-Ovalle & Menéndez-Benito [AO & MB] 2010; Dawson 2018).

3. Existing accounts Pragmatic analyses of epistemic indefinites fall into two classes: domain widening (Kratzer & Shimoyama 2002; AO & MB 2010; Dawson 2018) and choice functions (Yanovich 2005; Dawson 2018). These accounts derive ignorance effects via competition with other nominals. Domain widening analyses impose requirements on the domain that the epistemic

indefinite quantifies over (e.g. that it must be non-singleton; AO & MB 2010). This requirement derives first order ignorance and predicts that these epistemic indefinites should be incompatible with restrictors with singleton extensions. This prediction is unwelcome for Kipsigis, where *-yan* can take a necessarily singleton superlative restrictor (3); in such cases, the *-yan* form triggers higher order ignorance (e.g. about the car's make).

(3) I attended an auction where Linus bought the most expensive black car. I saw the car, but didn't learn any more information about it like its make or model. I say:
kɔɔ-al Linus kar-ɪ-yan ne tui ne koo-kɑli ɛɛn tʊgʊl ɛɛn ɔkshɛn.
PST-buy L. car-TH-YAN REL.SG black REL.SG PST-expensive in all in auction
'Linus bought the most expensive black car at the auction.'

Choice functional analyses involve existential quantification over choice functions (CFs) rather than individuals. When speakers choose to use this higher order quantification, interlocutors reason that the speaker must be ignorant about how the witness is to be selected, which derives higher order ignorance. Many implementations of CFs predict that they should take exceptional wide scope (Kratzer 1998; Matthewson 1999), even with respect to downward-entailing operators that bind into the CF's restrictor (Brasoveanu & Farkas 2011). This prediction is also unwelcome for Kipsigis, where *-yan* forms can generally scope below or above operators like universal quantifiers (4), modals, and attitude verbs, but must scope below operators that bind into their restrictor (5).

(4) ʊnyɛ-gɛɛ laakwɛɛt agɛ tʊgʊl ɛɛn rʊʊm-ɪ-yan.
hide-REFL child every in room-TH-YAN
'Every child is hiding in some room.'
a. ✓ Every child is hiding a different room. $\forall > \exists$
b. ✓ There is a particular, unknown room that every child is hiding in. $\exists > \forall$

(5) mɑ-mɑch-e chi ko-ɑl-dɑ mɑriinde-yɑn ne koo-nɑp-e.
NEG-want-IPFV person 3.SBJV-buy-IT dress-YAN REL.SG PST-make-IPFV
'No one$_i$ wanted to sell some dress that they$_i$ made.'
a. ✓ Three women all made many dresses. Each woman was planning to sell all of her dresses, but decided that she didn't want to sell any of her own products. no one $> \exists$
b. # Three women all made many dresses. Each woman was planning to sell all of her dresses, but ultimately decided to keep one for herself. $*\exists >$ no one

4. A new analysis Against this backdrop and building on ideas in AO & MB (2017), I offer an analysis centered around a new kind of anti-singleton constraint that applies to a set of sets of salient properties rather than to a set of individuals directly (6).

(6) $[\![\text{-yan}]\!]^{c,w} = \lambda P_{\langle e,st\rangle}\lambda Q_{\langle e,st\rangle}$: anti-singleton$(S_P).\exists x[(P)(x)(w) \wedge Q(x)(w)]$
where S_P is the smallest set containing all sets of contextually salient properties of members of $\{x : P(x)(w') = 1\}$, where w' is a doxastic alternative of the speaker

The restrictor P undergoes contextual domain restriction and is then subject to the anti-singleton constraint in (6). If this constraint is satisfied, there's at least one salient property according to which the member(s) of the restrictor differ across $Dox(sp, w)$; first order ignorance arises when the restrictor contains multiple individuals whose properties differ across $Dox(sp, w)$ (1a), while higher order ignorance arises when the restrictor contains just one individual whose properties differ across $Dox(sp, w)$ (1b). If *-yan*'s presupposition isn't met, all the salient properties of the individuals in $\{x : P(x)(w') = 1\}$ are the same across $Dox(sp, w)$ (1c), yielding a singleton S_P.

Crucially, this presupposition doesn't encode ignorance itself, as desired given that ignorance effects show the hallmarks of conversational implicature. Instead, ignorance effects arise via competition with Kipsigis bare nouns, which impose no such anti-singleton constraint. I assume that

the relevant instance of competition is between the *-yan* form and the bare noun on a reading where S_P is singleton (see AO & MB 2017 for a similar idea). When a speaker uses a *-yan* form, they could also use a bare noun with equivalent truth conditions. In choosing the *-yan* form, a speaker makes a weaker statement than with a bare noun, which allows the possibility that the speaker knows all the salient properties of the individual in $\{x : P(x)(w') = 1\}$. Interlocutors reason that the speaker chose the *-yan* form because they don't know all the salient properties of the witness.

4. Implications Kipsigis *-yan* forms can convey higher order ignorance, yet their scopal properties pose challenges for a choice functional account. This new empirical pattern calls into question Dawson's (2018) claim that ignorance type correlates with epistemic indefinite scope. Instead, I offer a new domain widening account that encodes variation in contextually salient properties into *-yan*'s presupposition, which derives first order ignorance as a sub-type of higher order ignorance.

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Positive gradable adjective ascriptions with states, not degrees
Fabrizio Cariani, Paolo Santorio, and Alexis Wellwood

Introduction. A long-standing tension in semantic theory concerns how to reconcile the analysis of vague positive gradable adjective (GA) ascriptions like (1a), with that of crisp comparative GA ascriptions like (1b). Vagueness-based approaches derive the comparative from the positive, and face non-trivial challenges with incommensurability (but see D09, D11) and the cross-categoriality of comparatives (but see B15 for nominals). Degree-based approaches effectively do the reverse, which is out-of-sync with the direction of evidence from morphology (K82), and also face difficulty accounting in a natural way for GA scale-mates with differing thresholds (e.g., *cold* $\sim$ *warm* $\sim$ *hot*). We propose a new reconciliation capitalizing on recent proposals that analyze GAs as predicates of states (or similar objects; W15; F17; B15) rather than as measure functions (K99) or individual-degree relations (H00), but which otherwise preserve the virtues of degree-based approaches.

(1) a. Miami is hot. [context-sensitive threshold]
b. Miami is hotter than Barcelona. [not context-sensitive]

A classic degree-based analysis. We present a degree-based analysis in the style of K99, though our remarks apply equally well to the style of H00. Here, *hot* expresses the measure function in (2a), and (1a) involves a degree relation and contextually-determined standard introduced by the null element POS, (2b). The comparative involves abstraction and maximization of degrees, (2c).

(2) a. $[\![\text{hot}]\!] = \lambda x.\mathbf{heat}(x)$ type $\langle e, d\rangle$
b. $[\![\text{Miami is hot POS}]\!] = \mathbf{heat}(m) \geq std_C(\mathbf{heat})$
c. $[\![\text{Miami is hotter than Barcelona}]\!] = \mathbf{heat}(m) > max(\lambda d.\mathbf{heat}(b) \geq d)$

Suggestive evidence that e.g. *hot* and *warm* are scalemates can be seen in the fact that (1a) asymmetrically entails (3a). Yet (3b) is truth-conditionally equivalent to (1b). Standard degree-theoretic approaches resolve that equivalence by interpreting *warm* identically to *hot*, (2a), but must posit distinct POSs to arrive at different thresholds in the positive form.[1] There are two reasons to be dissatisfied with this sort of account: (i) hard-wiring such selection restrictions seems undesirable; (ii) there appear to be no languages in which POS is overtly realized (G16, G18).[2]

(3) a. Miami is warm. [requires lower threshold than (1a)]
b. Miami is warmer than Barcelona. [equivalent to (1b)]

A states-based analysis. We assume W15, W19's analysis focused on cross-categorial *more*. She argues that comparative morphology introduces measure functions, and lexical verbs, (4a), nouns (4b), and GAs (4c) simply introduce 'measuranda' on the basis of which measure functions can be selected by the assignment function, i.e. $g(\mu)$ (cf. S15). There are constraints on that selection including semantic category (e.g. entities can be weighed, events cannot) and monotonicity (e.g., the degree ordering must preserve base ordering relations; cf. S02).

(4) a. $[\![\text{Mary ran more}_\mu \text{ (than Bill)}]\!]^g = (\exists e)(\mathbf{agent}(e, m)\ \&\ \mathbf{run}(e)\ \&\ g(\mu)(e) > \delta)$
b. $[\![\text{There is more}_\mu \text{ wine (than soup)}]\!]^g = (\exists x)(\mathbf{soup}(x)\ \&\ g(\mu)(x) > \delta)$
c. $[\![\text{Miami is hotter}_\mu\text{(than Barcelona)}]\!]^g = (\exists s)(\mathbf{holder}(s, m)\ \&\ \mathbf{tall}(s)\ \&\ g(\mu)(s) > \delta)$

How to handle what appears to be the problematic entailment to (1a) from (4c) is left mainly unsettled. (F17's approach should end up with a similar logical form as (4c), but, so far, their analysis focused on the positive appears to inherit the problematic entailment in the other direction.)

Our approach. In line with earlier work we assume that GA domains include a 'background ordering', and that their meanings carve out a positive region within that ordering. We formalize

[1] To see this, note that *std* applies to *meanings*, not *lexical items*. See e.g. K05.
[2] Similar comments apply for EVAL (R08) or ANTI-EVAL (B12); we have not yet addressed these authors' insights.

this in our terms as follows. GA 'background structures' are pairs $\langle D, \succeq \rangle$ consisting of a domain of relevant states (e.g. all the states of heat) and a total pre-order defined on them. Two functions allow us to switch between different elements in this structure: (i) **background**$(\cdot)$ inputs a property and outputs its background structure, if defined (e.g., given λs_v.**hot**(s), it outputs the ordered set of heat states); (ii) **domain**$(\cdot)$ inputs a background structure $\langle D, \succeq \rangle$ and outputs its first element (the domain). Then, the first component of our analysis is as in (5a): *hot* presupposes that its input state is drawn from the appropriate background structure, and delivers that property of states which, in context, count as states of being genuinely hot. The second is as in (5b): *more* operates on the (presupposed) background structure rather than on the at-issue content of *hot*.

(5) a. $[\![\text{hot}]\!]^g = \lambda s_v : s \in \textbf{domain}(\langle D_{\textbf{heat}}, \succsim \rangle)\ .\ \textbf{hot}_C(s)$
b. $[\![\text{-er/more}_{\mu}]\!]^g = \lambda d_d \lambda G_{vt} \lambda s_v :\ s \in \textbf{background}(G)\ .\ g(\mu)(s) > d$

(6) derives the critical parts of (1b), the result of which is (7): it says that m is in a heat state which is $g(\mu)$-greater than any such state of n. This at-issue content will be identical for interpreting (3b).

(6) a. $[\![\text{than Barcelona}]\!]^g = \delta = max(\lambda d\ .\ (\exists s'_v)(\textbf{heat}(s') \wedge \textbf{holder}(s', b) \wedge g(\mu)(s') > d))$
b. $[\![\text{-er [than Barcelona]}]\!]^g = \lambda G_{\langle vt \rangle} . \lambda s_v :\ s \in \textbf{background}(G)\ .\ g(\mu)(s) > \delta$
c. $[\![[\text{hot [er than Barcelona}]]\!]^g = \lambda s_v :\ s \in \textbf{background}(\textbf{hot}_C).\ g(\mu)(s) > \delta$

(7) $[\![(1\text{b})]\!]^g = (\exists s_v :\ s \in \textbf{background}(\textbf{hot}_C))(\textbf{holder}(s, m) \wedge g(\mu)(s) > \delta)$

Specifically, *hot* and *warm* have the same background structure, but associate with different positive regions (cf. Figure 1). Hardwiring these relationships requires complicating the framework a little. For present purposes, we focus on the special case of backgroundss associated with two adjectives. We assume the context-parameterized function **threshold**$_C(\cdot)$ that maps a background structure (e.g. **heat**) to a pair of thresholds, selected by the functions **upper** and **lower**. We then revise the analysis of the GAs as in (8a) and (8b). Then, (1a) is interpreted as in (9a) and (3a) as in (9b).

(8) a. $[\![\text{hot}]\!]^g = \lambda s_v : s \in \textbf{domain}(\langle D_{\textbf{heat}}, \succsim \rangle)\ .\ s \succeq \textbf{upper}(\textbf{threshold}_C(\textbf{heat}))$
b. $[\![\text{warm}]\!]^g = \lambda s_v : s \in \textbf{domain}(\langle D_{\textbf{heat}}, \succsim \rangle)\ .\ s \succeq \textbf{lower}(\textbf{threshold}_C(\textbf{heat}))$

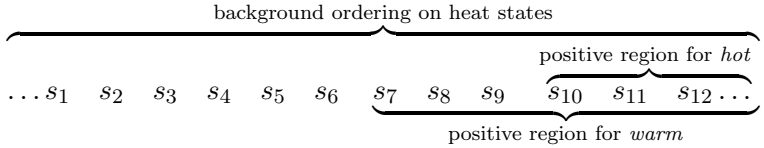
(9) a. $[\![(1\text{a})]\!]^g = (\exists s_v \in \textbf{domain}(\langle D_{\textbf{heat}}, \succsim \rangle))(\textbf{holder}(s, m)\ \&\ s \geq \textbf{upper}(\textbf{threshold}_C(\textbf{heat}))$
b. $[\![(3\text{a})]\!]^g = (\exists s_v \in \textbf{domain}(\langle D_{\textbf{heat}}, \succsim \rangle))(\textbf{holder}(s, m)\ \&\ s \geq \textbf{lower}(\textbf{threshold}_C(\textbf{heat}))$

To the central tension, we say: vagueness emerges from resolving thresholds on an ordering between states, crispness from resolving relations between arbitrarily fine-grained degrees. There are other positive considerations. We avoid the worries about POS, and like W15, W19 support a unified analysis of GAs both for languages like English and those lacking degree morphology (cf. B15). And, our **background**$(\cdot)$ can be used uniformly to formalize exclusion of non-GAs, singular count NPs, and telic VPs from degree constructions (i.e., domains with no non-trivial ordering relations).

Conclusion. Our account preserves insights from both the vagueness and degree literatures, while avoiding their problematic aspects. And the details of our analysis are important: it is not merely that we differentiate background structures from degree structures—B08 does this, for example. Our states are specific enough to provide the appropriate functionality provided by **background**$(\cdot)$, as well as to independently influence the resolution of $g(\mu)$. And there are potentially other benefits. B08 accounts for *Ann is tall for a 5-year-old* by having the *for*-phrase restrict an underlying individual ordering. This runs into trouble with S10's *Ann bought an expensive hat for a 5-year-old*.[3] We can adapt B08's account, where *for*-phrases restrict the background domain of eventualities with specific contents determined by attachment height, e.g. **threshold**$_C$ can be calculated relative to states 'instantiated by a 5-year-old', 'instantiated by a hat possessed by a 5-year-old', &c.

[3]S10, himself, opts for a 'scope of POS' analysis that is unavailable to us.

FIGURE 1. Sample ordering for *warm* and *hot*; (upper threshold = s10; lower threshold = s7)



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Restrictiveness and the scope of adjectives — Kalen Chang, UCLA

Introduction: Canonical restrictive uses of adjectives help narrow down the set of potential referents by specifying a subset of the nouns they modify, as in (1). On the other hand, nonrestrictive uses of adjectives (NRAs) attribute a property to a referent that is already described enough for the listener to select the intended referent(s), as in (2). There is no consensus on how nonrestrictive adjectives should be analyzed, or whether their compositional semantics differs from restrictive adjectives at all.

(1) I have five dogs, but two aren't feeling well. I need to take my sick dogs to the vet.

(2) I have five dogs, but they aren't feeling well. I need to take my sick dogs to the vet.

(2') I need to take my dogs, who are sick, to the vet.

NRAs are often paraphrased and felt to be synonymous with appositive relative clauses (ARCs) like (2'). Based on this similarity, some linguists have analyzed NRAs as covert DP-level modifiers, in effect giving the adjectives scope over their hosting descriptions (e.g. Potts 2005, Leffel 2014). However, NRAs can modify all kinds of quantificational DPs, while appositives are much more restricted. This led Morzycki (2008) to an alternate analysis leaving NRAs in-situ where they contribute information to a second, supplemental semantic dimension about the maximal set of referents satisfying the modified noun. There are yet other accounts which treat nonrestrictiveness as a pragmatic epiphenomenon, instead giving an ordinary intersective compositional semantics (e.g. Esipova 2019). In this presentation, I argue that at least some nonrestrictive adjectives must take scope over the DP they modify, based on interactions with non-intersective adjectives like *other*. This is broadly consistent with Potts, Leffel, and others, but I will show that the *other* data, especially in quantified cases, is better modeled by an anaphoric semantics more in line with recent approaches to nominal appositives (e.g. Del Gobbo 2007, Nouwen 2007).

Data: As shown in (3), o*ther* requires an antecedent (here, *my little poodle*) which bears the property denoted by its sister (here, *dog*).

(3) Over there is my little poodle. My other {dog/#cat} is with my parents right now.

I assume, following Kamp (2001), that *other* is anaphorically linked to this antecedent and requires that its subject and antecedent are disjoint.

(4) $[\![\text{other}_i]\!]^g = \lambda P.\ \lambda x\text{: } P(g(i)).\ P(x) \wedge g(i) \neq x$

Then, it follows that if a restrictive adjective appears in the sister of *other*, the antecedent will be presupposed to satisfy that adjective, as in (5).

(5) (*Scenario: I give you two small books and two large books, and point to a small book.*)
Leave that small book on the table, and put the other {small/#large} book on the shelf.

However, with the right intonation, cases like (6) are also felicitous, where an adjective (*larger*) in the argument of *other* is clearly not intended to describe the antecedent. I will call adjectives like this "contrasting", i.e. those to the right of *other* but do not contribute to its presupposition.

(6) (*Scenario: I give you a small book and a large book, and point to the small book.*)
Leave that small book on the table, and put the other, larger book on the shelf.

Crucially, contrasting adjectives are not semantically commutative with *other*; they are necessarily interpreted nonrestrictively, in that they are predicated of the entire class of objects selected by *other*. For instance, (7a) cannot be used to refer to those books with are both larger than and other than the antecedent; instead it commits the speaker, infelicitously here, to all of

the other books in the office being larger than the one they picked up. Note that an ordinary restrictive interpretation is also possible (7b), but also infelicitous because it is contradictory.

(7) *(Scenario: You enter my office with books everywhere. I pick up an average-sized book. You see there are only two books larger than the one I picked up but many smaller ones.)*
Take this book home, and put the {a. other, larger/b. other larger} books on the shelf.

Similar patterns can be observed with other non-intersective adjectives whose semantic contributions are affected by the phrases they modify, such as superlatives, ordinals, and exclusives like *only*.

(8) John bought the last(,) utterly useless(,) VHS tape from the garage sale.

Analysis: Contrasting adjectives need to escape the semantic scope of *other*; in addition, they must be interpreted nonrestrictively. For ordinary definite descriptions as in (6), it is sufficient for such adjectives to out-scope their host DP, as in (9), and combine them via a compositional mechanism in (10) like Leffel's (2014) TMAP. I leave open whether *all* nonrestrictive adjectives should be treated as taking inverse scope, but there is no harm in supposing they do.

(9) $[_{DP} \ldots [\text{ Adj X }]\,] \rightarrow [_{NRA}\ \text{Adj}\ [_{DP} \ldots [\text{ X }]\,]\,]$

(10) Given $\alpha : \langle\sigma,t\rangle$ and $\beta : \sigma$, $[\![[_{NRA}\ \alpha\ \beta]]\!]$ asserts $[\![\beta]\!]$ (type σ); backgrounds $[\![\alpha]\!]([\![\beta]\!])$ (type t)

This is illustrated in (12), in contrast to an ordinary restrictive adjective in (11). Interpreting *small* outside the DP simultaneously accounts for i) how the nonrestrictive predication is generated, and ii) why the NRA *larger* does not describe the antecedent of *other*.

(11) $[\![[\text{the}\ [\text{other}_i\ [\text{small book}]]]]\!]^g = \iota x$: **small**(g(i)) ∧ **book**(g(i)). **small**(x) ∧ **book**(x) ∧ g(i)≠x

(12) $[\![[\text{larger}\ [\text{the}\ [\text{other}_i\ \text{book}]]]]\!]^g$ = asserted: ιx: **book**(g(i)). **book**(x) ∧ g(i)≠x
not-at-issue: **larger**(ιx: **book**(g(i)). **book**(x) ∧ g(i)≠x)

Quantifiers: As mentioned above, one difference between appositives and NRAs is that NRAs can modify quantificational DPs, as in (13).

(13) Most/every/at least three lazy senators skipped the meeting yesterday.

A nonrestrictive interpretation of *lazy* conveys that *all* senators are lazy (not just most/at least three). Here, I suggest that NRAs mirror patterns seen with nominal (not relative) appositives. It has long been argued that appositives are linked anaphorically to their anchors (e.g. Sells 1985, Arnold 2004) in that the felicity of an appositive closely corresponds to the felicity of downstream discourse anaphora. For instance, singular ARCs cannot modify distributive quantifiers, just as singular pronouns cannot be bound outside of their scope (14). On the other hand, plural nominal appositives can comment on the plurality of elements satisfying the distributive quantifier's restrictor, just as a subsequent plural pronoun can (15).

(14) a. *Every plane, which has an engine in its tail, took off on time.
b. *Every plane took off on time; it has an engine in its tail.

(15) a. Every climber, all of them experienced adventurers, made it to the summit.
b. Every climber made it to the summit; they were all experienced adventurers.

Though space precludes the details here, in the talk I will show how NRAs can be analyzed as anaphoric using post-suppositional techniques that have recently been applied to other scope-taking adjectives like modified numerals (Brasoveanu 2013) and superlatives (Bumford 2017). The predication of *lazy* to the maximal set of senators in (13) then follows exactly as an instance of "maxset" anaphora (Evans 1977).

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NPI *any* in non-monotonic environments

Introduction The *even* approach to NPI *any* (Crnič, 2011, 2014a, 2014b, 2019a, 2019b) makes two claims: (i) *any* and minimizers behave the same in strictly DE environments; (ii) in non-monotonic environments like the scope of 'exactly *n*', due to the covert *even*, *any* is felicitous only if the *any*-sentence is contextually less likely than its alternatives. I show that neither claim stands. Following the recent split scope analysis of modified numerals (Bumford, 2017; Zhang, 2020), I propose that *any* in the scope of 'exactly *n*' on the surface structure actually finds itself in the restriction of a definite plural in the logical form. The licensing of *any* in such sentences is therefore reduced to the licensing of *any* in the restriction of a definite plural description (Gajewski & Hsieh, 2014; Gajewski, 2016).

Any≠even+one Crnič (2014a) analyzes NPI *any* as *even+one* (cf. Lahiri, 1998; Lee & Horn, 1995). However, the minimal pairs in (1) and (2) show that *any* and *even+one* are not equivalent even in strictly DE environments, thus casting doubt on the *even* approach.

(1) *Context: Mia asked John to count how many students were present. John totally forgot about it. Mia complained,*
   a. John didn't count even one student.
   b. *John didn't count any student.

(2) *Context: John is from a small town.*
   a. John wasn't born in any metropolis. He was born in a small town.
   b. *John wasn't born in even one metropolis. He was born in a small town.

Any≠ even+D In another version of the *even* approach to *any*, Crnič (2011, 2014b, 2019a, 2019b) analyzes *any* as an existential quantificational determiner carrying a domain variable D, and the subdomain alternatives $D'(D' \subseteq D)$ are activated (cf. Krifka, 1995; Chierchia, 2013). D serves as the focus associate of a covert *even* operator. Crucially, this analysis predicts that when an *any*-sentence and its alternatives are logically independent of each other, the *any*-sentence is only felicitous in particular contexts that satisfy the least likelihood presupposition of *even*. This is how Crnič explains the contrast in (3) (cf. Linebarger, 1987). According to this analysis, then, it can never be the case that both *exactly* followed by a small number n and *exactly* followed by a big number n will make *any* felicitous in the same context. (4) shows that this prediction is not borne out. Both (4a) and (4b) are felicitous reports of what the game is like right now in the given context. Thus, against Crnič, I conclude that if the semantic import of *even* is present in an *any-sentence*, as reported for (3), it is NOT from the lexical requirement of *any*.

(3) *Context: There are 12 graduate students.*

a. Exactly 2 students read any book. b. $^{??}$Exactly 10 students read any book. (Crnič, 2019a)

(4) *Context: John is watching a car racing game. There are 12 cars competing. From 100 miles onward, there is a gas station every few miles.*

a. Exactly 2 cars are close to any gas station. b. Exactly 10 cars are close to any gas station.

Proposal I propose that sentences in (4) are interpreted as in (5). The key ingredients of this proposal are: (i) *any* is in the restriction of a definite plural description in the logical form; (ii) *any* is licensed very locally in the restriction of a definite plural; (iii) 'exactly *n*' comes in after *any* is already licensed.

(5) Exactly n cars are close to any gas station.
   Interpretation: The cars that are close to a gas station are exactly n in number.

Following the recent split scope analysis of modified numerals (Bumford, 2017; Zhang, 2020),

I decompose *exactly n* into an indefinite determiner $\mathbf{some^u}$ that introduces a discourse referent, a definite determiner $\mathbf{M_u}$ that selects the maximal plurality satisfying the condition given by the sentence, and a cardinality predicate $\mathbf{2_u}$. The composition of example (4a) is given in (8).

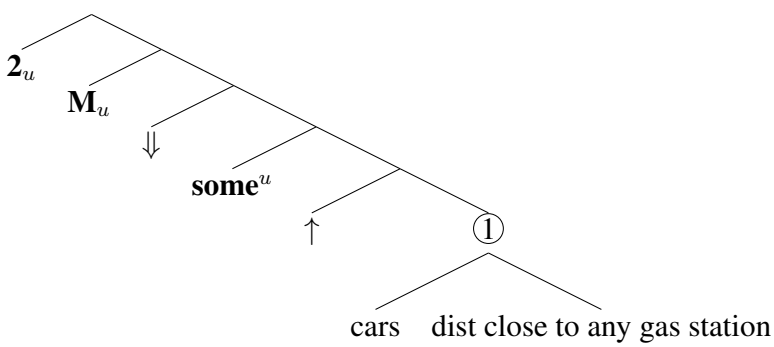
The main ingredients of the current proposal are each independently motivated. The decompositional analysis of modified numerals is mainly motivated by their use in cumulative sentences (Brasoveanu, 2013, see Bumford (2017) and Zhang (2020) for discussion)). Once the decompositional analysis is adopted, as shown in (8), we find that in the logical form, the NPI *any* is in the restriction of a definite plural description.

Evidence showing that *any* can be licensed very locally in the restriction of a definite plural description is from sentences like (6a) (cf. Gajewski & Hsieh, 2014; Gajewski, 2016). Note that in (6a), *any* is in a non-monotonic environment at the sentential level due to the collective predicate. However, against the prediction of the *even* approach, *any* is felicitous in (6a) WITHOUT generating an *even* reading. For example, we do not require (6a) to be contextually less likely than its alternative (6b) to make *any* felicitous. Gajewski and Hsieh's (2014) generalized definition of strawson-DE, which extended strawson-DE to the nominal domain, as given in (7), can accommodate (6a) into the general strawson-DE theory of *any* (Von Fintel, 1999). Adopting (7), I account for (4) with the logical form in (8) in the same way.

(6) a. The students with any knowledge of French formed a team.
b. The students with any knowledge of French in tense formed a team.

(7) Generalized SDE in the nominal domain
If α and β are of type e, then $\alpha \rightarrow_S \beta$ iff $\beta \sqsubseteq \alpha$

(8)



a. $[\![①]\!] = \lambda X.cars(X) \wedge \forall x[x \sqsubseteq_{atom} X \rightarrow \exists y[gas\text{-}station(y) \wedge close\text{-}to(y)(x)]]$
b. $[\![\uparrow]\!] = \lambda P \lambda x \lambda g.\{\langle P(x), g\rangle\} \quad [\![\Downarrow]\!] = \lambda m.m(\eta) \quad [\![\eta]\!] = \lambda x \lambda g.\{\langle x, g\rangle\}$
c. $[\![some^u]\!] = \lambda c \lambda k \lambda g. \bigcup\{k(x)(g') | x \in D_e, \langle T, g'\rangle \in c(x)(g^{u \rightarrow x})\}$
d. $[\![M_u]\!] = \lambda m \lambda g.\{\langle X, h\rangle | \langle X, h\rangle \in m(g) \wedge \neg\exists \langle Y, h'\rangle [\langle Y, h'\rangle \in m(g) \wedge h(u) \sqsubset h'(u)]\}$
e.

$$[\![2_u]\!] = \lambda m \lambda g. \begin{cases} \{\langle T, g'\rangle | \langle X, g'\rangle \in m(g)\} & \textbf{if } |atoms(\oplus G_u)| = 2, where G = m(g), \\ & G_u = \{g'(u) | \exists \beta. \langle \beta, g'\rangle \in G\} \\ \{\langle F, g\rangle\} & \textbf{otherwise} \end{cases}$$

Discussion Against the *even* approach to *any*, my proposal predicts that *any* in the scope of *exactly n* does not convey an expectation for a larger number. This prediction is also corroborated by the recent experimental study in Alexandropoulou, Bylinina, and Nouwen (2020).

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A theoretically motivated quantitative model for the interaction between vagueness and implicatures

Alexandre Cremers

Despite extensive work on implicatures and vagueness in isolation, very little is known about their interaction. [9] observed a puzzling contrast between relative and minimum standard adjectives, which they attribute to the difference in vagueness between the two:

(1) John is not very tall. $\not\rightsquigarrow$ John is tall

(2) The antenna is not very bent $\rightsquigarrow$ The antenna is (somewhat) bent

(2) gives rise to the expected structural implicature, by competition with the simpler and more informative alternative *not bent*, but this implicature is absent in (1), unless *very* is stressed. [9] remark that no height can both clearly satisfy *tall* and clearly falsify *very tall*, making the candidate strengthened meaning of (1) akin to *borderline contradictions* such as "tall and not tall" ([11]). By contrast, in (2) one can choose a degree arbitrarily close to 0 in order to satisfy both *not very bent* and *bent*, since the latter can be interpreted strictly. [9] propose to generalize [5]'s notion of *innocent exclusion* so that the EXH operator block such borderline contradictions. While this explanation captures the initial observation, we argue that it is unlikely that implicatures' sensitivity to vagueness is actually encoded semantically. Instead, we propose a pragmatic model which explains the contrast without revising the standard definition of EXH. We show that this model goes further than [9]'s explanation by making accurate quantitative predictions about their data.

Informal description: Our model makes explicit the intuition of [9]: (1) does not give rise to an implicature because *tall but not very tall* is only compatible with a very narrow range of heights, and small differences between the thresholds the speaker and listener assign to *tall* can make the ranges of heights they consider "tall but not very tall" non-overlapping. Importantly, this explanation relies on the speaker being uncertain about the listener's interpretation: if the strengthened meaning denoted a small but agreed-upon range of heights, it would actually be very informative. We factor this uncertainty by implementing higher-order vagueness in the model: not only is there uncertainty about the threshold θ, but the distribution of θ is itself uncertain. We translate [9]'s intuition by adopting [12]'s variant of the RSA (inspired by supervaluationism and originally meant for homonegeity): the utility of a message is its weighted average utility across all possible threshold distributions. In the RSA framework, utility diverges to $-\infty$ as the probability of the message being true approaches 0, so a message must be true under all possible interpretations to be usable. Crucially however, we average over second-order vagueness. Since first-order vagueness ensures that relative adjectives are never absolutely false, the model is more flexible than traditional supervaluationist accounts. In line with the grammatical view of implicatures ([3]) and recent work in the RSA framework ([6]), implicature derivation is treated as a disambiguation problem between parses with and without EXH. We adapt [6]'s Global Intentions model for disambiguation, which differs radically from our treatment of vagueness: the speaker chooses the pair (message, parse) which best conveys their intention. In particular, this decision rule does not prevent the speaker from using a message u when one of its parses is false or likely false (e.g., *not very tall*). Piecing everything together, the model captures the observation in (1) as follows: upon hearing *not very tall*, the pragmatic listener knows that—in principle—the speaker could have either an exhaustive or a literal parse in mind. However, no matter which height the speaker wants to convey, the exhaustive interpretation has a very low expected utility (across all possible vague denotations for *tall* and *very tall*): in supervaluationist terms, no height makes EXH*[not very tall]* supertrue. By contrast, low heights make the literal parse nearly true under almost all thresholds for *very tall*. The listener therefore draws the inference that the speaker almost certainly meant the literal interpretation, and that John is somewhat short.

Details: Following [10], we assume that minimum standard adjectives can combine with either the POS morpheme of [8], yielding a loose interpretation, or MIN, resulting in a strict interpretation. We assign the following graded truth-conditions to vague messages,[1] where θ and $\theta+\delta$ are the thresholds for POS *adj* and *very adj* respectively, h the degree to convey, and Θ a set of parameters describing the distribution of θ and δ:

$$\begin{array}{rclrcl} [\![\text{MIN adj}]\!]^{h,\Theta} & = & 0<h & [\![\text{very adj}]\!]^{h,\Theta} & = & P(\theta+\delta<h|\Theta) \\ [\![\text{POS adj}]\!]^{h,\Theta} & = & P(\theta<h|\Theta) & [\![\text{not very adj}]\!]^{h,\Theta} & = & P(\theta+\delta\geq h|\Theta) \\ [\![\text{not POS adj}]\!]^{h,\Theta} & = & P(\theta\geq h|\Theta) & [\![\text{EXH not very adj}]\!]^{h,\Theta} & = & P(\theta<h\leq\theta+\delta|\Theta) \end{array}$$

Our L_0 listener is parametrized by Θ and a parse i. The speaker S_1 selects the pair (u,i) such that u under parse i maximizes expected utility (across all parameter sets Θ). L_1 jointly infers h and i by applying Bayes' rule, with uniform prior on $i|u$.

$$L_0(h|u,i,\Theta)\propto P(h)[\![u]\!]^{h,i,\Theta} \qquad S1(u,i|h)\propto\exp(\lambda U_1(u,i|h))$$

$$U_1(u,i|h)=\int\log L_0(h|u,i,\Theta)P(\Theta)d\Theta-c(u) \qquad L_1(h,i|u)\propto P(h)S_1(u,i|h)$$

Implementation and Evaluation: We tested the model on [9]'s Exp 1, which compared relative *tall* and minimum standard *late*. We are not interested in explaining vagueness *per se*, only its interaction with implicatures, so we fitted a hierarchical Stan model ([2]) on data from the affirmative constructions *adj* and *very adj* to obtain the distribution of Θ empirically. As a first approximation, we treat participants' graded judgments as indicative of first-order vagueness, and between-participants variance as second-order vagueness. That is, we assume that each participant represents an instantiation of Θ, and the population variance represents the distribution of Θ. From the fitted hyperparameters of the distribution of Θ, we computed L_1's posterior probability on EXH as a function of $(\lambda, c_{\text{adj}}, c_{\text{not}}, c_{\text{very}})$. We then fitted participants' responses to *not adj* and *not very adj*, assuming that the acceptability of a message u in this experiment is its average truth given Θ and a pragmatically inferred probability $P(\text{EXH})$ (and $P(\text{MIN})$ for *late*). The Θ fitted for each participant from their responses to *adj* and *very adj* was fed to a new Stan hierarchical model with parameters $(\lambda, c_{\text{adj}}, c_{\text{not}}, c_{\text{very}})$ common to *tall* and *late*, predicting behavior on *not very adj*. Fig. 1 shows that the model correctly predicts participants' behavior with median by-participant parameters $(\lambda=1.5, c_{\text{adj}}=2.0, c_{\text{not}}=2.6, c_{\text{very}}=2.1)$. The posterior probability of the exhaustive interpretation is lower with *tall* than with *late* (.17, CI [.14,.19] vs. .38, CI [.36,.39]). Crucially, Fig. 2 shows that $P(\text{EXH}|\textit{not very late})$ usually increases with rationality, but $P(\text{EXH}|\textit{not very tall})$ always falls to 0.

Discussion: By combining theoretical results and intuitions with recent advances in RSA models, we were able to capture the whole range of behaviors observed in experimental data. Qualitatively, the model correctly predicts that *not very tall* does not convey "tall but not very tall" while this interpretation can be very salient for *not very late*. The model can even capture the negative strengthening from *not very tall* to *not tall* ([9]), because the uncertainty on the effect of *very* creates a wider gap between *very tall* and literal *not very tall* than between *tall* and *not tall*, but the exponential distribution assumed for δ may be doing the heavy-lifting here and we ignored social effects discussed in [7] (though see [1] for RSA implementation of such variables). We can show that the decision to use a Spector's model for vagueness and Global Intentions for implicatures (empirically motivated by [4]'s observation that homogeneity and vagueness behave similarly, unlike implicatures) is crucial: treating vagueness and implicatures uniformly under a single disambiguation rule fails to capture the contrast between *tall* and *late*.

[1] It is possible to keep the truth-conditions binary and have a probabilistic interpretation by adding a hypothetical "literal speaker" S_0 parametrized by (θ,δ) in the RSA model. This would be a purely pragmatic account of vagueness, while the main text treats first-order vagueness as a semantic phenomenon and second-order vagueness as pragmatic. The two models are formally equivalent.

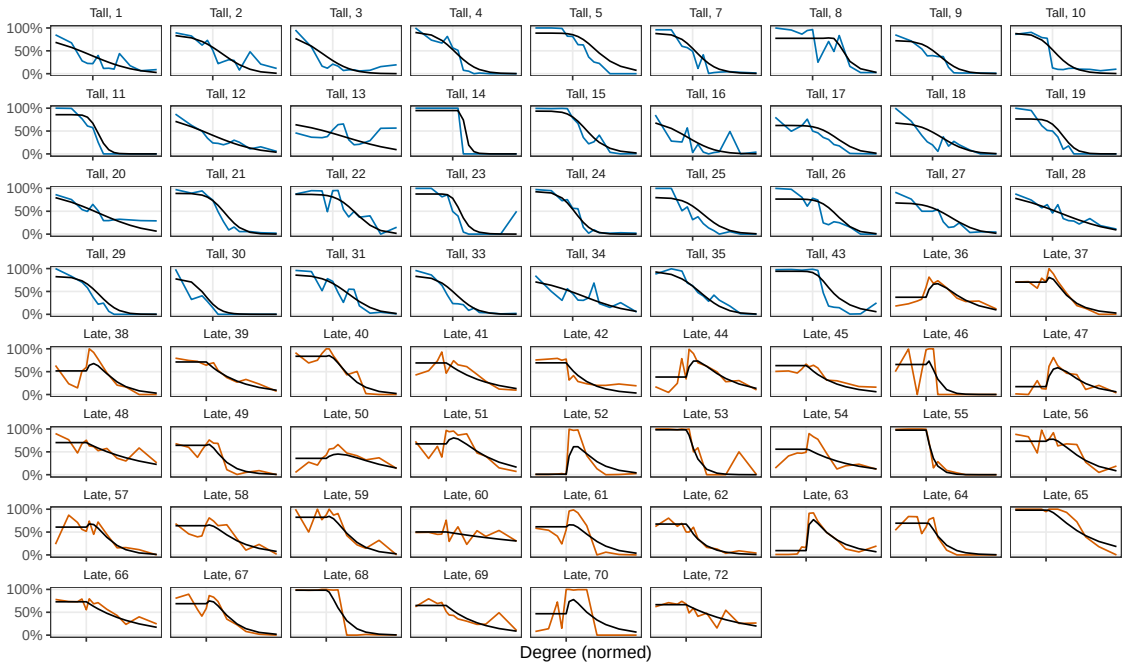

Figure 1: Individual participants' acceptability of *not very adj* (colored line) and model fit (black line). The implicature is reflected by reduced acceptability for low degrees. For comparison, the degrees are scaled, with 0 representing the average height for *tall* and the minimum threshold for *late*.

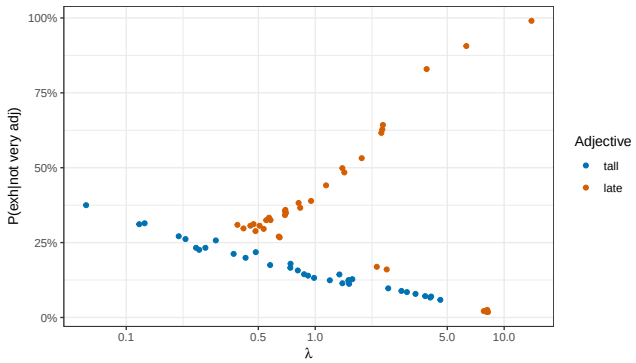

Figure 2: $P(\text{EXH}|\textit{not very adj})$ as a function of participants' fitted rationality (log-scale).

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Introduction: It is something of a mantra to say that complex sentences are subject to *simplification*, and that certain inferential processes are driven by simpler alternatives. For example, many accounts of inferences associated with disjunctive sentences φ *or* ψ make reference to the individual disjuncts φ, ψ; see e.g., the literature on ignorance (Grice 1975, Sauerland 2004), distributive inferences (Crnič, Chemla & Fox 2015, Bar-Lev & Fox 2020), and Free Choice (FC) (Kratzer & Shimoyama 2002, Alonso-Ovalle 2005, Fox 2007, Franke 2011, Bar-Lev & Fox 2020). Here, we focus on FC, pointing out that the presence of an *anaphoric dependency* between φ and ψ poses a significant problem for any account that assumes simplification. First, we provide arguments against two prominent lines of attack: (i) an e-type analysis, and (ii) an enrichment of structural alternatives. Instead, our idea is that inferences involving disjunction should be framed in terms of *ways in which the disjunctive sentence could be dynamically verified*. An important consequence of this is that free choice and other similar inferences must be computed with respect to semantic alternatives, rather than structural alternatives.

Simplification and anaphora: As background, note that anaphora is possible across a disjunction, if the first disjunct contains an indefinite and its *negation* contextually-entails a witness to the indefinite (as famously observed by Partee); (1). Partee disjunctions are famously problematic for (orthodox) dynamic semantics (Groenendijk & Stokhof 1991), due to non-classical negation (see, e.g, Gotham 2019).

(1) Either there isn't a^x bathroom, or it_x's upstairs. $\overbrace{not\, a_x B(x)}^{\mathbf{alt}_1}\ or\ \overbrace{U(x)}^{\mathbf{alt}_2}$

Bearing this in mind, we'll first state the general problem for simplification abstractly. In (1), $U(x)$ contains a variable bound in its local context, but if we consider the second disjunct in isolation, x is free. Any computation which makes reference to $\mathbf{alt}_2$ will therefore derive an inference involving an open sentence $U(x)$. Another way of appreciating the problem, is to recognize that $\mathbf{alt}_2$ isn't a *truthmaker* of the disjunctive sentence.

FC with anaphora: Our central case study is *FC with anaphora*. The problem of FC is typically characterized as how to validate $\Diamond(\varphi\ or\ \psi) \vDash \Diamond\varphi, \Diamond\psi$ (Kamp 1973). We can group theories into (i) exhaustification accounts (Kratzer & Shimoyama 2002, Alonso-Ovalle 2005, Fox 2007, Franke 2011, Bar-Lev & Fox 2020) and, (ii) semantic accounts (Zimmerman 2000, Aloni 2003, Simons 2005, Willer 2017, Aloni 2018, Rothschild & Yablo 2020, Goldstein 2019). All exhaustification accounts we are aware of presuppose simplification, while semantic theories use a semantic notion of alternatives (see Marty et al. 2021 for an overview). *FC with anaphora* (2) is striking because the FC inference (as classically stated) delivers a strange result — (2) doesn't imply that *it's possible that Tony hid it*, but rather (2b).

(2) It's possible that Tony doesn't have a stash, or that he hid it. $\Diamond(\neg\exists_x S(x) \vee H(x))$
   a. $\Longrightarrow$ *It's possible Tony has no stash.* $\Diamond(\neg\exists_x S(x))$
   b. $\Longrightarrow$ *It's possible that Tony has a stash and hid it.* $\Diamond(\exists_x S(x) \wedge H(x))$

alternative accounts: An e-type approach to anaphora (i.e., [it=**the stash**]) would potentially help get the right descriptive content in the latter alternative, while maintaining simplification. This begs the question of whether an e-type analysis of this anaphora is even feasible here. A naïve implementation would predict a uniqueness inference; Mandelkern & Rothschild (2020: p. 94) show that this isn't warranted with (3). A more nuanced approach based on situational uniqueness (Heim 1990), would require an entry for disjunction which interprets the second disjunct with respect to minimal *falsifying* situations of some kind, which is tantamount to a dynamic approach in any case.

(3) Either Sue didn't buy a^x Sage plant, or she bought eight others along with it$_x$.

Another possibility for exhaustification accounts would be to invoke *(not φ) and ψ* alternatives. However, allowing such alternatives undermines the structural solution to the *symmetry problem* (Katzir 2008) — if alternatives are closed under negation, then *φ or ψ* will have both the alternatives (a) *(not φ) and ψ*, and (b) *not (φ and ψ)*; (b) is symmetric to the *φ and ψ* alternative, blocking the scalar *not both* inference. We do not see a principled way to include (a) for anaphora while excluding (b). We thus conclude that FC and other relevant inferences of disjunction are derived using *semantic*, rather than structural alternatives. Note that we do not mean to imply all implicatures require semantic alternatives; here, we leave this question open. As a proof of concept, we present a formal theory of FC with anaphora below, which combines Elliott's (2020) Strong Kleene account of Partee disjunctions with Goldstein's (2019) dynamic theory of FC.

Analysis: Elliott's account of Partee disjunctions is based on the insight that Strong Kleene semantics can be embedded in a dynamic setting by keeping track of true/false/uncertain dynamic information. We formalize Elliott's idea in update semantics, where we define positive $c[\varphi]_+$, negative $c[\varphi]_-$, and uncertain $c[\varphi]_?$ updates derivatively in terms of Heimian updates $c[\varphi]$. The semantics of the Partee disjuncts is given in (4) and (5) respectively. N.b. the positive update of (4) simply removes bathroom worlds from c; the negative update removes non-bathroom worlds and introduces a bathroom dref x.

(4) a. $c[\text{there is no}_x \text{ bathroom}]_+ = c - c[\text{there is a bathroom}]$
b. $c[\text{there is no}_x \text{ bathroom}]_- = c[\text{there is a bathroom } x]$

(5) a. $c[x \text{ is upstairs}]_+ = c[x \text{ is upstairs}]$ if x is defined throughout c else $\emptyset$
b. $c[x \text{ is upstairs}]_- = c - c[x \text{ is upstairs}]$ if x is defined throughout c else $\emptyset$
c. $c[x \text{ is upstairs}]_? = c$ if x is undefined in some part of c else $\emptyset$

Each cell in the Strong Kleene truth table for disjunction is interpreted as a successive update. For expository purposes we only define $c[\varphi \vee \psi]_+$ here (6). Anaphora is possible because part of the positive update of disjunction involves updating with the negative part of the first disjunct (which introduces a bathroom dref x) followed by the positive part of the second disjunct. Note that this semantics is expressive enough to keep track of the (potentially overlapping) parts of the update which are true by dint of the first disjunct ($c[\varphi \vee \psi]_1 := c[\varphi]_+[\psi]_{+,-,?}$, here: non-bathroom worlds), and the part which is true by dint of the second disjunct ($c[\varphi \vee \psi]_2 := c[\varphi]_{+,-,?}[\psi]_+$, here: the bathroom worlds).

(6) $c[\varphi \vee \psi]_+ := c[\varphi]_+[\psi]_+ \cup c[\varphi]_+[\psi]_- \cup c[\varphi]_+[\psi]_? \cup c[\varphi]_-[\psi]_+ \cup c[\varphi]_?[\psi]_+$

We're now in a position to account for FC with anaphora. For concreteness, we adopt Goldstein's dynamic account. Goldstein's idea is that $c[\varphi \vee \psi]_+$ requires $c[\varphi]_+$ and $c[\psi]_+$ to be consistent. Instead, we make reference to $c[\varphi \vee \psi]_1$ and $c[\varphi \vee \psi]_2$; we formalize Goldstein's modal disjunction in as $\overline{\vee}$ (7). As is standard, we treat epistemic *might* as a consistency test (Veltman 1996, Groenendijk, Stokhof & Veltman 1996) (8).

(7) $c[\varphi \mathbin{\overline{\vee}} \psi]_+ := c[\varphi \vee \psi]_+$ if $c[\varphi \vee \psi]_1 \neq \emptyset$ and $c[\varphi \vee \psi]_2 \neq \emptyset$ else $\emptyset$

(8) $c[\Diamond\varphi]_+ := c$ if $c[\varphi]_+ \neq \emptyset$ else $\emptyset$

We're now in a position to see that $\Diamond(no_x \textit{ bathroom or } x \textit{ upstairs})$ dynamically entails $\Diamond(a_x \textit{ bathroom upstairs})$. For $c[no_x \textit{ bathroom or } x \textit{ upstairs}]_+$ to be non-empty, it's required that $c[no_x \textit{ bathroom}]_-[x \textit{ upstairs}]_+$ be non-empty by the $c[\varphi \vee \psi]_2$ requirement. For that to be the case, there must be some worlds in c in which there is a bathroom upstairs. It follows that every state which passes the consistency check $\Diamond(\varphi \vee \psi)$ is one which is consistent with there being a bathroom upstairs. Goldstein shows that this strategy can be generalized to non-epistemic modals too. Free choice with anaphora is thereby captured.

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Questions in non-distributive belief ascriptions (Enrico Flor - MIT)

Introduction Non-distributive (henceforth, ND) construals of belief ascriptions have recently received attention in the literature ([7, 8, 6, 10, 2, 3]). In the given scenarios, (1) and (2), adapted from [10] and [8], are true only in the ND construal, since both would be false if the plural attitude holder were replaced by just "A." or "B.". In (1), neither A. nor B. is committed to there being two monsters, in (2), neither is committed to both properties holding of Jane's girlfriend.

(1) *A. thinks there was a zombie; B. thinks there was a griffin. They separately tell Roy, who reports*: A. and B. think two monsters were in the castle! (true)

(2) *A. only thinks "rich"; B. only "linguist"*: A. and B. think Jane is dating a rich linguist. (true)

One choice point in the analysis of these ND construals is whether they are due to a plural-sensitive meaning of *think* ([8]), or they are instances of cumulativity between the plurality denoted by "A. and B." and a plurality of propositions resulting from a mechanism of projection of the embedded plural denoting expression ([10, 3]). The latter approach, relying on the presence of such plural denoting expression, cannot account for (2). I will defend an analysis of the former type, building on Pasternak's but overcoming its critical empirical inadequacies (see below) by implementing two general claims: that belief reports are always interpreted in relation to questions ([11]), so that subject matter sensitivity has semantic import, and that belief states (BSs) require a richer model-theoretic representation than classical propositions—namely, objects of type $(\mathsf{st})\mathsf{t}$ (henceforth, propositions$^{\mathsf{Q}}$), similar to the Inquisitive Semantics (IS) treatment of propositional content ([1, a.o.]). These, I argue, are general properties of the semantics of belief, but their full effect is only observable in some corners of the empirical landscape, like ND ascriptions. **Pasternak's account** Pasternak identifies plural BSs with the best set of worlds given an ordering induced by the Premise Set ([cf. 4, 5]) determined by the individual BSs. This derives the fact that summation of compatible BSs results in their conjunction, as in (2), summation of incompatible ones in their disjunction:

(3) *A. thinks "New Yorker"; B. thinks "Bostonian"; C. thinks "linguist"*: A., B. and C. think Jane is dating a linguist either from New York or from Boston. (true)

The prediction that $p \wedge q$ can be ascribed as a belief to "A. and B." if A. thinks p and B. thinks q overgenerates ND-construals, as [10, 6] point out. (4,5,6) are incorrectly predicted to be true here:

(4) *A. thinks "every dog at the party will play with Jane"; B. thinks "Fido will be the only dog at the party"* : A. and B. think Fido will play with Jane at the party. (false)

(5) *A. thinks "if Jane is a linguist, she is rich"; B. thinks "Jane is a linguist"* : A. and B. think Jane is a rich linguist. (false)

(6) *A. thinks "Jane is either from NYC or Boston"; B. thinks "Jane is from Boston"* : A. and B. think Jane is from Boston. (false)

The solution Following [11], who is concerned with different data, I assume that belief reports are always relative to a salient question: $[\![\, x \text{ think}_{\mathrm{Q}}\ p \,]\!]^w$ is defined iff p is an answer to Q and true iff p is x's BS relative to Q in w. In the spirit of IS, I assume that questions denote downward closed sets of states (sets of worlds). *What kind of person is J. dating?*, a question relative to which (2) can be interpreted, denotes a proposition$^{\mathsf{Q}}$ containing, for every property f, the set of worlds where f is true of Jane's girlfriend, and all of its subsets. One important feature of this type of questions is that they allow for non-exhaustive answers: only when belief reports are relative to such questions will we observe, like in (2), a collective belief that is stronger than the individual beliefs.

(7) $[\![\,\text{What kind of person is J. dating?}\,]\!] = \{s : \exists f_{\mathsf{s,e,t}}[s \subseteq \{w : \exists x_{\mathsf{e}}[f_w(x) \wedge \mathsf{dating}_w(\mathsf{j}, x)]\}]\}$

BSs are also downward closed sets of states: the individual BSs in (6) are $\{\mathsf{Boston}\}^{\downarrow} \cup \{\mathsf{NYC}\}^{\downarrow}$ and $\{\mathsf{Boston}\}^{\downarrow}$ ($\{\varphi\}^{\downarrow}$ is the set containing the set of worlds where φ is true and all its subsets). Entailment between propositions^{Q} is subsethood, just like for classical propositions; $\mathsf{info}(p)$, the informative content of p, is the grand union of all the sets in p, a classical proposition (p is true at w iff $w \in \mathsf{info}(p)$). Now we can give a question-sensitive definition of BS for atomic individuals (whereby $\mathrm{Dox}(x, w)$ is the set of worlds compatible with what x believes in w):

(8) $\mathcal{B}(Q, x, w)$ is the logically strongest p s.t. $\mathrm{Dox}(x, w) \subseteq \mathsf{info}(p) \wedge \forall s[s \in \mathrm{MS}(p) \rightarrow \exists s', \ldots, s'' \in \mathrm{MS}(Q)[s = \bigcap\{s', \ldots, s''\}]]$, where $\mathrm{MS}(p) := \{s : s \in p \wedge \neg\exists s' \in p[s \subset s']\}$

Thus, if x is unopinionated as to Q, $\mathcal{B}(Q, x, w) = Q$. In all cases, $\mathcal{B}(Q, x, w) \subseteq Q$, i.e., an opinionated BS relative to Q is an answer to Q. Belief reports assert opinionatedness of each individual attitude holder and they are defined iff the embedded proposition p is relevant given the salient Q (i.e., p must be the union of some states in Q). We then define for both plural and singular attitude holders:

(9) $[\![\,\mathsf{think}\,]\!]^{w} := \lambda Q.\lambda p.\lambda x : \mathrm{Rel}(Q, p).\mathsf{info}(\mathcal{B}(Q, x, w)) = p \wedge \forall y \sqsubseteq x[\mathcal{B}(Q, y, w) \subset Q]$

Accounting for (4, 5, 6) We correctly predict (4) and (5) to be false in the given scenarios, because in both cases the individual BSs cannot be answers to the same question. This is obvious for (4). In the case of (5), the point is that A.'s conditional BS is $\{\neg\mathsf{linguist} \vee \mathsf{rich}\}^{\downarrow}$, namely a proposition^{Q} that is not a subset of (7). In fact, A. in (5) is technically unopinionated as to a question like (7): they cannot commit themself on a property holding of Jane's girlfriend. The formal property of answerhood as subsethood delivers the desired result automatically. In order to make the correct prediction for (6), we need to finally leverage on the higher type assumed for BSs. Since conjunction and disjunction in IS are intersection and union, for any two distinct propositions^{Q} p and q, $p \vee q$ includes more maximal states than either p or q (disjunction is inquisitive, unlike other connectives). Thus, $\mathcal{B}((7), \text{A.})$ in (6) is an inquisitive proposition^{Q} with two maximal states. BSs being propositions^{Q}, we have a way to access the different possibilities entertained by A. in (6) in the formation of the plural belief, and make sure that A.'s uncertainty does not "get lost" in the ND-ascription: we want *A. and B. think Jane is either from Boston or NYC* to be true in (6). This is achieved straightforwardly if we adapt the premise negotiation mechanism used by Pasternak to our case, whereby states, rather than worlds, are ordered on the basis of a Premise Set of propositions^{Q}, rather than classical propositions. Given such a set B, we define an order $\prec_B$ s.t. $\forall s, s'[s \prec_B s' \longleftrightarrow \{p : s \in p \wedge p \in B\} \supset \{p : s' \in p \wedge p \in B\}]$, and a best proposition^{Q} relative to B as $\mathrm{Best}(B) = \{s : \neg\exists s' \in \mathcal{P}(W)[s' \prec_B s]\}$. The ordering guarantees that we obtain the strongest proposition^{Q} that satisfies all the premises. Crucially however, each possibility entertained by any individual attitude holder is a premise in its own right: this ensures that summation of $p \vee q$ and p does not result in p but rather in $p \vee q$.

(10) $\mathcal{B}(Q, x, w) := \mathrm{Best}(\{\{s' : s' \subseteq s\} : \exists y_{\text{AT}} \sqsubset x[s \in MS(\mathcal{B}(Q, y, w))]\})$, for $| x |> 1$

Thanks to the premise negotiation mechanism, we can account for the more complicated cases like (3) in a way parallel to Pasternak's account. **Outlook** The restricted distribution of "conjunctive" plural belief reports like (2) is naturally accounted for by the hypothesis that individual BSs must be answers (in a formal sense) to the same question, which must allow for non-exhaustive answers (as is commonly the case for questions where the *wh*-quantifier ranges over a domain of properties, cf. [9]). Furthermore, the question-sensitive analysis enables us to give a natural explanation for the cases in which the ND-construal can be enforced by effectively bypassing this very requirement. If the independently needed notion of distinctness of belief objects ([2, 3]) is adopted, cases like (1) are covered too. Finally, I will explore some general consequences of assuming a semantics like the one stated above for *think*, and potential extensions to other attitude report predicates.

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Vanilla rules: The "no ice cream" construction

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Introduction *General Prohibitives* (GPs) in English are constructions that feature gerunds as well as ordinary, non-deverbal, nominals with an imperative flavor. Unlike regular imperatives, these constructions are licensed only under certain operators, such as negation (1a,b) and *only* (1c,d). Across languages, GPs also feature infinitives (Iatridou 2021; Portner et al. forth.).

(1) a. No littering on the beach! / #Littering on the beach!
b. No motorized vehicles beyond this point! / #Motorized vehicles beyond this point!
c. Walking only in this area.
d. Authorized personnel only!

GPs have been argued to be a type of non-canonical imperative: a construction that, despite having a non-standard syntactic packaging, has the same illocutionary force as imperative utterances. Thus, Iatridou (2021) argues that GPs always function as commands, just like root infinitives in languages like German (Gärtner 2014) or Russian. Donovan (2020) goes as far as claiming that GPs are vanilla imperatives semantically and can perform a range of directive speech acts. We present a series of arguments against the imperative view and propose instead that GPs are assertions that refer to a pre-existing rule (cf. intuition expressed by Portner et al. (forth) for Italian and Korean). Like other statements with normative expressions (e.g., deontic modals), GPs as such are not inherently performative but can be interpreted this way. We also discuss the impersonal flavor of GPs.

Empirical landscape Imperatives across languages are well-known to exhibit functional heterogeneity (Kaufmann 2012; Schmerling 1982) and perform a range of mostly directive speech acts: commands, permissions, suggestions, advice, and even wishes. Donovan (2020), who advocates an imperative analysis of GPs, argues that they have the same functional heterogeneity. In line with Iatridou (2021), we argue that the performative effect of GPs is limited to command uses. (2) illustrates that only a negative imperative, but not a GP, is allowed in a suggestion scenario.

(2) A. I have to swim, run and cycle when training for a triathlon. But since my time is limited on weekends, do you have any suggestion which of these I could drop?
B. Maybe don't swim. / #Maybe no swimming.

We depart from Iatridou (2021) in arguing that GPs are not inherently performative. We show that—unlike even non-canonical imperatives—GPs are truth-evaluable, do not require speaker's endorsement and are not always used to issue new commands. Illocutionary force of an utterance is usually not evaluable for truth (Roberts 2018), as (3) illustrates for negative imperatives. GPs, on the other hand, can be targeted by anaphors such as *That's not true* (4), which shows that their contribution is descriptive. Non-canonical imperatives, such as German root infinitives, pattern like regular imperatives and are always performative, which is precisely the behavior Iatridou (2021) incorrectly predicts for GPs.

(3) A. Don't smoke in this bar!
B. #That's not true. (Intended: 'There is no such rule here.')

(4) A. No smoking in this bar!
B. That's not true. (I see no sign saying that, plus there are ashtrays on the tables.)

Another argument against the imperative view is the lack of speaker's endorsement. Ordinary imperatives commit the speaker to a preference for the prejacent being actualized (Condoravdi and Lauer 2017; Harris 2021). Although imperatives may have acquiescence uses (von Fintel and Iatridou 2017), the felicity conditions of commands require that the speaker endorse the sentence radical (5a). GPs, on the other hand, are compatible with the speaker explicitly disavowing the rule (5b).

(5) a. Don't smoke in this bar. #But I don't care if you do. / #But I wish it were otherwise.
b. No smoking in this bar. But I don't care if you do. / But I wish it were otherwise.

Finally, while imperatives can be used in any context where the speaker issues a one-off request (6a), GPs typically refer to a rule that is already in place prior to conversation (6b). (6b) is only felicitous if this was previously agreed upon.

(6) *A is watching B making a salad and says:*

a. Don't put yoghurt, I hate it.

b. #No putting yoghurt in the salad, I hate it.

GPs can be used to issue commands when the speaker has relevant authority (7b), but even in that case, unlike with imperatives (7a), the command becomes a rule that has to be followed from now on:

(7) *Bar owner to a guest:*

a. Don't smoke here. [can be a one-time order]

b. No smoking here. [describes a new rule]

Proposal We propose that GPs encode a covert deontic operator O, which states that the prejacent follows from the objective rules relevant in the context. More formally, we assume the semantics below, where $Deon_{w,c}$ stands for the set of worlds compatible with the objective rules in w that are relevant in c.

(8) $[\![O]\!]^{w,c}(p) = 1$ iff for all $w' \in Deon_{w,c} : p(w') = 1$

As for the internal structure of GPs, we adopt the existential construction analysis of Donovan (2020). According to this analysis, a GP has the structure as exemplified in (9):

(9) A. $[_{ModP} O\ [_{TP}$ ~~there is~~ no smoking here]]

B. $[_{ModP} O\ [_{TP}$ ~~there is~~ authorized personnel only]]

Evidence for this analysis comes from tags, where presumably the tag copies the subject and the auxiliary of its antecedent.

(10) No smoking here! Actually, is there? / *are you? / *is it? (cf. Donovan 2020:20)

The rule-like behavior of GPs is supported by the fact that these constructions can answer a QUD about rules, just like sentences with overt deontics (11).

(11) A. What are the rules in this park?

B. No littering, no barbecuing on the grass, no dog poop, … [GPs]

B'. You are not allowed to litter, you are not allowed to barbecue on the grass, you are not allowed to leave dog poop, … [deontic modals]

In cases of assumed authority (cf. 7b), GPs can get a non-truth-evaluable performative reading (12).

(12) *Bar owner to a guest:*

A. You are not allowed to smoke in here. / No smoking in this bar.

B. #That's not true.

Crucially, just like overt deontics and unlike imperatives (cf. also discussion in Condoravdi and Lauer 2017), GPs are not inherently performative, a fact reflected in our modal semantics.

Conclusion We have shown that GPs differ from imperatives and are more akin to overt deontic statements. Nevertheless, we also observe that unlike the case of overt deontics, GPs seem to be restricted (syntactically, semantically) to gerunds and generic DPs. This restriction receives an explanation on our proposal: since GPs express rules, only embedded predicates that make a generic interpretation available are compatible with GPs. As exemplified in (11) above, GPs answer a QUD about what a rule says in a particular context. But since they are not performative (unless the speaker has authority, cf. 7 and 12), the utterance of GPs is interpreted as answering a QUD about a rule, in which case it is informative, or it can be accommodated as such, in which case it serves as a reminder for the addressee (13):

(13) No smoking in this bar, remember?

Importantly, as per our semantics in (8), the rule is merely described and the addressee is understood to be generally bound by it. Like other generic statements (Greenberg 2007), it allows exceptions, for example, if licensed by the speaker's authority (14):

(14) Hey, no smoking here! But if you're on your way out, then OK. Just be quick.

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What Does *Vajon* Contribute?

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The Hungarian particle *vajon* can be added to interrogatives to render the question acts they are used for "reflective" in the sense of raising a question without answer request ([1], p.755), i.e., with weakened "call-on-addressee" ([2]). This effect puts *vajon* in close proximity with triggers of "non-intrusive" questions (NIQs), as noted by [3](p.19), and "conjectural" questions (CQs) ([4]). Studying *vajon* against this theoretical background [A] uncovers difficulties for content-based approaches to particle/clause type (in)compatibilities; [B] demonstrates the need to distinguish two types of rhetorical questions; [C] plausibilizes the view that *vajon* is a CQ-trigger, and [D] adds another example to the inventory of cross-linguistic indirect speech act discrepancies.

[A] As shown in (1), *vajon* is strictly banned from declarative clauses (**vajon*-DEC).

(1) (* *Vajon*) *Ezeknek a furcsa szimbólumoknak van jelentésük.* (\)
vajon these.DAT the strange symbol.PL.DAT be.3SG meaning.their
"These funny symbols have a meaning."

Importantly, **vajon*-DEC also covers "rising declaratives" (RDs), which implies that the elegant account by [3] of the parallel constraint on the Romanian NIQ-trigger *oare* in standard declaratives should not be combined with the analysis of RDs by [5]. In technical terms, taken as an "NIQ-trigger," *vajon* would contribute $DC_{Ad} \cup \{ \text{info}(I) \}$ to the projected set (ps) of future addressee discourse commitments, which will always be redundant for declaratives ([3], p.20). The latter project $DC_{Ad} \cup \{ p \}$, where the denoted "issue" $I = \{\{ p \}\}$ (downward closure disregarded), and $\text{info}(I) = \cup I = p$. At the same time, [5] assimilate RDs to polar interrogatives in denoting $\{ p, \overline{p} \}$ and projecting $DC_{Ad} \cup \{ p \}$ and $DC_{Ad} \cup \{ \overline{p} \}$. And, given that $\cup\{ p, \overline{p} \} = W$ (in the general case), adding $DC_{Ad} \cup \{ \text{info}(I) \}$ creates the characteristic "non-intrusive" option of a compliant reaction that does not resolve the issue. Thus, *vajon*-marked RDs are incorrectly predicted to be fine.

A purely pragmatic approach to this clash isn't likely to succeed. Without *vajon* (and prosodically marked by repeated /\), (1) could be used as an "incredulous" ([6]) RD – Hungarian doesn't have "confirmatives" ([7]) and "assertives" can be disregarded – in a meeting of researchers inspecting the field notes of an absent colleague. Addressed to the "conversational community" ([3], p.25), such an utterance would not "put anyone on the spot." In the same context, a polar interrogative counterpart containing *vajon* is equally felicitous, directly encoding the weakened call-on-addressee. Likewise, attributing **vajon*-RD to some kind of "anti-bias" – as suggested wrt *NPI-RD ([5], p.280; see [8], 2.7; [9], for further discussion) – fails to account for occurrences of *vajon* in interrogatives used as rhetorical questions (RHQs), such as (2).

(2) *(Vajon) Megtett a kormány mindent, hogy elkerülje a válságot?* (/\)
vajon VM.did the government everything.ACC that VM.avoid.SUBJ the crisis.ACC
"Has the government done everything to avoid the crisis?"

[B] Cases like (2) bring out interesting subtleties involved in the interaction between RHQs and NIQ-triggers as laid out by [3]. In particular, the idea that for RHQs "the input context resolves the issue they raise in an obvious way" (p.36) threatens to systematically void the contribution of the NIQ-trigger and predicts **vajon*-RHQ in analogy to **vajon*-DEC. For (2), $DC_{Ad} \cup \{ p \}$ would be undefined and $DC_{Ad} \cup \{ \text{info}(I) \} = DC_{Ad} \cup \{ \overline{p} \}$. The solution to this relies on a derivational mechanism that first projects all three DC-updates and then "discards" the undefined ones (p.36). The resulting pragmatic "mock non-intrusivity" fits in strikingly well with the fact that *vajon* only occurs in initiating RHQs promoting potentially controversial claims, while it is ruled out from reactive RHQs with "trivial" content, such as (3) (see below) (used, for example, to reject a childish request). From the above perspective,

(2) would require contextual adjustment ("accommodation") as familiar from "informative presuppositions," and *vajon* heightens the off-record status ([10], p.69) of this imposition.

(3) (# *Vajon*) *Az anyád* *vagyok?* (/\)
vajon the mother.your be.1SG
"Am I your mother?"

[C] At first glance, the existence of (2) rules out considering *vajon* a CQ-trigger, given that the prime examples for CQ construal, i.e., German root *ob*-(*wohl*-)V(erb)F(inal) clauses, "cannot be used as rhetorical questions" ([4], p.35). At the same time, *vajon* differs from the Romanian NIQ-trigger *oare* in contexts where the latter serves to "tactfully" grant non-resolving addressee compliance in spite of manifest addressee competence ([3], p.28). Adding *vajon* to such examples – e.g., (4) *Where are you?* (uttered over the phone) – is infelicitous (#), or giving the impression of a sudden shift to a self-addressed aside. Confirmed by parallel facts for German *ob*-(*wohl*-)VF, this behavior is in line with core properties of CQs, whose "answers are defeasibly inferred from pooled knowledge of speaker and addressee" ([4], p.31). Going for such answers isn't called for in cases like (4), where addressee competence must be assumed.

To tip the scale for *vajon* in favor of an analysis as CQ-trigger, the status of (2) has to be further scrutinized. Signaling a mere "invitation to joint speculation" ([4], p.31) while steering toward an apparently unassailable conclusion, can be considered a conventionalized means of provocative persuasion. In fact, the majority of such examples stem from public political discourse. Furthermore, *vajon*-questions felicitously remain unanswered by "unhelpful" knowledgeable interlocutors, a hallmark "conventionalized reaction" to CQs ([4], p.35).

Formally, *vajon* as CQ-trigger will have to do double duty and introduce both the STEREO relation ([4], p.17), responsible for the "quality" of pooled knowledge, and the SHARE operator, inducing joint answer responsibility ([4], p.32). Although *vajon*-questions overall seem to preferably be reacted to by silence rather than speculation, attempts to do without SHARE, may fail to predict "equal expertise"-effects. Thus, even where none of the interlocutors can resolve a certain issue, posing a *vajon*-question concerning that issue by a non-expert to an expert is infelicitous (#) – e.g., (5) *Who will get the job?* (uttered by an outsider to a committee member at an early stage of the job search).

A radical step toward making the appropriate distinctions between *oare* and *vajon* within the approach by [3] could have *vajon* restrict the ps options to just $DC_{Ad} \cup \{ \text{info}(I) \}$, which amounts to an elimination of any addressee competence assumption. The operation would be non-monontonic in the sense of disregarding the interrogative update of ps ($ps_{c[I]}$) ([3], p.18) and targeting the original input ps (ps^{i}) instead. The signal of "curiosity" resulting from putting an issue on the table accompanied by a strict expectation of non-resolving addressee compliance fits well with the persuasive strategy underlying (2), the effect of seemingly talking to oneself in (4), and the infelicity of *vajon*-questions in contexts like (5), where it would add heightened disrespect as an additional factor.

[D] Finally, characterizations of NIQ-triggers as "'softening' the question, or making it more polite" ([3], p.19) and CQs as "invit[ing] to engage [...] in joint speculation" ([4], p.28) lead one to expect the suitability of NIQs and CQs for the performance of particularly polite indirect requests. And indeed, this is directly confirmed for German ([11], p.182) (for Danish, see [12], p.126), with the proviso that a cue like *bitte* ("please") seems to have to be added:

(6) *Ob du mir wohl bitte die Tür öffnest?* "Could you please open the door for me?"

At the same time, the Hungarian counterpart of (6) involving *vajon* is infelicitous, with or without cues of polite request: (7) *(# Vajon) Kinyitod nekem légyszi az ajtót?* (/\)

Conventionalization as explanation aside, the option of introducing a higher degree of self-addressedness into *vajon*-CQs stands next to searching for a mechanism that captures

"pragmatic freezing" ([13], p.496). We speculate that "shielded use conditions," i.e., use conditions that persist under Gricean reasoning, are an appropriate means. (E.g., *Vajon*-questions concern information.) This would be compatible with an indirect speech act approach to the RHQ-construal of (2) and might even help explain the infelicity of (3).

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A pitch accent beyond contrastive Focus marking: experimental evidence from auditory rating

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Intro According to the influential account developed by Rooth (1985, 1992), Focus evokes a set of propositional alternatives obtained from replacing the Focus-marked constituent with a variable, as in (1). In an intonational language like English, the location of Focus is marked via stress or, in phonological terms, pitch accent. However, prominent accounts of the intonational phonology of English like the ToBI transcription system (Beckman et al. 2005) posit multiple accent types. A resulting question is whether all accent types equally mark Focus or whether there is a separate characteristic meaning attributable to them. Here we address this issue with two auditory rating studies examining pitch accent differences, with their interaction with *at least* as starting point.

(1) a. Emma won $[\text{SILVER}]_F$.
b. $[\![\text{Emma won } [\text{SILVER}]_F]\!]^f$ = { Emma won silver, Tiffany won silver, ... }

Pitch Accents The widely adopted set of accent types in ToBI consists of H*, LH* and L*H. A large body of work has focused on H* vs LH* distinction, with LH* often dubbed contrastive, linking it to Rooth's notion of Focus. This categorization has been supported by psycholinguistic work showing how LH* affects the generation of alternatives (e.g. Watson et al. 2008, Husband & Ferreira 2016). For instance, Gotzner (2019) shows that LH* in German increases the rate of implicature calculation. Here we focus on the less studied L*H accent, testing the hypothesis that it induces an evaluative scale (Pierrehumbert & Hirschberg 1990, Göbel 2019).

At least *At least* is ambiguous between two interpretations: it either indicates a lower bound on what is known (=*epistemic*, (2a)) or marks lower alternatives as less desirable (=*concessive*, (2b) (Nakanishi & Rullmann 2009). Unified analyses like Biezma (2013) and Chen (2018) capture this ambiguity by treating *at least* as a Focus-particle with a contextually determined scale, either via the QUD or a measure function, with epistemic *at least* using an entailment scale and concessive *at least* an evaluative scale. One informative cue to disambiguation is the syntactic position of *at least*, as used in (2). However, no such cue is available when *at least* modifies the subject, as in (3). The first experiment assessed the intuition that the type of pitch accent on the modified constituent affects how *at least* gets interpreted, with our hypothesis predicting that an L*H accent should be more compatible with concessive *at least* by virtue of evoking an evaluative scale.

(2) a. Emma won **at least** $[\text{SILVER}]_F$(, but maybe even gold).
b. **At least** Emma won $[\text{SILVER}]_F$(, it could've been just bronze).

(3) **At least** $[\text{EMMA}]_F$ won silver.

Exp1 The experiment used auditorily presented dialogues that crossed two factors in a 2x2 Latin-square design. First, the CONTEXT sentence was either a *how many*-question targeting the subject (4a-i), or an assertion expressing a negative attitude about the falsity of a higher scale item (4a-ii), each being most compatible with an epistemic or a concessive interpretation of *at least* respectively. Second, the INTONATION of the target sentence either had a rising accent on *at least* followed by a falling accent on *some* (=(LH*)+H*)), or no accent on *at least* and an accent with a delayed peak on *some* (=(∅+)L*H) (4b) (sample audio linked below). The remainder of the sentence was deaccented and had a final fall in both conditions.

(4) Sample Item, Experiment 1

a. *Context Sentence*

(i) A: How many children do you think ate their broccoli? (epistemic)

(ii) A: I'm shocked that not all of the children ate their broccoli. (concessive)

b. *Target Sentence*

B: At least SOME of the children ate their broccoli. [(LH*+)H*], [(∅+)L*H]

41 participants rated 24 sentences of this type and 24 fillers on a 6-point Likert scale according to the perceived naturalness of the dialogues. Results are shown in Figure 1 and were analyzed using ordinal mixed effects regression with sum-coding. Epistemic CONTEXTS were rated better than concessive ones (z=-6.31, p<=.001***) and H* INTONATION better than L*H (z=-2.09, p<=.05*). Additionally, there was a significant INTERACTION, with ratings for H* increasing more in epistemic contexts than ratings for L*H (z=1.99, p<.05*).

Interim Discussion This pattern of results is in line with the hypothesis that L*H induces an evaluative scale, which should be more compatible with concessive *at least*, leading to decreased acceptability in mismatching contexts. The next experiment addressed the question if the effect of L*H was due to it indirectly biasing the interpretation of *at least*, or if the accent makes its own independent contribution, and additionally if the effect depends on the combination with the presence or absence of an accent on *at least*.

Exp2 To address these issues, the same design and stimuli were used, except that *at least* was manually removed from the audio recordings, rendering the accent comparison more minimal, as in (5). Any difference would thus have to be attributable to the contrast in pitch accents.

(5) *Target Sentence, Experiment 2*

B: SOME of the children ate their broccoli. [H*], [L*H]

Results from 33 participants are shown in Figure 2. The statistical analysis yielded a pattern similar to Experiment 1: epistemic contexts received higher ratings than concessive ones (z=-8.05, p<.001***), but there was no effect of INTONATION (z=-1.35, p=.18). However, the INTERACTION was again significant such that the increase in ratings for epistemic contexts was larger with H* than L*H (z=2.26, p<.05*). This pattern thus provides direct evidence that the difference in accent type is making its own contribution, rather than being mediated through the ambiguity of *at least* or dependent on (the absence of) a preceding pitch accent.

Concluding Discussion The two experiments showed how differences in the type of pitch accent can affect the acceptability of an utterance in context. Crucially, this finding would not be accounted for by assuming that both H* and L*H only mark Focus. Moreover, assuming that L*H is a phonological variant of the "contrastive" LH* with an exhaustive meaning seems implausible given the data: an exhaustive interpretation of (5) seems odd as a reply to the concessive context sentence in (4a-ii) due to its uninformativeness, but the rating difference was restricted to L*H being less acceptable than H* in epistemic contexts (confirmed by a post-hoc pairwise comparison). Instead, the pattern of results is most naturally accounted for by taking the L*H accent to evoke a contextual scale that leads to a meaning resembling concessive *at least* even in the absence of an overt operator. We suggest that this contribution is best captured by L*H directly affecting Rooth's squiggle-operator and adding the restriction that alternatives have to be ranked evaluatively (Göbel 2019) to account for the independence of but possible interaction with *at least*.

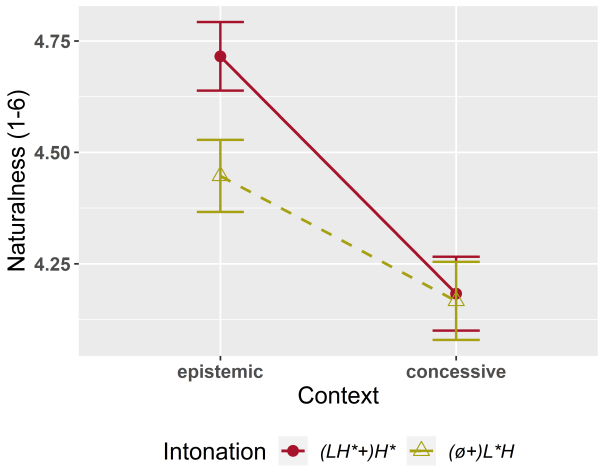

Figure 1: Mean ratings by condition, Exp1.

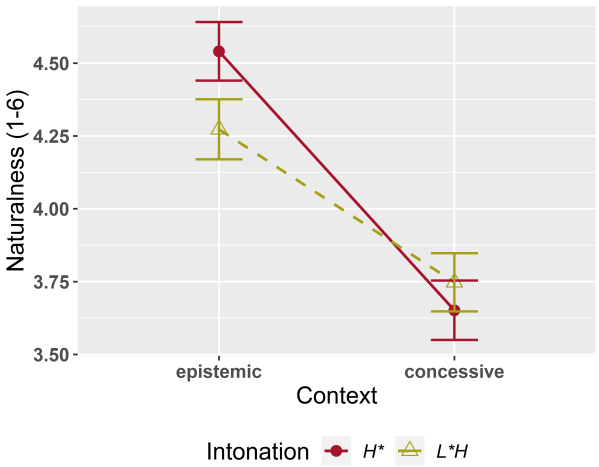

Figure 2: Mean ratings by condition, Exp2.

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Presupposition projection from the scope of 'say'

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Introduction. Presupposition projection out of embedded clauses has received much attention over the last few decades (Karttunen 1973, Heim 1992, Geurts 1998, Uegaki 2021, a.o.). Most existing work focuses on declaratives and interrogatives embedded under attitude predicates. Very little is discussed however about the projection pattern of presuppositions from under verbs of saying. The goal of this work is to fill this gap by investigating presupposition projection from the scope of 'say'. Common wisdom attributes verbs of saying the label of presupposition plugs. We show, however, that this characterization is not completely accurate. We provide a set of data from French, German, Italian and English that shows differences in projection behavior from two types of embedded clauses—declaratives and interrogatives (for space reasons, only the French data and corresponding English translations are included here.) We show on one hand that presuppositions from strong triggers in embedded declaratives are filtered through 'say' to the attitude holder's beliefs. On the other, the existential presupposition of embedded interrogatives (and of strong triggers embedded therein) project all the way to the speaker's beliefs. These results show that 'say' behaves differently from other responsive predicates, suggesting an analysis of 'say' as ambiguous between a rogative and anti-rogative predicate with different projection properties.

Embedded declaratives. Example (1) shows that a declarative involving a strong presupposition trigger like 'too'/'also' can be embedded under 'say' when the speaker (SP) does not take for granted its presupposition $\pi(p)$ (i.e., someone other than Zoe has bought milk). In contrast, such a declarative cannot be embedded under 'say' when the attitude holder (AH) does not take $\pi(p)$ for granted (2). Thus, $\pi(p)$ is anchored to the AH's beliefs at the matrix level. This projection pattern is robust across the four languages under study, and across embedded declaratives involving other strong presupposition triggers, e.g., clefts.

(1) AH but not SP believes π(p):

When I left my appartment this morning, there was no milk left in the fridge.

Max me dit qu'il a acheté du lait, mais je ne le crois pas. Une heure plus tard, il me dit que Zoé **aussi** a acheté du lait. D'après moi il est encore en train de mentir.
'Max tells me he bought some milk, but I don't believe him. One hour later, he says to me that Zoe bought some milk too. I still think he's lying.'

(2) SP but not AH believes π(p):

I bought some milk this morning. Back home, as I open the fridge I see that Max also bought some. Max didn't see the new milk, and thinks he's the only one who bought milk.

Il va voir Zoé et il lui dit que lui **aussi** a acheté du lait.
'So he goes to Zoe and he says to her that he bought milk too.'

Embedded interrogatives. Examples (3) and (4) show that a *wh*-question like 'Who bought milk?' cannot be embedded under 'say' when either of the illocutionary agents (SP in (3) and AH in (4)) does not take for granted its presupposition $\pi(Q)$ (i.e., someone bought milk). This suggests that the presupposition π(Q) projects to the matrix level. We found this projection behavior across several types of embedded interrogatives, including 'who'-questions, 'what'-questions and polar questions involving strong presupposition triggers like 'too'/'also' in French, German and English.

Because in Italian the verb *dire* 'say' cannot embed *wh-* and polar questions, this set of data could not be replicated in this language.

(3) AH but not SP believes π(Q):

When I left my appartment this morning, there was no milk left in the fridge.

Contrairement à Max, je pense que personne n'a acheté de lait. Lui me dit qui en a acheté.
'Unlike Max, I think that no-one bought milk. He says to me who bought some.'

(4) SP but not AH believes π(Q):

I believe that there is a new milk carton in the fridge. Max heard one of his flatmates talk about it, but he is skeptical.

Je demande à Max ce qu'il a entendu. Il me dit qui a acheté du lait, pourtant il ne croira pas qu'il y en a tant qu'il ne le verra pas.
'I ask Max about what he heard. He says to me who bought milk, yet he won't believe that there is some until he sees it.'

The contrast found between the projection behavior of presuppositions out of embedded declaratives and embedded interrogatives leads to several empirical and theoretical insights.

① **'Say' is not a 'plug' with strong presupposition triggers.** Since Karttunen (1973), it is assumed that verbs of saying are plugs, i.e., they block the presuppositions of the declarative they embed. To our understanding, this claim is based on the projection behavior of presuppositions coming from weak presupposition triggers. This study however shows that when strong presuppositions triggers (e.g., 'too'/'also', clefts) are embedded under 'say', this predicate does not act as a plug: the presupposition of the embedded declarative is anchored to the AH's beliefs at the matrix level. In the case of embedded interrogatives, the predicate 'say' acts as a 'hole' as it lets the presupposition of the complement become a presupposition of the matrix sentence. In sum, we observe a 3-way projection behavior under 'say': (i) presuppositions from weak triggers are blocked, (ii) those from strong triggers in declaratives are filtered to the AH's beliefs, and (iii) those from interrogatives project as is to the matrix level.

② **An ambiguity account of declarative and interrogative-embedding 'say'.** This study shows that 'say' behaves differently from other responsive predicates (i.e., that can embed both declaratives and interrogatives) like 'know' and 'be certain'. For these predicates, Uegaki (2021) claims that the existential (and uniqueness) presupposition of questions projects in the same way as the prejacent and its presuppositions in a declarative complement. If 'say' were to follow this pattern, since it is non-veridical, we expect it to block the existential presupposition from projecting. However, this is not what we observe. We take this to be evidence that 'say' in English, French and German does not directly embed questions through a composition mechanism that derives question-embedding from declarative-embedding, as proposed in Spector and Egré (2015). Instead, it is ambiguous between an anti-rogative non-veridical predicate, as in (5-a), and a rogative predicate associated with a factive presupposition, as in (5-b).

(5) a. $[\![\text{ say }]\!](p)(x)(w)$ is defined iff $Dox^x_w \subseteq \pi(p)$
b. $[\![\text{ say }]\!](Q)(x)(w)$ is defined iff $\pi(Q)$

Presupposition projection from strong vs. weak triggers. We explain this difference by allowing presupposition accommodation under 'say', which targets weak triggers only (Abusch, 2002). As

a result, we observe only presuppositions from strong triggers being obligatorily anchored to AH. In contrast, other attitude predicates don't display this difference (as per Karttunen's well-known claim), which we take to stem from the inability to accommodate presuppositions below them.

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A dynamic alternative-pruning account of asymmetries in Hurford disjunctions

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Puzzle. Hurford Disjunctions (HD) are of the form $p \vee q$ where $p \Rightarrow q$ and are generally deemed infelicitous (Hurford, 1974): *#Jolyne lives in Paris or France*. This is known as Hurford's constraint (HC). Singh, 2008b however, noticed that HDs involving scalemates are subject to an asymmetry: a weak-to-strong scalar HD is felicitous (1a), while a strong-to-weak one is not (1b).

(1) a. Joseph ate some or all of the cookies.
b. # Joseph ate all or some of the cookies.

➤ **Since the asymmetry arises in the presence of scalar items, it must result from an interplay between scalar implicatures (SI) and Hurford's constraint.**

Background on Exhaustification. The grammatical view of SIs (Chierchia et al., 2012; Fox, 2007; Spector et al., 2008) posits that the covert exhaustivity operator EXH ($\simeq$*only*), is inserted (merged) at the syntactic level. EXH takes a proposition p and a set of alternatives to p $\mathscr{A}_p$,[1] and returns the conjunction of p with the negation of strictly stronger alternatives.[2]

$$\textsc{Exh}(p, \mathscr{A}_p) = p \wedge \bigwedge \{\neg q \mid q \in \mathscr{A}_p \wedge q \Rightarrow p \wedge q \not\Leftarrow p\}$$

This view is promising since it allows to exhaustify *within* the weak disjunct – which may rescue the whole structure from HC-violation. For instance, given that *all* ($\forall$) is an alternative to *some* ($\exists$), (1a) would yield $\textsc{Exh}(\exists, \{\forall\}) \vee \forall = (\exists \wedge \neg\forall) \vee \forall$, which is HC-compliant (exclusive disjuncts). However, the asymmetry remains, since (1b) would be rescued by EXH as well. ➤ **EXH must be made asymmetric somehow.**

Previous accounts. Fox and Spector, 2018 (henceforth F&S) postulated that EXH should *not* be inserted whenever it is *Incrementally Weakening* (IW), i.e. when it leads to a weaker meaning of the whole sentence, for any continuation thereof. This captures (1) (and also (3) and (4)!), but at the cost of positing a quite complex and global principle. Tomioka, 2021, building on Rooth, 1992, proposed that HC was a matter of contrastive focus between two (scalar) items. This correctly predicts that the asymmetry extends to other contrastive environments, e.g. *but*-statements (2). However, replacing *but* by *or* in (2) makes the asymmetry vanish, suggesting that HC cannot be reduced to a formal constraint between *scalemates*, but really is about the logical relation between *disjuncts*.

(2) a. Adam did some of the homework, but✓/or✓ Bill did all of it. (Tomioka, 2021)
b. Adam did all of the homework but#/or✓ Bill did some of it.

Capturing the basic asymmetry. The key novelty of our account is that the set of alternatives to p, $\mathscr{A}_p$, is made sensitive to preceding elements. Let R contain a focused scalar item. We assume with Rooth, 1992 that R has an ordinary semantic value $[\![R]\!]_o$, and a focus semantic

[1] Alternatives may be determined *via* a lexically encoded "scale" (Gazdar, 1979), focus (Rooth, 1992), or a specific question-under-discussion (Groenendijk and Stokhof, 1984).

[2] A more accurate implementation of EXH requires the notion of INNOCENT EXCLUSION, which guarantees that the stronger alternatives are negated in a non-arbitrary way (Fox, 2007). But none of the cases studied in this work require this more complex notion.

value $[\![R]\!]_f$, defined as the set of propositions identical to $[\![R]\!]_o$, except that the focused element is replaced by a salient alternative that is at most as complex. The set of alternatives to R is then:

$$\mathscr{A}_R = \begin{cases} [\![R]\!]_f \setminus [\![L]\!]_o \text{ if } \exists L \prec_{\mathscr{L}} R.\ [\![R]\!]_f = [\![L]\!]_f \\ [\![R]\!]_f \text{ otherwise} \end{cases} \qquad \text{(Dynamic Alternative Pruning (\textbf{DAP}))}$$

Where $\prec_{\mathscr{L}}$ represents local linear precedence within a disjunctive statement. Following Tomioka, 2021, we call L the contrast antecedent (CA) of R. In (1a), applying EXH to the 1st disjunct ($L = \exists$) yields $\exists \wedge \neg\forall$, because L has no CA. The 2 disjuncts become exclusive and (1a) is rescued. In (1b), the 2nd disjunct ($R = \exists$) has the CA $L = \forall$, which is then pruned from $\mathscr{A}_R$. EXH becomes idle, and (1b) remains HC-violating. This result can be easily generalized to other scalar HDs, such as *Lisa ate cake or ice cream, or both* ($= (p \vee q) \vee (p \wedge q)$).

Cases of HC-obviation. F&S noticed that the asymmetry vanishes in various cases, whereby both orders are fine (HC-*obviation*).
1) Distant entailing disjuncts. When the 2 scalar items are separated by a salient alternative, the strong-to-weak order appears felicitous (3) (Fox and Spector, 2018).

(3) *Context: does Rohan remember most (*M*) of the book?*
Rohan remembers all or some of the book. $\forall \vee \exists$

Our account correctly rescues (3). Indeed, $\forall$ constitutes a legit CA to $\exists$, so $\mathscr{A}_\exists = \{\text{M}, \forall\} \setminus \{\forall\} = \{\text{M}\}$ by DAP. Thus, $\text{EXH}(\exists, \mathscr{A}_\exists) = \exists \wedge \neg\text{M} \not\Leftarrow \forall$, i.e., the disjuncts become non-entailing.
2) Universally quantified disjuncts. HC-obviation also occurs when the items are embedded under $\Box$ (4) or $\forall$ (Fox and Spector, 2018).

(4) a. Jonathan must solve HW1 **or** HW2, or he must solve **both**.
$\text{EXH}(\underbrace{\Box(p_1 \vee p_2)}_{L}) \vee \underbrace{\Box(p_1 \wedge p_2)}_{R}$

b. Jonathan must solve HW1 **and** HW2, or he must solve **either**.
$\underbrace{\Box(p_1 \wedge p_2)}_{L} \vee \text{EXH}(\underbrace{\Box(p_1 \vee p_2)}_{R})$

In (4a), $\mathscr{A}_L = \{\Box p_1, \Box p_2, \Box(p_1 \wedge p_2)\}$. $\Box p_1$ and $\Box p_2$ being the only 2 stronger alternatives, EXH yields $\neg\Box p_1 \wedge \neg\Box p_2$, contradicting R. In (4b), $\mathscr{A}_R = \{\Box p_1, \Box p_2\}$, since $L = \Box(p_1 \wedge p_2)$ is pruned. Yet, this does not affect EXH, which again yields $\neg\Box p_1 \wedge \neg\Box p_2$, contradicting L.
3) Scalar long-distance HDs (LDHDs). In LDHDs (Marty and Romoli, 2022), the strong item occurs in a lower-level disjunction. Non-scalar LDHDs are deemed infelicitous: *#John lives in France, or in Paris or London*. (5) compiles *scalar* LDHDs arranged in various linear orders.[3]

(5) a. Trish ate most of the cookies, or (else) she ate none or all of them. $\text{M} \vee (\neg\exists \vee \forall)$
b. Trish ate most of the cookies, or (else) she ate all or none of them. $\text{M} \vee (\forall \vee \neg\exists)$
c. ?Trish ate none or all of the cookies, or (else) she ate most of them. $(\neg\exists \vee \forall) \vee \text{M}$
d. Trish ate all or none of the cookies, or (else) she ate most of them. $(\forall \vee \neg\exists) \vee \text{M}$

Surprisingly, sentences in (5) sound fine. This is predicted by our account: since DAP searches CAs locally, at the level of each $\vee$, no relevant CA can be found in (5), which leads to standard exhaustification across the board. We thus have (5) = $\text{EXH}(\text{M}, \{\exists, \forall\}) \vee (\neg\exists \vee \forall)$ =

[3]We tried to eliminate a triviality issue in (5) by using *most* instead of e.g. *some* as a weak scalemate.

$(\mathrm{M} \wedge \neg\forall) \vee (\neg\exists \vee \forall)$, i.e., 2 exclusive disjuncts. F&S's account on the other hand, rescues (5a) and (5b), but bans (5c) and (5d), where EXH is IW, because: $(\neg\exists \vee \forall) \vee (\mathrm{M} \wedge \neg\forall) = (\neg\exists \vee \forall) \vee \mathrm{M} \wedge \top = (\neg\exists \vee \forall) \vee \mathrm{M}$.

Conclusion. We accounted for Singh's asymmetry by proposing that formal alternatives are being dynamically pruned. DAP constitutes an incremental, local, and, unlike previous accounts, one-pass algorithm, which does just as well for a variety of HDs, and makes interesting predictions in the case of LDHDs. Further (experimental?) evidence would be welcome to assess the accuracy of DAP *vs* F&S's account in that respect. However, DAP, being too local, cannot capture a case of HC-obviation triggered by embedding an entire scalar HD under EXH (6). It appears difficult to modify DAP to capture that, without having to posit some global constraint akin to IW.

(6) Gabby **must** do all or some of the readings. $\textsc{Exh}(\Box(\forall \vee \textsc{Exh}(\exists)))$

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The Anaphoric Polarity-Sensitivity of Negativity-Tags is Sensitivity to Speaker Commitments about Discourse Referents

This work argues that the anaphoric polarity-sensitivity of negativity-tags, and the notion of a negative propositional antecedent (see 'sentential negativity' in Klima, 1964, also Ginzburg & Sag, 2000; Kramer & Rawlins, 2009; Farkas & Bruce, 2010; Krifka, 2013; Brasoveanu et al., 2013, 2014; Roelofsen & Farkas, 2015) is best explained by speaker commitments about discourse referents, rather than appealing to sentential negation. It provides evidence for understanding drefs in relation to speaker commitments, addressing the interaction between anaphora and negation.

Licensing Negativity-Tags. English *neither*-tags may have negative antecedents (1a), but not affirmative ones (2a) (Klima, 1964). The same is observed for agreeing uses of the polarity particle (PolP) *'no'* (1/2b) (Pope, 1972), factive uses of elliptical *'Why not'*-questions (c) (Hofmann, 2018), and propositional anaphora in anti-veridical contexts (d).

(1) **Negative antecedent**:
Sue didn't dance at the party.
a. *Neither did Mary*
b. *No, she really didn't*
c. *but she didn't explain why not*
d. *so that was just a rumor.*

(2) **Positive antecedent**:
Sue danced at the party.
a. *# Neither did Mary*
b. *# No, she really did,*
c. *# but she didn't explain why not*
d. *# so that was just a rumor.*

Further, a syntactically and semantically diverse class of negative expressions, including negative proximatives, anti-additive and downward-entailing quantifiers, in adverbial or argument positions (3a)/(3b) also licenses negativity-tags (4) (Klima, 1964; Brasoveanu et al., 2013, 2014).

(3) a. *Pat {never/hardly/rarely} dances.*
b. *{No one/hardly anyone/few people} dance(s).*

(4) a. *Neither does Mary.*
b. *No, they truly don't.*
c. *and I know why not.*
d. *That was just a rumor.*

Because previous accounts suggest a sensitivity to sentential negation, they are challenged by new data where antecedents are non-negative clauses: Under neg-raising (5a) (see also Kroll, 2019 on sluicing), including uncontroversially pragmatic neg-raising in island contexts (Collins & Postal 2018), (5b), and in anti-veridical (AV) attitude contexts (5c); illustrated here for *why not* (6).

(5) a. **Neg-raising antecedent**:
I don't think that Sue danced at the party
b. **(Pragmatic) Island Neg-raising antecedent**:
I don't get the impression that Sue danced at the party
c. **AV-attitude antecedent**:
You are mistaken that Sue danced at the party

(6) *...but I'm not sure why not*

While judgments for (5c)+(6) vary, I present experimental data from a forced-choice continuation task, showing that in a significant portion of cases, speakers pick *why not* over its counterpart *why*.

Previous Accounts, requiring a notion of sentential negation in the representation of the clause introducing the antecedent, do not capture (5)+(6). E.g. ellipsis-based analyses (e.g. Kramer & Rawlins, 2009 for PolPs, Hofmann (2018) for *why not*) rely on syntactic reflexes of negation (e.g. Zeijlstra, 2004). The feature-based account of PolPs (Farkas & Bruce, 2010; Roelofsen & Farkas, 2015) is based on Jackendoff's (1969) semantic characterization, where contradictory negation takes scope over the full clause. The variety in (3) is then captured by a decompositional analysis of negative quatifiers (e.g. Penka, 2007). These accounts rule out (5)+(6), where negativity-tags referring to the embedded clause are licensed by AV operators (not limited to negation), or semantically veridical contexts which are pragmatically strengthed towards an AV interpretation.

Anaphora to Counterfactual Propositions. I propose an analysis in a version of intensional CDRT (following Muskens, 1996; Brasoveanu, 2006), where propositional operators introduce drefs for their prejacents (Stone, 1999; Krifka, 2013; Snider, 2017), which tracks the relationship between propositional drefs and speaker commitments. It is thus suited to capture the generalization in (7).

(7) **Commitment-based characterization**: An utterance is discourse-negative iff it introduces a counterfactual propositional dref (for a proposition that the speaker is committed to being false).

(7) predicts that AV embeddings (1), (5c) license negativity-tags. It captures the neg-raising cases (5a), (5b) based on an introduced propositional dref and the inference that it is counterfactual; and (3) under a decompositional analysis of negative quantifiers, analogizing them to AV operators.

Counterfactual drefs in Intensional CDRT. The basic types are: t (truth-values), e (entities), w (worlds), s (variable assignments). A dref δ is a function of type $s\tau$ from assignments i_s to objects of some type τ. A propositional dref ϕ is of type $s(wt)$. Utterances are interpreted as DRSs, i.e. relations of type $s(st)$ between input state i_s and output j_s. A DRS contains a list of updated drefs $(\delta_1, \ldots, \delta_n)$, and conditions on the output (type st). Propositional operators introduce drefs for their arguments and specify their relation to the superordinate intensional context. The global context is provided by declarative mood, as a designated dref ϕ_{DC_S} for the set of worlds compatible with the commitments of a speaker S. Negation and AV-attitudes provide counterfactual drefs:

(8) a. *Mary didn't dance* $\rightsquigarrow [\phi_1 \mid \phi_{DC_S} \subseteq \phi_1]; [\phi_2 \mid \phi_1 = \overline{\phi_2}]; [\upsilon \mid \upsilon = \mathtt{Mary}]; [\mathtt{danced}_{\phi_2}\{\upsilon\}]$

b. *You*$_H$ *are mistaken that Mary didn't dance* $\rightsquigarrow$
$[\phi_1 \mid \phi_{DC_S} \subseteq \phi_1]; [\mathtt{mistaken}_{\phi_1}\{H, \phi_2\}]; [\upsilon \mid \upsilon = \mathtt{Mary}]; [\mathtt{danced}_{\phi_2}\{\upsilon\}]$

Both updates in (8) introduce a dref ϕ_2 containing all possible worlds in which Mary danced. Both also introduce a dref ϕ_1, which contains none of the ϕ_2-worlds (because of negation or an AV attitude, respectively). The condition $[\phi_{DC_S} \subseteq \phi_1]$, due to the assertive effect of declarative mood, ensures that ϕ_2 is an counterfactual propositional dref. Neg-raising provides a semantically non-veridical dref, which is interpreted as counterfactual due to pragmatic inference:

(9) I_S *don't believe that Mary danced* $\rightsquigarrow$
$[\phi_1 \mid \phi_{DC_S} \subseteq \phi_1]; [\phi_2 \mid \phi_1 = \overline{\phi_2}]; [\mathtt{believe}_{\phi_2}\{S, \phi_3\}]; [\upsilon \mid \upsilon = \mathtt{Mary}]; [\mathtt{danced}_{\phi_3}\{\upsilon\}]$

(9) introduces a dref ϕ_3 where Mary danced, and a dref ϕ_2 where S believes ϕ_3. ϕ_2 can contain worlds where ϕ_3 is true or false. Its complement ϕ_1 may therefore also contain worlds where ϕ_3 is true or false, and asserting ϕ_1 does not entail commitment about ϕ_3. ϕ_2 is semantically non-veridical (but not counterfactual). Speaker commitment to ϕ_3 being false is a pragmatic inference, which may be characterized as the update $[\phi_{DC_S} \subseteq \phi_3]$, stating that all speaker's commitments are non-ϕ_3 worlds. (E.g. following Gajewski (2007): **(i.)** excluded middle proposition associated with uses of *believe*, **(ii.)** self-ascription of belief leads to discourse commitment.)

Negativity-Tags receive their interpretation from a counterfactual propostitional dref (10)+(11).

(10) [*Mary didn't* [~~*Mary*~~ *dance*]$^{\phi_2}$]$^{\phi_1}$

(11) a. *so that*$_{\phi_2}$ *was just a rumor.*

b. *Why*$_{\phi_1}$ [*not*$_{\phi_2}$ [~~*Mary dance*~~]]

The interpretation of an anaphor *that*$_{\phi_2}$ in (11) requires that the referent proposition ϕ_2 is true in its local context (see also Kroll, 2019, for sluicing). But since the anaphor is in an AV embedding , ϕ_2 is false according to the speaker. Counterfactual pronoun use is only consistent with a counterfactual antecedent (*# Mary danced at the party but {that's just a rumor/I don't know why not}*). This alone does not rule out a non-negative antecedent in cases where the interpretation allows for the discourse segments to be inconsistent (*Either Mary danced at the party or {that's just a rumor/tomorrow I will hear all about why not}*). The negative antecedent requirement arises in combination with an additional way of linking the negativity-tag to the previous discourse. For (11a), the assertion of both discourse segments by the same speaker requires them to be consistent. In (11b), it is the factive presupposition associated with information-seeking *why*-questions. The analysis combines insights from Krifka's (2013) analysis of PolPs (on the level of representation) and feature-based analyses from Farkas & Bruce (2010); Roelofsen & Farkas (2015)) (appealing to a (revised) notion of (discourse) polarity and the relationship to the antecedent utterance).

Conclusion. This work argues that semantic interpretation relies on a discourse representation which stores information about speaker commitments about drefs. This provides a suitable basis for analyzing discourse-negativity and the anaphoric polarity-sensitivity of negativity-tags.

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Deriving presupposition projection in polar questions: A reply to Enguehard 2021

Intro: We argue, contra recent work by Enguehard (2021), that presupposition projection from polar questions does not necessitate a move to a trivalent inquisitive denotation for questions, that bakes their 'yes-no' asymmetry directly in the semantics. Instead, we propose that the projection data and the yes/no asymmetry can be treated with traditional inquisitive denotations by adopting the projection mechanism of *Limited Symmetry* (Kalomoiros 2021), independently motivated to account for the projection asymmetry of conjunction and symmetry of disjunction.

Core Data: Enguehard 2021, observes that presupposition projection from coordinations of polar questions follows the projection pattern of coordinations of declaratives: presuppositions project from the first conjunct, (1a)-(1b), but get filtered when the first conjunct entails the relevant presupposition, (1c)-(1d) (Kartunnen 1973, Heim 1983 a.o.).

(1) Context: We do not know the system of government of Freedonia

a. #Is the Freedonian monarch a progressive and is Freedonia a monarchy?
b. #The Freedonian monarch is a progressive and Freedonia is a monarchy.
c. ✓Is Freedonia a monarchy and is the Freedonian monarch a progressive?
d. ✓Freedonia is a monarchy and the Freedonian monarch is a progressive.

Previous approach: Enguehard 2021 argues that the patterns above cannot be accommodated within traditional theories of questions, on two grounds: **i)** traditional accounts (e.g. Kartunnen 1977, Ciardelli et al 2013 a.o.) assign conjunctions like $?p \wedge ?q$ a denotation that partitions the logical space into four cells: $P = \{p \wedge q, p \wedge \neg q, \neg p \wedge q, \neg p \wedge \neg q\}$; each formula in P specifies a class of worlds where the issue raised by the conjunctive question is resolved. However, when combined with an account of projection like Schlenker 2009, this leads to problems. Schlenker 2008/2009 requires p to be *transparent* in the position of q, to derive the filtering in (1). Loosely, this means that conjoining p to q in each of the formulas in P should lead to a tautology (e.g. $p \wedge q \equiv p \wedge (p \wedge q)$ etc.). This does not hold for P. **ii)** Traditional theories of questions assign the same denotation to $?p$ and $?(\neg p)$, i.e. questions are modeled as yes/no symmetric. However, Enguehard 2021 observes that this predicts (1c) to be equivalent to (2) (take 'monarchy' and 'republic' as mutual opposites):

(2) #Is Freedonia a republic and is the Freedonian monarch a progressive?

Enguehard 2021 proposes to treat questions as trivalent inquisitive predicates that map sets of worlds to $0, 1$ and $\#$. In this system, the denotations of positive vs negative questions are yes/no **a-**symmetric; the appearance of $\#$ is regulated by a Middle Kleene logic, deriving the correct filtering properties for (1a) vs (1c) (see Enguehard 2021 for full details). The cost is adopting a non-standard semantics for polar questions, that bakes the various asymmetries (projection, yes/no) into the lexical entries.

Limited Symmetry: We argue that a more traditional and explanatory picture is possible if one adopts the *Limited Symmetry* system for projection (Kalomoiros 2021). We will work with the following language $\mathcal{L}$ (this can be extended to disjunction in interesting ways):

(3) $\phi := p_i \mid p'_j p_k \mid \neg\phi \mid (\phi \wedge \phi) \mid ?\phi$ (indices are natural numbers and are omitted below)

Ignore questions, and consider a classical semantics where statements are mapped to sets of possible worlds. $p'p$ presupposes p' and asserts p (inspired by Schlenker 2009); it is interpreted as conjunction: $w \models p'p$ iff $w \models p'$ and $w \models p$. The core ideas are: **i)** sentences are parsed from left to right, symbol by symbol, against a context C: $(p'p \wedge q)$ is associated with a parsing list `[(,(p'p,(p'p ∧, (p'p ∧ q, (p'p ∧ q)]`. At every parsing point t_i on this list, the parser attempts to compute the sets T(rue) = $\{w \mid w \models t_i d\}$, F(alse) = $\{w \mid w \not\models t_i d\}$ for every possible continuation d (the sets where

sentences are true/false regardless of continuation). **ii)** For every $\mathcal{L}$-sentence S we have access to a presuppositionless version $(S)^-$, where primed bits have been removed: $(p'p)^- = p$. **iii)** If at a parsing point t_i of S, T/F can be computed, then a version of the standard constraint requiring presuppositions not to introduce new info applies: all the worlds in T/F at t_i must be worlds in the T/F sets computed at the corresponding parsing point t'_i for $(S)^-$: $\mathrm{T/F}_S^{t_i} \subseteq \mathrm{T/F}_{S^-}^{t'_i}$

Limited Symmetry$_{\mathbf{inq}}$: We lift the reasoning above to Inquisitive Semantics (Ciardelli et al 2013). **i)** A sentence ϕ now denotes a set of states that support ($\vdash$) ϕ, where a state s is a set of possible worlds: $\{s|\ s \vdash \phi\}$. $p'p$ denotes $\{s|\ s \vdash p'\ and\ s \vdash p\}$. Conjunction is set intersection. **ii)** A question $?\phi$ denotes a set of states that support either ϕ or $\neg\phi$: $\{s|\ s \vdash \phi\ or\ s \vdash \neg\phi\}$. **iii)** Instead of reasoning about worlds where truth value has been fixed regardless of continuation, we now reason about states where the **polarity** of a response to a question Q is fixed regardless of continuation. For instance, in (1c), as soon as we have access to 'Is Freedonia a monarchy and' we know that in states that support that 'Freedonia is not a monarchy', the entire question will receive a negative answer (we might not know the full answer, but we know its polarity). Polarity depends on whether a response R to a question Q agrees or reverses a default discourse referent that Q introduces (cf Roelofsen & Farkas 2015). Call this discourse referent $Decl(Q)$, where $Decl(Q)$ is a sentence just like Q but with all ?-operators removed. Thus, T/F now become: $\mathbb{P}$(os): $\{s|\ s \vdash Decl(t_id)\}$ and $\mathbb{N}$(eg): $\{s|\ s \vdash \neg Decl(t_id)\}$ (sets of states that agree/reverse $Decl(Q)$). **iv)** The presupposition constraint becomes: given an $\mathcal{L}$-sentence S and a parsing point t_i of S, all the states s that are in $\mathbb{P}/\mathbb{N}$ at t_i must also be in the $\mathbb{P}/\mathbb{N}$ you can compute for $(S)^-$ at the corresponding parsing point t'_i. **v) Once a set of states fixes polarity, it is not considered for future polarity calculations**.

Conjunction: Consider a question $S = (?p'p \wedge ?q)$, parsed against a context C. At parsing point `(?p'p` $\wedge$, we know a $\mathbb{N}$ set, since all subsets of C where $\neg p'p$ holds are not in the denotation of $Decl($ $(?p'p \wedge d$), for all possible continuations d. Thus, $\mathbb{N}_S = \{s|s \vdash \neg p'p\} = \{s|s \vdash \neg p'\ or\ s \vdash \neg p\}$ (at this parsing point). Compare with the $\mathbb{N}_{S^-}$ at the corresponding parsing point for $(?p'p \wedge ?q)^- = (?p \wedge ?q)$: at `(?p`$\wedge$, $\mathbb{N}_{S^-} = \{s|s \vdash \neg p\}$. Thus, it is **not** generally the case that $\mathbb{N}_S \subseteq \mathbb{N}_{S^-}$. Unless the subsethood constraint on presuppositions holds (e.g. by having $C \vdash p'$), we will have presup failure at this parsing point, no matter what follows. Now consider the reverse: $(?q \wedge ?p'p)$, where $q \models p'$. At `(?q`$\wedge$, $\mathbb{N} = \{s|s \vdash \neg q\}$. q carries no presupposition, so the presupposition constraint holds trivially. Since, in all states that support $\neg q$, the polarity is negative, **these states are not considered further**. At parsing point `(?q` $\wedge$ `?p'p`, we can compute both $\mathbb{P}$ and $\mathbb{N}$: $\mathbb{P}_S = \{s|s \vdash q\ and\ s \vdash p'\ and\ s \vdash p\}$. $\mathbb{N}_S = \{s|\ s \vdash q\ and\ (s \vdash \neg p'\ or\ s \vdash \neg p)\}$ ($\neg q$ **states have been removed**). Since $q \models p'$, there can be no states in $\mathbb{N}_S$ that support $\neg p'$; thus, $\mathbb{N}_S = \{s|s \vdash q\ and\ s \vdash \neg p\}$. At the corresponding parsing point $(S)^- =$ `(?q` $\wedge$ `?p`, $\mathbb{P}_{(S)^-} = \{s|s \vdash q\ and\ s \vdash p\}$. $\mathbb{N}_{(S)^-} = \{s|s \vdash q\ and\ s \vdash \neg p\}$ (again $\neg q$ states don't count). Therefore, $\mathbb{P}_S \subseteq \mathbb{P}_{(S)^-}$ and $\mathbb{N}_S \subseteq \mathbb{N}_{(S)^-}$. We derived presup failure for (1a), but filtering for (1c)!

Yes/No Asymmetry: Consider $S = (?q \wedge ?p'p)$, where $\neg q \models p'$, cf. (2). At parsing point `(?q` $\wedge$, the polarity is already negative in $\mathbb{N} = \{s|s \vdash \neg q\}$. These states stop counting for polarity considerations; there is no presupposition to check here. The parse moves to `(?q`$\wedge$`?p'p`. $\mathbb{N}_S = \{s|s \vdash q\ and\ (s \vdash \neg p'\ or\ s \vdash \neg p)\}$ ($\{s|s \vdash \neg q\}$ **is no longer under consideration**). Correspondingly, $\mathbb{N}_{(S)^-} = \{s|s \vdash q\ and\ s \vdash \neg p\}$. But $\neg q \models p'$ does not guarantee that $q \models p'$. Thus, in the general case, $\mathbb{N}_S \nsubseteq \mathbb{N}_{(S)^-}$ (leading to projection, modulo info in the context). More broadly, positive and negative polar questions have the same denotation, but different $\mathbb{P}/\mathbb{N}$ sets: For $?p$, $\mathbb{P}_{?p} = \{s|s \vdash p\}$, $\mathbb{N}_{?p} = \{s|s \vdash \neg p\}$. For $?(\neg p)$, $\mathbb{P}/\mathbb{N}$ are the opposite, deriving the yes/no asymmetry.

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Countability and obligatory numeral classifiers in Uzbek

1. Introduction. Among theories of mass-count distinction, there is a debate as to whether the distinction exists at the lexico-semantic level, e.g. Link 1983, Krifka 1989, or is rather mediated through syntactic structure, e.g. Borer 2005, Acquaviva 2019. One piece of evidence in favor of the latter approach comes from classifier languages, in which all nouns seem to exhibit mass-like behavior in that they cannot combine with a numeral directly but only with the mediation of a classifier. In the present paper, we examine Tashkent Uzbek, an obligatory classifier dialect of Uzbek (Beckwith 1998, 2007). We argue that this language exhibits the mass-count distinction even in the absence of classifiers or, if they are present, in lower positions, before the classifiers are merged (at the NP/nP level). We provide a formal analysis of a range of Uzbek classifiers, showing that they are sensitive to the mass-count distinction (rather than constituting a source thereof.) Thus, we provide evidence that the mass-count distinction is lexically encoded in nouns even in classifier languages (e.g. Cheng & Sybesma 1998, Doetjes 1997, Sudo 2016).

2. Mass-Count Contrasts. Evidence suggesting that Tashkent Uzbek makes mass-count distinction at the lexico-semantic level comes from the contrasts in the distribution of (non-)counting modifiers, the plural morphology, and different types of classifiers.

(i) Modifiers. First, there exist quantifiers compatible only with notionally count nouns. They also require the presence of the plural morpheme on the noun (1a). Conversely, some quantifiers select for only notionally mass nouns (1b). The mass-count contrasts are also found in modification by numerals that cannot co-occur with classifiers and are only compatible with count nouns, i.e. **approximatives** and **collectives** (1c). The mass-count contrast also arises with non-counting modifiers like distributive adjectives known to only modify individuated units (1d).

(1) a. **ba'zi** kitob-lar/ *suv(-lar)
some book-PL water-PL
'some books (*waters)'

b. **ozgina** *kitob(-lar)/ suv(-lar)
small amount book-PL water-PL
'a small amount of water (*book(s))'

c. **ming-lab/ uch-ala** kitob/ *suv
thousand-APPROX three-COLL book water
'thousands of/ all three books (*waters)'

d. **katta** kitob/ *suv
big book water
'a big book (*water)'

(ii) Plural. While pluralization of count nouns leads to 'more than one' interpretation, pluralization of mass nouns is restricted, resulting in plurality of abundance/subkinds. In certain environments, e.g. partitives, the plural is **obligatory** on count (2a), but **ungrammatical** on mass nouns (2b):

(2) a. kitob-*(**lar**)-dan oluvdim
book-PL-ABL take.PST.1SG
'I took some of the books.'

b. suv-(***lar**)-dan ichuvdim
water-PL-ABL drink.PST.1SG
Int.: 'I drank some of the water.'

(iii) Classifiers. In the presence of numerals, the choice of the classifier is determined by whether the noun is notionally count or mass. In other words, **the distribution of the classifiers is sensitive to the mass-count distinction on the NP**. So-called sortal and group classifiers select exclusively count nouns (3a), most mensural ones are compatible with both count and mass nouns (3b), while some with exclusively mass nouns (3c), yet other classifiers look exclusively for aggregates (3d), meaning that the substance/aggregate distinction is linguistically relevant, too (Grimm 2012). The distinction between these classifier expressions is left unexplained if we assume that all nouns are mass before a classifier is attached.

(3) a. ikki **dona/ dasta/ juft** kitob
two CL_{item} CL_{pile} CL_{pair} book
'two (items of)/ piles of/ pairs of books'

b. ikki **qop** tuz / kitob
two CL_{sack} salt book
'two sacks of salt/ books'

c. ikki **litr** suv
two CL_{liter} water
'two liters of water'

d. ikki **zarracha** tuz
two $CL_{particle}$ salt
'two particles of salt'

The facts are accounted for straightforwardly if we assume that some nouns in Uzbek denote sets of individuated entities, while others do not, denoting instead non-atomic/ non-disjoint entities.

3. Formal Analysis of Uzbek Classifiers. 3.1 Syntactic Analysis. We propose that Uzbek classifiers do not merge directly with the NP. Rather, they first combine with the numeral, and the resulting expression, in turn, forms a constituent with the NP ([$_{DP}$ [$_{MeasP}$ ikki dona] [$_{NP}$ kitob]] 'two CL_{ITEM} book'). Our motivation for this claim is both theoretical and empirical. **Theoretically**, robust evidence in favor of the mass-count distinction in Uzbek suggests that classifiers are not needed in order to "turn the nouns into count". Therefore, we follow the approach according to which classifiers are needed for numerals, turning them into functions that can combine with an NP without type mismatch (Krifka 1995, Bale & Coon 2014, Sudo 2016, Little & Winarto 2019, Sağ-Parvardeh 2019). **Empirical evidence** can be divided into two parts. First, the particularly widespread and underspecified classifier *-ta* is a suffix which, crucially, attaches to the numeral, rather than the noun (*ikki-ta kitob* 'two-CL books', not **ikki kitob-ta*). Second, classifiers (whether suffixational or free morphemes) are incompatible with other counting-related units which get suffixed to the numeral, such as the approximative and the collective suffixes (1c). A combination leads to ungrammaticality, suggesting that classifiers, approximatives and collectives compete for the same syntactic position and/or are semantically incompatible since both require a numeral as an argument.

3.2 Semantic Analysis. We propose that all classifiers function as mediators between a numeral (type n) and a property-denoting NP (type <e,t>). The difference between sortal and mensural classifiers has to do with the fact that mensurals further introduce a measure function, thereby dividing the denotation of the NP into units (which makes counting possible for originally mass nouns). In turn, sortals only introduce a cardinality function, meaning that they work with a division into P-atoms that is present for independent reasons (a distinction along the line of Cheng & Sybesma 1998). This is why these quantifiers are normally only compatible with count nouns (some exceptions include mass nouns that undergo a mass-to-count shift for independent reasons). The semantics of sortal classifiers is illustrated for ***-ta*** (underspecified) and ***nafar*** 'person' (used exclusively with [+human] nouns; the underlined part represents a presupposition), (4-5). (6) illustrates the semantics of a mensural classifier. ***litr*** 'liter' is a mensural (mass) classifier that imposes a particular measure unit. Mass nouns typically require such classifiers, because division into units is not built in into their own semantics.

(4) $[[\text{-ta}]] = \lambda n \lambda P \lambda x.\ P(x)\ \&\ |x| = n$ (undefined if P is not atomic)

(5) $[[\text{nafar}]] = \lambda n \lambda P \lambda x.\ \underline{P \subset \text{HUMAN}}\ \&\ |x| = n$

(6) $[[\text{litr}]] = \lambda n \lambda P \lambda x.P(x)\ \&\ \text{LITER}(x) = n$

Aggregate nouns like *tuz* 'salt' are conceptually divisible into relatively salient units; however, semantically and syntactically they behave as mass nouns, meaning that their denotation is not atomic. Therefore, such nouns are incompatible with sortal classifiers. We propose that the special aggregate classifiers, such as ***zarracha*** 'particle', are in essence mensural classifiers that contribute the natural unit (NU) measure function (Krifka 1989), as represented in (7). The classifiers thus largely share the contribution of singulative affixes, turning aggregates into count properties.

(7) $[[\text{zarracha}]] = \lambda n \lambda P \lambda x.\ NU(P)(x) = n$

The fact that aggregates pattern differently from notionally count nouns like *kitob* 'book' supports the claim that Uzbek exhibits the lexical mass-count distinction (otherwise, all notionally count nouns would be expected to behave like aggregates.)

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Secondary Experiential Attitudes are not 'Parasitic Attitudes'

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Abstract. Secondary experiential attitudes [SEAs] are experiential states (e.g. remembering previously perceived events) whose content depends on the content of another experience (here: a past perception). It is often assumed that reports of SEAs have the same analysis as reports of 'parasitic attitudes' (in the sense of Maier, 2015; Blumberg, 2018). My paper refutes this assumption. Specifically, I identify several properties (e.g. flexible dependency) that escape Blumberg's 'parasitic' analysis. I provide an alternative semantics that captures these properties. This semantics also accounts for the propositional counterparts of SEAs (e.g. perception-based remembering *that*). The inapplicability of this semantics to belief-dependent desires suggests that experience- & belief-dependence are different phenomena.

1. Introduction. Experiential attitudes are mental states (e.g. episodic remembering, experiential imagining) that agents bear towards personally [= physically or mentally] experienced events or scenes (see Stephenson, 2010; cf. Higginbotham, 2003). Many of these attitudes enter complex dependency relations with other experiences (Vendler, 1979). Thus, the content of Noa's remembering in (1a) depends on (the content of) her perception from the park (s. (1b/c)). The content of Ida's mental visualization in (2a) depends on her imagining (in the sense that the visualization content may vary with Ida's different imagining events; see (2b/c)). To capture the dependence of these attitudes on other experiences, I call them *secondary experiential attitudes*.

(1) *Context:* Last week at the park, Noa saw a girl dancing.
- a. (Now,) She remembers a/the girl dancing.
- ≡ b. Noa remembers the girl from her perceived visual scene [at the park] dancing.
- ⇒ c. Noa has witnessed [= veridically (visually) experienced] a girl dancing.

(2)
- a. Ida is imagining a fairy flying above.
- ≡ b. Ida is imagining a fairy in a non-actual visual scene flying (in this scene).
- ⇒ c. Ida is witnessing [= non-veridically (visually) experiencing] a fairy flying.

Since (1a)/(2a) have a similar form to reports of familiar 'parasitic attitudes' (s. Maier, 2015; e.g. belief-dependent desire, in (3a)), it is tempting to assume that they receive an analogous analysis. The latter involves treating the complement as a paired proposition [= a function from worlds to propositions] (overbraced in (5a); Blumberg, 2018,'19). The semantics of the attitude verb (in (4)) converts this paired proposition into a classical proposition that depends on the agent's doxastic alternatives (s. the evaluation of *rob* at $\boldsymbol{w}$). In (5b), $f_{\text{IM}_{@,bill}}(\boldsymbol{w})$ is the set of Bill's imagination alternatives at @ that is dependent on $\boldsymbol{w}$ (details in Blumberg, 2019, pp. 62–64).

(3) *Context:* Bill thinks that a man robbed him. (Blumberg, 2018, p. 539, ex. (25))
- a. (Now,) He is imagining that the man (who robbed him) had never robbed anyone.

(4) $[\![\text{imagine}]\!]^{@}_{\text{BLUMBERG}} = \lambda p^{*}_{\langle s,\langle s,t\rangle\rangle}\lambda z_e\ (\forall \boldsymbol{w} \in \text{DOX}_{@,z})\ [f_{\text{IM}_{@,z}}(\boldsymbol{w}) \subseteq p^{*}(\boldsymbol{w})]$

a paired proposition (type $\langle s,\langle s,t\rangle\rangle$)

(5)
- a. Bill is imagining-in-@ $[\lambda \boldsymbol{w}_1\ \lambda w_2.$ Bill's-robber-in-$\boldsymbol{w}_1$ never-robbed-in-$w_2]$
- b. $(\forall \boldsymbol{w} \in \text{DOX}_{@,bill})\ [f_{\text{IM}_{@,bill}}(\boldsymbol{w}) \subseteq (\lambda w_2\ \exists x.\, rob_{\boldsymbol{w}}(x, bill) \wedge (\neg \exists y.\, rob_{w_2}(x,y)))]$

a classical proposition (type $\langle s,t\rangle$), dependent on $\boldsymbol{w}$

2. Problems of Blumberg's account. Its merits notwithstanding, the semantics in (5b) resists an application to reports of secondary experiential attitudes. This is due the fact ❶ that this semantics equates attitudinal parasitism with doxastic parasitism (Blumberg, 2019, § 5.2), ❷ that it identifies experience-content with the content of the embedded TP (for (1a): with the informationally sparse proposition 'the girl from the park was dancing'), and ❸ that it remains neutral

about whether the agent in fact experienced an event with this content. ❷ and ❸ conflict with the intuitive non-equivalence in (6) resp. with the contradiction in (7) (but s. Stephenson, 2010):

(6) a. (1a) $\not\Leftrightarrow$ b. Noa remembers *that* the girl was dancing.

(7) #Noa remembers a girl dancing, but she has never witnessed/seen a girl dance.

Beyond the above, ❹ Blumberg's semantics fails to capture the intuitive truth-conditions of reports (e.g. (2a)) where the secondary experiential attitude (there: visualizing/non-veridically seeing) is not denoted by the matrix attitude (imagining). The use of Blumberg-style paired propositions for (2a) would wrongly suggest that Ida's imagining depends on her mental imagery (see the order of the λ's in (8a)), rather than the other way around (see the more intuitive (8b)).

(8) a. Ida is imagining-in-@ [λw_1 λw_2. a fairy-in-w_1 fly-above-in-w_2]

b. Ida is imagining-in-@ [λw_2 λw_1. a fairy-in-w_1 fly-above-in-w_1]

3. Alternative Account. To answer the above challenges, I build the 'experientiality-presupposition' of secondary experiential attitudes (see (1/2c), (7); the 'λw_1' in (5a) & (8)) directly into the semantics of the verbs for these attitudes (thus avoiding ❸). My entry for (2^{ary}) experiential uses of *remember* is given in (9). There, '$exp_{w_@}(e', z, p)$' := 'in the world, $w_@$, of which @ is part, z has/had an experience e' with content p'. η_σ is a function that selects a situation (an event/scene), σ, from the set of situations p in dependence on the remembering event e (vs. ❷).

(9) $[\![\text{remember}]\!]^@ = \lambda p_{\langle s,t\rangle}\, \lambda z\, \big(\exists e\colon \underbrace{\exists e'.\, e' \prec e \wedge exp_{w_@}(e', z, p)}_{\text{presupposed past experience}}\big)\big[remember_@(e, z, \eta_e e''.\, p(e''))\big]$

Note that the experientiality-presupposition leaves the specific nature of the relevant experience undetermined. As a result, my interpretation of (1a) (in (10)) is – in principle – compatible with different experiences *exp* (e.g. visual, auditory, kinesthetic perception). The relevant experience is selected by pragmatics (here: by the fact that we typically witness other people's dancing with our eyes) or by the linguistic context (e.g. by the predicate saw in the context for (1a)).

(10) $[\![[\text{a}]^1\,[\lambda_1\,[\text{Noa remembers } t_1\text{-girl dancing}]]]\!]^@ = (\exists x)\big(\exists e\colon \exists e'.\, e' \prec e \wedge exp_{w_@}(e', noa, \lambda w.\, girl_w(x) \wedge dance_w(x))\big)\big[remember_@(e, noa, \eta_e \sigma.\, girl_\sigma(x) \wedge dance_\sigma(x))\big]$

The presupposed experience in (9) is even undetermined w.r.t. whether it gives rise to the matrix attitude (as in (1)) or is dependent on this attitude (as in (2)). I assume that, in (9)/(10), the dependence of remembering on the experience is a consequence of the relation of temporal precedence, $\prec$, between the experience e' and the remembering event e. By dropping '$e' \prec e$' in the entry for *imagine*, I allow for the possibility of an inverse dependency (as in (2); see (8b)).

4. Application to Propositional Attitude Reports. Blumberg ('19, § 5.2) has observed that experience-involving dependencies like the above are also found in the *that*-clause counterparts of secondary experiential attitude reports (e.g. (11) when interpreted against the context from (1)):

(11) a. Noa remembers *that* a/the girl was dancing.

$\equiv$ b. Noa remembers *that* the girl from her perceived scene [at the park] was dancing.

My semantics also captures such 'propositional' dependencies. To identify the attitude's content with the value of the embedded TP [= ❷], it interprets *that* as a function from propositions p to the set of their minimal exemplifiers of the form $\eta_e e''.\, p(e'')$ (Kratzer,'02). The result has several advantages over Blumberg's semantics, incl. its ability to avoid the challenges from ❸ & ❹.

5. Outlook. Notably, my entry for *remember* in (9) presupposes a single experience. While dependence on an experience distinguishes secondary experiential attitudes from classical cases of doxastic parasitism, the dependence on a single experience distinguishes secondary experiential attitudes from other cases of 'parasitic attitudes' (e.g. (12a)):

(12) *Context:* Last night, Noa dreamt of a handsome boy playing the piano.

a. She is imagining (that) the boy from her dream (is) kissing the girl from the park.

The above suggests that 'structural' dependence on an experience is a different phenomenon from attitudinal parasitism (and possibly also from modal subordination, discussed in the talk).

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'Articleless' languages are not created equal

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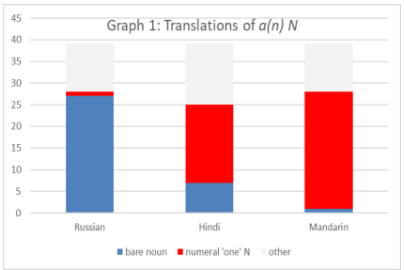
1. Intro and RQs | Dayal (2004) argues that bare singulars (BSs) in Russian and Hindi and bare nominals (BNs) in Mandarin cannot get indefinite interpretations. She derives this fact in a neo-Carlsonian framework (Chierchia 1998) by enriching it with the postulate that only plural kinds – realized as bare plurals (BPs) – allow for derived indefinite readings. Dayal's empirical claims about Russian and Mandarin have not been unequivocally adopted by the literature (e.g., Šimík & Demian 2020, Seres & Borik 2021 on Russian; Cheng and Sybesma 2005 on Mandarin). However, the question whether there are distributional differences between BNs in Russian, Hindi and Mandarin is pending and – with it – the question how to best analyze these expressions. The current paper fills this gap by studying the distribution of BNs in the three languages in parallel.

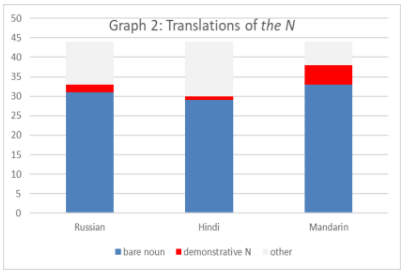
2. Methodology | In line with Bremmers et al. (2021) and van der Klis et al. (2022), we adopt a *Translation Mining* approach to cross-linguistic semantics. We randomly selected 120 indefinite and definite referential expressions (*a(n) N*, *the N*, *N-s*, *the N-s*) from the first chapter of *Harry Potter and the Philosopher's Stone* and aligned them with their translations in Russian, Hindi, and Mandarin. The *Translation Mining* approach builds on the assumption that the meaning of a source text is kept constant in its translations. We consequently assume that the meanings of the translations of the different referential expressions are as closely related to each other as the grammars of the respective languages allow them to be.

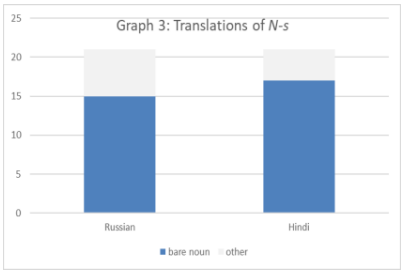
If Russian and Mandarin BNs are to receive the same analysis as those in Hindi, we predict their distributions to be identical. To check this prediction, we compare BNs for Russian/Hindi and Hindi/Mandarin. We perform separate comparisons for the translations of (i) *a(n) N* (n=39), (ii) *the N* (n=44), and (iii) *N-s* (n=21). Definite plurals are the least frequent category (n=16) in our dataset and interact with proper names (e.g., 'The Potters', 'The Dursleys'). For these reasons, definite plurals are not taken into consideration.

For translations of *a(n) N*, we focus our comparison on the distribution of BNs and that of nouns appearing with the counterpart of the numeral *one* (followed by a classifier in Mandarin). For translations of *the N*, distributions of BNs are compared to those of demonstratives. For translations of *N-s*, we focus our attention on BPs in Russian and Hindi. The literature does not suggest obvious competing expressions for BPs, and we consequently compare their distribution to that of the group of 'other' expressions.

3. Results (see p. 3 for bigger graphs) | Graph 1 shows that the counterparts of the numeral 'one' play a negligible role in Russian but an important role in Hindi and an even more important one in Mandarin. The differences in distribution of BNs and the counterparts of *one N* are significant (Russian/Hindi: $p < 0.001$, Hindi/Mandarin: $p = 0.012$, Fisher's Exact Test (FET)). **Graph 2** shows that the standard translation of *the N* in all three languages is a BN. There seems to be a slightly higher use of demonstratives in Mandarin but the differences in distribution do not reach significance in our dataset (Russian/Hindi: $p = 1$, Hindi/Mandarin: $p = 0.22$, FET). **Graph 3** shows that the standard translation of *N-s* in Russian and Hindi is a BP. The differences in distribution between BPs and 'other' expressions is not significant ($p = 0.72$, FET).







4. Discussion | Our distributional data of BNs in Russian, Hindi and Mandarin reveal that there are crucial differences between the three 'articleless' languages, which cannot be ignored if we try to build a realistic and empirically adequate semantics of BNs.

Our results confirm the empirical data from **Hindi** that Dayal's (2004) proposal is built on: BNs in Hindi are used in singular definite and plural indefinite contexts (Graph 2-3) but are dispreferred in singular indefinite contexts, where *numeral 'one' N* accounts for the majority of the translations (Graph 1). Thus, our Hindi data are in line with Dayal's neo-Carlsonian analysis that takes BNs to uniformly take on a kind interpretation and allows for derived indefinite interpretations for BPs but blocks them for BSs. The small proportion of BNs we find in singular indefinite contexts could be argued to involve pseudo-incorporation (Dayal 2011).

The **Russian** data, however, go against the predictions of Dayal (2004): BSs freely appear in both definite and indefinite contexts (Graph 1 and 2) and *numeral 'one' N* rarely appears as the translation of *a(n) N*. This means that Dayal's analysis for Hindi cannot be straightforwardly extended to Russian, at least not without modifying one of its fundamental postulates, *viz.* that derived indefinite interpretations are blocked for BSs. Russian BPs (Graph 3) do not pose a problem for Dayal's analysis, as they are correctly predicted to freely appear in indefinite contexts.

Mandarin, in our data, patterns with Hindi rather than with Russian in the sense that it has a clear preference for *numeral 'one' N* in singular indefinite contexts (Graph 1). The fact that we find a significant difference with Hindi suggests that the two languages are still different and calls for a more detailed comparison.

We conclude that Hindi, Russian and Mandarin BNs are not created equal and that the languages vary in the way they deal with the singular indefinite domain. Dayal's neo-Carlsonian analysis cannot account for this variation as it uniformly proscribes derived indefinite interpretations in the singular domain. Our data consequently favor a classical blocking analysis, as proposed – among others – by Krifka (2004) and de Swart & Zwarts (2010). On a classical blocking analysis, BNs are in complementary distribution with determiners and the variation we find can be accounted for by the narrower/broader distribution of *numeral 'one' N*. Our data show that there is no blocking in Russian, but that *numeral 'one' N* plays an important role in Hindi and Mandarin. In this sense, Russian qualifies as a prototypical 'articleless' language whereas Hindi and Mandarin are arguably articleless in the definite domain but not in the indefinite domain.

5. Triangulation and follow-up research | Our argumentation in favor of a classical blocking analysis for BNs crucially depends on the hierarchical distribution of *numeral 'one' N* that we find in our translation data. A comparison with massive monolingual corpora of English (English Web 2018, +25bn words), Russian (Russian Web 2011, +18bn words), Hindi (Hindi Web 2012, +100m words) and Mandarin (Chinese Web 2017, +16bn words) confirms that this pattern is not an artifact of our dataset. In these monolingual corpora, the numeral *one* occurs twice per one thousand words in English and so does its Russian counterpart. However, the Hindi and Mandarin counterparts of

one are 3 and 4,5 times more frequent, respectively. These quantitative monolingual data confirm the hierarchical pattern we find in our translation corpus.

With the opposition between Russian and Hindi/Mandarin firmly established, the next step is to explore the exact dynamics of the competition between BNs and *numeral 'one' N* in Hindi and Mandarin. To do so, we are currently expanding our translation corpus to all occurrences of *a(n) N*, *the N*, *N-s*, *the N-s* in the first chapter of *Harry Potter and the Philosopher's Stone*. Differently from monolingual corpora, our translation corpus allows us to compare the use of these referential expressions across a stable set of contexts. The analysis of this extended dataset will be included in our presentation.

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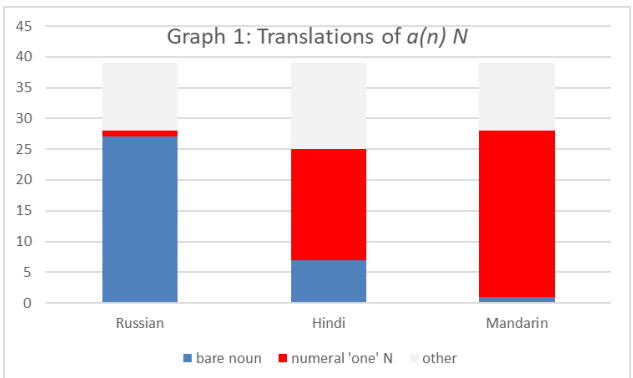

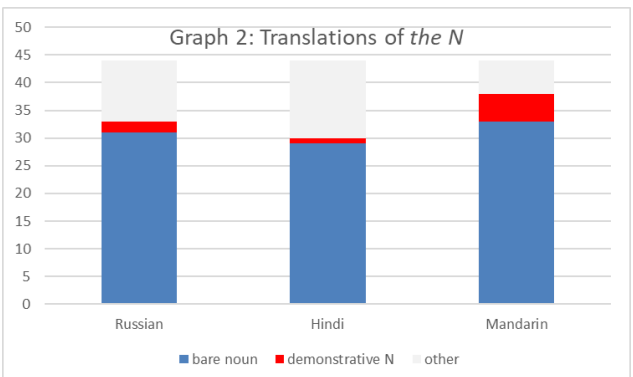

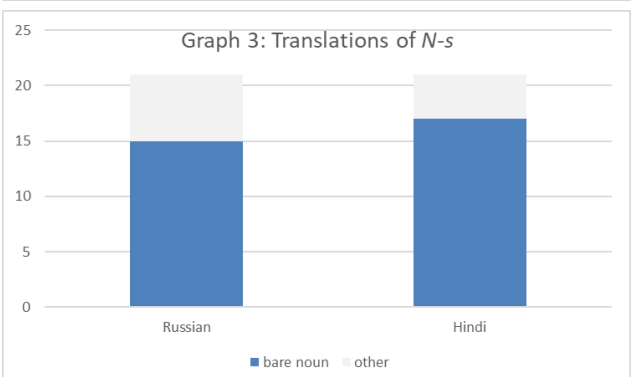

FUTURE & FREE CHOICE

Jéssica Mendes, Maryland

Introduction This paper focuses on the distribution of unscheduled future readings without future morphology in English, especially under modal auxiliaries. My empirical claim is that there is a striking overlap between the environments that license these readings, and environments that license certain polarity-sensitive items, in particular, Free Choice Items (FCIs). Based on this novel observation, I develop a formal account couched in Alternative Semantics.

The source of futurity I assume the source of futurity in sentences like *it might rain (later)* is a prospective aspect operator (PROSP), which is covert in English, but pronounced in some languages. Some version of this assumption can be found in most recent accounts of temporal orientation (Kratzer (2011), Matthewson (2012), Klecha (2016), Williamson (2021)). I refer the reader to Williamson's work (§3.8) for a defense of this view. From now on, I'll be using PROSP as a label for future readings without future morphology.

Data Suitable licensors for PROSP include all possibility modals, the restrictor of *every*, and if-clauses, and exclude episodic sentences, sentential negation, and the restrictor of *some*. These facts strongly suggest PROSP is a kind of polarity-sensitive item (PSI). In fact, these are exactly the environments that license ∀-FCIs, like Brazilian Portuguese *qualquer* and English *any* (in its non-NPI uses). When it comes to necessity modals, there's a split: root necessity can license PROSP, but epistemic necessity cannot. Throughout the rest of this abstract, I'll focus on this flavor asymmetry.

(1) a. * It rains later.
b. * It doesn't rain later.
c. It might$_{epis}$/*must$_{epis}$ rain later.
d. John may$_{root}$/must$_{root}$ go to the party.
e. If I smile when I get out, the interview went well. Crouch (1994)
f. Every / *Some student who comes out smiling (later) did well. Williamson (2021)

Proposal I assume PROSP introduces an interval of time whose left boundary is set by tense, and right boundary is set by adverbs like *by tomorrow*. Since PROSP doesn't introduce existential quantification over events, it must embed other aspectual heads—either the imperfective or the perfective. My analysis doesn't hinge on the aspectual head under PROSP, so I'll omit it for the sake of clarity.

(2) $[\![\text{PROSP}]\!] = \lambda P_{\langle it\rangle}.\lambda t_i.\exists t'_i[P(t') \wedge t' \succ t]$

To account for the limited distribution of PROSP, I adopt Chierchia's (2013) account of FCIs. I assume PROSP projects subdomain alternatives and a scalar alternative that are recursively exhaustified by the exhaustification operator EXH. Since PROSP quantifies over intervals of time, I stipulate its subdomain alternatives are simply different future intervals, t_1, t_2, t_3, etc., and its scalar alternative is the universal counterpart of the lexical entry in (2); a potential candidate for this scale-mate is *going to*. The operator EXH asserts all alternatives not entailed by the assertion, and excludes the others:

(3) $\text{EXH}_C(p) = p \wedge \forall q \in C[q \rightarrow p \subseteq_C q]$ $\quad C = Alt(p)$

In certain environments, like episodic contexts, recursive exhaustification of PROSP yields (logically) contradictory truth conditions, which result in ungrammaticality (see Gajewski (2002), Del Pinal (2019) and Chierchia (2021) for different accounts of logical triviality). To show this derivation more clearly, I assume a toy domain with only two intervals, t_1 and t_2, and I collapse the truth conditions in (4a) with the logical forms $(t_1 \vee t_2)$. Let EXH^2 stand for recursive application of EXH.

(4) a. $[\![$*It rains (later)$]\!] = 1$ *iff* $\exists t[t \succ \text{now} \wedge \text{it-rains at } t] = (t_1 \vee t_2)$

b. $\text{EXH}^2(t_1 \vee t_2) = (t_1 \vee t_2) \wedge \neg\text{EXH}\ t_1 \wedge \neg\text{EXH}\ t_2 \wedge \neg\text{EXH}\ (t_1 \wedge t_2)$

c. $= (t_1 \vee t_2) \wedge \neg[t_1 \wedge \neg t_2] \wedge \neg[t_2 \wedge \neg t_1] \wedge \neg(t_1 \wedge t_2)$

d. $= (t_1 \vee t_2) \wedge [t_1 \leftrightarrow t_2] \wedge \neg(t_1 \wedge t_2) = \bot$

To derive the flavor asymmetry between root and epistemic necessity, I capitalize on observations about the scope of modals, and about the scope of EXH previously made in the literature. First, I make the common assumption that epistemic modals are interpreted above tense, while root modals are interpreted below (see Picallo (1990), Brennan (1993), Butler (2003), Hacquard (2006), among many others). Second, I follow Jeretič (2021) in assuming EXH attaches at the level of TPs or *v*Ps. These assumptions ensure that the exhaustification of PROSP always takes place below epistemic modals, but above root modals.

(5) $[_{\text{ModP}}$ **Mod$_{\text{epis}}$** $[_{\text{EXH}}$ $[_{\text{TP}}$ T $[_{\text{ModP}}$ **Mod$_{\text{root}}$** $[_{\text{AspP}}$ PROSP $[_{\text{EXH}}$ $[_{v\text{P}}$ ...VP... $]]]]]]]$

Since root modals intervene between EXH and PROSP, both necessity and possibility modals lead to contingent truth conditions:

(6) a. $\text{EXH}^2(\Box(t_1 \vee t_2)) = \Box(t_1 \vee t_2) \wedge [\Box t_1 \leftrightarrow \Box t_2] \wedge \neg\Box(t_1 \wedge t_2)$

b. $\text{EXH}^2(\Diamond(t_1 \vee t_2)) = \Diamond(t_1 \vee t_2) \wedge [\Diamond t_1 \leftrightarrow \Diamond t_2] \wedge \neg\Diamond(t_1 \wedge t_2)$

Epistemic necessity modals, on the other hand, yield a contradiction similar to the one seen in episodic contexts. Epistemic possibility modals have the same rescuing potential as root modals:

(7) a. $\Box(\text{EXH}^2(t_1 \vee t_2)) = \Box(t_1 \vee t_2) \wedge \Box[t_1 \leftrightarrow t_2] \wedge \Box\neg(t_1 \wedge t_2) = \bot$

b. $\Diamond(\text{EXH}^2(t_1 \vee t_2)) = \Diamond(t_1 \vee t_2) \wedge \Diamond[t_1 \leftrightarrow t_2] \wedge \Diamond\neg(t_1 \wedge t_2)$

Conclusion Many previous proposals have reduced the asymmetry between epistemic and root necessity to either a force-based or a flavor-based constraint. Banerjee (2018) and Williamson (2021), for example, argue that epistemic necessity modals cannot be future-oriented because they are stronger than root necessity modals; a claim that might be problematic for a unifying account of modal auxiliaries. Klecha (2016), on the other hand, argues that epistemic modals are never future oriented, contrary to speakers' intuition. My account derives the flavor asymmetry indirectly, from well-accepted assumptions about the scope of epistemic and root modals. It also has the merit of tying together two apparently disparate phenomena—temporal orientation and polarity sensitivity. Cross-linguistic evidence about the distribution of future markers suggests that the polarity-sensitivity of PROSP is not exclusive to English. For example, Mucha (2016) argues that in Medumba, a covert PROSP is licensed by questions and negation, among other environments. Bochnak (2016), on the other hand, shows that graded future markers in Washo can be licensed by modals, conditional antecedents, attitude verbs, and questions, but not by negation. All these environments have been shown to be proper licensors for different PSIs (see Chierchia (2013) for a cross-linguistic survey of PSIs).

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Missing words and missing worlds - Zahra Mirrazi & Hedde Zeijlstra

INTRODUCTION: STRONG VS WEAK MODALS. Traditionally, universal modal auxiliaries have been divided in two categories: strong necessity and weak necessity modals. They are called like that as strong necessity modals (such as *must* or *have to*) are semantically stronger than weak necessity modals (such as *should* or *ought to*), as the following examples show:

(1) a. you should/ought to leave but you don't have to leave.
b. you should/ought to leave; in fact you have to leave.

Such a distinction cannot be made for existential modals:

(2) a. # You could leave but you can't leave. b. # You can leave but you couldn't leave.

(3) a#She might be in her office; in fact, she may be in her office.
b. She may be in her office; in fact, she might be in her office.

This shows that the same notion of strength that is involved in (1) cannot capture differences between *may/might* and can/could despite morphological similarities. In this paper, we argue that *may/might* and can/could are existential duals of strong necessity modal, that is they are 'strong' in the relevant notion of strength. Strikingly, no language seems to have a set of weak possibility modals at its disposal. Naturally, the question is why there is such a semantic gap?

THE ANCHOR SEMANTICS AND THE IMPORTANCE OF THE ACTUAL WORLD. We adopt the *Anchor semantics* for modals proposed by (Kratzer, 2013), according to which modals differ in two dimension: (i) the type of quantification over possible worlds (modal force), and (ii) the worlds included in their domain of quantification, the latter being constructed out of two ingredients: a modal anchor which projects the initial domain, and a modal restriction that determines the final domain. The central idea of Anchor semantics is that the domain of modals initially projects from a piece of actuality by considering the set of worlds that have a match of that piece of actuality. This conjecture, dubbed *factual domain projection* by Kratzer, captures the intuitive idea that even in our modal claims, we are concerned with worlds that we take to be candidates for the actual world. The reason is that the actual world is generally among the worlds the piece of actuality from which the modal domain projects (unless the modal domain is projected from a particular individual's mental state that might be in conflict with the actual world).

A SEMANTIC GAP, NOT A LEXICAL GAP. In this paper, we argue that the difference between strong and weak modals is whether the actual world **must** be part of the final modal base, after the contextual modal restriction has applied. We follow Von Fintel & Gillies (2010); von Fintel & Gillies (2021); Kratzer (2013) in taking statements with necessity modals like *must* to be strong, as these imply that their prejacents are true in true in the world of the modal anchor. This accounts for the fact that epistemic *It must be raining* infers that it is raining in the actual world. By contrast, statements with necessity modals like *should* are not strong as *It should be raining* does not entail that it is raining in the actual world. In principle, this distinction ought to be extendable to possibility modals. Then, four types of modals should expected to be attested across languages: strong and weak universals, strong and weak existentials. However, this fourth type appears cross-linguistically absent. The reason for this, we argue, is that not presupposing the inclusion of the actual world in the quantification domain of an existential modal leads to an extremely weak meaning: a proposition is true in *some* possible world, where the chosen world doesn't have to be a candidate for the actual world, which is trivially true and thus banned from natural languages. Then, languages have two ways to go about. The first option is that a weak existential modal is actually lexicalized in a language, but must undergo strengthening to a weak necessity modal outside downward entailing environments. An example is Kinande *anga* (Newkirk, 2021). This modal is underspecified in terms of modal force with respect to whether it makes reference to the actual world, but when it does not, it gets strengthened into a weak necessity modal, not a strong necessity modal, just as we predict.

(4) Kabunga a-**anga**-na-sya oko kalhasi ko munabwire
Kabunga 3SG-MOD-T-come PREP class PREP today
'Kabunga might come to class today.' **or** *'Kabunga should be coming to class today'* **but not** *#'Kabunga must be coming to class today'* (Newkirk, 2021)

The second option is that only a weak necessity modal is lexicalized, as is the case with English *should*.

PRUNING OF SINGLETON PROPOSITIONS. With this in mind, we can now address another question. How can both weak possibility modals and weak necessity modals be strengthened (the latter evidenced by

the fact that thy can give rise to neg-raising readings), but strong modals cannot (as strong necessity modals do not give rise to neg-raising, as shown by Homer's (2015) (5))

(5) The doctor doesn't think that John should/must jog.

*think≫ should/*must≫ ¬; think≫ ¬ ≫ should/must*

We show that inclusion of the actual world in the modal base leads to the unavailability of strengthened readings. The reason is that the strength of a modal (i.e., whether or not the actual world is in the domain of quantification) has important consequences for the calculation of relevant subdomain alternatives. Only modals that do not presuppose the inclusion of the actual world in their domain of quantification can give rise to a universal reading via exhaustification. A closer look to the exhaustification procedure shows that the key to get a strengthened reading is the inclusion of singleton alternatives (as shown in the scheme below) (Bar-Lev, 2018, 2020). We argue that the singleton set alternatives are normally pruned from the set of domain alternatives of strong modal whose domain has to include the actual world. The reason is that, as outlined by Kratzer (2012), singleton propositions are too specific to be cognitively viable. To believe a singleton proposition, where the world is a candidate for the actual world, a person has to be omniscient in a strong sense. Their beliefs have to be so specific that they are able to distinguish the actual world from all other possible worlds. Exhaustifcation after the pruning of singleton alternatives, however, does not give rise to strengthened readings (Bar-Lev, 2018, 2020). The expression of certainty, objectivity and evidentiality (*certain*, *must*, *might*, *probably*) requires the inclusion of the actual world into modals' domain of quantification. Therefore, such modals cannot be strengthened, as exhaustification apply to the subset of domain alternatives remained after pruning singleton alternatives. This is in line with Jeretič (2021), who argues that the presence of actuality entailment blocks the derivation of scaleless implicatures in the case of French modals *falloir* and *devoir*. At the same time, an Innocent Exclusion (IE) + Innocent Inclusion (II) based exhaustification operator (Bar-Lev & Fox, 2017, 2020), defined in (6), incorrectly predicts the availability of strengthening with Actuality Entailments. With the pruning mechanism developed, an EI+II-based exhaustification operator can derive the blocking of strengthening by Actuality Entailments.

(6) $[\![\text{EXH}]\!]^{IE+II}(C)(p)(w) \Leftrightarrow \forall q \in \text{IE}(p, C)[\neg q(w) \wedge \forall \in \text{II}(p, C)[r(w)]$

If none of the worlds in the domain of quantification *has to* be the actual world, pruning does not have to take place. Consequently, strengthened readings can be yielded. Utterances with apparent weak possibility modals will thus be strengthened into weak necessity modals (unless appearing in downward entailing contexts), as otherwise they are too weak (as is the case in Kinande). Utterances containing negated weak necessity modals like English *should*, and also *think* and *believe* (which are strictly equivalent to $\exists w : \neg p(w)$ (Mirrazi & Zeijlstra 2021)), are strengthened, and then give rise to neg-raising readings.

weak	Domain	$\{w_1, w_2, w_3\}$
	Subdomain Alt	$\{\{w_1, w_2, w_3\}, \{w_1, w_2\}, \{w_1, w_3\}, \{w_2, w_3\}, \{w_1\}, \{w_2\}, \{w_3\}\}$
	EXH^{IE+II}(Alt(∃w∈{w_1, w_2, w_3}: p(w)))	∀w∈{w_1, w_2, w_3}:p(w) **weak** ∃ →**weak**∀ / **NR: weak** ∃¬ →**weak**∀¬
	EXH^{IE+II}(Alt(∀w∈{w_1, w_2, w_3})): p(w)))	∀w∈{w_1, w_2, w_3}:p(w) **no effect**
strong	Domain	$\{\mathbf{w}_0, w_1, w_2\}$
	Subdomain Alt	$\{\{\mathbf{w}_0, w_1, w_2\}, \{w_1, w_2\}, \{\mathbf{w}_0, w_1\}, \{\mathbf{w}_0, w_2\}, \{\mathbf{w}_0\}, \{w_1\}, \{w_2\}\}$
	EXH^{IE+II}(Alt(∃w∈{$\mathbf{w}_0$, w_1, w_2})): p(w)))	∃w∈{w_0, w_1, w_2}: p(w)∧ ∃w∈{w_1, w_2}: p(w) ∧ ∃w∈{w_0, w_1}: p(w)∧ ∃w∈{w_0, w_2}: p(w) **no effect**
	EXH^{IE+II}(Alt(∀w∈{$\mathbf{w}_0$, w_1, w_2})): p(w)))	∀w∈{w_0, w_1, w_2}: p(w)∧ ∀w∈{w_1, w_2}: p(w) ∧ ∀w∈{w_0, w_1}: p(w)∧ ∀w∈{w_0, w_2}: p(w) **no effect**

CONCLUSIONS. Weak universal modal readings can be derived in two ways. Either a universal modal is lexicalized as such, or an existential modal gets strengthened by means of exhaustifiifcation. We argue in this paper that the latter can and must take place only if the domain of quantification does not contain the actual world; otherwise triviality would be yielded. Existential modals that contain the actual world are not trivial and therefore not in need of strengthening. A consequence of this is that weak necessity modals and predicates like *think* or *believe*, unlike strong necessity modals, at least at first sight lack existential duals and give rise to neg-raising readings.

Presupposition Maximization in Indefinites with Internal and External Modifiers

Manfred Krifka & Fereshteh Modarresi

The Problem, according to Alonso-Ovalle, Menéndez-Benito & Schwarz (2011) (AMS):

(1) a. *#Yesterday, I talked to a husband of Mary's.*
b. *Yesterday, I talked to a man who is married to Mary.*

(1)(a) is odd because it is blocked by the salient alternative *the husband of Mary's,* which carries a uniqueness presupposition. Following Heim (1991) and Hawkins (1991), the non-use of this more specific expression gives rise to the implicature that Mary might have more than one husband, contradicting the monogamy assumption. This rule is known as "Maximize Presupposition!" (MP), cf. Sauerland (2008). The puzzle is that by the same argument, (1)(b) should be infelicitous as well, due to competition with *the man who is married to Mary.*

Our Contribution: We point out theoretical and empirical problems of the explanation of contrasts like (1)(a)/(b) by AMS, and we present a novel proposal. We observe that (1)(a), with *of Mary* as argument of *husband*, is structured as [DP *a* [NP N PP]], with [DP *the* [N PP]] as alternative, invoking MP. In contrast, (1)(b) has can be structured as [DP [DP *a* NP] RC], with a modifying RC external to the DP, whereas the semantically plausible definite competitor is structured as [DP *the* [NP NP RC]], where the RC is DP-internal. Hence, MP is not invoked (this is a case of structure-sensitive alternatives; Singh 2010). We extend our analysis to other modifiers and present experimental results arguing in support of our analysis.

The AMS Proposal: According to AMS, there are two types of definites, those that presuppose uniqueness, and those that presuppose familiarity (givenness). The relevant alternative that blocks (1)(a) is the uniqueness definite, whereas (1)(b) only contrasts with the familiarity definite. AMS support this argument by data from German, which sometimes marks uniqueness definites when occurring as object of certain prepositions (e.g., *beim Mann* vs. *bei dem Mann*, so-called "weak definites", Schwarz 2009):

(2) a. *#Gestern habe ich bei einem Mann von Mary angerufen.* indefinite
b. *Gestern habe ich beim Mann von Mary angerufen.* weak definite
c. *Gestern habe ich bei dem Mann von Mary angerufen.* regular definite

(3) a. *Gestern habe ich bei einem Mann, der mit Mary verheiratet ist, angerufen.* indef.
b. *(#)Gestern habe ich beim Mann, der mit Mary verheiratet ist, angerufen.* weak def.
c. *Gestern habe ich bei dem Mann, der mit Mary verheiratet ist, angerufen.* reg. def.

According to AMS, (2)(a), 'Yesterday I called up a man (= husband) of Mary' is bad because one of the competitors, (2)(b), expresses uniqueness, and the object ('husband of Mary') satisfies uniqueness. In contrast, (3)(a) with a relative clause, 'Yesterday I called up a man who is married to Mary' is fine, the reason being that (3)(b) is not a competitor, as weak definites are claimed to be ruled out in this syntactic environment, and (3)(c) does not express uniqueness, but familiarity, and hence does not compete with (3)(a).

Problems with the AMS Proposal: There are conceptual problems with this account. It is not clear why (3)(b) is bad. Also, it is rather stipulative to assume homophony of two separate definite articles across languages, one presupposing uniqueness and the other familiarity, with the special property of only one of them being compatible with restrictive relative clause, as the familiarity definite reading does not block (3)a.

There is also an empirical problem. We carried out a rating experiment of similar sentences in German (>100 participants, examples judged between subjects). This produced the assumed difference between (2)(a) and (b) (3.20 vs. 2.00, on a Likert scale with 5 bad, 1 good), but it did not show much difference between (3)(a) and (b) (1,67 vs 1,76).

Lexical vs. syntactic uniqueness: The contrast between (1)(a) and (b) can be seen as one between functional nouns (FN) that imply uniqueness due to their lexical semantics (*husband of x*), and others that do so due to their syntactic construction (*man x is married to*). We showed this experimentally with the FN *Mittelpunkt* 'center point of x' and the noun *Punkt genau in der Mitte* 'point exactly in the center of x'. In particular, we determined ratings for (a) FNs with a PP argument, and uniqueness-implicating nouns that involve (b) PP modification, (c) participial clause (PC) modification, and (d) relative clause (RC) modification. The averaged ratings are given in (4); the functional noun is worst when occurring as an indefinite.

(4) a. *Der Schüler hat einen Mittelpunkt des Kreises identifiziert.* FN 2.55
b. *Der Schüler hat einen Punkt genau in der Mitte des Kreises identifiziert.* PP 1.52
c. *Der Schüler hat einen genau in der Mitte des Kr. liegenden Punkt identifiziert.* PC 1.32
d. *Der Schüler hat einen Punkt, der genau in der Mitte des Kr. liegt, identifiziert.* RC 1.27

Our proposal: We present an explanation that avoids the conceptual and empirical problems of AMS and explains the experimental results for (4).

For DPs with **functional nouns**, as in (4)(a) we assume the structure [$_{DP}$ INDEF [$_{NP}$ N PP]]; the indefinite DP is blocked by the competing definite DP [$_{DP}$ DEF [$_{NP}$ N PP]] due to MP.

For **DPs with PP modifiers** as in (4)(b) we assume structural ambiguity between a DP-internal modification [$_{DP}$ DET [$_{NP}$ NP PP]] and a DP-external modification [$_{DP}$ [$_{DP}$ DET NP] PP]. For indefinite DPs, the interpretations of these two structures coincide: ⟦[$_{DP}$ INDEF [$_{NP}$ NP PP]]⟧ introduces a discourse referent x with ⟦[$_{NP}$ NP PP]⟧(x), i.e. ⟦NP⟧(x) and ⟦PP⟧(x), whereas ⟦[$_{DP}$ [$_{DP}$ INDEF NP] PP]⟧ introduces a discourse referent x with ⟦NP⟧(x) that is further restricted by ⟦PP⟧(x). The two procedures yield the same result in all models. Assume now that the discourse referent x happens to be uniquely anchored, i.e., that ⟦NP⟧(x) ∧ ⟦PP⟧(x) is true for a unique x, but that ⟦NP⟧(x) is not uniquely anchored (e.g., there are many *points* but a unique *point exactly in the middle of the circle*). Then the competing definite DP is the one with DP-internal modification, [$_{DP}$ DEF [$_{NP}$ NP PP]], not the one with DP-external modification, [$_{DP}$ [$_{DP}$ DEF NP] PP]. But the definite DP with internal modification only blocks the indefinite DP with internal modification, [$_{DP}$ INDEF [$_{NP}$ NP PP]], not the meaning-identical indefinite DP with external modification, [$_{DP}$ [$_{DP}$ INDEF NP] PP]. Hence indefinite DPs with PP modifiers are predicted to be good, if the PP can be attached outside of the core DP.

For **DPs with RC modifiers** as in (4)(d) the same argument applies. The fact that such examples are judged considerably better can be explained by assuming that larger constituents, like clauses, tend towards high attachment, hence DP-external modification (cf. Fodor 1998). The sentences would be judged even better if the RC is extraposed to the end of the clause.

For **DPs with prenominal PC modifiers** as in (4)(c) we appear to have a problem: They are judged good but the seem to allow only for an internal modification: [$_{DP}$ INDEF [$_{NP}$ PC NP]]. However, PCs can be interpreted as external modifiers (cf. Viesel 2017); for example, they can be prosodically marked as parentheticals and contain their own discourse modifiers, such as *übrigens* 'by the way'. Hence in spite of their position, they allow for an external modification: [$_{DP}$ INDEF [$_{NP}$ {PC} NP]], where braces indicate parenthesis, is interpreted as involving external modification. In particular, in their external modification reading, indefinite PC constructions do not semantically contrast with their definite counterparts, as for expressions of the constituent structure [$_{DP}$ DEF [$_{NP}$ {PC} NP]], like *der – (übrigens) in der Mitte des Kreises liegende – Punkt*, uniquenes has to be satisfied by [$_{DP}$ DEF NP].

Further details about the experiment. We will show that the ratings in (4) are due to uniqueness. In case uniqueness is not involved, as in *Bekannter von Olga* 'acquaintance of Olga', we find quite different results for constructions parallel to (4)(b/c/d), namely 1.17, 2.04 and 1.77, which reflect preferences for syntactically simpler constructions (PP > RC > PC).

Glosses of the German examples:

(2) a. Yesterday I called at a husband/man of Mary. indefinite
b. Yesterday I called at-the.WD husband/man of Mary weak definite
c. Yesterday I called at the.RD husband/man of Mary. regular definite

(3) a. Yesterday I called at a man who is married to Mary. indef.
b. Yesterday I called at-the.WD man who is married to Mary. weak def.
c. Yesterday I called at the.RD man who is married to Mary. reg. def.

(4) a. The student identified a center point of the circle.
b. The student identified a point exactly in the center of the circle.
c. The student identified an [exactly in the center of the circle being] point.
d. The student identified a point which is exactly in the center of the circle.

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Anaphoric Potential of Weak Definites vs. Indefinites in German

Fereshteh Modarresi

Weak definites (WDs) as in *going to the cinema* (Poesio 1994, Carlson & Sussman 2005, Schwarz 2013, 2014) differ from regular definites in various respects: They have a number-neutral reading (cf. *Mary took the train to Munich* – could be one or more trains). They also co-vary in conjunctions (as in *Peter went to the cinema and Mary too*) and take narrow scope under quantifiers (as in *everybody went to the cinema* – it could be different cinemas in either case). As such, WDs appear to be similar to narrow-scope indefinites (IDs) as *in going to a cinema*. However, WDs differ from IDs as they support anaphoric uptake to a reduced degree (Scholten & Aguilar-Guevara 2010). For example, in German, which marks WDs different from regular definites as objects of prepositions, (1a) with an ID antecedent is generally judged better than (1b) with a WD antecedent (Modarresi, Fortmann & Krifka, 2019).

(1) a. *Dann gingen wir in **ein Kino**. Wir haben **es** schon von weitem gesehen.*
b. *Dann gingen wir **ins Kino**. Wir haben **es** schon von weitem gesehen.*

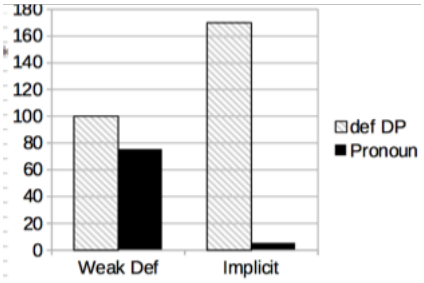
We present two experiments. The first shows that anaphoric reference to WDs by pronouns as in (1b) is indeed possible, and is distinct from associative anaphora, which strongly prefers full noun phrases. The second shows that anaphoric reference to WD antecedents as in (1b) is indeed less straightforward than anaphoric reference to ID antecedents as in (1a).

The results of the first, but also the second experiment argue against theoretical proposals for WDs that analyze them as kind-referring (Aguilar-Guevara & Zwarts 2010), as property denoting (van Geenhoven 1992, McNally 1995), or as involving predicate restriction instead of argument saturation (Ladusaw & Chung 2003, Dayal 2015). These theories do not assume that any entity-level discourse referent (DR) is introduced. Anaphoric update should be possible only by associative anaphora (bridging). In fact, bridging has been proposed for anaphoric properties of compounds or implicit arguments e.g., *Mary went apple-picking. #They/The apples were delicious* (cf. Ward et al. 1991).

If WDs uptake were due to bridging, then there should be no difference in anaphoric uptake between (2)(a) and (b): *Dem Flugzeug* in 2(a) is a clear case of a WD, as no airplane was mentioned, and our general knowledge does not dictate that there is a unique airplane in the context (contraction to *mit'm* is possible in spoken German). *Fliegen* in (b) implicitly invokes an airplane as the prototypical means of airborne transportation.

(2) *Susanne ist Journalistin bei einem Nachrichtensender.*
a. *Gestern ist sie **mit dem Flugzeug** nach Costa Rica **geflogen**.*
b. *Gestern ist sie nach Costa Rica **geflogen**.*
*Da über dem Atlantik starke Stürme herrschten, geriet **es / das Flugzeug** öfters in Turbulenzen.*

In fact, in **Experiment 1** (36 participants, 25 items), a selection tasks between anaphora (*es*) and full DP (*das Flugzeug*) as in (2) revealed that participants continued (b) (implicit cases) overwhelmingly with *…das Flugzeug…* In (a) (WD cases), continuations with … *das Flugzeug…* only slightly outnumbered continuations with *…es…* The difference is highly significant. We cannot rule out the mechanism of associative anaphora for WD antecedents. But insofar as associative anaphora with pronouns is highly restricted (to humans with prototypical gender roles, e.g., in *John married. She is pretty.*) we conclude that WDs must allow for anaphoric uptakes distinct from associative anaphora.



Experiment 2: Testing the accessibility of WD and ID antecedents in subsequent sentences has resulted in relatively subtle differences. Here we report on an experiment that uses a novel technique. The first sentence contains both an ID antecedent and a second antecedent that is realized either as ID or as WD. The second sentence contains a pronoun that is compatible with either antecedent (in its gender and its plausible interpretation). Consider (3a/b) as an example.

(3) a. *Nora hat sich gestern **ein** Museum angeschaut, bevor sie **ins** Kino gegangen ist. Es war gerade neu eröffnet worden.*

b. *Nora hat sich gestern **ein** Museum angeschaut, bevor sie in **ein** Kino gegangen ist. Es war gerade neu eröffnet worden.*

In an online survey (with 60 participants, 14 + 7 filler items, randomized using Latin square design), the participants were asked to read the antecedent clause as in the sample item (3)(a) or (b), followed by a subsequent sentence with a pronoun that potentially referred to either one of the antecedents. The participants were then asked, in a separate screen, to decide whether the pronoun refers to the first or the second antecedent (here, *Was ist gerade neu eröffnet worden?* with a selection between *das Museum* und *das Kino*).

In the ID-ID case, we found a preference for the second antecedent, which is to be predicted because it is more recent, and more salient (Ariel 1991). In the ID-WD case, there were fewer updates for the second antecedent. The difference between uptake of IDs and WDs in second position was significant (Wilcoxon p-value = 0,01, significant). At the same time, there were many cases in which the pronoun was interpreted as referring to the WD antecedent. These results are in line with the eye-tracking study by Broscher et al. (2020). We conclude that WDs do introduce DRs, but that these DRs are less salient than the DRs introduced by IDs.

The result supports proposals of WDs that assume that they introduce DRs in a more limited way (Farkas & de Swart 2003) or in a position that is not immediately accessible but where they can be recovered by operations such as abstraction and summation (cf. Krifka & Modarresi 2016 for weak definites, Modarresi & Krifka 2021 for bare nouns).

Glosses:

(1) a. Then we went to a cinema. We had seen it from afar.
b. Then we went to the cinema. We had seen it from afar.

(2) Susanne is a journalist working with a news agency.

a. Yesterday she flew to Costa Rica with the airplane.
b. Yesterday she flew to Costa Rica
Since there were strong storms over the Atlantic Ocean, the plan often ran into turbulence.

(3) a. Nora went to a museum yesterday before going to the cinema. It was newly opened.
b. Nora went to a museum yesterday before going to a cinema. It was newly opened.

What was newly opened?

Select between: Museum – Cinema.

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Alternatives and jurisdiction in predication

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Introduction. An obvious fact about predicates is that different predicates contribute different kinds of information. For example, *green* describes its subject's colour, while *table* describes its subject's shape and function. This paper argues that the kind of information contributed by a predicate (its 'jurisdiction') plays a role in semantic composition; specifically, it underlies how predicates interact with alternative-sensitive expressions.

Predicates and additives. Some predicates (1a), but not all predicates (1b), are incompatible.

(1) a. #This fork is a spoon. b. This fork is a gift.

One might simply claim that the predicates *fork* and *spoon* are incompatible because their extensions cannot overlap; put another way, the concepts FORK and SPOON are incompatible. However, there are reasons to think this is not the case. In particular, (1a) belongs to a class of examples where contradictions stemming from predicates can be lifted by additives like *also*:

(2) a. This fork is #(also) a spoon.
b. This comedy is #(also) a tragedy.
c. The white flag is #(also) green.
d. This car is #(also) a boat.

These sentences could be uttered of a spork, a tragicomedy, a green and white flag, and a convertible vehicle. Meanwhile, contradictions which are truly the result of conceptual incompatibility remain contradictory even in the presence of *also*, confirming that *also* does not have the power to modify predicates' denotations (as expected given its Boolean conjunctive nature):

(3) a. #This triangle is (also) a square. b. #This duck is (also) a beaver.

What sort of relation must hold between two predicates for them to display this on-again-off-again incompatibility? What distinguishes *fork*/*spoon* from *fork*/*gift* (1b) and *duck*/*beaver* (3)?

Predicates undergo ultra-local strengthening. Building on [4], I assume that predicates like the pairs in (2) are strengthened in sentences like (1a). The predicates are lexically consistent, but are made incompatible via strengthening. Indeed, recent work on additive particles [2, 1] claims that, when additives are obligatory, it is because an obligatory Exh(aust) operator would otherwise create problems. Thus, I take (1a) to have the LF and meaning in (4).[1]

(4) a. LF: This $[_{\text{NP}}\ \text{Exh}_{\text{ALT}}$ fork] is a $[_{\text{NP}}\ \text{Exh}_{\text{ALT}}$ spoon].
b. $[\![(4a)]\!] = 1$ iff this (fork & not spoon & not knife & not ...) is a (spoon & not fork & not knife & not ...) $\Rightarrow$ contradiction

This is not a typical exhaustivity effect [4]: not only is it obligatory (otherwise a non-contradictory parse of (1a) would be available), but it is also necessarily computed locally to the alternative-bearing element (*fork*, *spoon*). If it was possible for Exh to be global, it would not create a contradiction, because its prejacent would entail that the subject is in the intersection of *fork* and *spoon*. These properties (obligatoriness and locality) give the exhaustivity effect a lexical-like flavour.

As such, the question for this paper is specifically the following: What relation must exist between two predicates for them to be alternatives for this ultra-local Exh?

Alternatives from conceptual taxonomies. Paillé [4] argues that the alternatives for Exh in the examples in (2) are the predicates from a given conceptual taxonomy:

[1] In (4), I assume a type-flexible Exh. See [5] on how *also* fixes the problems stemming from the Exh operators.

(5) a. UTENSILS: {fork, spoon, knife, ...} c. COLOURS: {green, white, red, ...}
b. GENRES: {comedy, tragedy, ...} d. VEHICLES: {car, boat, plane, ...}

(6) follows because *fork* and *spoon* are alternatives for local Exh, whereas *fork* and *green* are not.

(6) a. #This fork is a spoon. b. This fork is green.

These taxonomies are somewhat reminiscent of Horn scales [3], but without entailment relations. However, stipulating such taxonomies raises the question of what gives them special status for the creation of alternatives: why should language treat conceptually compatible predicates from a given taxonomy differently than conceptually compatible predicates from different taxonomies?

Jurisdiction in predication. Rather than taking conceptual taxonomies to be primitive, I suggest that predicates are alternatives for our ultra-local Exh iff they contribute the same kind of information in a given sentence. It simply happens to be that predicates from a given taxonomy usually contribute the same kind of information (e.g., the body and function of an individual (5a,d), the logic of a story (5b), the colour of an object (5c), etc.). Of course, the fact that different predicates contribute different kinds of information is perfectly obvious; but I claim that this notion has theoretical status, in determining alternatives for the local strengthening of predicates. Call the kind of information provided by a predicate its 'jurisdiction' (cf. the 'qualia' of [6]). Beyond being more explanatory, relying on jurisdictions rather than taxonomies for ultra-local Exh has other benefits.

Benefit 1: function vs. body. One prediction this account makes is that, if two predicates have the same jurisdiction in one sentence but different jurisdictions in another, they should require *also* in the first but not the second. This is borne out. Indeed, some predicates require *also* in some sentences, but not others, viz. when one predicate refers to the body and the other to a function:

(7) a. Poor John! This fork is his spoon. b. This shirt is a good hat.

For instance, (7b) means that the object has the physical make-up of a shirt, but is used as a hat. The pairs of predicates in (7) are alternatives when they share the 'physical make-up' jurisdiction (e.g., (6a)), but not when they have different jurisdictions (7).

Benefit 2: no need for a grand 'artefact' taxonomy. One problem for taxonomies as stated in (5) is that some of them are too narrow to capture all the data. Indeed, many predicates *do* require *also* without coming from a single taxonomy, if taxonomies are so narrow as in (5a) or (5d):

(8) This couch is #(also) a car.

To be sure, (8) could be understood simply as *couch* and *car* both coming from a grand taxonomy of artefacts. If so, (5a) and (5d) should really be collapsed in a larger 'ARTEFACTS' taxonomy. But positing such a large taxonomy would undergenerate; in particular, sentences like (9) involve two artefactual predicates without requiring *also*.

(9) a. This car is a robot. b. Nowadays, phones are computers.

On the other hand, the acceptability of (9), and the unacceptability of (8) (without *also*), can be understood on the jurisdictional approach. Presumably, predicates like *robot*/*computer* contribute information about the inner workings of an object rather than its outer physical make-up or its *bona fide* function, explaining the compatibility of *car* with *robot* but not *couch*. (8), of course, requires *also* because both predicates have both the physical make-up and function jurisdictions.

Some formalization. Taking inspiration from the claim in the degree literature that scalar predicates take a degree as an argument, I suggest nouns like *fork* take a jurisdiction j as an argument:

(10) $[\![\text{fork}]\!] = \lambda j.\lambda x.\ x \in \{y : y \text{ has the } j \text{ of a fork}\}$.

In (6a), both nouns have the 'body' jurisdiction and are given an Exh, creating a contradiction:

(11) a. $[\![\text{BODY fork}]\!] = \lambda x.\, x \in \{y : y \text{ has the body of a fork}\}$. (*likewise for 'spoon'*)
b. $[\![\text{Exh}_{\text{ALT}}\ [\text{BODY fork}]]\!] =$
$\lambda x.\, x \in \{y : y \text{ has the body of a fork}\} \wedge x \notin \{y : y \text{ has the body of a spoon}\} \wedge \ldots$

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Sluicing and Free Choice

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INTRODUCTION In this work we provide an analysis of the different readings that arise when Free Choice (FC) disjunctions serve as antecedents for sluicing, a TP-ellipsis phenomenon involving embedded *wh*-questions. We focus on the different inferences generated by (1a) and (1b).

(1) a. You may have coffee or tea, but I don't know which.
$\rightsquigarrow$ only one between coffee and tea is a possible option. $(\Diamond a \wedge \neg\Diamond b) \vee (\Diamond b \wedge \neg\Diamond a)$

b. You may have coffee or tea, but I don't care which.
$\rightsquigarrow$ both coffee and tea are possible options. $\Diamond a \wedge \Diamond b$

Whereas (1a) blocks FC inferences (i.e. it seems to entail that only one alternative is possible, and the speaker cannot tell which one it is), (1b) licenses them (i.e. it appears to entail that both alternatives are possible to the addressee, and the speaker does not care which one the addressee will *actually* choose). To account for this fact, we start following Aloni's (2018) and Fusco's (2019) assumption (based on speakers' intuitions) that the different readings are tied to different ellipsis sites. In the case of *know* the modal is present in the recovered ellipsis site, as shown in (2a); while in the case of *care* the modal is omitted, as shown in (2b).

(2) You may have coffee or tea, but
a. I don't know which [you may have]. b. I don't care which [you have].

Beyond the conundrum it constitutes, the Free Choice-in-Sluicing (FC-in-S) puzzle is relevant also for it can inform us on the dynamics at play between antecedents and ellipsis sites, showing that the interpretation of the former can be determined, via a process of selection, by the latter.

THE PREVIOUS THEORY The only previous account of the FC-in-S puzzle is due to Fusco's (2019) theory, which relies on two main assumptions: (I) that FC cancellation is tied to ignorance (self-)ascription by the speaker, which would generate a contradiction (Moorean tension) with a FC permission; and (II) that the FC cancellation is due to the impossibility of FC effects in configurations in which the disjunction scopes above the modal (Wide-Scope configurations): this would deliver FC-cancellation whenever the modal is repeated in the sluice, since disjunction would have wide scope in the sluice and thus, by scopal parallelism, in the antecedent as well.

We argue that both these assumptions are incorrect. To challenge (I) we present examples in which knowledge is specifically ascribed in sluices but FC is cancelled nevertheless, as in (3):

(3) You may have coffee or tea, and
a. I know which. b. even Susie can tell which.

The examples above show that FC is cancelled even when knowledge is ascribed to the speaker, either directly as in (3a) or indirectly as in (3b), and this behaviour is shared by most question embedding verbs, proving that different FC readings are uniquely tied to the interpretation of the ellipsis site, the reconstruction of which is completely independent from ignorance ascriptions. We believe (II) is also wrong, not because of scopal parallelism, that we accept, but because of the presumption that FC is impossible whenever disjunction takes wide scope with respect to the modal. To tackle this assumption we recall the experimental (Cremers et al., 2017) and theoretical

(Klinedinst and Rothschild, 2012) works that have shown the existence of Wide-Scope FC, causing the most recent FC theories to account for it (Aloni, 2021; Bar-Lev and Fox, 2020; Goldstein, 2019). For this reason, our proposal exploits a theory of FC derivation that is able to account for Wide-Scope FC, namely the state-based semantics of Aloni (2018, 2021), labeled BSML.

DERIVING THE MODAL Motivating the different modal pattern in the two sluices is the first step of our proposal. While the *care*-case would be grammatical even if we overtly added the modal in the (pre-)sluice, leaving out the modal in the *know*-case would result in the infelicitous '#You may have coffee or tea, but I don't know which you have'. We claim that this is tied to the notion of temporal orientation (Condoravdi, 2001): leaving out the modal in the *know*-sluice would create a contrast between the future time of evaluation given to *have* by the modal *may* in the antecedent, and the present time of evaluation provided to the same event *have* by *know* in the sluice. The repetition of the modal ensures matching evaluation times, and thus grammaticality, an essential condition to undergo sluicing-deletion (Kroll, 2019; Dayal and Schwarzschild, 2010). On the contrary, *care* in the consequent of (1b) is able to provide future time of evaluation even if the event in its scope is expressed with a present, since *care* can have future orientation, like *may*. We take these cases as minimal pairs showing that leaving out the modal, if possible, is preferred to perfect antecedent-sluice matching. This economy-driven reconstruction turns out to be against the predictions of Kroll et al. (2017); Rudin (2019), who require identity between syntactic eventive cores (bare vPs) but assume full perfect matches as 'default' reconstructions. We propose non salience-based OT constraints predicting bare vPs to be optimal reconstructions, selected whenever they are grammatically paired with antecedent-matching evaluation time.

DERIVING FC-CANCELLATION From these considerations, we assume contextual entailment from antecedents to sluices as identity condition (Kroll, 2019), checked via the LFs in (4), exploiting the Inquisitive semantics $\exists$ operator to account for *wh*-questions (Ciardelli et al., 2018):

(4) a. I don't know which [you may have] $\neg K(\exists x \Diamond Hx)$

b. I don't care which [you have] $\neg C(\exists x Hx)$

Once we apply the flattening inquisitive operator ! for existential closure, to calculate entailments between declaratives and questions, and we properly restrict the domain, we end up with the following equivalences where $\vee$ is interpreted as the split disjunction from Aloni's BSML, while $\exists$ is still interpreted as in Inquisitive semantics (other formalisations are also possible):

(5) a. $!\exists x \Diamond Hx = \Diamond Ha \vee \Diamond Hb$

b. $!\exists x Hx = Ha \vee Hb$

As for Fusco (2019), in (4a) the disjunction/existential takes wide scope and by scopal parallelism the disjunction in its antecedent must take wide scope too. Contrary to Fusco (2019), however, we assume Wide-Scope configurations to be compatible with FC and Non-FC interpretations as in Aloni (2021). We then derive FC-cancellation by the uniqueness presupposition of singular *which* clauses (Dayal, 1996; Hirsch and Schwarz, 2020; Kobayashi and Rouillard, 2021). In (4a) this presupposition applies above the modal and generates a contrast with the FC reading of the antecedent (*which you may have* presupposes that *there is only one thing you may have*). Therefore, the Non-FC reading of the antecedent in (4a) is selected. On the other hand, in (4b) disjunction has narrow scope, and by scopal parallelism its antecedent too, which directly generates FC (when pragmatically enriched, following Aloni (2021)). The uniqueness presupposition this time applies to the event itself: *which you have* presupposes that *there is only one thing you will actually have*: no contradiction is detected with the FC antecedent and FC inferences go through.

CONCLUSIONS We propose a novel theory of the FC-in-S puzzle that is able to capture the various data in a flexible way, with two independent explanations for the presence/absence of the modal in the sluice and for FC-cancellation. The account shows both the role of lexical verbs in sluicing reconstructions and how ellipsis sites can affect the interpretation of their antecedents. In the talk we also present open issues (and possible solutions) for past inflected modals in Italian.

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Quantifying weak and strong crossover for *wh*-crossover and proper names

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Summary. Strong and weak crossover have been studied for decades (Postal, 1971), yet there is little experimental work quantifying the relative severity of these violations. We develop a novel experiment which shows a significant difference in meaning acceptability between strong and weak crossover in English, favouring theories which distinguish the two. This experimental method also lets us address controversial cases of crossover where appeal to intuition has been insufficient, such as cataphora with proper names. We provide quantitative data showing that this displays a similar strong vs. weak crossover effect. More generally, our method provides a way to empirically probe cross-linguistic variation involving crossover phenomena, something which was long overdue.

Methodology. Classical, standalone binding / crossover sentences may be judged acceptable because binding is possible – or, because participants accommodate some other referent that the pronoun corefers with. This creates a confound for previous experiments (e.g. Kush 2013) using acceptability judgements. Our design capitalises on this ambiguity by testing two readings (co-indexations) of the same sentence: whether the pronoun corefers with a preceding distractor NP (j) or whether it is bound by the *wh*-word (i). This disentangles whether it is the structure of the sentence or its reading which causes the crossover violation.

Data (*wh*-crossover). We use a 2x3x2 design which compares the two orders *wh*…[gap]…pronoun (binding, B) and *wh*…pronoun…[gap] (crossover, CO) across three sentence types corresponding to strong (S), secondary strong (2S) and weak (W) crossover. Each sentence has two readings:

(1) *SB*: The teacher$_j$ wondered which$_i$ of the students _ enjoyed the essay topic they$_{i/j}$ had chosen.

(2) *2SB*: The teacher$_j$ couldn't decide which$_i$ student's poem topic _ frustrated them$_{i/j}$ the most.

(3) *WB*: The teacher$_j$ wondered which$_i$ of the students _ enjoyed their$_{i/j}$ project topic.

(4) *SCO*: The teacher$_j$ couldn't remember which$_i$ of the students they$_{i/j}$ said _ didn't need to hand in the essay.

(5) *2SCO*: The teacher$_j$ couldn't decide which$_i$ student's poem topic they$_{i/j}$ liked _ the most.

(6) *WCO*: The teacher$_j$ wondered which$_i$ student their$_{i/j}$ project topic frustrated _ the most.

We test each configuration in six lexical variants. We also test each item across masculine, feminine and singular *they* pronouns (see Bjorkman, 2017; Conrod, 2019; i.a.) for a total of 108 test items.

Response type piloting. We ran a pilot with 200 participants to compare two response types: (A) Present the target sentence and ask participants to rate two side-by-side paraphrases for the distractor NP and bound readings. (B) Present a context supporting one reading, then ask participants to rate the target sentence. Each used a 5-point Likert scale. Results trended in the same direction for both, but the paraphrase task (A) produced crisper results. Below, we present two experiments with the paraphrase task (see Fig. 5); next steps include a full replication with the context task (B).

Experiment 1. We recruited 144 self-reported native English speakers using Prolific (8 excluded, $n = 136$). Participants saw 6 target items corresponding to (1-6) and 6 fillers, in random order.

Results (*wh*-crossover). We fit an ordinal mixed effects model in R using `ordinal` (Christensen, 2019) with an interaction between gap/pronoun order and reading. Fig. 1 shows the model's proportions of ratings for each condition. We see little

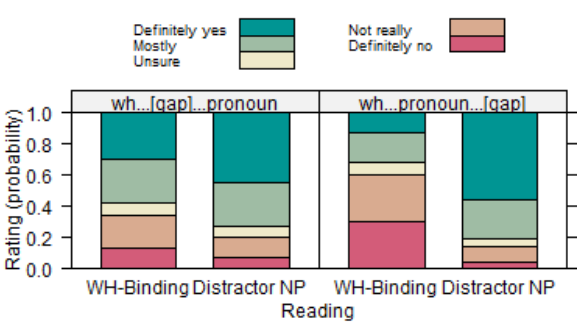

Fig. 1: Effect of gap/pronoun order

effect of reading alone, but a clear, significant effect of pronoun-before-gap on the bound reading (i.e. crossover vs. binding). We also see a significant positive effect of pronoun-before-gap with the distractor reading. This shows that it is the interpretation causing the low ratings, since the sentences are identical. We fit a second ordinal mixed effects model on just the bound reading of pronoun-before-gap (crossover) items to quantify the effect of strong vs. weak crossover, shown in Fig. 2. Notably, this effect is significant; weak crossover roughly doubles the likelihood of a high rating. Finally, results are comparable across pronoun gender, but singular *they* shows the least bias against bound readings compared to the distractor NP.

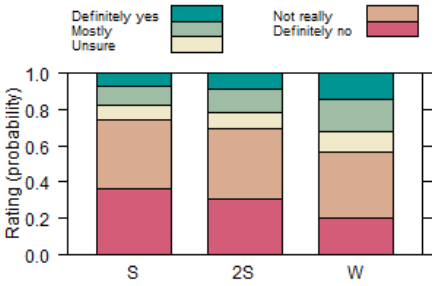

Fig. 2: Strong vs. weak crossover

Data (proper names). We use a 2x2 design which crosses proper name and pronoun order with strong and weak (possessive) configurations, balanced for pronoun gender. The acceptability of the *his*$_i$ reading in (10) is disputed (Chomsky, 1976; Lasnik and Stowell, 1991):

(7) The chef$_j$ knew that Daniel$_i$ was disappointed by the soup he$_{i/j}$ made.

(8) The chef$_j$ knew that Daniel$_i$'s soup had disappointed him$_{i/j}$.

(9) The chef$_j$ knew that he$_{i/j}$ was disappointed by the soup Daniel$_i$ made.

(10) The chef$_j$ knew that his$_{i/j}$ soup had disappointed Daniel$_i$.

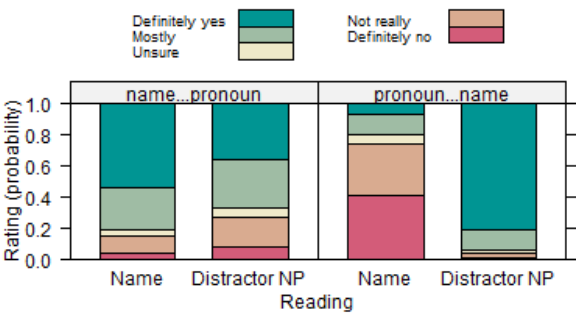

Fig. 3: Effect of name/pronoun order

Experiment 2. We recruited 48 native English speakers using Prolific (1 excluded, $n = 47$). Participants saw 6 target items and 6 fillers.

Results (proper names). We fit an ordinal mixed effects model with an interaction between name/pronoun order and reading, shown in Fig. 3. As above, we see no significant effect of the reading alone but a significant effect of pronoun-before-name on the name reading. We again see a significant effect of pronoun-before-name with the distractor reading, showing that only the cataphoric reading is dispreferred. We also see a significant effect of strong vs. weak, seen in Fig. 4.

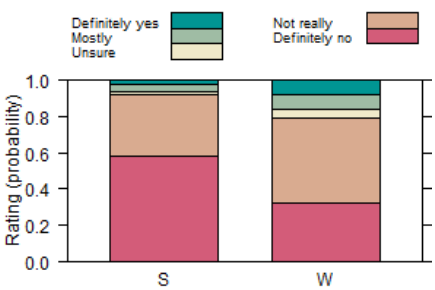

Fig. 4: Strong vs. weak in names

Conclusion. We present a novel experimental paradigm to measure strong and weak crossover. We find a significant difference in meaning availability between the two, contra Kush (2013) who did not find a difference using acceptability judgements. This supports theories which distinguish strong and weak crossover such as Koopman and Sportiche (1982), Safir (1984) or Ruys (2000), as opposed to unified accounts such as Reinhart (1983) or Safir (2004). We further find that proper names display a significant crossover effect similar to *wh*-crossover, supporting Rule I (Grodzinsky and Reinhart, 1993) and its derivatives. However, this is significantly less severe in weak configurations, suggesting that Rule I is not sufficient in these cases. This leaves an open theoretical question. More broadly, we propose a robust, adaptable methodology to test disputed cases of crossover, including relative clauses in English and French (Postal, 1993) and variation in weak crossover across languages (Bresnan, 1998; Lyu, 2017; i.a.).

Figures.

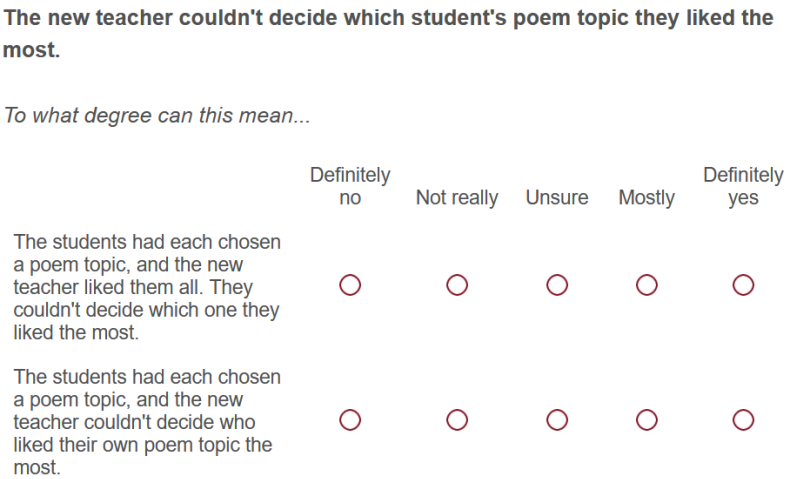

Fig. 5: Secondary strong crossover sentence in the "paraphrase" design (Experiment 1)

Parameter	Odds ratio	p-value
***Wh*-crossover**		
Distractor NP (reading)	–	$p = 0.14$
wh…pronoun…gap	0.33	$p < 0.05$
wh…pronoun…gap * Distractor NP	4.61	$p < 0.05$
Strong vs. weak	2.19	$p < 0.05$
Strong vs. secondary strong	–	$p = 0.30$
Proper names		
Distractor NP (reading)	–	$p = 0.08$
pronoun…name	0.06	$p < 0.05$
pronoun…name * Distractor NP	133.76	$p < 0.05$
Strong vs. weak	2.90	$p < 0.05$

Table 1: Model parameters for *wh*-crossover and proper names

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On the semantics of *wh*-

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This paper argues that a simple and independently motivated semantics for *wh*-expressions can be developed by identifying them as demonstratives. Morphologically, *Wh* is a demonstrative value, like PROXIMAL or DISTAL. Semantically, it's a variable.

The interpretation of *wh*-: two approaches On a Karttunen (1977) style analysis, *wh*-expressions contain existential quantifiers, wrapped in a mechanism that fits them into the semantic make-up of the interrogative clausal edge. An unselective binding analysis (e.g., Rullmann & Beck 1998), treats them as centered around free variables inside the question nucleus, qualified by a presuppositional definite, and bound through existential closure.

A shared problem: cross-categoriality. While the literature is mostly confined to nominals, *wh*-expressions exist across ontological and syntactic categories; the challenge is to define their commonality, i.e., a semantics for the *wh*-feature. Cresti's (1995) (1a) applies to GQ meanings (e.g., *someone*) but not, e.g., to manner-*how*, which would require the type-shifted version (1b) to fit a hypothetical underlying existential quantifier over manners 'somehow':

(1) a. $[\![\textit{wh-}]\!] = \lambda P_{<et,t>} \lambda R_{<e,<st,t>>} \lambda p_{<s,t>} . P(\lambda x_e.R(x)(p))$

b. $[\![\textit{wh'-}]\!] = \lambda P_{<<<v,t>,t>,t>} \lambda R_{<<v,t>,<st,t>>} \lambda p_{<s,t>} . P(\lambda x_{<v,t>}.R(x)(p))$

Rullmann & Beck focus on *which*-phrases; their semantics for *which* could be derived with a *wh*-feature as in (2a) applying to *the* in (2b) (or *which* might be equated with Schwarz' (2009) anaphoric definite article); but the treatment only yields e-type *wh*-expressions.

(2) a. $[\![\textit{wh}_i\textit{-}]\!] = \lambda R_{<et,e>} \lambda Q_{<et>} . R(\lambda y.Q(y) \wedge y{=}x_i)$

b. $[\![\textit{the}]\!] = \lambda P.\iota x P(x)$ [ι denotes the presuppositional definite det. meaning]

The paradigmatic status of *wh*-expressions In addition, centering *wh*-expressions around indefinites or definites is morphologically and etymologically implausible. Haspelmath (1997) reports that cross-linguistically, sometimes existential quantifiers are built on *wh*-expressions (as in *somehow*), sometimes *wh*-expressions and existentials are homophonous (e.g. German *wer* = 'someone' / 'who'), but *wh*-expressions are typically not built on existential quantifiers. Definite expressions typically do not occur in other syntactic categories than DP. On the other hand, Diessel (2003) reports that, crosslinguistically, *wh*-expressions tend to be most closely related to demonstratives; see the sample paradigm in (3).

(3): Lezgian (Haspelmath 1993).

(3)	**Dem.**	**Wh**
indiv.	im	him/wuž
place	inag	hinag
place:at	ina	hina
place:on	inal	hinal
place:in	inra	hinra
allative	iniz	hiniz
ablative	inaj	hinaj
manner	ik'	hik' (a)
amount	iq'wan	hiq'wan
quality	iˆ xtin	hiˆ xtin

(4): *wh* as a value for [DEMONSTRATIVE].

(4)	**proximal**	**medial**	**distal**	***u*/wh**
manner	kō	sō	ą	dō[1]
thing	this	that		what
locative	here	there		where
allative	hither	thither		whither
ablative	hence	thence		whence
time	then			when
person	der			wer[2]
degree	yay			how
amount	tiek			kiek[3]
quality	takoj			kakoj[4]

[1] Japanese. [2] German. [3] Lithuanian. [4] Russian

Demonstratives cross-categorially Like *wh*-expressions, demonstratives exist cross-categorially with a common semantic aspect (deixis) (4). We can treat this by utilizing the Referential Function R independently required for deferred ostension (5) (Nunberg 1993):

(5) [pointing at a recovered patient, to refer to the medication that cured him:]

That (stuff) worked great!

We adopt Elbourne's (2008) syntax, adapted in (6) for Japanese manner demonstrative *ạ* and English *that*:

(6) *ạ*: $[_{AdvP}\ [_{Adv}\ \text{MANNER}]\ [_{RP}\ \text{R DEM[DISTAL]}]]$ *that:* $[_{DP}\ \text{Det}\ [_{RP}\ \text{R DEM[DISTAL]}]]$

Let the DEM(onstrative) feature refer to δ_c (the demonstrated object), while the feature value triggers a presupposition: (7a). $R_{<e,\alpha>}$ is a free variable, its value recovered from context, which applies to δ_c to yield (a singleton set set containing) the intended referent: (7b).

(7) a. $[\![\ \text{DEM[DISTAL]}\ ]\!]^{g,c} = (\lambda x\text{:far\_from\_ speaker}(x).x)(\delta_c)$
$\equiv \delta_c$ [w/ presupposition δ_c is distal]

b. $[\![\ \text{R DEM[DISTAL]}\ ]\!]^{g,c} = g(R)(\delta_c)$

R's output type and properties are constrained by categorial and other features of the determiner or adverbial head, as in (8)/(9). For *that*, RP combines with an abstract Det *the* in (8a), yielding (8b).

(8) a. $[\![\ \text{Det}\ ]\!]^{g,c} = \lambda P.\iota x[P(x)]$ [ι the presuppositional determiner meaning]

b. $[\![\ \text{Det}\ [\ \text{R DEM[DISTAL]}]\ ]\!]^{g,c} = \lambda P.\iota x[P(x)](g(R)(\delta_c)) \equiv \iota x[g(R)(\delta_c)(x)]$
"the unique object that has the salient relation R with the demonstratum".
when R defaults to IDENT, $\equiv \iota x[(\lambda y.y=\delta_c)(x)] \equiv \delta_c$

If no contextual value is salient, R defaults to IDENT, $\lambda x.\lambda y.y=x$, and ostension is not deferred; if R is contextually determined, ostension is deferred and yields e.g. the medication for (5). The analysis explains how features like PROXIMAL and DISTAL can be interpreted with non-spatially definable demonstratives (e.g., Japanese *ạ*), in (9): R maps the spatially located demonstratum δ_c to the required denotation type, via deferred ostension.

(9) a. $[\![\ [_{Adv}\ \text{MANNER}\ ]\ ]\!]^{g,c} = \lambda x_{<v,t>}\text{:manner}(x).x$ [*v* for events]

b. $[\![\ [_{Adv}\ \text{MANNER}\ ]\ [\ \text{R DEM[DISTAL]}]\ ]\!]^{g,c} = (\lambda x\text{:manner}(x).x)(g(R)(\delta_c))$
$\equiv g(R)(\delta_c)$ [w/ presupposition that value of R applied to δ_c yields a manner]

***Wh*-expressions as de-natured demonstratives** Now assume that a *wh*-expression is a demonstrative, but with its [PROXIMAL/MEDIAL/DISTAL]-feature unvalued:

(10) *dō*: $[_{AdvP}\ [_{Adv}\ \text{MANNER}]\ [_{RP}\ \text{R DEM}[u]_i\ ]]$ *what:* $[_{DP}\ \text{Det}\ [_{RP}\ \text{R DEM}[u]_i\ ]]$

Treatment of the cross-categoriality of *wh*-expressions then comes for free. Let unvalued interpretable features, like trace-copies of moved expressions with uninterpretable features, function as variables, which will be unselectively bound. Other features and R function as before:

(11) a. $[\![\ \text{DEM}[u]_i\ ]\!]^{g,c} = g(x_i)$

b. $[\![\ \text{Det}\ [\ \text{R DEM}[u]_i]\ ]\!]^{g,c} = \iota x.x=g(x_i) \equiv g(x_i)$ [when R defaults to IDENT]

c. $[\![\ [_{Adv}\ \text{MANNER}\ ]\ [\ R_j\ \text{DEM}[u]_i]\ ]\!]^{g,c} = (\lambda x_{<v,t>}\text{:manner}(x).x)(g(R_j)(g(x_i)))$
$\equiv g(R_j)(g(x_i))$ [w/ presupposition that $g(R_j)$ applied to $g(x_i)$ yields a manner]

After reconstruction (forced, as the demonstrative lacks an operator semantics) and existential closure this yields the question meanings in (12)/(13). R may be either contextually fixed, or default to IDENT (12), or undergo existential closure together with the variable DEM[*u*] (13).

(12) a. what did Mary see ~~what~~ ?

b. $\{\ p \mid \exists x_i\ [\ p=\hat{}\text{Mary saw } \iota x.x=g(x_i)\ ]\}$ [when R defaults to IDENT]

(13) a. How did Mary sing ~~how~~ ?

b. $\{\ p \mid \exists R_j,x_i\ [\ p = \hat{}\text{Mary sang } R_j(x_i)\ ]\}$ [w/ presupposition R yields a manner]

If we assume that existential closure defaults to type e unless binding is local, we predict correctly that adverbial *wh*-expressions are uninterpretable in situ (Reinhart 1998), as in (14), unless a function from objects to the relevant higher type is contextually salient (as value for R) see (15) (Bayer 2006):

(14) * Who fainted when you behaved how?

(15) Who got excited when/because you went where?

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Local Accommodation is Also Backgrounded

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Presuppositions sometimes fail to project, as in (1) below. To derive such local interpretations, standard semantic local accommodation accounts posit an operation that, inside the scope of an embedding operator, turns content lexically marked as presupposed into non-backgrounded content and conjoins it with the clause's entailed content (Heim, 1983). Such accounts predict that locally accommodated presuppositions (LocAcc) differ from projecting presuppositions in lacking the presuppositional property of backgroundedness. (Recent pragmatic accounts arrive at a parallel prediction via their claim that all and only backgrounded material projects (Simons et al, 2010; Tonhauser et al, 2018)). To date, though, this prediction about the non-backgrounded status of LocAcc has not been systematically tested, perhaps due to challenges in testing embedded material for backgroundedness directly. Using reduced cognitive salience as a proxy for presuppositional backgroundedness in a picture-matching task (Schwarz, 2016), we test for differences in backgroundedness among LocAcc, the explicit, non-backgrounded conjunction paraphrases posited by semantic accounts (Heim, 1983), and equivalent non-presuppositional elisions more closely matching LocAcc surface forms. Standard LocAcc accounts predict equivalence among these three constructions. However, we find, to the contrary, that locally interpreted content contributed by *also* (previously attested, e.g., in Jayez et al., 2015) reflects greater presuppositional backgroundedness than equivalent explicit entailed content and, to a lesser degree, than more surface-similar elisions. Our task elicits a similar pattern with examples including global, rather than local, accommodation, supporting parallel backgroundedness across these cases.

Fig. 1

Exp. 1: Design. We measure the relative accessibility of identical information presented via LocAcc (1), its conjunctive paraphrase (2), and a non-presuppositional elision (3) (varied between subjects), using 3 item variants (one illustrated below). Participants are asked in (Q(A)) to judge whether a given picture accurately depicts the description in the highlighted part of the relevant utterance (Fig. 1). In the critical condition (1), the presupposition trigger *also* conveys that Paul has ice cream, but projection is blocked by the explicit ignorance context in the first clause (Abusch, 2010). The picture represents the non-presuppositionally introduced information that Paul has chocolate syrup, but not the presuppositional content that he has ice cream. Two control conditions introduce 'Paul has ice cream' as non-presuppositional content: (2) is the semantic account's conjunctive paraphrase of the local interpretation, differing from (1) in explicitly mentioning Paul's having ice cream. (3) conveys 'Paul has ice cream' implicitly but non-presuppositionally, using ellipsis.

(1) This could be wrong, but I heard that Paul might have ice cream; if he also has chocolate syrup, we could have sundaes for dessert. [ALSO condition]

(2) This could be wrong, but I heard that Paul might have ice cream; if he has ice cream and he has chocolate syrup, we could have sundaes for dessert. [CONJ condition]

(3) This could be wrong, but I heard that Paul might have ice cream; if he does, and he has chocolate syrup, we could have sundaes for dessert. [DOES condition]

Q(A): Do you think that this illustration accurately depicts [the speaker]'s description of the hypothetical situation highlighted in green? (YES / NO)

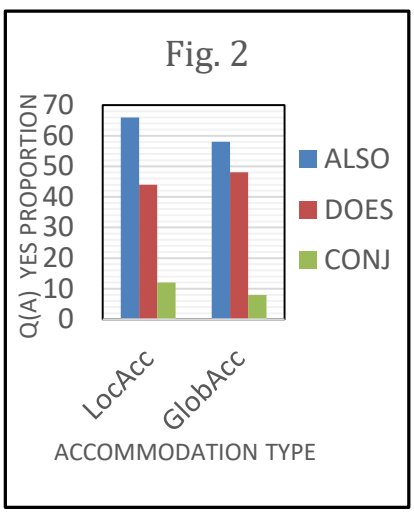
Q(B): Now, taking into account the entirety of what [the speaker] says in her remark, does Paul definitely, in reality, have ice cream? (YES /NO)

Q(B) was included to assure that participants were attentive and had the intended local interpretation of *also*. For such participants, if the information that Paul has ice cream is less salient in (1), where it is introduced through LocAcc, than in (2), where 'he has ice cream' is introduced as an explicit conjunct, we expect more frequent YES answers to Q(A) for (1) than for (2). (3), in which 'Paul has ice cream' is neither presuppositional nor explicit, controls for potential impact of explicitness independent of backgroundedness. Higher YES rates for (1) than for (3) are thus attributable to *also*'s presuppositional nature, beyond the implicitness also at play in (3).

Procedure. We recruited 479 participants from our university's subject pool to participate online via the PCIbex platform for course credit. Participants saw only a single trial of one utterance and picture to avoid adjustments in response behavior after seeing a full trial.

Results. Participants answering YES to Q(B) - thus not exhibiting the required local interpretation - or self-identifying as non-native English speakers were excluded from data analysis, leaving 401 participants. The proportion of YES answers to Q(A) exhibited the step-wise pattern on the left in Fig. 2, with the presuppositional ALSO (1) yielding the highest, the explicit conjunctive paraphrase CONJ (2) the lowest, and the elliptical DOES (3) in between. All 3 conditions were significantly different from one another, as confirmed by a linear regression analysis (*p's* < .001), with similar patterns across 3 items.

Fig. 2



Exp. 2. In order to confirm that our task reflects presuppositional backgrounding in general beyond LocAcc, we used the same **Design** and **Procedure** as in Exp. 1, substituting global accommodation (GlobAcc) for LocAcc, as in (4), and removing "hypothetical" from Q(A). (n=447).

(4) I called to find out whether Paul has ice cream; it turns out that he also has chocolate syrup/ he has ice cream and he has chocolate syrup/he does and he has chocolate syrup, so we can have sundaes for dessert.

Results are displayed on the right in Fig. 2. They exhibit a stepwise pattern parallel to Exp. 1's, though ALSO vs. DOES effects were numerically smaller and only marginally significant (p=0.068), perhaps due to easier processing of unembedded *also*. But a pooled analysis of both experiments revealed no interaction between condition and accommodation type, consistent with an overall parallel impact of backgroundedness for LocAcc and GlobAcc.

Discussion. We find that the presupposition of *also* is less accessible than its non-presuppositional, lexically equivalent counterparts in both experiments, indicating that the relevant content introduced by a presupposition trigger is lexically encoded as backgrounded, even when interpreted locally. This is of substantial theoretical importance, informing the relationship between backgrounding and (non-)projection in ways not captured by existing accounts. Semantic LocAcc accounts a la Heim could be amended, e.g., by modeling all accommodation as adding information to the relevant context, global or local, in a way that retains its backgrounded discourse status.

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Comparatives, Negation and Intervals

Solt (2014) discovered and discussed the following contrast:

(1) a. * Mary is more than about 20 years old. b. Mary is no more than about 20 years old.

Solt proposed an ingenious account based on certain assumptions about the meaning of 'about' and principles of language use, and, specifically, the fact that 'about' is an approximator that manipulates a granularity parameter. We argue that the pattern uncovered by Solt is not specifically tied to approximators, as it can be reproduced with disjunctions of numbers and interval-denoting expressions (*between n and m*), and is therefore part of a broader generalization. We offer an account based on a) the universal density of measurement scales (Fox and Hackl 2006), and b) a semantics for degree quantifiers based on maximal informativity (Buccola and Spector 2016).

A broader generalization: comparatives with disjunctions and *between*-phrases. *More than n or (n+1)* is infelicitous in a positive sentence but fully felicitous under negation:

(2) Context: How old is Mary?
   a. ??She's more than 22 or 23 years old.
   b. She's no more than 22 or 23 years old.

As to phrases of the form *more than between n and m*, they are attested *under the scope of a negative element*. A Google search with "more than between ten and" returns dozens of (relevant) hits, which seem to virtually always involve a negative element scoping over "more than" (e.g., *Most of your landmass is* ***no more than between ten and twenty metres above sea level.***). In all these cases, removing the negative element degrades the sentence. This effect is confirmed by the following pair, tested with 18 native English speakers on Amazon M Turk (13 vs. 2 preferred (3b) over (3a), 3 undecided):

(3) a. *Air Syldavia owns more than between 50 and 100 airplanes.
   b. ?Air Syldavia owns no more than between 50 and 100 airplanes.

Finally, as noted by Solt for (1b), the felicitous negative sentences imply that the relevant value is in the range indicated by the comparative phrase. Thus (2b) suggests that Mary is (about) 22 or 23 years old, and (3b) that Air Syldavia owns between 50 and 100 airplanes.

Degree Quantifiers and Maximal Informativity. Following Buccola & Spector (2016), we treat degree expressions such as *between-phrases* and *m or n* as generalized quantifiers over degrees which involve the notion of *maximal informativity*.

(4) a. $[\![\text{Between 50 and 100}]\!]^w = \lambda P_{<s,dt>} \exists m(50 \leq m \leq 100 \wedge Max_{inf}(P)(w)(m) = 1)$
   b. $[\![\text{3 or 4}]\!] = \lambda P_{<s,dt>} Max_{inf}(P)(w)(3) = 1 \vee Max_{inf}(P)(w)(4) = 1$
   c. If P is of type $< s, dt >$, $Max_{inf}(P)(w)(m) = 1$ if $P(w)(m) = 1$ and for no $m' \neq m$, $P(w)(m') = 1$ and $\{v : P(v)(m') = 1\} \subset \{v : P(v)(m) = 1\}$.

Universal Density of Measurement Scales. We adopt Fox and Hackl's (2006) *universal density hypothesis* about degrees: $\forall d \forall d'$, if $d < d'$, there exists d'' such that $d < d'' < d'$.

Account. We assume that the disjunctive and *between*-phrases scope out of the comparative phrase, leaving a degree variable.

(5) Bad case: 'Mary is more than 22 or 23 years-old'
   a. [22 or 23] λd.Mary is more than d-years old

b. True if for $d = 22$ or $d = 23$, the proposition that *Mary is more than d years old* is the logically strongest proposition among all propositions of this form.

c. Let a be Mary's age. The set of degrees d such that Mary is more than d-years old is the open interval $[0, a)$ (which *excludes* a). The 'logically strongest degree' in this set should be its maximum. But since the interval is open, given density, it has no maximum, and so the sentence can never be true – no degree can satisfy the predicate $Max_{inf}(\lambda d.$ Mary is more than d years old).

(6) Good case: 'Mary is no more than 22 or 23 years-old'

a. (22 or 23). $\lambda d.$ Mary is no more than d-years old.

b. True if for $d = 22$ or $d = 23$, the proposition that *Mary is no more than d-years old* is the logically strongest true proposition among all propositions of this form.

c. If Mary's age is a, 'Mary is no more than a-years old' is the logically strongest proposition of this form. So the sentence is true if a is equal to 22 or 23. The sentence is thus felicitous, and means that Mary is 22 or 23 years old.

A completely parallel analysis works for '(no) more than between m and n'. Furthermore, the account generalizes to Solt's initial cases, on the assumption that 'about n' is a GQ over degrees that includes an open parameter (explaining vagueness) and involves as well Max_{inf}:

(7) $[\![\text{about}_i\ n]\!]^{w,g} = \lambda P_{<s,dt>}.\exists k(n - g(i) \leq k \leq n + g(i) \wedge Max_{inf}(P)(w)(k) = 1)$

Open issues and refinements. While the contrasts in (2) and (3) are real, (2a) is not terribly infelicitous, and (2a) and (3a) do not feel contradictory. Furthermore, the inferences that Mary is 22 or 23 years old ((2b)) and that Air Syldavia owns between 50 and 100 air planes ((3b)) seem defeasible as, e.g., (2b) is not clearly false if Mary is 15 years old. We propose (in line with Buccola & Spector) that the semantics in terms of Max_{inf} is optional, and that the relevant degree phrases can also be interpreted as plain existential quantifiers over degrees, not involving Max_{inf}. Under this construal, (2a) means that Mary is more than 22 years or more than 23 years old, which is equivalent to 'Mary is more than 22 years old'. Without Max_{inf}, the sentence is infelicitous because it involves a redundant disjunct (cf. Katzir and Singh 2014; Meyer 2016), yet still interpretable. With Max_{inf}, it is contradictory, hence no parse makes it fully felicitous. As to (2b), without Max_{inf}, it means, depending on the relative scope of negation and disjunction, either 'Mary is no more than 22 years old or no more than 23 years old' (which is equivalent to 'Mary is no more than 23 years old'), or 'Mary is not (more than 22 years-old or more than 23-years old)', which is equivalent to 'Mary is no more than 22 years old'. Again these parses are pragmatically deviant (as one of the disjuncts is redundant) but they are still interpretable, and explain why the sentence is not felt to be clearly false if Mary is 15 years old. (2b) is felicitous because with Max_{inf}, no disjunct is redundant. Things work in the same way with the examples in (3) (without Max_{inf}, either the lower bound or the upper bound of the interval plays no role in the truth-conditions, making the construction redundant, cf. Buccola & Spector), except that both sentences in (3) are somewhat degraded compared to those in (2). Finally, (2a) also has a felicitous echoïc, metalinguistic use, under which it is understood to mean that Mary is more than 23 years old, a reading which requires a separate analysis: "- *Mary is 22 or 23 years old. - No! She is more than 22 or 23 years old!*" [with focal accent on 'more']

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Against the lexical view of cumulative inferences and homogeneity

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Summary: We argue on the basis of novel data from the Lebanese Arabic (LA) double subject construction (1) that the pluralization operator * (Li83) must be present in the syntax and that * is the only source of (i) cumulative inferences with plural predication and (ii) homogeneity gaps in the individual domain. We take this as evidence against Kr07's lexical cumulativity universal and against Kr15's approach where homogeneity is taken to be a lexical property of predicates.

Data: LA allows for double subject constructions (ABS94, Mo89), where there is a lower conjunction in which the first conjunct co-refers with the higher subject (1). We can contrast (1), where the agrees with the higher singular subject, with standard coordination in (2) where the verb bears plural agreement. In the paper, we provide evidence both that the higher subject is in Spec,TP and not a topic position (e.g. higher subject can be a negative quantifier) and that the lower DP is in a subject position (e.g. it agrees with the lower verb in raising constructions). The word order in (1) can therefore be derived by movement as follows: (i) the coordinated DP is base-generated in Spec,*v*P; (ii) the verb undergoes V→T movement to a position higher than the lower subject; and (iii) the first conjunct *Rasha* moves to Spec,TP, leaving behind a resumptive pronoun.

(1) Rasha ʔakalit hiyye w Hadi.
Rasha ate.PFV.PST.3SG.F her and Hadi.
Rasha and Hadi ate together.

(2) Rasha w Hadi ʔakalo.
Rasha and Hadi eat.PFV.PST.3PL
Rasha and Hadi ate.

The double subject construction can only be used in a subset of the situations where standard coordination can be used. In particular, the double subject construction can't be used with purely distributive predicates (3) and only gives rise to collective interpretations with underspecified predicates when the higher subject is singular (5) (compare to (4) which can also be true if Rasha and Hadi lifted the piano separately). See IM02 for similar observations with comitatives in Russian.

(3) #Rasha tawi:le hiyye w Hadi.
Rasha tall.F.SG her and Hadi.
Intended: 'Rasha and Hadi are tall.'

(4) Rasha and Hadi lifted the piano.

(5) Rasha ħimlet l piano hiyye w Hadi.
Rasha lift.PST.PFV.3SG.F the piano her and Hadi.
Rasha and Hadi lifted the piano together.

Lexical cumulativity: K07 argues that basic predicates in natural language are universally lexically cumulative and defines cumulativity in the individual domain as shown in (6).

(6) A predicate $P_{\langle e,t\rangle}$ is cumulative **iff** $\forall x \forall y[(P(x) \wedge P(y)) \rightarrow P(x \oplus y)]$

Cumulative inferences hold of plural predication in general in a language like English, regardless of the type of predicate. For example, if *Mary ate* and *Jane ate* are true, it follows that *Mary and Jane ate* is also true. In LA, the cumulative inference holds in standard plural predication (2) but not in the double subject construction (1). For example, in a situation where Rasha and Hadi ate separately, it is true that *Rasha ate* and that *Hadi ate*, but (1) is not true. Given that the only difference between (1) and (2) is the scope of the lower subject, we conclude that cumulativity can't be lexical, but instead must be contributed by an operator whose scope can be detected, as we argue below.

We propose, building on work by IM02 with distributivity in Russian comitative constructions, that distributivity is associated with the Spec,TP position. To implement this, we take cumulative inferences to be due to the application of Li83's * operator (7), which is syntactically present and

scopes above *v*P but below TP, giving rise to the LF in (8a) for the double subject construction. Conjunction of individuals is assumed to denote sum formation (Li83).

(7) a. $[\![*]\!] = \lambda f_{\langle e,t\rangle}.\lambda x.\exists g_{\langle e,t\rangle}[[\forall y[g(y) = 1 \rightarrow f(y) = 1] \wedge \exists y[g(y) = 1]] \wedge x = \oplus g]$

b. $\oplus g$ denotes the sum of all individuals x (plural or atomic) s.t. g(x)=1

(8) a. **Double subject construction:** ⟦ Karim [* 1 [t_1 and Hadi] VP] ⟧= 1 iff ⟦ VP ⟧(k ⊕ h)=1

b. **Standard coordinated subject:** ⟦ [Karim and Hadi] * VP ⟧= 1 iff ⟦ *VP ⟧ (k ⊕ h)=1

This proposal derives the restrictions discussed above. Assuming that distributive predicates like *tall* are true only of atomic individuals when unpluralized, we predict that they can never be used truthfully in the double subject construction: $\forall w$: ⟦ tall ⟧^{w}(k ⊕ h) = 0. Turning to underspecified predicates like *lift the piano*, which can apply both to atomic individuals and pluralities, we see that they can only be true in the double subject constructions under restricted conditions. We predict the truth-conditions in (9) for (4) and (5). Assuming that ⟦ lift the piano ⟧ is true of a plural individual a⊕b iff a and b collectively lifted the piano, we correctly predict that (5) only has a collective reading, while (4) can be true if a and b lifted the piano separately.

(9) a. ⟦ (4) ⟧= 1 iff (⟦ lift piano ⟧(r)=1 ∧ ⟦ lift piano ⟧(h)=1) ∨ ⟦ lift piano ⟧ (r ⊕ h) = 1

b. ⟦ (5) ⟧= 1 iff ⟦ lift piano ⟧(r ⊕ h) = 1

The double subject construction therefore allows us a view into the extensions of basic predicates before they are pluralized, something which is not directly observable in a language like English. For example, looking at (1), we can conclude that when unpluralized, ⟦ eat ⟧ is only true of a plural individual a⊕b if a and b ate together, predicting the invalidity of the cumulative inference in the double subject construction. Furthermore, we correctly predict that distributive readings should be available over the higher subject when it is plural (10), as shown by the truth-conditions in (11).

(10) Rasha w Hadi ħimlo l piano henne w Karim.
Rasha and Hadi lift.PST.PFV.3PL the piano them and Karim.
Rasha and Hadi each lifted the piano with Karim **or**
Rasha, Hadi and Karim lifted the piano together.

(11) ⟦ (10) ⟧= 1 iff (*(λx. ⟦ lift the piano ⟧(x ⊕ k)))(r ⊕ h) = 1
= 1 iff ⟦ lift piano ⟧ (r ⊕ h ⊕ k) ∨ (⟦ lift piano ⟧ (r ⊕ k) ∧ ⟦ lift piano ⟧ (h ⊕ k))

Homogeneity: When the higher subject is singular in the double subject construction, homogeneity effects (see Kr19 for an overview) do not arise over the coordinated subject, regardless of the type of predicate. For example, unlike the standard conjunction in (13), which entails both that *Rasha didn't eat* and that *Hadi didn't eat*, (12) can also be true (i) if only Hadi ate, (ii) if only Rasha ate, and (iii) if Hadi and Rasha both ate but not together.

(12) Rasha ma ʔakalit hiyye w Hadi.
Rasha NEG ate.PFV.PST.3SG.F her and Hadi.
Rasha and Hadi didn't eat together.

(13) Rasha w Hadi ma ʔakalo.
Rasha and Hadi NEG eat.PFV.PST.3PL
Rasha and Hadi didn't eat.

Under a view where homogeneity is a lexical property (Kr15), we expect that homogeneity gaps should be detected regardless of the scope of the lower subject. In particular, we expect that like (13), (12) shouldn't be true if only one of Hadi and Rasha ate. On the alternative view where the * operator is the source of homogeneity (e.g. Ba19, Sc93), these facts with negation immediately follow from our proposal. An implementation of this from Ba19 is given in (14), which gives the

conditions under which * applied to a function *f* and an individual *x* is false. Under the assumption that negation simply switches truth and falsity, we predict no (downward) homogeneity when the subject is singular (15). When the higher subject is plural, we correctly predict that homogeneity arises only over the higher subject (16).

(14) $[\![*]\!](f)(x)$= 0 iff $\neg\exists y \leq x$ s.t. $[\exists z : y \leq z \wedge f(z) = 1]$

(15) $[\![$ (12) $]\!]$=$[\![\neg$ [Rasha [* 1 [t_1 and Hadi] eat]] $]\!]$ = 1 iff $\neg\exists z[\text{r} \leq z \wedge [\![\text{eat}]\!](z \oplus \text{h}) = 1]$

(16) Karim w Hadi ma ʔakalo henne w Rasha.
Karim and Hadi NEG eat.PST.PFV.3SG.M them and Rasha.
Karim and Rasha didn't eat together, and Hadi and Rasha didn't eat together.

Conclusion We have argued that the meaning restrictions in the double subject construction require a theory of plural predication where the * operator is syntactically present, takes scope above the *v*P and is responsible for homogeneity. Looking ahead, we show that the double subject construction allows us to investigate cumulative readings of transitive predicates and the interaction of plural predication with modifiers like *together* and *separately* through a new lens.

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Updating unexpected moves

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This paper investigates the behaviours of the particle *ne* in the sentence-final position along with its interactions with different clause types in Mandarin. We present novel data showing that *ne* marks an *unexpected move* in both declaratives and interrogatives: in declaratives the speaker believes that the content of the prejacent of *ne* is not among what the addressee has expected in future discourse. In questions *ne* marks that the current move is not in the standard flow of a conversation. We propose that *ne* signals that the speaker believes that the current discourse move she makes is not *optimal* for the addressee: the speaker chooses to use *ne* when the discourse agents have conflicting beliefs, or the speaker wants to redirect/reset the conversational goals. The current account provides broader coverage of empirical data, and sheds light on the discourse dynamics on non-canonical/uncooperative conversations.

[**The pattern**] Like many other particles in the language, *ne* can appear both sentence-internally as a topic marker, or sentence-finally as a discourse marker. The current paper only concerns with its sentence-final uses. **When *ne* appears in declaratives**, the *ne*-marked sentence often carries the piece of information which the speaker believes must be surprising for the addressee. For instance, a *ne*-declarative is often used as a refutation as in (1).

(1) *A: I know Bill's apartment is pretty small.*
B: meiyou a, ta jia ke da **ne** *'No, his home is quite big **ne**.'* (**DEC+DEC**)

ne can also be used to directly answer a question as in (2), but only when the speaker believes that the answer is not among the normal ones, or the answer might not help the addressee resolve the issue. In (2), B uses *ne* to suggest that she is aware of the fact that her preference for whisky might not be practical for A to prepare.

(2) (A is preparing for tomorrow's breakfast. B is a guest.)
A: What do you usually drink for breakfast?
B: qishi wo zaocan jingchang yao he weishiji **ne**.
'*Actually, I often drink whisky for breakfast **ne**.*' **(INT+DEC)**

Turning to questions, although interrogatives are much more permissive than declaratives when it comes to licensing *ne*, a *ne*-interrogative can never appear out-of-the-blue. Instead, a *ne*-interrogative marks that the current move is to some extent 'abnormal'. For example, *ne* can appear when the speaker wants to step back and confirm if the Question Under Discussion is answerable as in (3), or as in (4) where the speaker raises a *ne*-question without answering the addressee's prior question first.

(3) *A: Would you like some wine? B: No, thanks.*
A: Would beer attract you? B: Actually no.
A: ni xiang he shenme **ne**? *'What do you want to drink **ne**?'* **(DEC+INT)**

(4) *A: Can we order Ubereats today?*
B: ni xiang dian shenme **ne**? *'What do you want to order **ne**?'* **(INT+INT)**

When the questioning move is desired by the addressee, as in (5), where the addressee asks the speaker to ask a question about snakes, *ne* is no longer felicitous.

(5) *A: Ask me anything about snakes!*
B: en...meiguo yigong you duoshao-zhong dushe #**ne**?
''*Well...How many kinds of poisonous snakes are there in the US **ne**?'* **(IMP+INT)**

[**Analysis**] We argue that *ne* (i) requires discourse anaphoricity (i.e. no out-of-the-blue uses), and (ii) marks that the current move is not optimal or not desired by the other discourse participant. What is expected after raising a question is to answer it, and a canonical move after

making an assertion is to accept it. However, we have seen that *ne* typically appears in scenarios where the speaker fails to make a canonical move.

Following Gunlogson (2003), Farkas & Bruce (2010) and Davis (2011), we implement our analysis in the following discourse model. We assume a context c consists of (i) $\mathscr{C}_x^c$ is Gunlogson's discourse commitment sets for each participant *x*, and thus the context set for each participant x, $cs_x^c = \bigcap \mathscr{C}_x^c$; (ii) $\mathscr{T}_c$ is F&B's *table* stack, tracking the proposals made by participants. In addition, we also assume that there is a salient *Action Set* $\mathscr{A}_x^c = \{a_1, ..., a_n\}$ in c, the set of possible actions for each participant *x*, representing the current *decision problem* that each participant *x* faces, following Davis (2011). The spirit behind is that aside from the mutual discourse goal of resolving the current QUD, each interlocutor often has separate *domain goals*, e.g. preparing for breakfast in (2) (Roberts 2012). We assume that an interlocutor always faces a decision problem of whether to accept the proposal when an assertion is made, or whether to figure out a practical answer/follow the instruction when a question or a command is made. Canonical moves are desired, but interlocutors can always choose not to obey the general communicative principles for achieving their own domain goals. We also adopt Davis' definition of *optimal set* which represents the optimal worlds for each participant.

(6) The *Optimal Set* $\mathscr{O}_x^c$ of participant *x* is defined as:
$\mathscr{O}_x^c = \{w_i \in cs_x^c | \neg \exists w_j \in cs_x^c : w_j <_x^c w_i\}$, where $w_j <_x^c w_i$ is the partial ordering of worlds defined in Davis (2011: 93)

We are now ready to state the felicity condition for the sentence-final *ne*. Specifically, the condition says that (i) *ne* marks the discourse move the speaker makes as not desired for the addressee, and (ii) the Table stack must not be empty (discourse anaphoricity).

(7) **Felicity Condition for sentence-final *ne***
Sentence-final *ne* can be felicitously used by a speaker s in c only if s performs an action a such that the worlds where $a(s_c)$ is true are not entailed by the addressee's a_c optimal set $\mathscr{O}_{a_c}^c$, and $\mathscr{T}_c \neq \langle\rangle$.

The proposal explains the patterns we have observed. In declaratives, *ne* signals that the speaker's beliefs are not compatible with the addressee's, and thus *ne* is used to reject the addressee's proposal, or to provide a surprising answer for addressee's question. In interrogatives, *ne* signals the speaker is not making a canonical move, e.g. reconfirming whether the QUD is valid, or raising a different question without resolving the previous one.

[**Predictions**] The current proposal predicts that *ne* can be used to challenge a command, i.e not to perform the addressee's preferred action. This is borne out in (8).

(8) *A: Ask me anything about the homework!*
B: wo weishenme yinggai wen ni **ne**? ni dou meiqu shangke!
*'Why should I ask you **ne**? You didn't even go to the lecture!'*

Second, *ne* can be used to redirect a QUD. This is also predicted since *ne*-marked questions often signal a departure from the current main point of the conversation.

(9) *A: I like eating fruits.*
B: na ni xihuan bu xihuan chi shucai **ne**? *'Then do you like vegetables **ne**?'*

[**A note on the Contrastive Topic account for *ne***] *ne* has been suggested to mark a topic as contrastive in Mandarin (e.g. Chu 2006, Constant 2014). For sentence-final cases, the claim is that for declaratives, *ne* can only appear in partial answers, or sentences that carry an uncertainty/incompleteness flavor; for interrogatives, *ne* marks a sub-question or a follow-up question. Although Constant's account correctly captures the intuition that *ne* can change the current goal of discourse, we suggest that at least sentence-final *ne* is more than that: we have seen above that *ne* can appear in a direct answer to a question as in (2), or in a higher-level QUD as in (3). Furthermore, in many lone CT/sentential CT cases, *ne* is not acceptable.

(10) *A: Is his car some crazy color?*
B: ta-de che shi juhongse de ***#ne****...*
*'His car is [**orange**]*$_{\text{CT}}$*.....(but I don't know if it's crazy.)'*

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The scope of supplements

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Potts (2005) put forth the now popular viewpoint that supplemental content, such as those introduced by non-restrictive relative clause (NRRC), lives on a semantic dimension *separate* from the main, *at-issue*, content. This is motivated by facts such as they almost always escape the effect of scope-taking operators (i.e. **projects**, 1), and is usually not at-issue.

(1) a. Alex **didn't/might** invite Nate, who is a musician. $\rightsquigarrow$ Nate **is** a musician.
b. If Alex invites Nate, who is a musician, then Mark will be happy. $\rightsquigarrow$ Nate is a musician.

(2) a. Who had prostate cancer?
b. ??Tammy's husband, who had prostate cancer, was treated at the Dominican Hospital.

The **bidimensional** approach to NRRCs has been repeatedly challenged recently. Firstly, AnderBois et al. (2015), following Nouwen (2007), argued that the content of NRRCs cannot be completely separated from the at-issue content because anaphora and presupposition resolution may cross the boundary between main clauses and NRRCs:

(3) a. John, who had been kissed by a$_i$ woman, kissed her$_i$ too.
b. John$_i$ kissed Mary, who kissed him$_i$ too.

Martin (2016), following Amaral et al. (2007), showed that quantifiers like *every* can bind into an NRRC (4) or its anchor (5), forcing a narrow-scope reading of the NRRC within their scope.

(4) Every$_i$ cyclist met Lance, who gave him$_i$ a Tour de France souvenir.

(5) Every$_i$ cyclist found his$_i$ brother, who was missing during Tour de France.

Finally, Schlenker (2013, 2021) presented the following case in which the NRRC receives a genuine narrow-scope reading (under the conditional antecedent):

(6) If tomorrow I called the Chair, who in turn called the Dean, we would be in big trouble.

These data inspired several **unidimensional** analyses to NRRCs. AnderBois et al. (2015) achieves unidimensionalism by turning **dynamic**, where anaphora and presupposition are resolved within the added structure of discourse referents. But a fundamentally bidimensional conceptualization remains as they proposed that NRRCs and at-issue content update the context differently. This accounts for projection, but just as its static counterpart, does not extend easily to (6). Martin (2016) and Schlenker (2021) abandoned bidimensionalism completely and treated NRRCs as semantically **conjoined** to the at-issue content. To account for (1), Martin proposed that supplements 'piggybacks' onto their anchor *Nate* which, beign a *definite* description, prefers to take wide scope. Schlenker proposed that NRRCs take wide scope by *syntactically* attaching to the matrix scope.

In this paper, I **defend** the **bidimensional** tradition. First, I show that the NRRCs in (4-5) do not take narrow scope by further embed NRRCs bound by *every* in classical scope islands (May, 1977). In (7a), *every* is trapped inside a conditional antecedent, but the reading that entails the universally quantified NRRC is readily available. Similar in (7b), while *every* is trapped under *claimed*, the universally bound NRRC does not have to be. Crucially, the argument does not hinge on the proffered contexts being scope islands (see e.g. Barker, 2021) – as long as there are scope inversions as in (7), one can conclude that quantificational binding does not lead to scope rigidity. Alternatively, I suggest that the binding is achieved via telescoping (Roberts, 1987).

(7) a. If every$_i$ cyclist has met Lance, who he$_i$ admired as a child, the organizer would be pleased. $\not\rightsquigarrow$ Every cyclist has met Lance. $\rightsquigarrow$ Every cyclist admired Lance as a child.
b. Someone$_j$ claimed that every$_i$ dog was returned to their$_i$ owner, who she$_j$ spent the whole day trying to contact. $\#\forall >$ claim, ✓Someone$_j$ contacted every dog-owner ($>$ claim)

Secondly, each unidimensional analysis faces technical challenges. Martin's 'piggybacking' has trouble dealing with *indefinite* anchors – the impossible reading of '*John didn't read a_i book, which$_i$ Mary had recommended*' with the indefinite scoping under the negation cannot be ruled out easily, and Schlenker's 'flexible syntactic attachment' needs cataphoric mechanisms for anaphora. Furthermore, the unidimensional approaches essentially decouple NRRCs' scopal behaviors from their pragmatic effects (e.g. non-at-issueness). Consequently, the latter needs to be independently stipulated, yet the task is not trivial – e.g. Schlenker proposed that NRRCs are *transluscent*, which is argued by Marty (2021) to be not necessary (and perhaps insufficient).

I develop a **bidimensional** semantics for NRRCs that accounts for (1-6), and (just by being *bidimensional*) circumvents the problems mentioned above. The account is **static** but can be modularly extended to capture dynamic effects (see Charlow, 2014). The key step is to refine the mathematical (**monadic**) structure that encodes non-at-issueness so that it may interact with the at-issue content *when needed*. Existing bidimensional analyses usually invoke Writer monad, where supplements form a *pair* with the at-issue content (cf. Giorgolo and Asudeh, 2012; Charlow, 2015). The semantic composition of either component/dimension of the pair proceeds in parallel without any operation enabling their interaction, rendering (6) problematic. Inspired by Grove's (2019) treatment of presuppositions, I propose to model supplements with Reader monads, which is equipped with a (unit) operation that lifts an ordinary value to a *function* from a *state* to said value. Assuming that the set of possible worlds inhabit the domain of *states*, then the corresponding Reader monad effectively models intensionality, and the semantics of NRRCs can be informally described as providing **domain restrictions** on the *at-issue* state-sensitive functions. This is achieved formally by treating supplements as introduced by a Reader monad *on top of* another Reader monad that encodes intensionality. The monad is defined as a triple in (9). For expository reasons, I represent the state-sensitive functions as sets of world-value pairs.

To capture supplements as domain restrictions for intensional values, I characterize the COMMA intonation as a function that takes an intensional property $\mathscr{P}$ and an individual x and returns a function from worlds to individual concepts that is defined only on worlds where $\mathscr{P}$ holds for x (10). The derivation of a basic example is shown in figure 1. In short, any constituent that contains supplements will (at certain point of the derivation) have the type signature that reflects at least two monadic lifts, with supplements and at-issue content residing in different layers of composition. They can later be integrated by applying μ_{M}, which happens *after* the derivation of the full sentence by default, but can be forced at an intermediate level by grammatical and discourse factors. Truth-conditions can be extracted as the the set of worlds w such that $\langle w, \top \rangle$ belongs to the resulting denotation, which is just the set of worlds where both the at-issue and the supplemental propositions are true. Figure 2 shows that as long as the scope-taking operator applies before μ_{M}, supplements are sufficiently *separated* from the at-issue content to 'project'. Figure 3 shows that when forced by the 'fake' past-tense marking and the coordinating discourse relation, μ_{M} applies before *if*, resulting in the NRRC being interpreted in the scope of the antecedent, capturing (6).

Finally, I note here the current analysis can be extended straightforwardly to model *nested* NRRCs as in (8), with a generalization of COMMA (11) that supplies domain restrictions to the inner-most intensional value. The denotation for (8) is (12).

(8) Alex invited Nate, who is from Virginia, which is a southeastern state.

(9) The Reader monad is a triple $\mathfrak{M} = \langle \mathsf{M}, (\cdot)^{\uparrow^{\mathsf{M}}}, \mu_{\mathsf{M}} \rangle$ s.t. (for any value a of type α):
   a. M is a type constructor s.t. $\mathsf{M}\alpha ::= s \to \alpha \to t$

b. $a^{\uparrow^{\mathsf{M}}}$ is the unit function of type $(\alpha \to \mathsf{M}\alpha)$ s.t. $a^{\uparrow^{\mathsf{M}}} := \{\langle w, a\rangle \mid w \in \mathscr{W}\}$

c. μ_{M} is the join function of type $\mathsf{M}(\mathsf{M}\alpha) \to \mathsf{M}\alpha$ that concatenates two layers of monadic effects: $\mu_{\mathsf{M}}(\mathbf{m}) := \{\langle w, a\rangle \mid \exists m.\, \langle w, m\rangle \in \mathbf{m} \;\&\; \langle w, a\rangle \in m\}$

$a^{\uparrow^{\mathsf{M}}}$ and μ_{M} can combine to define an apply function $(\cdot)^{\mathsf{A}}$ that encodes monadic composition: $m^{\mathsf{A}}n := \{\langle w, fx\rangle \mid \langle w, f\rangle \in m \;\&\; \langle w, x\rangle \in n\}$

(10) COMMA $:: \mathsf{M}(e \to t) \to e \to \mathsf{M}(\mathsf{M}e)$

$:= \lambda\mathscr{P}\lambda x.\, \{\langle w', \{\langle w, x\rangle \mid w \in \mathscr{W}\}\rangle \mid Pxw'\}$, where $\mathscr{P} = \{\langle w, \lambda x.\, Pxw\rangle \mid w \in \mathscr{W}\}$

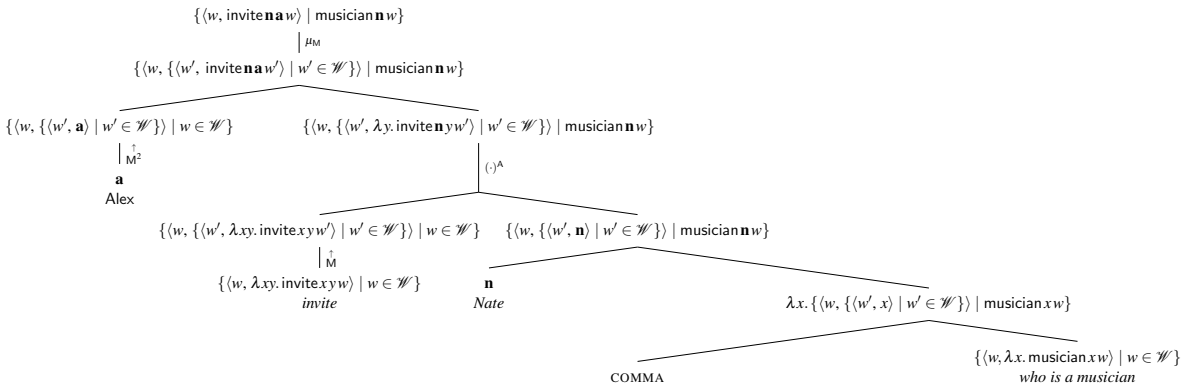

Figure 1: Alex invited Nate, who is a musician.

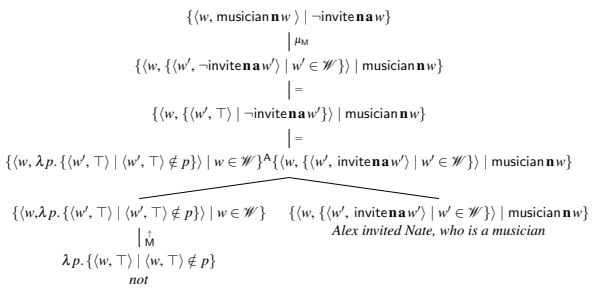

Figure 2: Alex didn't invite Nate, who is a musician.

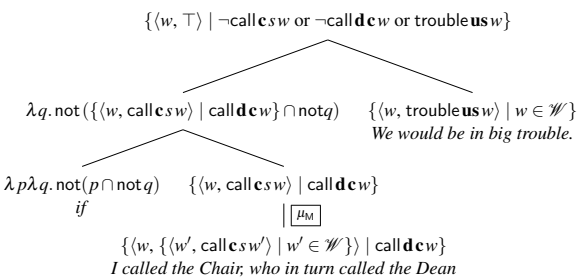

Figure 3: If tomorrow I called the Chair, who in turn called the Dean, we would be in big trouble

(11) COMMA $:: \mathsf{M}^k(e \to t) \to e \to \mathsf{M}^{k+1}e$

$:= \lambda\mathscr{P}\lambda x.\, \{\langle w_k, \{\langle w_{k-1}, \{...\{\langle w_2, \{\langle w_1, \{\langle w, x\rangle \mid w \in \mathscr{W}\}\rangle \mid Pxw_1\}\rangle \mid \textsc{Cond}_2\}\rangle ...\rangle \mid \textsc{Cond}_{k-1}\}\rangle \mid \textsc{Cond}_k\}$

where $\mathscr{P} := \{\langle w_k, \{\langle w_{k-1}, \{...\{\langle w_2, \{\langle w_1, \underline{\lambda x.Pxw_1}\rangle \mid w_1 \in \mathscr{W}\}\rangle \mid \textsc{Cond}_2\}\rangle ...\rangle \mid \textsc{Cond}_{k-1}\}\rangle \mid \textsc{Cond}_k\}$

(12) $[\![8]\!] = \{\langle w_2, \{\langle w_1, \{\langle w, \mathsf{invite}\,\mathbf{n}\,\mathbf{a}\,w\rangle \mid w \in \mathscr{W}\}\rangle \mid \mathsf{from}\,\mathbf{v}\,\mathbf{n}\,w_1\}\rangle \mid \mathsf{SEs}\,\mathbf{v}\,w_2\}$

Language studied in the paper: English

REF: **May 77**. *The Grammar of Quantification*. MIT. **Amaral et al. 07**. *Review of the logic of conventional implicatures by chris potts*. L&P. **Anderbois et al. 15**. *At-issue proposals and appositive impositions in discourse*. JoS. **Charlow 14**. *On the semantics of exceptional scope*. **Charlow 15**. *Conventional implicature as a scope phenomenon*. **Giorgolo & Asudeh 12**. $\langle M, \eta, \bigstar\rangle$ *Monads for Conventional Implicatures*. SuB 16. **Grove 19**. *Satisfaction without provisos*. **Martin 16**. *Supplemental update*. S&P. **Marty 17**. *A note on Schlenker's transluscency*. Snippets. **Nouwen 07**. *On appositives and dynamic binding*. **Roberts 87**. *Modal subordination, anaphora, and distributivity*. **Potts 05**. *The logic of conventional implicatures*. OUP. **Schlenker 13/21**. *Supplements without bidimensionalism*.

Posters

About 'us'

Jonathan David Bobaljik, Harvard & Uli Sauerland, ZAS

Harbour (2016) observes that generalization (1) is cross-linguistically robust at the level of a language (see also McGinnis 2005; Zaslavsky et al. 2021). The generalization allows languages that draw a four-way person distinction ('I and you (and possibly others)' – $iu(o)$, 'I, but not you' – $i(o)$, 'you, but not I' – $u(o)$, 'anyone other than you or me' – o) as in Tok Pisin or a three-way distinction ('I' – $i(uo)$, 'you, but not I' – u, 'anyone other than your or me' – o) as in English. It excludes though a language that in its morphology consistently draws a three-way person distinction ('I but not you' – i, 'you (and possibly I)' – $u(io)$, 'anyone other than your or me' – o). We present a proposal that improves on Harbour's account of (1), and offer empirical evidence in favour of our proposal over H's.

(1) Languages without an inclusive/exclusive contrast treat the inclusive meaning as a first person rather than a second person. (Zwicky, 1977)

Existing proposals Accounts of person marking make use of two or all three of the features AUTHOR, ADDRESSEE and PARTICIPANT. We define these as follows, and assume that a 'presuppositionalizer' ∂ ($[[\partial]]^c(P) = \lambda x \ : \ P(x) \ . \ 1$) applies to these before they combine with a pronominal index as in (5) (Cooper, 1979):

(2) $[[\textsc{author}]]^c = \lambda x \ . \ \text{author}(c) \sqsubseteq x$ $\{i, iu, io, iuo\}$

(3) $[[\textsc{addressee}]]^c = \lambda x \ . \ \text{addressee}(c) \sqsubseteq x$ $\{u, iu, uo, iuo\}$

(4) $[[\textsc{participant}]]^c = \lambda x \ . \ \text{author}(c) \sqsubseteq x \vee \text{addressee}(c) \sqsubseteq x$

(5) $[[\partial(\textsc{features})(pro_i)]]^g$ is defined iff $[[\textsc{features}]]$ is true of $g(i)$

Accounts of person using only AUTHOR and ADDRESSEE can treat the inclusive as the conjunction of the two (Zwicky, 1977; McGinnis, 2005; Zaslavsky et al., 2021). But in languages which lack dedicated inclusive forms, such accounts do not intrinsically explain (1), since the inclusive group *you, me, and others* is equally compatible with an underspecified ADDRESSEE and an underspecified AUTHOR. Such accounts therefore require an additional, extrinsic hierarchy such as a person hierarchy ($1 > 2 > 3$) to in effect stipulate (1). Accounts that use instead only AUTHOR and PARTICIPANT treat second person as underspecified PARTICIPANT (Sauerland 2003 and others). Such accounts invoke a competition principle, such as Maximize Presupposition, to ensure that any group including the author will be expressed by the first person, leaving the second person to express only groups that contain participants but not the author. Such accounts succeed in explaining (1), but do not offer an intrinsic characterization of the clusivity parameter.

Harbour (2016) proposes that person features, rather than introducing presuppositions on the value assigned to a referential index (Cooper, 1979; Sauerland, 2003; Heim, 2008), instead encode lattice-theoretic operations on an atomic lattice $\mathcal{L}$ with join operation $\sqcup$ that contains at least three atoms i (the author), u (the addressee), o (any third person referent), and the null element $\emptyset$. The join captures group formation (Link, 1983): $u \sqcup o = uo$ represents a group of the addressee and a third person. Harbour furthermore defines two binary operators, $\oplus$ and $\ominus$, that map two subsets of $\mathcal{L}$ to a third. $\oplus$ is defined via the pointwise application of the join operation. $\ominus$ is based on the lattice-theoretic analogue of set-subtraction. Harbour proposes that person is universally captured via a selection of one or both of the features AUTHOR and PARTICIPANT and their order of application. Details will of course be reviewed in the talk. Harbour contends that these innovations allow for a derivation of both the clusivity parameter and the generalization in (1) from the same feature inventory without appeal to extrinsic hierarchies.

Our Proposal: While Harbour's proposal is very original, he has to assume a divide between word-internal and sentence semantics, where operations like $\ominus$ are not motivated. We propose a novel approach starting also from two atomic person features, AUTHOR and PARTICIPANT, but adopt two operations of sentence semantics: exhaustification **exh** (Chierchia et al., 2012) and cumulative conjunction (Schmitt, 2013, 2019). Concretely, we adopt the predicate-level exhaustification operator **exh** of Mayr (2015) in (6).

(6) $[[\mathbf{exh}_{\text{Alt}}]]^w = \lambda P \in D_{et}\ \lambda x \in D_e\ .$
$P(x)(w) \wedge \forall Q \in \text{Alt}\ .\ \neg Q(x)(w) \vee (\forall x\ (P(x) \rightarrow Q(x)))$

Application of **exh** with a single, strictly stronger alternative has the same effect as pragmatic principles like maximize presupposition. E.g. (7) derives second person:

(7) $$\mathbf{exh}_{\{\text{AUTHOR}\}}(\text{PARTICIPANT})(x) = \begin{cases} 1 & \text{if } x \in \{u, uo\} \\ 0 & \text{otherwise} \end{cases}$$

For cumulative conjunction, we assume the $\sqcup$-operator (8) for $P, Q \in D_{\langle e,t\rangle}$:

(8) $P \sqcup Q = \lambda x\ \exists y, z \in D_e[y \sqcup z = x\ \wedge\ P(y) \wedge Q(z)]$ (Schmitt, 2013)

We assume that exhaustification (Magri, 2009) and cumulative conjunction (Schmitt, 2013) both must apply when they can. Then the feature combination AUTHOR, PARTICIPANT is predicted to have the inclusive meaning (see (9)): Since AUTHOR is true of *i*, *iu* and *iuo* and $\mathbf{exh}_{\text{AUTHOR}}$ (PARTICIPANT) of *u* and *uo*, the non-Boolean conjunction results in the property true of only *iu* and *iuo*.

(9) $$[\text{AUTHOR} \sqcup \mathbf{exh}_{\{\text{AUTHOR}\}}(\text{PARTICIPANT})](x) = \begin{cases} 1 & \text{if } x \in \{iu, iuo\} \\ 0 & \text{otherwise} \end{cases}$$

Further evidence: In Harbour's theory (details not shown here) an inclusive pronoun has an underspecified meaning, and is limited to inclusive meaning via competition (Lexical Complementarity) with a pronoun that is narrowly exclusive. In our account (as in older approaches), it is the exclusive which is the unmarked first person: its meaning is inherently only AUTHOR, which comes to the fore in English *we*. In an inventory containing a stronger competitor, namely the inclusive in (9), exhaustification strengthens the underspecified AUTHOR pronoun to yield the exclusive reading. Mandarin pronouns (9) support our approach over Harbour's:

(9)

PL	(INCL: *zánmen*)	1/EXCL:	*wǒmen*	2:	*nǐmen*	3:	*tāmen*
SG		1:	*wǒ*	2:	*nǐ*	3:	*tā*

The inclusive pronoun *Zánmen* is restricted both by dialect and, in dialects that have it, syntactically (subject position only, Ross and Ma, 2006, 25). As we predict, *wǒmen* is exclusive when the stronger inclusive is available, but is otherwise unspecified. Harbour's approach requires otherwise unmotivated systematic homophony: a lexically exclusive $wǒmen_1$ is needed in some contexts in order to provide a competitor for *zánmen*, while a distinct lexcially underspecified $wǒmen_2$ is needed where *zánmen* is not available.

Conclusion: By using exhaustification and cumulative conjunction within the composition of words, we thus provide a more conservative semantics for person than Harbour (2016) while replicating his core result in deriving both the clusivity parameter and the generalization in (1) from the same feature inventory without appeal to extrinsic hierarchies. In addition, our account finds empirical support over Harbour's in mixed systems where marking of clusivity is not consistent throughout the system.

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Experimental Perspectives on Spatial Deictic Expressions in Thai

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Background The terms *behind* and *in front of* are found to initially be used by typically-developing children (TD) to respectively refer to something that is *hidden* and *visible*, relative to their body (Johnston, 1984). Deictic terms have been found to pose additional challenges to children with autism spectrum disorders (ASDs), with regards to both person deixis (Bartak and Rutter, 1974; Charney, 1980, a.o.) and spatial deictic terms and gestures (Loveland and Landry, 1986; Hobson et al., 2010, a.o.). While the use of demonstrative determiners such as *this* and *that* is anchored at the speaker, terms such as *behind* and *in front of* can be prone to deictic-center shifting. The speaker may choose an egocentric viewpoint (e.g., *behind* as speaker's back) or an object-based allocative viewpoint (e.g., *behind* as the object's back) (Shusterman and Li, 2016), or even shift to the hearer's perspective, while describing the location of a certain object to the hearer. Such additional challenge may affect the interpretations of what these terms actually mean, not only to TD children and children with ASDs, but also to adults.

Methods and design The experiment was designed to test how the interpretations of Thai spatial deictic terms *lăŋ* 'behind' and *nâ:* 'in front of' were affected by the location of experimenter (E) and the participant (P) themselves (see Figure 1). The test was administered in two sessions either on two different days or in the morning and in the afternoon. Half of the participants participated in Scenario 1 (sitting on the same side of the table as the experimenter) in their first session (henceforth, Group A), while the other half participated in Scenario 2 (sitting across from the experimenter) in their first session (Group B). The experiment utilized 5 pens of 5 different colors and 5 balloons of 5 different colors. It began by asking the participants to say the color of each item. The experimenter then proceeded to arrange them into a row and asked '*The pen/balloon of which color is behind/in front of the x pen/balloon?*,' where *x* is the color of one of the middle three items. The test went on for 12 trials, with the items being rearranged every 3 trials. The experimenter only looked at the data collection form to avoid giving any non-linguistic cues of gazes and movements.

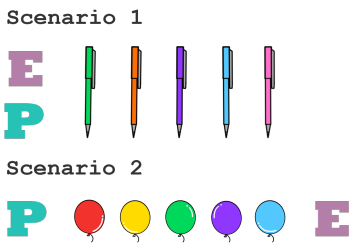

Figure 1: The two scenarios in the experiment.

Participants Participants were native speakers of Thai, including 31 adults (20 Female; *M* age = 37.52), 60 typically developing children (3 excluded due to incomplete data sets; *M* age for the included participants = 7;11; *M* nonverbal IQ (NVIQ) = 116.35), and 30 children with ASDs (2 excluded; *M* age for the included participants = 9;6; *M* NVIQ = 94.74).

Results The adults generally chose the object that was one position further away from them than the mentioned object (Position 1) in the *behind* condition and the object that was one position closer to them than the mentioned object (Position -1) in the *in front of* condition. The pattern is the opposite in the TD group, whereas the children with ASDs generally preferred closer objects regardless of what the deictic term was (see Figure 2). Group-wise, the adults in Group A, who started out on the same side with the experimenter, had clear preferences that follow the described pattern, although to a lower degree in their second session (Scenario 2). On the other hand, for the adults in Group B, cross-speaker randomness of choice was apparent in their first session. Their response pattern becomes clearer in their second session but is

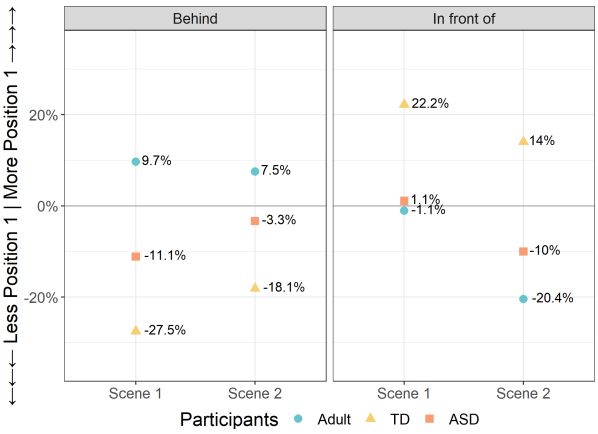

Figure 2: The percentage differences between choosing the object in Position 1 and Position -1. Positive differences indicate the overall preference of the Position 1 choice.

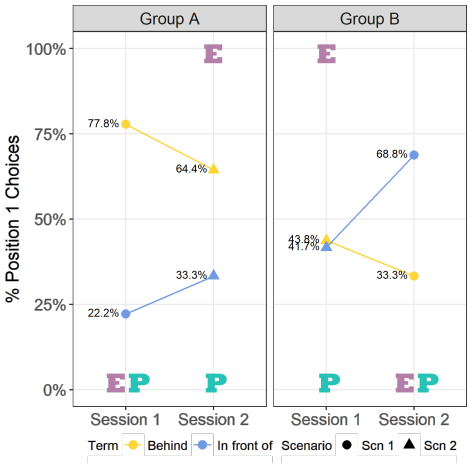

Figure 3: The percentages of responses by the adults in Group A and Group B by preposition, by session, and by location of experimenter.

the exact opposite of the pattern found in the first session of Group A (See Figure 3). Similar shifts in performances of Group B between sessions were also found in the TD children, but not in the children with ASDs. Moreover, the children with ASDs were found to choose wrong referents, i.e., choosing the mentioned object (of color *x*) or the objects that is more than one position away from the mentioned object, to a significantly greater extent than their TD peers. Mixed effects logistic regression models, whose factors include TRIAL NUMBER, the interactions between SCENARIO, GROUP, and PARGROUP (adult vs TD vs ASD), and a random effect of individual participants were fitted to see whether the participants' responses follow a non-contradicting pattern, interpreting the two deictic terms as being opposite to each other. The shifts in performances of Group B between sessions were not found to be significantly different between the adults and the TD children (β=1.03, p=0.26) but were significantly different between the adults and the children with ASDs (β=2.71, p<0.01) and marginally significant between the TD children and the children with ASDs (β=1.69, p=0.06).

Discussions Without the contrast between speaker and participant to consider, the adults in Group A seem to have chosen an object-based allocative viewpoint (Shusterman and Li, 2016), relativizing the deictic notions as if the objects were facing themselves. However, when there is no reason to assume the object is facing either the speaker or the participant, as in the case of the first session of the adults in Group B, the randomness of choosing an orientation of whom the object was facing appears. The TD children's general interpretations of the deictic terms were found to be opposite to the adults' and not in accordance with Johnston (1984)'s finding ('visible' *in-front-of* vs 'hidden' *behind*). However, this situation is different since the objects were not actually hidden from sight. It, therefore, seems plausible that the TD children prefer the egocentric viewpoint, in line with the theory of mind reasoning at their age. The experimenter's perspective displayed an effect in both the adults and the TD children. The second session of the adults in Group B involved more decisive choices, taking the exact opposite view from the adults in Group A in their first session. Unlike the other two groups, the children with ASDs were not found to be affected by where the experimenter was sitting. Additionally, one indicative difference between the TD children and the children with ASDs is the significant errors in choosing the mentioned object, suggesting their difficulty in even initially comprehending the relational property of the deictic terms *behind* and *in front of* in general. It is worth noting that in another experiment not mentioned in this abstract, where the exact same participants were tested for their comprehension of Thai proximal and distal spatial terms (e.g., *this*, *that*), the

difficulties with such terms were not as apparent. The results are in accordance with the results of the study by (Abarbanell and Li, 2021), where they found a correlation between children's ability to understand 'left' and 'right' and their perspective-taking ability.

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A perfect-like stative: On Icelandic *búinn að* and pragmatic competition in the aspectual domain — Jordan Chark (ZAS)

Background Modern Icelandic exhibits two constructions which have been termed "perfects" in the literature (Jónsson 1992; Thráinsson 2017). One is a *have*-perfect, as is prevalent in Germanic. The other is a periphrastic construction consisting of the auxiliary *be* in combination with the participle *búinn*—which can also be used adjectivally to mean 'finished/completed'—followed by a non-finite (infinitival) verb.

(1) Hann er búinn að borða. ? Hann hefur borðað.
He is BÚINN to eat ? He has eaten
He has eaten. (cf. Larsson 2008: 64)

Aim of this paper In this paper, I provide a compositional account of *búinn* in modern Icelandic which, coupled with auxiliary assumptions about the scalar structure of stative passives and principles of pragmatic reasoning, can adequately explain the restrictions on its distribution. Many approaches to the semantics of the perfect cross-linguistically endeavour to explain restrictions with regard to reading types, such as *experiential*, *universal* and *resultative* (McCawley 1971 and many others). I follow Jónsson (1992), Wide (2002) and Larsson (2008) in the view that the distribution of *búinn* and *have* is not adequately captured in terms of the markers having specialized for a subset of reading types, despite the fact that the former often has a resultative flavour and the latter an experiential one. The intuition in (1) is that *have* is odd since the time span of the assertion is by default something like "his whole life" (prototypically experiential). *búinn*, on the other hand, typically has what has been termed *current relevance* (Bybee et al. 1994; Portner 2003 a.o); even out-of-the-blue, *búinn* suggests that a state resulting from an eating event has consequences at speech time, which in turn gives rise to an inference of temporal recency. This reading cannot, however, be classified as resultative, since the embedded event description is atelic. **Summary of analysis** As pointed out by Larsson (2008), *búinn* readily gives rise to a "job-is-done" or "that's over" reading, like stative passives elsewhere in Germanic (Kratzer 2000), e.g. *the paper is accepted*. Building on these observations, I argue that the distribution of the two perfects can be tied to *búinn* involving a change of state component in its semantics which triggers contextual aspectual coercion. The gist of this view is that, in (1), *eat* is interpreted as an accomplishment rather than an activity under *búinn* (as in *eat his lunch*). While there is indeed significant functional overlap between *búinn* and *have*, due to their differing semantics they impose different requirements on the common ground and are appropriate answers to distinct QUDs. **Restrictions on modification** *Búinn* often requires the presence of adverbial modification in the clause where *have* does not. Restrictions on the distribution of *búinn* become especially apparent in two environments: i) where *búinn* embeds intransitive accomplishments and achievements; ii) where the embedded predicate is an activity (e.g. 1). *Búinn* requires iteration or measure modification (e.g. *a lot*, *enough*) when embedding intr. accomplishments and iteration or frequency adverbials with intr. achievements, as in (2) and (3).

(2) Bíllinn er búinn að ryðga *(mikið) í vetur.
The.car is BÚINN to rust *(much) this winter
The car has rusted *(a lot) this winter. (Thráinsson 2017: 127)

(3) Skipið er búið að blása tvisvar.
the.ship is BÚINN to whistle twice
The ship has whistled twice. / Das Schiff hat schon zweimal getutet (es ist höchste Zeit). (trans. from Kress 1982: 154)

Scalar approach Kratzer (2000) does not explain why stative passives become more felicitous when they are in the context of fulfilling an expectation. Baglini's (2012) scalar approach to stative passives does, however. The "job-is-done" reading can be yielded from atelic predicates, too, if they are coerced to denote scalar change; the relevant event description is coerced into a homomorphic mapping with a quantized theme.

Proposal: Embedded pred. I argue that the restrictions on adverbial modification sketched above fall out under a contextual aspectual coercion view—*búinn* requires that the embedded event description be gradable. The degree argument is introduced by a partitive head that in turn composes with the theme argument, measuring out the difference of change in its part structure in degrees (Kennedy 2012). Either an overt degree argument or a second covert head $[\![pos]\!]$ (ibid.) takes the measure function as input and contributes a comparison standard. The non-finite verb composes with the result of this by Event Identification (Kratzer 1996). For instances without an overt degree measure like (1), d can be set to 1 (max. value) and the durative event description *eat* can measure out a change in a covert theme (e.g. *his last meal*). With an overt degree argument, the property of events in (2) can be rendered as (4), assuming the denotation of *mikið* 'a lot' represents a degree equal to or greater than a high degree on a quantity scale linked to the part-structure of the theme (the car) (Baglini 2012), returned by a function **large**.

(4) $[\![\text{a.lot}]\!]([\![\text{rust }]\!])([\![\text{part}_{\triangle}(\text{the.car})]\!]) = \lambda e.rust(e) \wedge part_{\triangle}(the.car)(e) = d \wedge d \geq \textbf{large}(d)$

Proposal: Participle I propose that the quantization requirement follows from *búinn* lexically encoding a change of state—it has a BECOME operator (Dowty 1977). This receives diachronic support as well—it has been argued that. The semantics of *búinn* involves three components. The copula *vera* 'be', composes with tense and contributes the perfect state free (predicate) variable Q (Nishiyama and Koenig 2010), alongside two aspectual heads that make up the participle. [bú-] introduces a state that exists in a BECOME relation with the embedded eventuality; BECOME denotes a scalar change between opposing states on some scale, e.g. in terms of degrees (Maienborn 2009; Gehrke 2015). The formal implementation draws on the alternative analysis in Danckaert and Schaden (2021) for a late(r) stage of the Latin *have* stative (see also Schaden 2009). Finally, the stativizer [-inn] existentially quantifies over the initiator argument (cf. Gehrke 2015)—the combined entry is shown in (5a). I assume that *búinn* is located in AspP—(5c) composes with TP. If reference time is equal to *now*, then truth is yielded in case there exists a state s s.t. *now* is contained in the runtime of s, the free predicate Q holds of s; there is an event e of rusting, an individual x composed of sub-parts of the car s.t. the amount of x that underwent rusting equals or exceeds a contextually high degree; the BECOME relation holds between e and s and the runtime of e temporally precedes *now*.

(5) a. $[\![\text{búinn}]\!] = \lambda V_{\langle v,t\rangle}.\lambda s.\lambda i.\exists x.\exists e[init(x)(e) \wedge \text{V}(e) \wedge BECOME(e)(s) \wedge \tau(e) \prec i]$
b. $[\![\text{vera}]\!] = \lambda R_{\langle v,\langle i,t\rangle\rangle}.\lambda i.\exists s[i \subseteq \tau(s) \wedge Q(s) \wedge R(s)(i)]$

c. $[\![\text{vera}]\!]([\![5a]\!])([\![4]\!]) =$
$\lambda i.\exists s[i \subseteq \tau(s) \wedge Q(s) \wedge \exists x.\exists e.[init(x)(e) \wedge rust(e) \wedge part_{\triangle}(the.car)(e) = d \wedge d \geq$
$\textbf{large}(d) \wedge BECOME(e)(s) \wedge \tau(e) \prec i]]$

Conclusion and Implications The *búinn* construction is an argument-structurally complex derived stative: the participle contributes a change-of-state, which imposes restrictions on the scalar structure of the embedded event description. The analysis presented here has relevance for the cross-linguistic typology of derived statives and perfects, for which it has been shown that a change-of-state plays a prominent role, albeit with differing surface consequences across languages (Matthewsson et al. 2015).

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Cumulative readings of Czech distributive conjunction *i*: experimental evidence from ECM constructions

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Background. Singular universal DPs (UD), like English *every* in (1)/(2), always allow the distributive reading (each boy drew both, a rhinoceros and an elephant: the only reading of (1)), but in some syntactic configurations they allow a cumulative reading as well: (2) would also be true in a scenario where the first boy drew one half of the animals and the second boy drew the other half, resulting in the cumulative reading. The theoretical explanation of this asymmetry stems either from the path of thematic role hierarchies ([9, 4] a.o.) or from structural factors like [2, 8] a.o. Both approches focus on monoclausal cumulativity asymmetry (CA) effects which holds also for general theoretical approaches to distributivity (as [3] a.o.). We bring new experimental evidence concerning long distance configurations which partially challenges current theories of distributivity and also supports the structural theory of CA. Our data come from an experiment targeting the interpretation of the Czech distributive conjunction *i* (D-conjunction). We build upon the previous experimental work of [7], where it was established that UDs and D-conjunctions form a natural class w.r.t. CA. The research questions of our experiment were: (i) do speakers observe CA at long-distance? ii) how different are monoclausal and long distance configurations interpretations? Positive answer to the first question supports the structural theories and it directly contradicts the strong version of the θ-roles approach ($\approx$ θ-roles are the only factor of the CA); [9, 4] are weaker versions of the θ-role approach to CA. The second question is more exploratory, but no difference between local and distance configurations can be problematic for many current approaches to distributivity.

(1)Every boy drew a rhinoceros and an elephant. (2)Two boys drew every animal.

Experiment. The design of the experiment was 2x2x3 factorial: (i) D-conjunction in subject or object position (factor SUBJ with levels `subjTRUE`, `subjFALSE`) x (ii) D-conjunction in ECM or in simple SVO clause (factor ECM with levels `ecmTRUE`, `ecmFALSE`) x (iii) three different types of pictures (factor PIC with levels `cumul`, `distr`, `wrong`). Each item contained a D-conjoined NP and another NP conjoined by the *a* 'and' conjunction, which permits both cumulative and distributive reading regardless of its position. There were nine items in four conditions which were the result of crosses between the factors SUBJ and ECM. In addition, each of the four conditions had three nested picture conditions (PIC). Using Truth Value Judgement Task, every one of the 47 reliable participants completed a questionnaire consisting of 36 filler items and 36 experimental items. The participants were exclusively native speakers of the Czech language. Their task was to judge whether the picture they were presented corresponded with the sentence in question. We created the pictures in such a way that one represented the cumulative interpretation, another represented the distributive interpretation, and the last one, `wrong`, was used as the baseline. We constructed the `wrong` pictures in such a way that only a *no* answer would be acceptable as the correct one. As a way of example, in (3) we present an item in condition `subjFALSE` & `ecmTRUE` and condition `subjTRUE` & `ecmTRUE`; in Figure 1 are three pictures exemplifying the three conditions PIC:

(3)Context: The fifth grade of an elementary school went on a trip to the local zoo.

a.*Dan a Adam viděli Sáru fotit nosorožce i slona.*
Dan and Adam see.3PL.PST Sára.ACC take.photo rhino.ACC *i* elephant.ACC
'Dan and Adam saw Sára take a photo of a rhinoceros *i* an elephant.' `subjFALSE` & `ecmTRUE`

b.*Dan i Adam viděli Sáru fotit nosorožce a slona.*
Dan *i* Adam see.3PL.FEM.PST Sára.ACC take.photo rhino.ACC and elephant.ACC.
'Dan *i* Adam saw Sára take a photo of a rhinoceros and an elephant.' `subjTRUE` & `ecmTRUE`

Results. The barplot (descriptive statistics) represents acceptance of the PIC three levels crossed with conditions SUBJ and ECM is in Figure 2a. For inferential statistical modelling we used `wrong` of PIC as the reference level, but the level `wrong` of PIC was reversed: with the value `TRUE`/1 we label the subjects' rejections of the wrong picture, see the effects plot in Figure 2b. The acceptance rate of distributive (`distr`) pictures was high in all four crossed levels. The acceptability of the cumulative picture was much worse overall but its greatest acceptability decrease appears in condition `subjTRUE` & `ecmFALSE`: in sentences where D-conjunction was in the subject position of a simple clause. We analyzed the data in the mixed-effects logistic models (R package LME4, [11, 1]). The dependent variable was the subject's response (*yes* or *no*). The independent variables of the models were the three conditions (PIC, SUBJ, ECM) and their interaction (plus the item intercept+slope ranefs; more ranefs inclusive models did not converge). We found a strong negative main effect of `cumul` (z-value: $-7.48, p < 0.001$): if *i* were a regular *and*-type conjunction, the expected response would be *yes* for the `distributive` and `cumul` and *no* for the `wrong` but for the cumulative pictures, the expected response was given much less often than for the baseline, and the rates of expected pictures for the `distributive` and `wrong` conditions differed non-significantly (z-value: $1.53, p = 0.13$). The crucial info comes from the interaction effects, see Figure 2b, where the predicted probabilities of the logistic model are visualized in form of the effect plot. First, the model reports a strong negative interaction of PIC`cumul` by SUBJ`TRUE`, the strongest interaction effect of the model (z-value: $-4.63, p < 0.001$): subjects rejected the cumulative picture with added interaction coefficient -4.63 (to the main `cumul` negative effect) if the D-conjunction was in the subject position. On the other hand, there was no significant interaction effect neither between `cumul` and ECM nor between `distr` and ECM; moreover, the main effect of ECM was not significant: the ECM main and interaction insignificance by `cumul` disagree with the θ-role approaches to CA. The insignificance of the `distr` by `ecm` confirms that subjects accessed the distributive interpretation irrespective of monoclausal/ECM environment. There is a spurious positive three way interaction: `piccumul:ecmTRUE:subjTRUE` (z-value: $3.135, p < 0.01$) subjects accessed the cumulative readings for D-conjunction in the subject position of ECM conditions (see top-right facet in Fig 2b).

Discussion. The results of our experiment show that (i) monoclausally, the CA asymmetry is robust and subjects also accessed the cumulative reading for the D-conjunction in the object position of ECM construction: the second point empirically supports the scope-based theories; (ii) D-conjunction allows distributive interpretation monoclausally but also at long-distance which can be problematic for current theories like [3] which are tailored for local distributivity effects (but can be explained by dynamic approaches to distributivity, see [5, 6]). This answers both research questions: (i) speakers observe CA locally and at long-distance they allow the cumulative reading of D-conjunctions (contra approaches like [10, 12] where distributivity is hard-wired into the meaning of the D conjunctions); (ii) the distributive interpretation is possible both locally and at distance. There is at least one open question though: speakers accepted the cumulative interpretation for D-conjunction in the matrix predicate of ECM sentences which is unexpected in all current theories of CA since all predict only the distributive interpretation. We are working on a follow-up experiment where both matrix and embedded ECM subjects are tested for the cumulative asymmetry. Results of the follow-up can help us answer the open questions.

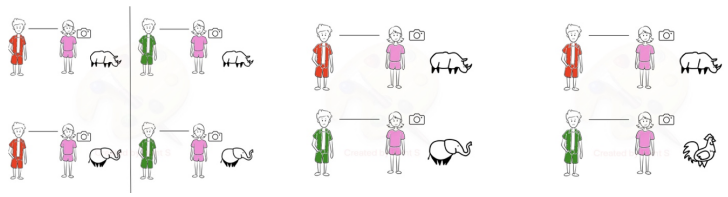
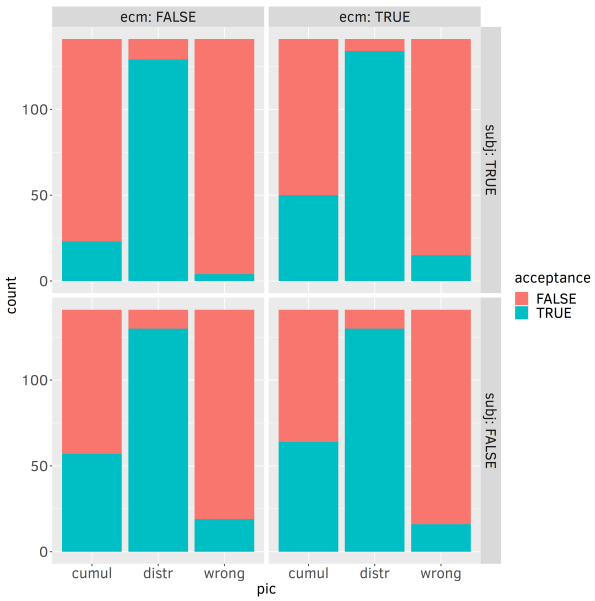
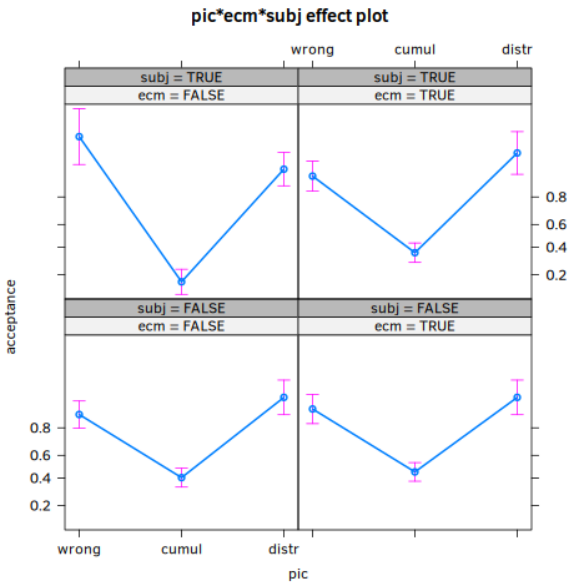


Figure 1: Pictures representing different interpretations for (3), in order: distributive, cumulative, wrong.



(a) Barplot of responses



(b) Effects graph

Figure 2: The descriptive stats barplot and the effects graph

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Pluractionality via competition: VV in Mandarin Chinese

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Introduction The Mandarin VV sequence formed with certain verbs expresses event-internal pluractionality (Deng 2013). For instance, *qiao qiao* 'knock knock' gives multiple events of knocking in one group of knocking event; such knocking events distribute over the temporal dimension yet not the spatial or the participant dimensions. This at first sight conforms to the cross-linguistic reports that pluractionality is closely tied to verbal reduplication (Cusic 1981, a.o.). However, treating VV as reduplication (Li & Thompson 1981) fails to explain insertion of an aspectual marker (*qiao-le qiao* 'knock-PERF knock') or a numeral (*qiao yi qiao* 'knock one knock'). Moreover, not all VV have pluractionality. For example, *deng deng* 'wait wait' cannot be interpreted as multiple occurrences of a single waiting event.

We argue that syntactically, VV is V-(NUMERAL)-CLASSIFIER, namely, the second V is a cognate verbal classifier (CL_{cog}) which provides a natural unit for events. NUM-CL is represented as Quan(tity)P (cf. Borer 2005). Semantically, on the basis of Neo-Davidsonian event semantics (Parsons 1980, Carlson 1984, a.o.), we propose that VV denotes an indefinite quantity of events with the unit specified as the event itself. Given our semantics, pluractionality of VV formed with certain verbs can be further derived through the competition with V-one-V.

VV is V-(NUM)-CL The following facts demonstrate that VV involves event-internal (NUM)-CL. First, VV and V-(NUM)-CL both have numeral-insertion (1a) where *yi* 'one' is optional (1b).

(1) a. qiao san {**xia**/**qiao**} men [Medieval Chinese]
knock three CL/knock door
'give three knocks on the door'

b. qiao (yi) {**xia**/**qiao**} men
knock one CL/knock door
'give knocks on the door'

Second, VV parallels V-NUM-CL formed with *xia*. As shown by (2a), *xia* is an event-internal classifier (CL_{int}) providing a counting unit for **events**; *ci* is an event-external classifier (CL_{ext}) providing a counting unit for **occasions**, i.e., groups of events (Landman 2006). That is, *xia* can be used as units for atomic knocks whilst *ci* cannot, as shown by (2b). (2c) patterns along with (2b), illustrating that VV encodes event-internal quantification just like V-NUM-CL_{int}.

(2) a. ta qiao-le san **ci** men, mei ci qiao si {***ci** / **xia**}.
he knock-PERF three CL_{ext} door each CL_{ext} knock four CL_{ext} CL_{int}
'He knocked on the door three times, and each time he gave four knocks.'

b. ta qiao-le san **xia** men, mei {***ci** / **xia**} dou hen qing.
he knock-PERF three CL_{int} door each CL_{ext} CL_{int} all very gentle
'He gave three knocks on the door, and each knock was very gentle.'

c. ta qiao-le **qiao** men, mei {***ci** / **xia**} dou hen qing.
he knock-PERF knock door each CL_{ext} CL_{int} all very gentle
'He gave several knocks on the door, and each knock was very gentle.'

Third, VV and V-NUM-CL_{int} are identical in selectional properties. VV is compatible with activity verbs only, barring stative and achievement verbs. This is in general the same as the distribution of verbs in V-NUM-CL_{int} rather than V-NUM-CL_{ext}, as attested by 170 verbs.

Class	Example	VV	V-one-CL_{int}	V-three-CL_{int}	V-NUM-CL_{ext}
Statives	*shi* ('be')	−	−	−	−
Achievements	*dao* ('reach')	−	−	−	+
Activities I	*qiao* ('knock')	$+_{pluractional}$	+	+	+
Activities II	*deng* ('wait')	$+_{singular}$	+	−	+

Structuring NUM-CL For the structure of VV and V-NUM-CL_{int}, we propose: (i) NUM-CL is an adjunct, as evidenced by the optionality of NUM-CL and its modification to the verb (3), the co-occurrence of NUM-CL with both the direct object and the indirect objects (4), and the lack of scope ambiguity with universal quantifiers (Landman 2004). Given that NUM-$CL_{int/cog}$ is event-internal (2b), we assume that NUM-$CL_{int/cog}$ is situated structurally inside VoiceP in the spirit of Kratzer (1996).

(3) ni qiao (yi {**xia**/**qiao**}) men
you knock one CL_{int}/CL_{KNOCK} door
'You gave knocks on the door.'

(4) ni jiao (yi) {**xia**/**jiao**} wo shuxue
you teach one CL_{int}/CL_{TEACH} me math
'You teach me math a bit.'

(ii) NUM-CL is represented as Quan(tity)P where Quan takes Div(ision)P as its complement (cf. Borer 2005). We propose that Div is a categorizer for classifiers on a par with v, the verbal categorizer – DivP and v' are syntactically isomorphic and semantically of the same type, which captures the grammaticalization of verbal classifiers out of verbs in Medieval Chinese.

Semantics of V-NUM-CL We propose that the semantic type of $CL_{int/cog}$ is the same as the verb, namely, a lattice-structured set of events which may include **atomic** and **complex events** (Krifka 1989, Landman 2006, a.o.). The composition of V-NUM-CL is illustrated by (10). To wit, (i) Div selects a set of complex events (with atomic events) given the cumulativity presupposition (5a) (cf. Scha 1981, Schein 1986, a.o.). Statives (*shi* 'be'), denoting a set of states rather than events, and achievements (*dao* 'reach'), denoting a set of events consisting of atomic events only, both fail to meet the cumulativity presupposition and cannot be selected by Div. Activities, with both complex and atomic events in their denotation, satisfy the cumulativity presupposition and thus can be selected by Div. The general classifier *xia* denotes a set of events restricted only by the cumulativity presupposition, and hence denotes a set of events that contain all activities. (ii) Quan has two flavours that differ in the stable atomicity presupposition (5b) (cf. Chierchia 2010). $Quan_1$ demands a set of events with stable atoms to be its input, like *qiao* 'knock' (Activities I), yielding a set of countable events. Therefore, $Quan_1$ can take any numeral as its specifier. By contrast, $Quan_2$ does not presuppose stable atomicity, and thus it can take a set of events like *deng* 'wait' (Activities II) as its input. Complex events without stable atoms cannot be counted, so $Quan_2$ can only take *yi* 'one' as its specifier. Eventually, QuanP adjoins to the verb as a modifier; V-NUM-$CL_{int/cog}$ denotes a set of events with $CL_{int/cog}$ as the unit and NUM as the counting result. Particularly, VV denotes an indefinite quantity of events since the counting result is unspecified.

(5) a. $\text{CUM}(P) \stackrel{\text{def}}{=} \forall e[P(e) \rightarrow \forall e'[P(e') \rightarrow P(e \oplus e')]]$

b. $\text{SAT}(P) \stackrel{\text{def}}{=} \forall e \forall s[P(e) \wedge ATOM_s(e) \rightarrow \forall e' \forall s'[P(e') \wedge ATOM_{s'}(e') \rightarrow e = e']]$

Why cognate classifiers? Intuitively, the manner of dividing depends on the objects that are being divided, which can be formalised as the subset requirement (6). For V-NUM-CL, the denotation of the verb is required to be a subset of the denotation of the classifier. Such a requirement can be satisfied by either the general classifier *xia* or a cognate classifier CL_{cog}. Due to the lack of any subset relation between different events, *da* (CL_{HIT}) cannot be the counting unit for *qiao* 'knock' (7b).

(6) **Subset requirement: The set denoted by the independent is a subset of the set denoted by the dependent.** Let $A = [\![\text{v}']\!]$, $B = [\![\text{DIVP}]\!]$, then $A \subseteq B$. (i) If $A \subset B$, then Div is realised as the general classifier *xia*. (ii) If $A = B$, then Div is realised as a cognate classifier CL_{cog}.

(7) a. {**da** / **qiao**} yi xia
hit knock one CL_{int}
'give a hit' / 'give a knock'

b. {**da** / ***qiao**} yi da
hit knock one CL_{HIT}
'give a hit' / Intended: 'give a knock'

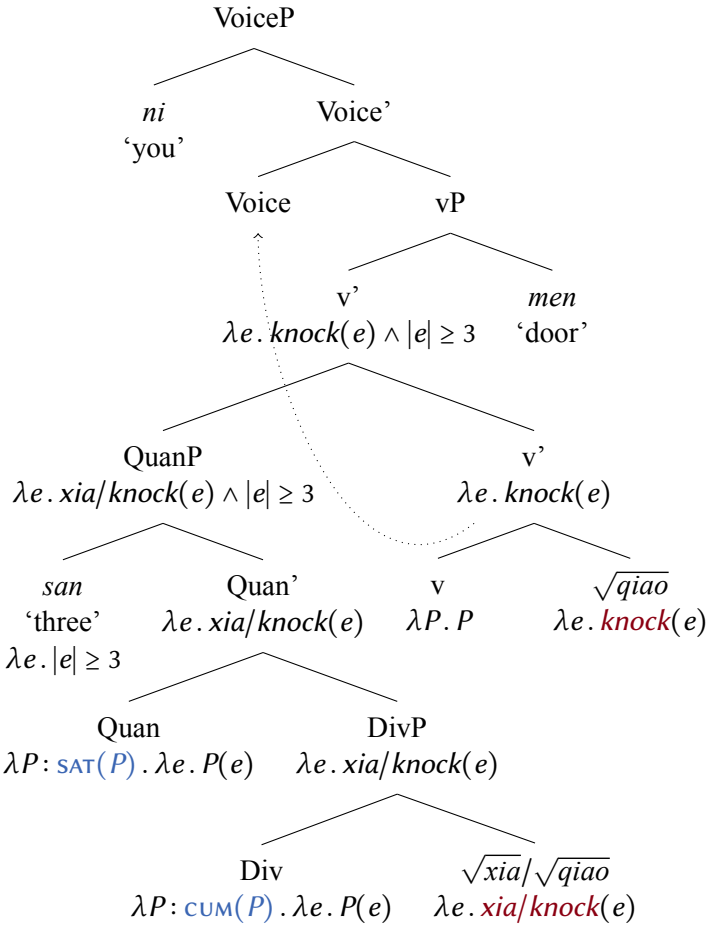
Our analysis can also be extended to the domain of individuals. In Archaic Chinese, *yang wu tou* 'sheep five CL' uses a general classifier to express the unit, whereas *yang wu yang* 'sheep five CL_{SHEEP}' resorts to a cognate classifier for sheep, both satisfying the subset requirement (6).

Pluractionality via competition As demonstrated by the plural quantification in (8) and the incompatibility with singular-event scenarios in (9), VV formed with Activities I (henceforth VV_{act_I}) shows pluractionality. Such pluractionality results from pragmatic competition. VV_{act_I} denotes an indefinite quantity of events (≥ 1). In Medieval Chinese, NUM in V-NUM-V_{act_I} can be focused, and V-one-V_{act_I} denotes one event ($= 1$). Since VV_{act_I} competes with V-one-V_{act_I}, using VV_{act_I} implicates that V-one-V_{act_I} does not hold. That is, VV_{act_I} denotes plural events.

(8) ta qiao-le {**qiao** /#**yi** **xia**} gu, dou qiao-zai-le gu-yan-shang.
he knock-PERF CL_{KNOCK} one CL_{int} drum all knock-on-PERF drum-edge-LOC
'He gave several knocks on the drum, all of which are on the edge.'

(9) hua hua hao-le, zai gai {#**gai** / **yi** **xia**} zhang jiu keyi le.
painting paint ready-PERF and affix CL_{AFFIX} one CL_{int} seal then alright PERF
'The painting is ready, and the last step is to affix a seal to it.'

(10) ni qiao san {**xia** / **qiao**} men.
you knock three CL_{int} CL_{KNOCK} door
'You give three knocks on the door.'



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Comparing contextual shifts in total/partial predication and plural non-maximality

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Summary. We explore a potential analogy between the partial/total contrast in singular predication and non-maximality with pluralities. We show the account of non-maximality of [5] can be extended to the 'mereological' construal of partial/total predicates but not the 'depth' (degree) construal; we suggest to account for the latter through contextually-provided partitions of scales.

The partial–total contrast is context-dependent. [7] observes that many predicates come in pairs, such as *dry*/*wet*, *clean*/*dirty*, and *straight*/*curved*; in all of these, one of the predicates holds of all parts of its argument (it is 'total'), while the other only holds of some parts (it is 'partial'). Here, we focus on *wet*/*dry*. In an out-of-the-blue context:

(1) a. PARTIAL PREDICATION: *The table is wet.* ≈ 'Some part of the table is wet.'
b. TOTAL PREDICATION: *The table is dry.* ≈ 'All parts of the table are dry.'

The predicates *wet*/*dry* have two 'dimensions'/'construals': they can make a claim about the amount of surface covered by liquid (2a), or the degree of wetness for each subatomic part (2b).

(2) *The table is half wet.*
a. MEREOLOGICAL CONSTRUAL: 'Half the surface of the table is wet; the rest is dry.'
b. DEPTH C.: 'All the table has a (uniform) degree of wetness halfway along the scale.'

Our first empirical point (cf. [3]) is that the contrast in (1) is not purely lexical, but rather subject to context-dependency. Indeed, we can construct contexts that change which predicates are partial and which are total. In (3), for instance, *not wet* means 'not fully wet' rather than 'not wet at all.'

(3) CONTEXT: A beached whale needs to be kept as wet as possible to survive, but
a. MEREOLOGICAL: ... some of its body parts are dry.
b. DEPTH: ... its entire skin is no longer maximally wet, just slightly moist.
The whale is not wet. **true** in (3a) and (3b)

The judgment in (1) is due to speakers assuming that the goal of the conversation is for the table to be fully dry; in contrast, in (3), the goal is for the whale to be fully wet.

The mereological construal patterns with plural predication. There is another area where the default construal of a predication is universal, but certain conversational goals license weaker construals. This is **non-maximality** with pluralities (e.g., [2, 6, 4]). In (4), it does not matter for B's sleep whether all or only some children sang, so (4B) is existential.

(4) A: *Did you sleep well last night?*
B: *Alas, the children sang all night.* **true** if e.g. 3 out of 10 children sang

Similarly, in an out-of-the-blue context for (1a), it typically does not matter whether the table is partially or completely wet; it must be dried either way. In contrast, in (3), some degrees of wetness require making the whale more wet, but others (namely the maximum) do not.

This fits well with recent analyses that relate non-maximality to a QUD parameter [6, 5, 1]. For instance, [5] (cf. [1]) take plural sentences to have an underspecified semantics: (4B) has a set of alternatives that each quantify existentially over a subset of the children (5a). This includes the default maximal construal (where $C = \{\bigoplus\{y : \mathbf{children}_w(y)\}\}$), but also purely existential ones. For [5], a sentence counts as true (false) iff all the alternatives that are **strongly relevant** to the QUD are true (false). Given the partition of worlds induced by the QUD, an alternative is 'strongly relevant' if it is true in all and only the worlds in a given set of cells. In (4), the proposition that all children sang is not strongly relevant because it does not pick out a partition cell (the QUD is 'did

any of the children sing?'). This proposal could be extended to the MEREOLOGICAL construal of (1a) by constructing alternatives that quantify over sets of the subatomic parts of the table (5b).

(5) a. $[\![(4B)]\!]^w = \{\lambda w'.\exists x[C(x) \wedge \mathbf{sang}_{w'}(x)] : C \text{ is an upward-closed subset of } \{y : \mathbf{children}_w(y)\}\}$

b. $[\![(1a)]\!]^w = \{\lambda w'.\exists x[T(x) \wedge \mathbf{wet}_{w'}(x)] : T \text{ is an upward-closed subset of } \{y : y \leq [\![\text{the table}]\!]^w\}\}$

In (3), meanwhile, the binary nature of the QUD ('is the whale safe?') gives *wet* a total meaning.

A crucial prediction of this framework is that a QUD for which multiple alternatives are relevant gives rise to a gap between the truth and falsity conditions, a **homogeneity effect**. Context (6) brings out this effect for plural predication with *wet*: for each table x, the alternative 'at least x is wet' is relevant. The truth conditions are obtained by conjoining these alternatives and the falsity conditions by conjoining their negations. The same homogeneity effect is found with the mereological construal of *wet* (7), which supports the account in (5b).

(6) SCENARIO: A and B need to varnish ten tables. For each table, A must spray it with water, and then B can start varnishing it. At present, half of the tables are wet.
B: *How are the tables looking?* A: *#They're wet.* / A′: *#They're not wet (yet).*

(7) SCENARIO: A and B need to varnish a huge table. A must spray it with water; as soon as some part of it is wet, B can varnish that part. At present, half the table is wet, the rest dry.
B: *How is the table looking?* A: *#It's wet.* / A′: *#It's not wet (yet).*

The depth construal differs from plural predication. The analogy with pluralities for the mereological construal raises the question of whether the same mechanism is involved in the depth construal. In principle, we could stipulate alternatives based on individual degrees rather than mereological parts, as in (8), where S_{wet} is the set of possible degrees of wetness.

(8) a. for depth: $[\![(1a)]\!]^w = \{\lambda w'.\text{WETNESS}_{w'}([\![\text{the table}]\!]^w) > d : d \in S_{wet} \backslash \{\max(S_{wet})\}\}$

b. for depth: $[\![(1b)]\!]^w = \{\lambda w'.\text{WETNESS}_{w'}([\![\text{the table}]\!]^w) < d : d \in S_{wet} \backslash \{\min(S_{wet})\}\}$

(8) correctly predicts that in a context in which multiple alternatives are relevant (9), (1b) means that the table is less wet than any degree in any relevant alternative. But (8) also wrongly predicts that in the same context, (1a) means that the table is wet to the highest relevant degree (10).

(9) SCENARIO: A and B need to varnish a table. A must spray it with water and B with varnish in equal amounts. A has added half of the water it will need in total for the varnishing job.
B: *How is the table looking?* A: *#It's dry.*

(10) [in scenario (9)] B: *How is the table looking?* A: *It's wet.*

In (10), the proposition that the table is maximally wet would be relevant, but A's utterance is true even though this proposition is false. So (8) predicts a 'gap' between *wet* and *dry* on the depth construal that is not in fact attested. Further, even though context (9), just like (7), makes multiple alternatives relevant, neither *wet* nor *dry* exhibit homogeneity effects on the depth construal:

(11) [in scenario (9)] B: *How is the table looking?* A: *It's not dry anymore./#It's not wet yet.*

Total and partial predicates differ lexically on the depth construal. As such, the depth construal should not involve alternatives of the kind employed by [5]. Instead of being directly sensitive to the QUD, we propose that context-dependency in the depth construal is the result of a contextually-provided partition $\mathscr{P}_{wet,c}$ of the wetness scale; *dry* is associated with the lowest cell and *wet* with the rest of the scale (rather than only the highest cell). In (12), P is a cell of the partition $\mathscr{P}_{wet,c}$.

(12) a. $[\![\text{dry}]\!]^{w,c} = \lambda x_e.\exists P \in \mathscr{P}_{wet,c}.\text{WETNESS}_w(x) \in P \wedge \min(S_{wet}) \in P.$

b. $[\![\text{wet}]\!]^{w,c} = \lambda x_e.\neg\exists P \in \mathscr{P}_{wet,c}.\text{WETNESS}_w(x) \in P \wedge \min(S_{wet}) \in P.$

For simplicity of presentation, (12) only targets the depth construal of these predicates; however,

by applying (12) within each of the mereological alternatives in (5), we can capture context-dependency along both depth and mereological dimensions simultaneously.

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Predicate Doubling in Bantu

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Summary: In this paper we investigate the semantics associated with a predicate doubling construction found in Bantu languages. In new data, we find predicate doubling with verum focus, contrastive topic (CT), intensive, and depreciative readings. We propose an analysis in which all of these readings fall under a single account: predicate doubling marks congruence to a discourse strategy (Büring 2003, 2016) which answers a relevant Question Under Discussion (QUD; Roberts 1996). We treat contrastive topics as a special case of focus (Constant 2014), and predicate doubling evokes a set of alternatives (à la Rooth 1985, 1992) to the QUD. We argue that the previously unstudied depreciative and intensive readings require an novel conceptualization of contrast in which the proposition denoted by predicate doubling is contrasted with alternative means of enacting that eventuality.

Bantu Predicate Doubling: While three variants of these predicate doubling constructions have been described in Bantu (Meeussen 1967, Fiedler & Güldemann ms), in this talk we concentrate on what has been called the "topic doubling" construction in earlier Bantuist work; we use the term "predicate doubling" here in order to draw highlight the fact that the construction appears in several other languages (cf. Kandybowicz 2007, Aboh & Dyakonova 2009, Muñoz Pérez & Verdecchia 2022). As part of a larger project on information structure in Bantu, our data come from six languages: Kîîtharaka (Kenya), Rukiga (Uganda), Kinyakyusa (Tanzania/Malawi), Makhuwa (Mozambique), Copi (Mozambique), and Kirundi (Burundi).

Syntactically, the predicate doubling construction involves two instances of the same predicate: the first in the infinitive and the second fully inflected. Following Muñoz Pérez & Verdecchia (2022), we assume that predicate doubling involves a base-generated predicate in the left periphery, and is therefore not a case of overtly pronounced copies of a single movement chain (cf. Nunes 2004, *inter alia.*) Semantically, four readings are observed: contrastive topic (sometimes with exhaustive focus), verum, depreciative, and intensive. The data in (1)-(2) exemplify these readings.

(1) *Ukuryá, ndya inyama, kunywá nywa ifanta.* (Kirundi)

u-ku-ryá n-rí-a i-nyama ku-nywá n-nyó-a i-fanta
AUG-INF-eat 1SG.SM-eat-FV AUG-10.MEAT 15-drink 1SG.SM-drink-FV AUG-9.fanta

'For eating, I eat meat; for drinking, I drink fanta.' **CT+ExhF**

(2) *Okuhínga tuhingíre.* (Rukiga)

oku-hínga tu-hing-íre
INF-dig 1PL.SM-dig-PFV

a. 'As for ploughing, we did plough.' [We were expected to dig and feed the animals] **CT**
b. '(Yes,) We did actually plough.' [There is doubt as to whether we did the ploughing] **Verum**
c. 'We ploughed a lot!' [The boss expected us to cover only part of the field but we did the whole field] **Intensive**
d. 'We ploughed anyway.' [It's planting season but there is no rain] **Depreciative**

Descriptively, the contrastive topic (with exhaustive focus) reading, exemplified in (1), indicates a partial resolution of an issue of a multi-part question. The verum reading (2) asserts that the proposition did, indeed, take place. The intensive and depreciative readings (2c)–(2d) convey that the asserted predicate was performed with intensity or in a circumstance that would be expected to preclude the eventuality denoted by the predicate.

Predicate Doubling and Contrastive Topics: Büring (2003, 2016) extends Rooth's (1992) analysis of $[\![\ ]\!]^f$ to the analysis of CT, treating CT as utterances in relation to a QUD. A (shortened) version of Büring's account is given in (3):

(3) $[\![$ A $]\!]^{ct}$ equals (Büring 2003:539,(52a-b))
a. $\{D_{type(A)}\}$, if A is F marked, otherwise

b. $\{\{\alpha\} \mid \alpha \in D_{type(A)}\}$, if A is CT marked ...

On this approach, the CT meaning of (1) is a set of questions asking, i.e. "What do you P?", calculated (for readability, informally) in (4), cf. Büring (2003:519). In (4a), the focused element is converted to a variable; in (4b), the question is converted into a set of alternatives.

(4) $[\![$ [kuryá]$_{CT}$ ndya [inyama]$_F$. $]\!]^{ct}$
   a. [kuryá]$_{CT}$ $x \rightarrow$ What do you eat?
   b. What do you P? $\rightarrow$ { *What do you eat?, What do you drink?, ...* }

Thus, the meaning of the doubled predicate is an answer to a sub-question within a strategy aimed at addressing a larger issue, crucially captured by Büring's CT-Congruence Condition:

(5) CT-Congruence (Constant 2014:37 from Büring 2003:520)
An utterance U with CT-marking answers a question within a strategy containing $\geq$2 questions from the set $[\![\text{U}]\!]^{ct}$.

The meaning of (1), as laid out in (4), answers a sub-question (the meaning asserted by the focused element) but doesn't address at least one alternative sub-question (capturing the contrastive nature of the reading). Though this alternative sub-question is not the current QUD, it crucially will have been by the time the larger issue is closed. CT, then, indicates contrasting questions which are derived from substitutions for the CT phrase.

Polarity and Intensity: Adopting Büring's approach, Muñoz Pérez & Verdecchia (2022:20) treat verum focus as involving focus marking of a polarity head Σ (Laka 1990, Holmberg 2016). (2) with Σ in its structure would correspond to the following set of questions polar questions {*Did you plough, did you feed the animals?*, ... }. Building on this notion, we propose that the intensive and depreciative readings arise in a similar fashion as the verum reading. The intuition behind this analysis is that verum, intensive, and depreciative all answer a similar kind of question, e.g. *Did you P?*; in each case, an assertion is made that indeed P, and (for intensive and depreciative), the response involves an additional assertion of intensity (2c) or action despite circumstances which preclude the action (2d).

We contend that the intensive and depreciative semantics are situated within a theory of contrast. Vicente (2007:64-65) makes use of the distinction between contradictory and non-contradictory verum focus; the former emphasizes the truth of p in contrast to its negation (6a), while the latter establishes a contrast between p and a different proposition q (6b). We add to this typology *relational* contrast, which is a proposition p' which entails p but is not equal to it.

(6) a. **Contradictory:** $\neg p$
   b. **Non-contradictory:** $\neg p \wedge q \not\models p$
   c. **Relational:** $p' \models p \wedge p' \neq p$

Coupling this definition of contrast with CT focus analysis, then, the relational contrastive set of alternative questions would include things like {*Did you write well?, Did you write poorly?, Did you write something despite being disinterested?, ...* }. We propose that, by conventional implicature, the extremes of this set are invoked for the concessive and intensive readings. Thus the intuitive similarity between verum and intensive/depreciative is uncovered by virtue of how the assertion of truth is made; for verum, the contrast is the contradictory contrast of p; for intensive/depreciative, the contrast is from the set of alternative ways of doing the eventuality, via relational constrastiveness.

Conclusion: We analyze novel data from six Bantu languages and present an account of predicate doubling. We show that four seemingly distinct readings of predicate doubling arise from a unified account of congruence to a discourse strategy which answers a relevant sub-question under discussion. One of our central contributions is incorporating intensity and concession into the semantics of verum focus by evoking a parallel of these to the non-contradictory verum focus. Thus, a single semantics of contrast and congruence to a discourse strategy underlies the various readings which arise.

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Conversational dynamics of *razve*-questions in Russian

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1. Introduction Biased questions are questions which, along with requesting information, signal the speaker's attitude towards the truth of the sentence radical [15]. Based mostly on data from Germanic and Romance [with few exceptions; 18, 20], a lot of this research focuses on devices that create a biased-question interpretation by interacting with the structure of speech acts. This paper examines a different type of bias marker: Russian interrogative *razve*. Syntactically, *razve* is as an interrogative complementizer. Semantically, it conveys negative bias in conflicting-evidence scenarios. I argue that *razve* is a question operator with two epistemic inferences. The proposed analysis uses familiar semantic building blocks in a new combination and thus enriches our understanding of question bias.

2. Basic facts Matrix polar questions in Russian have a declarative surface syntax and are formed by rising intonation [1], with the optional complementizer *li* [11, 17]. *Li* is a second-position clitic whose host is the focus of the question (main predicate by default). Such questions are felicitous in neutral inquiries (1a). In this paper, I examine questions with the typically-clause initial particle *razve* (here translated as 'really'). *Razve*-questions are biased and are infelicitous, even rude, in neutral contexts (1b).

(1) Question on a job application form / during a job interview:

a. ✓Vy govorite po-russki? ↑ / Govorite li vy po-russki? ↑ [PQ]
you.PL speak.2PL.PRES Russian / speak.2PL.PRES Q you.PL Russian
'Do you speak Russian?'

b. #**Razve** vy govorite po-russki? ↑ [*razve*-Q]
RAZVE you.PL speak.2PL.PRES Russian
≈'Do you really speak Russian?'

On its own, (1b) is grammatical. Unlike other markers of bias, such as English *really* and Italian *mica*, which occur in declaratives, Russian *razve* is limited to polar interrogative clauses. First, (1b) requires rising intonation and is ungrammatical with the declarative intonation. Second, *razve*-clauses are interrogative based on data from pronoun licensing. Like ordinary polar questions and unlike simple declaratives [19, 21], *razve*-questions license *nibudj*-indefinites (2) and bare *wh*-indefinites.

(2) **Razve** vas kto-nibudj uzhe priglashal v Ameriku?
RAZVE you.PL.ACC who-INDEF already invite.MASC.SG.PST to America
≈ 'Has anyone really suggested your going to America already?' (*Ruscorpora*)

Outside of interrogative clauses, *razve* is used in nominal exceptives and exceptive conditionals. I will not discuss exceptives here and leave unifying those different uses for future research.

3. *Razve* and bias Question bias is a type of higher-order mental attitude towards the truth of the sentence radical. The literature recognizes different types of bias [5, 15, 18]: (i) **epistemic**, speaker's belief prior to conversation [16], and (ii) **contextual**, mutually available evidence during conversation [2]. Bias can be positive (p), negative ($\neg p$), or neutral. The table below summarizes the acceptability of (3) across different conditions (I only discuss *razve* itself; see [9] on *razve*+negation). These data show that *razve* obligatorily expresses negative epistemic bias in contexts of conflicting evidence.

(3) **Razve** ty ljubish svjoklu?
RAZVE you love.2SG.PRES beet.ACC
≈ 'Do you really like beets?'

	Cont: neutral	Cont: p	Cont: $\neg p$
Epi: neutral	#,(1b)	#,(4a)	#,(4b)
Epi: p	#,(5a)	#	#, (5b)
Epi: $\neg p$	#,(6a)	✓,(6b)	#

(4) **Neutral epistemic bias** (Sp agnostic about p): I have just met you and we go out for lunch.
a. **Positive contextual bias:** At the buffet, you take extras of everything containing beets.
b. **Negative contextual bias:** At the buffet, you avoid anything containing beets.

(5) **Positive epistemic bias** (Sp believes p): Based on what I know, I'm sure you like beets.
a. **Neutral contextual bias:** I invite you over and want to double-check that beets are fine.
b. **Negative contextual bias:** At lunch, you avoid all beet mezzes.

(6) **Negative epistemic bias** (Sp believes $\neg p$): Based on what I know, I'm sure you hate beets.
a. **Neutral contextual bias:** I invite you over and want to double-check that beets are no go.
b. **Positive contextual bias:** At lunch, you order beetroot hummus.

To recapitulate, *razve*-questions require contextual evidence for p. Such evidence may be firsthand (6b) or based on inference (7; Context 1). The evidence must be strong enough to create an epistemic conflict but still leave room for reasonable doubt (7; Context 2). Furthermore, this must be a piece of mutually, not privately (7; Context 3) available information. In the latter case, the addressee may accommodate the use of *razve*, but is likely to highlight their misunderstanding (*Net, a chto?* 'No, why?').

(7) [We go to a bar in New York, where I'm sure smoking is banned indoors.]
✓**Context 1**: *There are ashtrays at each table. I ask:*
#Context 2: *There are signs "Smoking allowed" at the entrance. I ask:*
#Context 3: *Another guest lights a cigarette (you're at the counter and don't see). I ask:*
Razve zdesj kurjat?
RAZVE here smoke.3PL.PRES
≈ 'Can one really smoke here?'

4. Proposal I propose that *razve* is an interrogative complementizer (a C head that selects for [+Q] clauses), which immediately explains its syntactic distribution: (1) *razve* only occurs in interrogative, but not declarative, clauses due to selectional restrictions; (2) *razve* and *li* are in complementary distribution, as they occupy the same position; (3) *razve*, like *li*, is not licensed in *wh*-questions because Russian bans a doubly-filled complementizer (term used descriptively). Semantically, I propose that *razve* is a Hamblin question operator, like *whether*, with two additional epistemic components (another analytical option, not explored here, would be to treat *razve* as a speech-act modifier; cf. [20] on German *etwa*).

(8) $[\![\text{ razve } p]\!]^{c,w,g} = [\![\text{ Q [FALSUM p] }]\!]^{c,w,g} = \{p, \neg p\}$ defined if
(i) $\forall w' \in \text{DOX}_{Sp(c),w}.(\forall w'' \in \text{CONV}_{Sp(c),w'}.(p \notin CG_{w''}))$. [negative bias]
Speaker believes that, in all worlds satisfying their conversational goals, $p \notin CG$.
(ii) $\lambda q.\forall w' \in max_{g_{st}(w)} \cap f_{ep}(w).[q \rightarrow p](w')$ [contextual evidence]
In all of the most normal words compatible with what is known in w, q entails p.
($f_{ep}(w)$: an epistemic modal base; $g_{st}(w)$: a stereotypical ordering source; $\forall u, v : v <_{g(w)} u$ iff $\{q \mid q \in g(w) \wedge u \in q\} \subset \{q \mid q \in g(w) \wedge v \in q\}\}$; $max_{g_{st}(w)}(\cap f_{ep}(w)) = \{w' \in \cap f_{ep}(w) \mid \neg\exists v \in \cap f_{ep}(w).v <_{g_{st}(w)} w'\}$; cf. classic Kratzerian semantics for weak *must*)

A *razve*-question is felicitous iff (i) the speaker has a pre-exiting belief that $\neg p$ and (ii) there is mutually available evidence that p. The proposed analysis captures this via two epistemic presuppositions.

(i) The **FALSUM presupposition** [adapted from 8, 14] ensures that *razve*-questions are in fact biased. Utterances with FALSUM object to adding p to the common ground, which amounts to denial in assertions and to negative bias in questions (treated as a presupposition for simplicity of representation; cf. [10]). *Razve* is always anchored to the speaker. *Razve*-questions (and biased questions at large; [4]) are not embeddable, so it doesn't shift in attitudes. And such questions (unlike those with *really* according to [16]) do not involve reasoning about what the addressee said. To this end, the speaker is treated as a Kaplanian indexical in (8). Importantly, *razve*-questions do not license negative *ni*-indefinites, which require clause-mate negation [13], nor do they anti-license PPIs. This supports the FALSUM-based analysis, as FALSUM does not interact with propositional operators as ordinary negation would [8, 16].

(ii) The **evidential presupposition** ensures that the speaker raises their objections to adding p to the common ground only in the presence of mutually available evidence. Conflicting-evidence restrictions have been observed for biased questions before [2, 18], but were typically left unformalized. Capitalizing on the research on evidentiality and epistemic modality [6, 12], I propose that the evidential requirement is a defeasible inference from q to p that holds in the most normal of the epistemically accessible worlds. Thus, while it is true that ashtrays allow one to infer that smoking is allowed (Context 1 in 7), this conclusion may be wrong and both interlocutors know it. This move captures an important aspect of utterances with *razve*: even in contexts with strong evidence for p, they are questions and can be followed up by 'I really want to know' (a telltale sign of genuine questions; [3]). This differentiates *razve* from markers of surprise, such as *neuzheli*, which do not perform questions and as such are banned in interrogative clauses (thus, *neuzheli* doesn't license *nibudj*-pronouns; cf. 2).

5. Conclusion This paper provides the first analysis of the Russian particle *razve* in a broader context of research on question bias (thus complementing [9], who focus on negative questions). I argue that *razve* is an interrogative complementizer, a typologically unusual marker of bias given that matrix complementizers are generally rare (though see [7] on pedagogical questions with the Old English *hwæþer>whether*). Semantically, most markers of bias—English *really*, Italian *mica*—have been argued to interact with the question operator, since they also occur in assertions. I argue that *razve* itself is a question operator that semantically encodes two epistemic inferences, one about bias and one about conflicting evidence. The proposed analysis uses familiar semantic building blocks to account for a new combination of properties found in *razve* and also connects research on bias to research on evidence, thus advancing our understanding of the language of epistemic commitments.

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Modeling Adjacency Pairs in Common Ground Updates:
Assertions, Questions, Greetings, Commands

Manfred Krifka

This presentation develops a general strategy to incorporate Adjacency Pairs, recognized as a basic feature of discourse organization, into discourse models of Common Ground update. In doing this, I attempt to draw insights about communicative interaction from Conversation Analysis into formal grammatical models (cf. [1], [2], [3] for related attempts).

Adjacency pairs [4, 5] are understood as conversational moves by one participant, the "first pair part" (FPP), that invite conversational moves of a particular type by the other participant, the "second pair part" (SPP). Examples are greeting – greeting back, question – answer, request – grant (or refusal), offer – acceptance (or declining offer), and assertion – consent (or dissent). If the FFP is not followed up by an SPP, the conversation is felt incomplete.

Formal approaches to discourse often subscribe to the idea that a speech act A by a participant S leads to an update of the common ground (CG), as in CG + S: A = CG′, cf. [6] and much related work). While most implementations focus on single updates, some also consider updates that involve cooperation between participants. They refine the update operation +, the notion of CG, or both. For example, [7] proposes an automata-theoretic procedure for updates with assertions; [8], [9], [10], [11] extend the notion of CG to incorporate questions and to-do lists for commands; and [12], [13] develop both a more refined structure of the CG and of the update operation + in order to capture assertions and questions.

I present a generalized way how adjacency pairs can be modeled in a framework of CG update. It is based on Commitment Spaces [13] as a framework that folds possible continuations of the CG into the notion of CG itself; it differs from [13] insofar as it captures negotiating aspects in conversation by integrating non-preferred continuations into this projective notion of CG, instead of relying on destructive operations that undo previous updates.

The general framework is as follows: Starting out with Commitment States (CSt) c, sets of propositions, I define Commitment Spaces (CS) C as sets of CSts. The set of smallest CSts in a CS, $\{c{\in}C \mid \neg\exists c'{\in}C[c'{\subset}c]\}$, is called the root $\sqrt{C}$ of C. If this root is a singleton, it stands for the factual knowledge of a CG, and the other CSts in C stand for how this can develop in the course of conversation. C can be updated by propositions φ; I write $\cdot\varphi$ for the update function $\lambda C\{c{\in}C \mid \varphi{\in}c\}$. Update of the input CG C, as in $\cdot\varphi(C)$, written $C{+}\cdot\varphi$, results in the output $C' = \{c{\in}C \mid \varphi{\in}c\}$. This update establishes φ in the root of the output, $\sqrt{C'}$. The input C can also be updated by just restricting the continuations, as in $C{+}?\varphi = \sqrt{C} \cup C{+}\cdot\varphi$, which restricts further updates to updates with φ. In this way one can model questions; e.g. asking whether φ or $\neg\varphi$ is the case is interpreted as $C{+}[?\varphi \vee ?\neg\varphi]$, where $\vee$ is interpreting as disjunction, resulting in $\sqrt{C} \cup C{+}\cdot\varphi \cup C{+}\cdot\neg\varphi$. This only allows further updates with φ or with $\neg\varphi$. Other updates, e.g. with $+\cdot\psi$, are possible but they lead to a multiple root, which records open issues that still have to be resolved (cf. [14]). Another operation is denegation of a proposition; $C{+}{\sim}\varphi$ is defined as $C{-}[C{+}\cdot\varphi]$, resulting in a CS that does not allow admittance of φ.

Following [13], assertions are analyzed as commitments by the speaker S_1 to a proposition φ (the illocutionary act, rendered as a proposition $S_1{\vdash}\varphi$), with the intention that φ become part of the CG (the primary perlocutionary act). This is modeled as a dynamically conjoined update $C{+}[\cdot S_1{\vdash}\varphi\ ;\ \cdot\varphi]$, which amounts to incremental update $[C{+}\cdot S_1{\vdash}\varphi]{+}\cdot\varphi$. The perlocutionary update, $+\cdot\varphi$, is up to negotiation – the other speaker S_2 can accept φ, e.g. by *okay*, can express his or her own commitment by $+\cdot S_2{\vdash}\varphi$, or can reject it by $+\cdot S_2{\vdash}\neg\varphi$. In the latter case φ will not become part of the CS due to an integrity constraint that excludes CSts that contain both propositions φ and $S{\vdash}\neg\varphi$, for any participant S in conversations. Rejecting requires a destructive operation that steps back to the state before the performative update, $[C{+}\cdot S_1{\vdash}\varphi]$, and updates this by $\cdot S_2{\vdash}\varphi$, resulting in a CS in which S_1 and S_2 disagree about φ.

I present a framework in which such destructive operations are not necessary. Update of C by a FPP A with possible SPPs B_1, … B_n is represented by $C+[A\ ;\ [B_1 \vee \ldots \vee B_n]]$, i.e. update by A followed by an invitation to the other participant for one of the updates B_1, … B_n.

For example, assertive update of φ by S_1 is modeled as $C+[\cdot S_1 \vdash \varphi\ ;\ [\cdot\varphi \vee \cdot S_2 \vdash \neg\varphi]] = C'$, which consists of the illocutionary act $S_1 \vdash \varphi$ followed by either acceptance of φ, or by the other speaker S_2 committing to $\neg\varphi$. Assenting reactions, e.g. by *okay*, are modeled by denegation that S_2 commits to $\neg\varphi$, $C'+\sim S_2 \vdash \neg\varphi$, thus eliminating the branch of C' that contains $S_2 \vdash \neg\varphi$, and resulting in $C+[\cdot S_1 \vdash \varphi]+\cdot\varphi$. Confirming reactions, e.g. by *yes*, are modeled by the assertion of φ, $S_2 \vdash \varphi$, resulting in $C+[\cdot S_1 \vdash \varphi]+\cdot\varphi+[S_2 \vdash \varphi]$. Dissenting reactions, e.g. by *no*, are modeled by $S_2 \vdash \neg\varphi$, taking the second branch and resulting in $C+[\cdot S_1 \vdash \varphi]+[\cdot S_2 \vdash \neg\varphi]$, which records that S_1 and S_2 disagree, and precludes further update with φ. Notice that no undoing of the update + as in [13] or negotiating rules as in [12] are required. One possible reaction by S_1 after dissent by S_2 is to retract the claim $S_1 \vdash \varphi$, and admit to $\neg\varphi$. This can be achieved by non-monotonic update rules, retraction, $C^{+-}[S_1 \vdash \varphi] = \sqrt{C} \cup \{c\text{-}\{[S_1 \vdash \varphi]\} \mid c \in C\}$, which removes $S_1 \vdash \varphi$ from all continuations, and addition, $C^{++}[\neg\varphi] = \sqrt{C} \cup \{c \cup \{\neg\varphi\} \mid c \in C\}$, which adds φ to them.

Interrogative update by a questioner S_1 to an addressee S_2 is modeled by restricting the continuations of the input CS to certain addressee updates in which the addressee commits to one of the propositions that are congruent answers to the question. Again, we have to account for continuations in which the addressee excludes such commitments (e.g. because of lack of knowledge). This leads to the following analysis, illustrated here by an alternative question that asks whether φ or ψ holds: $C + [?[S_2 \vdash \varphi] \vee ?[S_2 \vdash \psi] \vee [\sim[S_2 \vdash \varphi] \,\&\, \sim[S_2 \vdash \psi]]$. The question is analyzed as requesting reactions by which S_2 asserts φ, or asserts ψ, or refrains from committing to either of these propositions, hence it just consists of the elicitation of SPPs.

I illustrate this general idea with two additional speech acts types, greetings and commands. With greetings like *Hi!* or vocative calls like *Mary!* the speaker recognizes and identifies a person as a participant, making this person the addressee, beyond other social aspects, cf. [15], [16]. Let us express this by the proposition 'x recognizes y (as participant)'. The essential effect of S_1 greeting/calling S_2 at C then is the update $C + \cdot$'S_1 recognizes S_2' (this is not an assertion but a performative update by which S_1 makes the proposition true). The expected reaction is that S_2 recognizes S_1, taking this into account as SPP we have $C + [\cdot$'S_1 recognizes S_2' ; ?'S_2 recognizes S_1'] (recall that updates with ? leave the root unchanged, which represents that the countergreeting is the reaction expected by S_2). Hence, greetings can be seen as eliciting a unique type of SPP, counter-greetings.

Commands can be analyzed as requests by the speaker to the addressee to perform a certain action, i.e. to make a certain proposition true, cf. [11], [17]. For example, the update of C with the command by S_1 to S_2, *Do the dishes!* can be modeled as $C + ?[$'S_2 will do the dishes'], i.e. S_1 requires a continuation that makes the proposition 'S_2 will do the dishes' true. (Notice that this is not the same as requiring an assertive commitment, as e.g. *Say that you will do the dishes*, as this asks for a commitment to the truth of a proposition). The preferred SPP is carrying out the action; the assertion *I will do the dishes.* acts as a guarantee that the action will be carried out. But we also have to account for refusals. As before, such non-preferred SPPs can be expressed by a disjunction, resulting in the analysis $C + ?[$'S_2 will do the dishes'] $\vee ?[$'S_2 excludes that S_2 will do the dishes']. The exclusion can be done in different ways, e.g. by S_2 committing to the negation of the proposition, $S_2 \vdash \neg$'S_2 will do the dishes'. The confirming reaction *okay*, similar as in the case of assertions, is a denegation of this exclusion.

In the talk I will discuss how the general approach presented here works for other speech acts. For example, exclamatives that express emotive or epistemic attitudes may evoke a request that the other speaker joins in in this attitude or explicitly expresses a different attitude. I also point out that the present approach follows recent interactional models of grammar, as e.g. [3], in incorporating the participants of the conversation into the model.

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“Czech” the Alternatives: A Probe Recognition Study of Focus and Word Order

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In addition to the literal meaning of their utterances, speakers can “package” the information provided in their utterances in different arrangements of information structure, emphasising some parts and presupposing others (Chafe, 1976). For the information structure category of focus, one of the most influential accounts is that of Rooth (1985; 1992), which sees focus as providing an additional level of meaning to the ordinary semantic interpretation of sentences (Krifka, 2008). This level consists of a set of propositions derived by replacing the focused element with its contextually appropriate alternatives of the same semantic type. Take the following example:

1) $[\text{Jane}]_{\text{Focus}}$ played the sonata.

Suppose that there are four individuals, Jane, Peter, Mary, and Fido the dog. According to the theory, the focus value of (1) would be the set of propositions such that {played(x, *the sonata*) | x ∈ E}, where E is the contextually-restricted set of individuals {Jane, Peter, Mary}, since the semantic type of the focused element *Jane* is <e>. While also of type <e>, Fido, being a dog, is contextually inappropriate, and cannot replace the focused element *Jane*, and thus is not a part of the restricted set of alternatives.

This account of focus has predictions for the online comprehension of language, namely that comprehenders ought to create representations of contextually appropriate focus alternatives to focused elements. The last decade of psycholinguistic research has confirmed this prediction (see Gotzner & Spalek, 2019, for an overview). It has been found that contrastive prosody activates a broad set of associations (Braun & Tagliapietra, 2010) and that following this initial activation, a selection mechanism leaves only those elements that could serve as plausible replacements for the focused element in the context (Fraundorf et al., 2013; Husband & Ferreira, 2016; Gotzner & Spalek, 2017).

While these results have already been replicated in several distinct languages (Yan & Calhoun, 2019, for Mandarin; Tjuka et al., 2020, for Vietnamese), most of the research in this area has worked with a small sample of Germanic languages, which use prosody to mark focus. Yet focus marking differs between languages and can be syntactic as well as prosodic (Zimmermann & Onea, 2011). Research on the processing of alternatives with syntactically induced focus has so far been missing. This leaves the possibility that the observed effects of focus are in fact only attributable to prosodic prominence, as predicted by information-theoretic and RSA models which see focus as a means of communication noise reduction (Bergen & Goodman, 2015).

In the current research, we aim to fill this gap in the literature by conducting a probe recognition experiment designed to test the representation of focus alternatives in the comprehension of Czech. Ever since the study of information structure by the Prague School, it has been claimed that in Czech, word order variation corresponds to differences in information structure (e.g. Mathesius, 1941). While prosody also marks focus in a similar fashion to Germanic languages (Groeben et al., 2017), Czech can use non-canonical word orders too, which is done by placing the focused element last (Junghanns, 2001). This is due to the last position being the default for the placement of sentential stress (Daneš, 1957). Czech speakers can therefore either move the stress to the focused element or the focused element into the position where it receives default sentential stress (Šimík & Wierzba, 2017). This combination of features makes Czech a good test-case for our question, since it could show that improved representation of alternatives can be induced in comprehenders solely by means of manipulating word order using written stimuli even in the absence of explicit prosody.

We ran a pre-registered web-based experiment (https://bit.ly/3ifHMZL), in which native Czech speakers (N = 180) saw sentences (30 items) presented in the rapid serial visual presentation mode (RSVP). The sentences were either subject-final or verb-final, encoding narrow focus on the subject (2) or on the verb (3) respectively:

2) Minulou sobotu sonátu zahrál [houslista]$_{Focus}$ [Subject-focus]
   Last Saturday sonata played violinist
   'Last Saturday, a/the [violinist]$_{Focus}$ the sonata.'
3) Minulou sobotu sonátu houslista [zahrál]$_{Focus}$. [Verb-focus]
   Last Saturday sonata violinist played
   'Last Saturday, a/the violinist [played]$_{Focus}$ the sonata.'

These sentences were followed by 2s of a blank screen, measured from the subject. Then, the participants saw a probe word and their task was to indicate as fast as possible whether the given word occurred anywhere in the preceding sentence. The probes were either plausible subject-alternatives capable of replacing the focused element (*pianist*), subject-associated nouns yet not appropriate for the context (*symphony*), or unrelated nouns (*curb*). This probe recognition task has been argued to tap into the representations constructed by comprehenders to model the discourse (Gernsbacher & Jescheniak, 1995). We predicted that if Czech comprehenders represent alternatives to focused subjects, there would be a difference in the reaction times of correctly rejecting the subject-alternative and subject-associated probes in the subject-focus condition only.

Numerically, the pattern of RTs was consistent with our predictions. However, our pre-registered frequentist analysis (Table 1) did not show the predicted interaction between focus status and the contrast between subject-alternative and subject-associated probes. We also ran a post-hoc subset analysis on the first half of experimental trials only. Here, the predicted interaction was significant. As can be seen in Figure 1, the pattern appears to be present only in the first half of trials. Given that our probes were always nouns, it is plausible that our participants learnt to disregard conditions with narrow verb focus as verbs were never probed. Further work is needed to explore these trial effects.

Our results provide preliminary evidence for Czech comprehenders representing alternatives to focused subjects. We suggest that word order manipulations alone are sufficient for comprehenders to interpret the subject as focused and to start building their representations of alternatives in their discourse model. Together with the results of Chromý and Vojvodić (2022), who found improved memory recall for focused constituents in Czech, our study points to the Roothian-inspired processing account of focus generalising to languages that more heavily rely on word order to mark focus. It also suggests that explicit prosody might not be needed for focus alternative activation. The lack of prosody, however, could be argued to be one of the reasons for our results being less clearly indicative of focus alternative representation. This stands in contrast to the predictions of information theoretic and RSA models that explain focus by appealing to prosodic prominence. While we aim to replicate these results on a larger sample due to the post-hoc nature of our analysis, they give us initial evidence that Czech comprehenders process focus analogously to the speakers of previously studied languages. Further work is necessary to establish how subsequent processes operate on these alternatives in cases where they are exposed to non-canonical word orders marking narrow subject focus. This research will ultimately have important implications for the long-standing theoretical debates concerning the nature of alternatives and their place in meaning (e.g. Chierchia, 2013; Gotzner & Romoli, 2022).

Figure 1: The means and SEMs of the RTs of correct rejections by block:

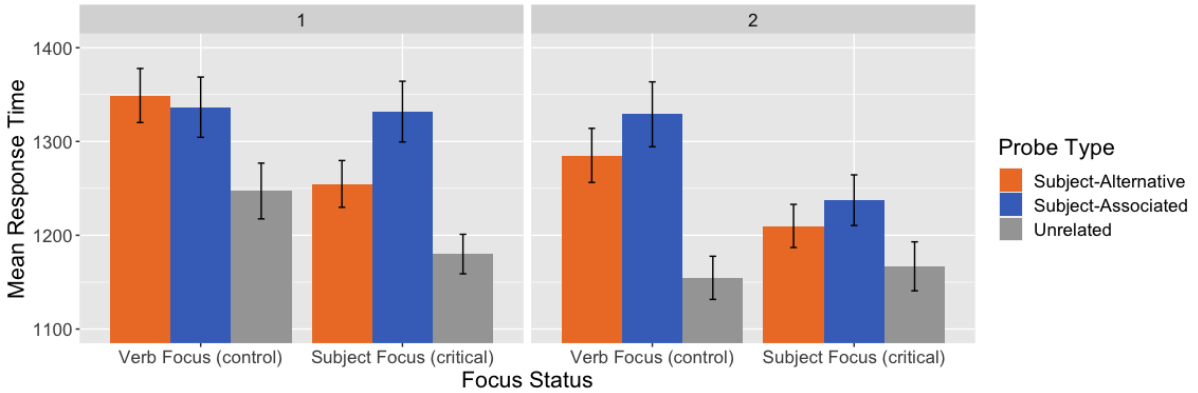

Table 1: Fixed effects of a linear mixed effects model predicting log-RTs (full dataset):

Fixed effects	Estimate	Std. error	df	t-value	p-value
(Intercept)	7.1000	0.0284	232.3	310.803	< 0.001***
Trial	-0.0028	0.0004	5037	-6.757	< 0.001***
Focus status (FS)	-0.0161	0.0037	432.7	-4.297	< 0.001***
Alternative (Al) v. Associated (As)	-0.0085	0.0051	191.1	1.656	0.0994
Al+As v. Unrelated (Un)	0.02674	0.0027	335.0	-10.042	< 0.001***
Al v. As : FS	0.00622	0.0047	220.2	1.328	0.1854
Al+As v. Un : FS	0.00326	0.0026	215.9	1.252	0.2120

Table 2: Fixed effects of a linear mixed effects model predicting log-RTs (block 1 only):

Fixed effects	Estimate	Std. error	df	t-value	p-value
(Intercept)	7.1140	0.0244	256.5	291.905	< 0.001***
Trial	-0.0045	0.0012	2413	-3.876	< 0.001***
Focus status (FS)	-0.0204	0.0054	249.2	-3.796	< 0.001***
Alternative (Al) v. Associated (As)	-0.0019	0.0070	179.5	-0.269	0.7880
Al+As v. Unrelated (Un)	-0.0260	0.0037	305.7	-6.934	< 0.001***
Al v. As : FS	-0.0152	0.0068	178.1	-2.235	0.0267 *
Al+As v. Un : FS	-0.0021	0.0037	467.6	-0.567	0.5710

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An unexceptional semantic treatment of exceptive-additive *besides*

Introduction Exceptive expressions like *except* and *but* are known to contribute a negative inference when they occur with universal quantifiers (as illustrated in (1)) and not to be compatible with existential quantifiers (as shown in (2)) (Keenan & Stavi 1986; Hoeksema 1987, 1990; von Fintel 1993, 1994). Similarly to exceptives, exceptive-additive expressions like *besides* contribute a negative inference in universal statements (as illustrated in (3)). They differ from exceptives in being able to occur with existentials and in those contexts they contribute a positive inference (shown in (4)) (von Fintel 1989, Sevi 2008, Vostrikova 2019).

(1) Every girl except/ but Ann came. (Inference: Ann did not come)
(2) *At least one/ exactly one/ some girl(s) girl except/ but Ann came.
(3) Every girl besides Ann came. (Inference: Ann did not come)
(4) At least one/ exactly one/ some girl(s) besides Ann came. (Inference: Ann came)

We propose a unified semantic treatment of exceptive-additives – the first for *at least n DP besides* at all – that derives their interaction with universal and existential quantifiers from independently motivated mechanisms. We extend the treatment of exceptives in terms of Exh (Hirsch 2016; Črnic 2021) to exceptive-additives and propose that the difference between the two types of constructions lies in the way the alternatives are constructed.

Every girl besides Ann came Building on von Fintel (1989, 1993, 1994), the core meaning of *besides* is domain subtraction. *Besides DP* forms a constituent with the restrictor of a quantificational DP (as in the LF in (5) for (3)). The DP following *besides* is interpreted as a set of individuals. This set is subtracted from the restrictor of a quantifier. *Besides* also introduces a presupposition that this set is a subset of the restrictor set.

(5) $[_{IP2}$ Exh $[_{IP1}$ every [girl [besides Ann]$_F$] came]]]
(6) $[\![\text{besides}]\!] = \lambda P_{<e,t>}.\lambda Q_{<e,t>}$: $P \subseteq Q$. Q-P

We follow Gajewski (2008) where the inferences of exceptive sentences come about in two steps: (i) domain subtraction (here by *besides*) and (ii) exhaustification (here by Exh as argued by Hirsch (2016) and Črnic (2021)). The semantics in (6) yields the meaning in (7) for the prejacent IP_1 of Exh. Assuming the girls are A, B, C, and D, all of B, C, and D came.

(7) $[\![IP_1]\!] = 1$ iff $\forall x[x \in \{(y: y \text{ is a girl}\} - \{A\}) \rightarrow x \text{ came}] \Leftrightarrow \forall x[x \in \{B, C, D\} \rightarrow x \text{ came}]$

We suggest that the only alternative for IP_1 made use of by Exh is *Every girl including Ann came* (or alternatively, following Katzir 2007, the structurally simpler *Every girl came*) with the semantics in (8). With this we essentially implement von Fintel's (1989, p.5) minimality condition approach to the semantics of *besides* in terms of Exh. (8) is strictly stronger than (7). So Exh negates it, giving (9): if we do not count Ann, every girl came; if we include her, there is a girl who did not come. Together this captures the inference that Ann did not come.

(8) $\text{Alt}(7) = {}^{\wedge}\forall x[x \in \{A, B, C, D\} \rightarrow x \text{ came}]$
(9) $[\![IP_2]\!] = 1$ iff $\forall x[x \in \{B, C, D\} \rightarrow x \text{ came}] \,\&\, \exists x[x \in \{A, B, C, D\} \,\&\, \neg x \text{ come}]$

Exactly one girl besides Ann came This approach is straightforwardly extendable to *exactly one* numerals, as in (10). The prejacent IP_1 saying that exactly one of B, C, or D came and its alternative saying that exactly one of A, B, C or D came are non-monotonic. With Exh asserting the former and negating the latter, the result in (11) follows. This entails that exactly one of B, C, and D came and that A came as well, correctly capturing the meaning of (10).

(10) $[_{IP2}$ Exh $[_{IP1}$ exactly one girl [besides Ann] came]]
(11) $[\![IP_2]\!] = 1$ iff $\exists!x[x \in \{B, C, D\} \,\&\, x \text{ came}] \,\&\, \neg\exists!x[x \in \{A, B, C, D\} \,\&\, x \text{ came}]$

The difference with exceptives The relevant difference between exceptives and exceptive-additives is the way the alternatives are constructed. For exceptives, we adopt Hirsch's (2016) proposal, where the alternatives are formed by substituting the DP following *but* by other DPs of at most equal complexity. This leads to a vacuous application of Exh in (2) with *but*, as none of the resulting alternatives are IE. Assuming that use of Exh should not be

vacuous (e.g. Fox & Katzir 2011, Chierchia 2013), the ungrammaticality is explained (Hirsch 2016). Alternatives replacing the DP are also available for *besides DP* (which is needed for cases when the DP is plural), but we omit the discussion of this for space reasons.

At least one girl besides Ann came Notice that simply replacing *exactly* with *at least* in (10) would give rise to an upward monotonic prejacent entailing its alternative. Exh would be vacuous and its application would be ruled out. Similar to *exactly n*, we suggest that upward monotonicity should be broken with an additional Exh operator. By itself, though, this would derive an unwanted exactly-reading for *at least n*. In order to guarantee the ignorance inference that the speaker is not sure whether *n* or more than *n* is the case, we assume that the epistemic operator K is embedded under two Exhs, as in (12). K contributes speaker certainty that the prejacent is true, represented semantically as $\Box_s$ (Meyer 2013, Buccola & Haida 2020). The first Exh makes use of alternatives contributed by the numeral, the second one of those to *besides Ann*, as indicated by indexation.

(12) $[_{IP3}\ \text{Exh}_2\ [_{IP2}\ \text{Exh}_1\ [_{IP1}\ \text{K}\ [\ \text{at least one}_1\ \text{girl}\ [\text{besides Ann}]_2\ \text{came}\ ]]]$

Thus IP_1 receives the meaning in (13) saying that the speaker is certain that at least one of B, C or D came. The alternatives to this are all strictly stronger as they only vary in the number *n* where $n > 1$. So all entail that the speaker is certain that at least two of B, C and D came. Exh_1 negates them yielding (14). ($\exists n$x means there are at least *n* x.)

(13) $[\![IP_1]\!] = 1$ iff $\Box_s(\exists 1x \in \{B, C, D\} : x \text{ came})$

(14) $[\![IP_2]\!] = 1$ iff $\Box_s(\exists 1x \in \{B, C, D\} : x \text{ came}) \ \&\ \neg \Box_s(\exists 2x \in \{B, C, D\} : x \text{ came})$

The alternatives to IP_2 in (15) have A included in the domains of the quantifiers. They do not stand in an entailment relation to IP_2, and thus get negated by Exh_2 yielding (16). The first conjunct in (14) entails the first one in (15), whereas the situation is the reverse regarding the second conjuncts. This means that the final meaning is as in (16) where underlining indicates that it is, effectively, the negation of the second disjunct in (15) that gets conjoined with the prejacent. This says that the speaker is certain that at least one of B, C and D came but is not certain that two or more of B, C and D came and is certain that at least two of A, B, C and D came. This can only be the case if the speaker is certain that A came, as desired.

(15) $\text{Alt}(14) = \{\widehat{\ }\Box_s(\exists 1x \in \{A, B, C, D\}: x \text{ came}) \ \&\ \neg \Box_s(\exists 2x \in \{A, B, C, D\}: x \text{ came}), \ldots\}$

(16) $[\![IP_3]\!] = 1$ iff $[\underline{\Box_s(\exists 1x \in \{B, C, D\}: x \text{ came}) \ \&\ \neg \Box_s(\exists 2x \in \{B, C, D\}: x \text{ came})}] \ \&$

$[\neg \Box_s (\exists 1x \in \{A, B, C, D\} : x \text{ came}) \vee \underline{\Box_s(\exists 2x \in \{A, B, C, D\} : x \text{ came})}]$

As mentioned above, Exh_2 in (12) would be vacuous if embedded under K. For the same reason Exh_2 could not occur between Exh_1 and K. If this proposal is on the right track, the interaction of *besides* with *at least n* numerals lends additional support to the assumption that speaker certainty can be represented in the grammar via an operator like K.

Some girl(s) besides Ann came For (4) with singular *some girl* both the LFs in (10) and (12) with *some* replacing *exactly* and *at least one*, respectively, would be options. Assuming that the plural *some girls besides Ann came* is an alternative, the first option would yield the inference that exactly one girl in addition to Ann came and the second one that the speaker is not certain whether more than one girl came in addition to Ann but is certain that at least one did. Notice that this requires *some girls* and *some girl* to be non-equivalent, possibly by implicature (e.g. Sauerland et al. 2005, Spector 2009, Zweig 2007, Ivlieva 2013). This can be extended to (4) with plural *some girls*. Assume for concreteness that *some* here has a meaning as in (17) where g(i) denotes the minimal cardinality n of X. Then the analysis from above can be extended assuming alternatives of the form *n + 1 girls came* are available. Again, depending on whether the LF is parallel to (10) or to (12) one would get an exact or an ignorance reading with the inference that (the speaker is certain that) Ann came.

(17) $[\![\text{some}_i]\!]^g = \lambda P_{<e,t>}.\lambda Q_{<e,t>}\ .\ \exists X[P(X) \ \&\ |X| \geq g(i) \ \&\ Q(X)]$

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Indefinite quantifiers vs disjunctions: the view from distributive readings

Andreea Nicolae, ZAS

Overview This abstract engages with a recent analysis by Denic & Chemla (2020) who argue that quantifier spreading in child language should be analyzed as distributive inferences. While such an analysis straightforwardly accounts for the child data involving q-spreading, they claim that a certain aspect of the adult data is left unexplained, namely the fact that adults do not obtain distributive inferences for EVERY[AN] sentences. This abstract offers a solution to this problem; this solution is in line with recent literature arguing that children have difficulties deriving inferences which involve alternatives obtained by lexical replacement.

Background There is a longstanding observation (Inhelder and Piaget 1964) that children tend to judge sentences like (1b) as unacceptable in a context where there are leftover apples. There have been many different accounts for this so-called q-spreading phenomenon (see Drozd et al. 2019 for an overview) but in this abstract we follow Denic & Chemla and assume that this interpretation can be derived in the grammar via a strengthening mechanism (e.g., via application of the exhaustifier operator *exh*) and that its derivation is similar in nature to the derivation of the FC inference for (1a) in that both appeal to domain alternatives.

(1) a. John can read an(y) article. **indef + FC**
   ⇝ John can read article 1, he can read article 2 and he can read article 3.
   b. Every girl took an apple. **indef + dist**
   ⇝ Every apple was taken by some girl.

In order to better understand the parallel, consider first the pair of sentences in (2). Building on the intuition in Kratzer & Shimoyama 2002, deriving the FC inference of (2a) involves the domain alternatives of the disjunction, namely the individual disjuncts; depending on the specific implementation the implicature might arise either via innocent exclusion after recursive exhaustification (Fox 2007) or via innocent inclusion (Bar-Lev & Fox 2017, 2020). Similarly, the distributive interpretation of (2b) can be obtained by appealing to the domain alternatives of the sentence. Crnic et al. 2015, Bar-Lev & Fox 2020 and Denic & Chemla 2020 outline distinct routes to this inference, all of which however rely on the domain alternatives.

(2) a. John can read article 1, article 2 or article 3. **disj + FC**
   ⇝ John can read article 1, he can read article 2 and he can read article 3.
   b. Every girl took apple 1, apple 2, apple 3 or apple 4. **disj + dist**
   ⇝ Every apple was taken by some girl.

Returning now to the sentences in (1), the idea is that both the FC inference of (1a) and the distributive or q-spreading inference of (1b) come about via exhaustification wrt to the domain alternatives since indefinites introduce existential quantification over a contextually supplied domain. Specifically, both the indefinite *an apple* and the disjunction *apple 1, . . . or apple 4* are assumed to denote an existential quantifier over the same 4-membered set, meaning that the domain alternatives of the indefinite will be identical to those of the disjunction.

Crucially, child language data support this analysis since kids derive both FC inferences and q-spreading, for both indefinites and disjunctions (Aravind et al. 2017, ao). The problem, however, arises once we turn to adults who do not appear to conform with the pattern. While adults derive FC inferences for both disjunctions and indefinites, (1a) and (2a), they only derive distributive inferences for EVERY[OR] sentences, (2b), and not for EVERY[AN] sentences, (1b), which they judge as true even when there are apples left untouched. Why are distributive inferences with indefinites absent in adults? What happens over the course of language acquisition that leads to the loss of these inferences?

Of importance is the observation that while children are adult-like in their ability to draw FC in-

ferences, they have difficulties deriving scalar implicatures associated with the weak quantifier *some* and the disjunction. What distinguishes one set of implicatures from another is the type of alternatives invoked; FC inferences make reference to domain alternatives whereas scalar implicatures make reference to lexical alternatives. The conclusion that has been drawn from this contrast is that children have difficulties with lexical alternatives, be it due to an issue with lexical retrieval or difficulty establishing which alternatives are relevant (Skordos & Papafragou 2016); this has been dubbed the Alternative-based approach and has been at the heart of many debates in recent work on language acquisition (Chierchia et al. (2001); Gualmini et al. (2001); Barner & Bachrach (2010); Barner et al. (2011); Tieu et al. (2016); Singh et al. (2016), ao.).

Proposal In order to test for the existence of a distributive inference, the context must be such that there are more apples than girls. Looking at examples (1b)/(2b), in order to get a distributive inference in a situation where there are more apples than there are girls, multiple apples would have to be taken by at least one girl. The intuition we will pursue here is that adults, but not children, derive the inference that *Every girl took exactly one apple* in (1b) which is at odds with the distributive inference in a situation where there are more apples than there are girls.

Formalizing this intuition, we propose that adults derive the strengthened meaning that *Every girl took one and only one apple* by negating a stronger alternative obtained by replacing the indefinite *an apple* with the plural *(multiple) apples* in (3a); we remain agnostic here as to how the plural alternative is represented as well as to how the inference is derived, be it via local or global *exh*. It suffices to note that in the presence of this alternative, the domain alternatives in (3b) are no longer excludable (or includable, depending on what theory of *exh* one adopts). What is crucial to the analysis is the fact that children do not appear to be calculating this additional scalar inference and we argue that this is by virtue of not having access to the alternative in (3a); without this alternative they can rely only on the alternatives in (3b), allowing them to derive the distributive inference in (1b).

(3) Every girl λx [x took an apple].
   a. lex-alt: x took multiple apples.
   b. dom-alt: x took A1, A2 or A3. . . .

(4) Every girl λx [x took A1, A2, A3, or A4].
   a. lex-alt: x took A1, A2, A3, and A4.
   b. dom-alt: x took A1, A2 or A3. . . .

As for the contrast between (1b) and (2b), note that the relevant lexical alternative to (2b) is one involving the conjunction, (4a). The corresponding implicature that *Every girl took some and not all of the apples*, is consistent with the distributive inference that each apple was taken by some girl, obtained by appealing to the alternatives in (4b). The crucial difference between the indefinite and the disjunction then is the corresponding scalar alternative and its ability to interfere with the distributive inference in a scenario where there are more apples than girls.

Conclusion We have shown that an approach to q-spreading as distributive inferences can be maintained even in the face of seemingly contradictory data from adults. The solution relies on the observation that children have problems deriving certain types of inferences; in the case at hand, an implicature that appeals to a plural alternative. Note that another possible inference for the EVERY[AN] sentence, besides EVERY¬[MULTIPLE], is the weaker ¬EVERY(MULTIPLE) alternative, which crucially is compatible with the distributive inference. If we want to maintain this analysis of q-spreading as distributivity, coupled with the solution presented above, we need to assume that SI derived by adults is the stronger EVERY¬[MULTIPLE] one rather than ¬EVERY(MULTIPLE). There is no empirical data testing for this difference but note that Bill et al. 2021 tested adults' interpretation of EVERY[SOME] sentences and found that the weaker ¬EVERY(ALL) SI is more likely to be derived than the stronger ¬SOME(ALL) SI. More work is required on the possibly different implicatures of AN and SOME sentences.

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Parallel and Differential Contributions from Language and Image in the Discourse Representation of Picturebooks

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Children's picturebooks combine language and images, and have narrative structure that involves temporal progression and identification of discourse referents across language and images. This presentation formulates discourse representations (DRSs) for common discourse structures in picturebooks, with emphasis on works where the language and the images have a different informational status. Previous super-semantic research on multimodal materials uses a unitary DRS with a semantics phrased in primitives of worlds, individuals, and viewpoints [11, 12]. We apply this to the common pattern in picturebooks of *co-temporal juxtaposition*, where language and image on the same page describe temporally overlapping events and states. In example (1) from *Gaspard and Lisa's Christmas Surprise*, there are discourse referents for two characters, two objects, two events, a time t, and a viewpoint v from which the world looks like the picture at t. The discourse referents for individuals coming from language and image are identified at the bottom in the DRS (1b). Co-temporal juxtaposition is captured with a condition that the witness time for the picture is contained in the temporal projection of the sum of the events introduced in the language (1c). Discourse referents for depicted individuals are introduced with bounding boxes a_i following [1].

(1) a. [we put the raincoat in the machine and dumped in some yellow dye] p_1 (in Figure 1)

b. $$\left[\begin{array}{l|l} U\ x\ y\ z & \mathbf{machine}(x) \wedge \mathbf{raincoat}(y) \wedge \mathbf{dye}(z) \wedge \mathbf{yellow}(z) \wedge \\ t\ v\ e_1\ e_2 & e_1{:}\mathbf{putIn}(U,y,x) \wedge e_2{:}\mathbf{dumpIn}(U,z,x) \wedge \\ u'\ u''\ x'\ y'\ z' & t,v{:}p_1[a_1{:}u'\ a_2{:}u''\ a_3{:}x'\ a_4{:}y'\ a_5{:}z'] \wedge \\ & U = u' \oplus u'' \wedge x = x' \wedge y = y' \wedge z = z'] \end{array}\right]$$

c. $t \sqsubset \tau(e_1 \oplus e_2)$

Rosie's Walk describes and illustrates a hen Rosie walking around a farmyard. Exceptionlessly, language and image on a page or two-page spread are in co-temporal juxtaposition. The language mentions no threatening events, while images show a fox stalking the hen (see p_3 in Figure 1). *The Trouble with Mom* is a story with a first-person narrator whose mother is a witch. The language and images are consistent (because there are worlds satisfied by both), but the language is wryly understated by comparison with the images, see (2). *Lily Takes a Walk* describes a girl Lily and dog Nicky taking a walk through a city. The language is prosaic, but the images veer into hallucination, with Nicky seeing monsters, see (3).

(2) She doesn't get along with the other parents. p_2 [picture with parents turned into frogs]

(3) She stops by the bridge to say goodnight to the gulls and the ducks on the canal. p_4 [picture with dinosaur in Nicky's field of view.]

Previous research on such picturebooks points out the difference in informational status between language and image [13]. Taking account of this in a super-semantic framework requires separate access to pictorial content and linguistic content of the DRS. This is accomplished with parallel definitions of pictorial possible-worlds content $[\![d]\!]^P$, linguistic content $[\![d]\!]^L$ and combined content $[\![d]\!]$ of a unitary DRS d for a picturebook. These are defined straightforwardly in recursive definitions of DRS contents, with the first two substituting *True* for DRS components of the opposite kind. For instance $[\![\mathbf{machine}(x)]\!]^P \triangleq \mathit{True}$ (trivializing the condition derived from language in the pictorial content) and $[\![t,v{:}p]\!]^L \triangleq \mathit{True}$ (trivializing the content of picture p in the linguistic content of the DRS). In *Rosie's Walk*, the distinction between the weaker $[\![d_{\text{Rosie}}]\!]^L$ (with no entailments about a fox) and stronger $[\![d_{\text{Rosie}}]\!]$ creates an effect comparable to overt understatement uses of R-implicature, as in (4) [8].

(4) A and B touring a blatantly banal real estate development
A: The architecture is not distinguished.

Gaspard and *Trouble* are first person narratives in the language part. Altschuler and Maier [2] gave a development in discourse representation theory where first person intradiegetic narration is represented with embedding, like attitudinal embedding. They applied this to the problem of "imaginative resistance" in linguistic narratives, where passages (as analyzed by Altschuler and Maier) of embedded narration intrude into neutral third-person narratives. We apply this DRS framework to the representation of picturebooks with first-person linguistic narration. The DRS for (1) has embedding under an attitude predicate of material coming from the language, with Lisa (the white dog) as the attitude-holder. We do not postulate a narrator for the pictorial part. Instead the pictures directly constrain base worlds. Separated linguistic and pictorial contents are defined with an extension of the method above.

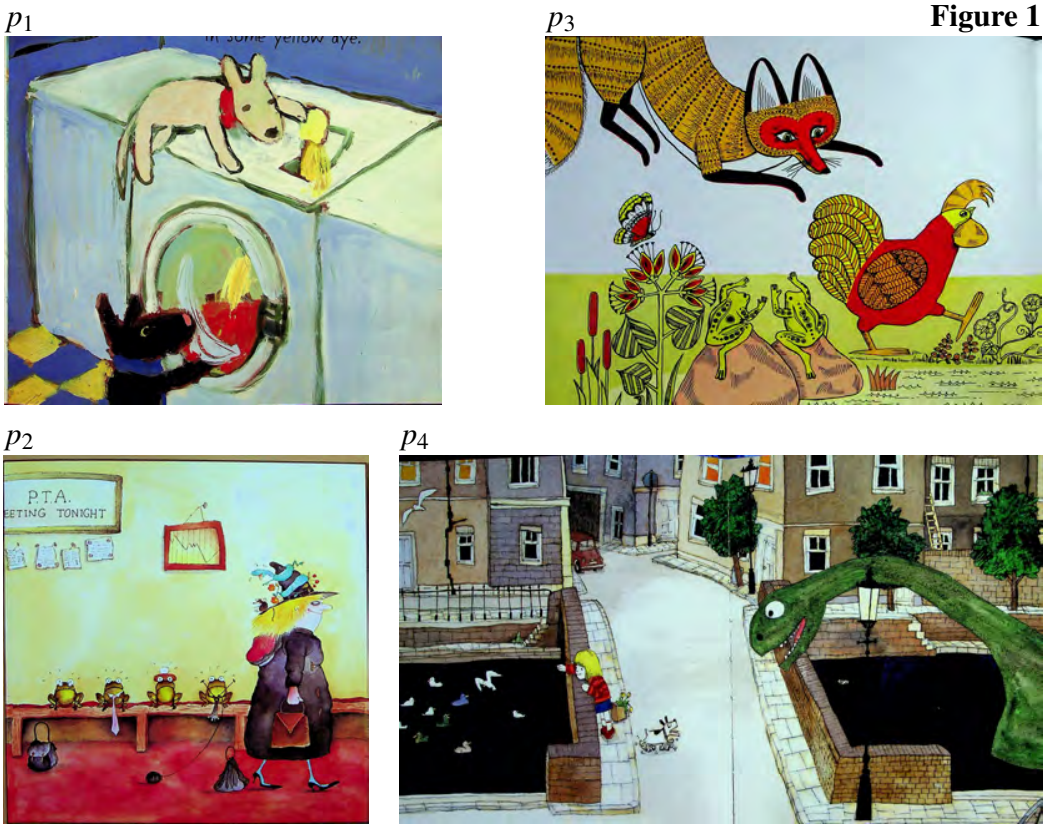
In principle *Rosie* and *Lily* could be analyzed in a parallel way, with the part of the DRS corresponding to the language embedded, with Rosie or Lisa as experiencer, and references to them in the language analyzed using de-se from de-re. This analyzes the language as free indirect discourse [5]. This is perhaps somewhat plausible for *Lily*, where the definite descriptions in (3) can be understood as conveying familiarity for Lily. We don't think it is plausible for *Rosie*, and advocate the analysis above with separable language and picture contents, in the absence of embedding in the DRS. The pictorial part of *Lily* includes information that is understood as hallucinated by the dog Nicky. For this a splitting analysis following [3] is applied, with part of the picture constraining Nicky's perceptual attitude worlds, and other parts constraining the base world.

In *Rosie* there is an implication that Rosie was not aware of the fox. This is an implicature, because it can be cancelled with an extension of the story where Rosie turns around and says "Run away you silly fox, I saw you the whole time." It is analyzed as a quantity implicature. The conjoined content $[\![d_{\text{Rosie}}]\!]$ has the salient entailment that a fox is stalking Rosie, thereby making salient the possibility q that Rosie is aware of that. The conjoined content is weaker than $[\![d_{\text{Rosie}}]\!] \wedge q$, leading to a quantity implicure $\neg[[\![d_{\text{Rosie}}]\!] \wedge q]$, leading to $\neg q$ by Boolean reasoning. This is in principle independent of the fact that the language content does not entail the information about the fox. We think that empirically a wordless version of *Rosie* has the same implicature. But the weak $[\![d_{\text{Rosie}}]\!]^L$ makes the weak information (without the fox) salient, facilitating the implicature.

Discourse relations apart from co-temporal juxtaposition for language and image on a page are common. In *generic elaboration*, the language is a generic, for which the image provides a positive instance. (2) has this relation. There is an overwhelming tendency for discourse referents coming from the language being resolved in the image on the same page. But this is a default: *Gaspard* has a case with a novel dref from the language being resolved in the image two pages later.

Superlinguistic research to date on pictorial narratives has employed Greenberg's possible worlds semantics for pictures, which uses geometric projection to define semantic values [6]. The issue of how to apply the approach to stylized images such as those in picturebooks has been largely ignored. This is a problem because the theorization here assumes contents of pictures as relations between worlds and viewpoints. The last part of the presentation attempts to remedy this by considering the effect of pictures on agents, both human agents and AI agents. Roughly, the content of a stylized picture p is the relation between worlds w and viewpoints v that holds if exposure to p puts most agents into a state similar to the state resulting from exposure to w from v.

Figure 1



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In ages is not an NPI, which explains its distribution

Manfred Sailer & Suzanne Smith

The expression *in ages(/years/months/weeks/days)* can only occur in sentences that contain an NPI-licensing operator, such as (1). Therefore, it is generally considered an NPI (von Bergen & von Bergen, 1993; Krifka, 1995; Hoeksema, 2006; Iatridou & Zeijlstra, 2021).

(1) I haven't seen you in ages.

We will reassess previous observations on *in ages* in the light of extensive corpus data. We will show that it has a paradoxical distribution for an NPI: it occurs in some weak NPI-licensing contexts, but is excluded from some strong NPI-licensing contexts. We will show that this distribution is natural, once the expression is **not** considered an NPI anymore.

Corpus distribution We extracted quantitative and qualitative profiles for *in ages*, based first on google searches that were tailor-made for individual NPI-licensing contexts, and then by extracting all occurrences of the expression from the *Corpus of Contemporary American English* (COCA, Davies 2008–2017). We categorized the occurrences according to the NPI licensing classes used for the *Collection of Distributionally Idiosyncratic Items* (www.english-linguistics.de/codii/ Trawiński et al. 2008) as adapted to English in Sailer & Csipak (2011). Taking the google results and the analysis of the 501 COCA occurrences together, we found *in ages* with clausemate verbal negation, neg-words, neg-phrases with the determiner *no*, but also with the superlative, comparative, *hardly/barely*, and *only*-constituents. Other NPI licensing context were missing, such as the complement clause of Neg Rasing and adversative predicates, *without* clauses (all of which are natural contexts for strong NPIs), as well as the restrictor of a universal quantifier, *if* clauses, and questions – in which strong NPIs but not weak NPIs are restricted to particular readings, see Heim (1984).

The occurrence with *hardly* strongly suggests that *in ages* is a weak NPI, but its absence from Neg Raising and adversative contexts is highly unexpected for any NPI. Nonetheless, this absence is also reported in the corpus profile in Hoeksema (2006) – though Gajewski (2007, 293) claims that the expression can occur in Neg Raising.

To study individual licensing contexts in detail, we also used the web corpus enTenTen20 (via sketchengine.co.uk/). We noted that there is no single co-occurrence of *ever* and *in ages* in our data, and that *never* never occurs as a neg-word with *in ages*.

Previous approaches Krifka (1995) treats *in weeks* like *in a million years*, only looking at their occurrence in future tense sentences, see his example in (2). He assumes that if someone knows something at time t, they will (still) know it at any time later than t. Consequently, if someone doesn't know something at a time far in the future, they don't know it at any earlier time either. However, our COCA data did not contain a single occurrence of *in ages* in the future. Rather, it consistently occurs in the present perfect or the pluperfect. Krifka's reasoning cannot easily just be reversed for past-time occurrences.

(2) We will not know the truth in weeks/in a million years. (Krifka, 1995)

Iatridou & Zeijlstra (2021) provide a detailed analysis of *in years* in sentences in the perfect. The perfect states that the described event culminated within a timespan with endpoints. The right boundary of that timespan is set by tense, the left boundary by the temporal adverbial (*ages/years/...*). A scalar theory works in this set-up: if the event culminates in a sub-timespan, it also culminated in the overall timespan. However, if it does not culminate in the overall timespan, it does not culminate in any of its sub-timespans. Iatridou & Zeijlstra also assume that the NPI sets a maximal left boundary. This captures the observation that an event of the same type has culminated earlier than the indicated timespan.

Hoeksema (2006) and Iatridou & Zeijlstra (2021) observe that *in ages* does not occur in sentences with *few/at most*. They conclude from this that it is a strong NPI. However, our data show that the expression occurs with weak licensers such as *barely/hardly*, as in (3).

(3) I've hardly played story mode in ages. (www)

Finally, Hoeksema (2006) notes that the absence of *in ages* from contexts licensing strong NPIs does not follow from any NPI theory that he considered in his paper.

The non-NPI-hood of *in ages* According to the truth conditions in Iatridou & Zeijlstra (2021, 102), *in ages* is not an NPI in the sense that it must be in the scope of an NPI-licenser. Rather it sets the left boundary of the perfect timespan and triggers all shorter timespans as alternatives. This means that it adds timespan alternatives to the perfect timespan and the requirement that what is said about the asserted timespan must hold for all alternatives. In other words, the effect of *in ages* is that the expression in the scope of the quantifier over the perfect timespan must be downward entailing. This condition is sufficient to explain the distribution of *in ages*.

Let us first provide additional support for this condition: There are no attested examples in our corpora of *in ages* with a modal that is interpreted in the scope of negation (see Iatridou & Zeijlstra 2013 for a list of candidate modals), but with scope over the perfect timespan. Similarly, whenever *in ages* occurs in a clause with a *because* adverbial clause, the adverbial clause takes wide scope over the negation, rather than intermediate scope between the negation and the perfect timespan (in whatever relative order), see (4).

(4) I love pepperoni, which I haven't eaten in ages because I was a vegetarian until two months ago. (COCA) (✓*because* $>\exists\tau>\neg$; *$\neg>$ *because* $>\exists\tau$; *$\exists\tau>$ *because* $>\neg$)

We can now show that this scope property accounts for the seemingly paradoxical distribution of *in ages*. First, it is sufficient to block licensing by *few/at most*: In (5), the downward-entailing quantifier contributed by the subject takes scope over the quantifier over the perfect time span τ. The scope of this quantifier is, then, not a downward entailing expression.

(5) * Few patients have had a seizure in years. (Iatridou & Zeijlstra, 2021, 98)

putatively: 'There are few patients x such that there is a time span τ, ranging from now to years back, such that x had a seizure in τ.'

Matters are different for *barely/hardly*, as in (3), which is paraphrased in (6), where *hardly* is interpreted inside the scope of the time span quantifier.

(6) 'There is a timespan τ, raning from now ages back, such that hardly have I played story mode in τ.'

Second, the scope condition captures the non-occurrence of *in ages* under a licenser in a matrix clause. Horn (1978, 182) already noticed that, even though a matrix negation can be interpreted inside an embedded clause in Neg Raising, it takes scope over all material within the embedded clause. Consequently, any matrix clause negation, even if interpreted inside a complement clause, takes scope over an embedded timespan quantifier.

While we find co-occurrences of *in ages* with *no/anyone* or *no/anything*, it does not co-occur with *(n)ever*. This follows, again, from the scope constraint introduced above. Neg-words or *any*-NPIs can only co-occur with *in ages* if they take narrow scope with respect to the timespan quantifier, see (7)

(7) Across the entire planet, nothing had changed in ages. (COCA)

'There is a timespan τ, ranging from now ages back, such that nothing has changed in τ.'

In the case of *(n)ever*, a quantification over a time variable is introduced. This sets a higher topic time which would have to include the perfect time span, as sketched in (8)

(8) * Alex has never smoked in ages. (constructed)

putative: 'There is no timespan τ' such that τ' includes a timespan τ, ranging from now ages back, such that Alex has smoked in τ.'

Conclusion We showed that the distribution of *in ages* only seems to be paradoxical when the expression is looked at as an NPI. If we view it as imposing downward-entailingness on the expression in the scope of the timespan that it limits, all mysteries vanish. In fact, the analysis proposed in Iatridou & Zeijlstra (2021) does exactly what is needed for this. However, the authors phrase their approach in terms of an NPI-hood of the expression and do not look at the full range of NPI-licensing contexts which are relevant for the complete picture of *in ages*.

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The modal perfective and actuality entailments

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0. Overview. I propose a modal theory of perfective aspect: ⌜PFV($P(e)$)⌝ states that the P-event e holds at exactly the same time intervals of all worlds in a historical modal base. This new meaning entails the standard meaning of the perfective (with some empirical advantages). In addition, in combination with plausible assumptions, it predicts actuality entailments for circumstantial and ability modals.

1. Background. Sentences involving root modals combining with perfective aspect generate AEs, i.e. entailments to the effect that the prejacent is true. Here are some examples from French:

(1) Jeanne pu prendre le train, # mais elle ne le prit pas. (Hacquard 2009)
Jane can-past-PFV take the train, but she not take-past-PFV

Some relevant facts: (i) AEs are never produced by epistemic modals; (ii) AEs are reversed under negation (*Jeanne ne pu pas prendre le train* entails that Jeanne did not take the train); (iii) AEs are generated by both possibility and necessity modals; (iv) AEs are generated by both modal auxiliaries and modal adjectives (Homer 2019), though not by all modal expressions.

2. Previous accounts. Several accounts of AEs have been proposed (Hacquard 2009, Kratzer 2011, Homer 2019 a.o.). For reasons of space, I focus on Hacquard. Hacquard suggests that: (i) perfective aspect (henceforth, PFV) introduces an existential quantifier over events; (ii) PFV moves above root modals, hence it is evaluated at the actual world, giving rise to the AE. (2) has the meaning in (3).

(2) Jeanne pu prendre le train.

(3) $[\![(2)]\!]^{w,f}$ = there is an event e in w such that, in some world w' compatible with the modal base $f(w)$, e is an event of Jane taking the train

A few issues with the account have been noticed (see Hacquard 2020, Homer 2019 a.o.). I point out a further problem. Hacquard predicts that modals have no event variable, and that aspect quantifies over the event described by the VP in the prejacent clause. But this prediction seems incorrect. Consider:[1]

(4) **Scenario**: Messi has an on-and-off injury; it was unclear that he'd manage to play in tonight's game. But he made it. We are now 20 minutes into the game.

(a) # Messi a joué. Il est en train de jouer très bien.
Messi perf-play. He progr-play great

(b) Messi a pu jouer. Il est en train de jouer très bien.
Messi perf-can play. He progr-play great

(4)-a is infelicitous: PFV requires that the relevant playing event is concluded, which contradicts the second sentence. Conversely, (4)-b is felicitous. This suggests that PFV quantifies over an event variable linked to the modal and not the prejacent, contrary to Hacquard's predictions.

3. Background model: branching time. I assume a standard branching time framework (see Condoravdi 2002, Werner 2006 a.o.). The modal base of root modals, HIST, maps a world w and a time i to a set of wolds $\text{HIST}_{w,i}$, which includes all and only worlds that share a history with w up to i. In addition, I assume the following 'plenitude' principle:

> **Wide Openness.** For any proposition p, world w, and time t: if p is logically compatible with the history of w up to t, then, for some $w' \in \text{HIST}_{w,t}$, p is true at w'.

[1] I'm assuming that, in the sentences in (4), the perfect realizes PFV. The data can be replicated, in more complex scenarios, with sentences the unambiguously realize PFV, like sentences involving *passé simple*.

4. Semantics for perfective aspect. PFV has a modal meaning and works roughly as a 'settledness' operator. $\ulcorner \textsc{pfv}(P(e))(i) \urcorner$ states that there is a P-event e overlapping with a reference time i, and presupposes that, for all worlds in $\textsc{hist}_{w,i}$, for all times at those worlds, e takes place exactly at the same worlds and times. (For short: $\textsc{hist}_{w,i}$ is *uniform* wrt e.) E.g., (6) has the truth conditions in (7).

(5) $[\![\textsc{pfv}]\!]^w = \lambda i.\lambda P_{\langle v,t\rangle}.\ \exists e:\ \forall w', w'' \in \textsc{hist}_{w,i} \forall i'\ (P(e) \text{ in } w' \wedge \textsc{at}(e, i', w')) \leftrightarrow (P(e) \text{ in } w'' \wedge \textsc{at}(e, i', w''))).$
$P(e) = 1\ \wedge\ \tau(e) \sqcap i\ \wedge\ e$ is in w

(6) [past [PFV [Jane take the train]]]

(7) $[\![(6)]\!]^w$ is true iff $\exists i' < i_c$:$\exists e$ *in* w: e is an event of Jane taking the train and e overlaps with i';
presupposes: $\forall w', w'' \in \textsc{hist}_{w,i'}$, Jane takes the train at the same time intervals in w' and w''.

Notice: the presupposition of PFV and Wide Openness force the event of Jane taking the train to be entirely in the past wrt c. The presupposition requires that all worlds in $\textsc{hist}_{w,t}$ agree on the interval in which Jane takes the train. Via Wide Openness, if a world w' is compatible with the history of w at t_c, w' is in $\textsc{hist}_{w,t_c}$. The two conditions are jointly satisfied (without making (6) always false) only if the event of Jane taking the train is fully included in some time interval before t_c.

5. Comparison. On the standard account (see Kratzer 1998 a.o.), PFV states that an event is fully included in a reference time (see (8)). Notice facts (i) and (ii) about (5) *vis-á-vis* (8).

(8) $[\![\textsc{pfv}]\!]^w = \lambda i.\lambda P_{\langle v,t\rangle}.\ \exists e:\ P(e) = 1\ \wedge\ \tau(e) \sqsubseteq i\ \wedge\ e$ is in w

(i) The meaning in (5) entails the one in (8) (proof in appendix). The intuitive reason: given Wide Openness, a modal base $\textsc{hist}_{w,i}$ is uniform with respect to an event e (i.e., e occurs at the same time intervals and worlds in $\textsc{hist}_{w,i}$) only if e is in the past wrt i. See Fig. 1 for an example.

(ii) (5), but not (8), predicts that $\ulcorner \neg \textsc{pfv}(P(e))(i) \urcorner$ requires not only that $\tau(e)$ not be contained in i, but that there be no overlap at all between $\tau(e)$ and i. This prediction is correct. *Hier, Jeanne ne prit pas le train* entails that none of yesterday has any overlap with a Jane-taking-train event.

6. Deriving AEs for ability/circumstantial modals. Consider (2), whose LF is in (9).

(2) Jeanne pu prendre le train.

(9) [past [PFV [pouvoir [ASP [Jeanne prendre le train]]]]]

I treat modals as stative predicates (Homer 2019) with their own event argument. (The prejacent may include a second aspect, represented as 'ASP' in (9).) I also assume that circumstantial and ability modals have a historical modal base, indexed to the time $\tau(e)$ of the event argument (simplified entry in (10)). Given the meanings in (5) and (10), (2) gets the truth conditions in (11):

(10) $[\![\text{pouvoir}]\!]^w = \lambda p_{\langle w,t\rangle}.\ \lambda e.\ e$ is a state such that $\exists w' \in \textsc{hist}_{w,\tau(e)}$ such that $p(w') = 1$

(11) $[\![(2)]\!]^w$ is true iff $\exists i' < i_c$:$\exists e$ *in* w: e is a state of Jeanne having the possibility of taking the train and e overlaps with i';
presupposes: $\forall w', w'' \in \textsc{hist}_{w,i'}$, Jeanne has the possibility of taking the train at the same time intervals in w' and w''

(11) entails that Jeanne has taken the train (proof in appendix; see Fig. 2 for an example). The intuitive reason: (2) presupposes that the set $\textsc{hist}_{w,i'}$ is uniform wrt the state *Jeanne can take the train*. Because of Wide Openness, this requires that there is an event of Jeanne taking the train before i'.

7. Further predictions. The account immediately predicts (i) that AEs do not arise for non-root modals, since the latter exploit a non-historical modal base; (ii) that under negation, AEs are reversed.

Appendix: figures and proofs

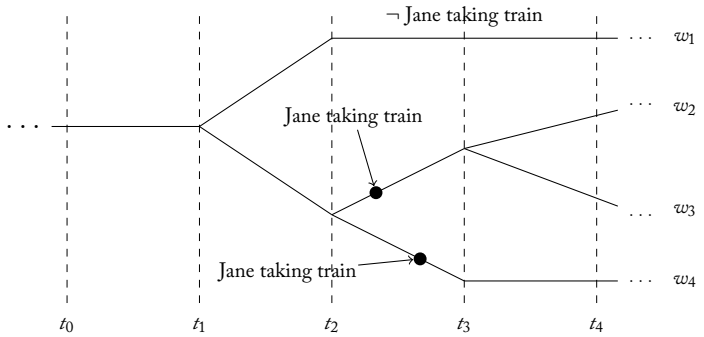

Figure 1. The uniformity presupposition of PFV requires that the relevant event be in the past. For illustration: HIST_{t_3,w_2} is uniform wrt Jane taking the train (the event of Jane taking the train took place at the same times in all worlds in HIST_{t_3,w_2}), but HIST_{t_2,w_2} is not.

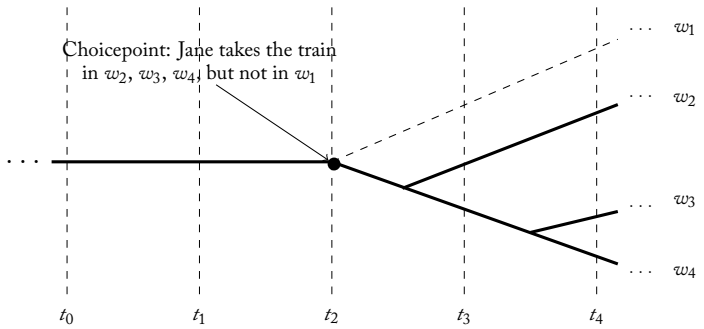

Figure 2. The uniformity presupposition of PFV requires that, when PFV combines with a modal with a historical modal base, the event described by the prejacent is in the past. For illustration: the state *Jeanne can take the train* holds throughout the time intervals that are drawn in thick, continuous lines. Hence HIST_{t_3,w_3} is uniform wrt the state of Jane having the possibility of taking the train, but HIST_{t_1,w_3} is not.

Fact 1. The meaning for PFV in (5) entails the meaning in (8).

Proof. For *reductio*, suppose that $\tau(e)$ is not included in i, and in particular that $\tau(e)$ stretches beyond i. Via Wide Openness there are two histories w' and w'' that pass through $\text{HIST}_{w,i}$ and such that they differ with respect to e; in particular, e will end earlier in one than in the other. But, via the semantics of PFV, we know that, for all worlds in $\text{HIST}_{w,i}$, e has exactly the same duration. Contradiction.

Fact 2. The truth conditions in (11) Strawson-entail (von Fintel 1999) that Jane has taken the train.

Proof. Suppose, for *reductio*, that at the relevant past time i Jane had the possibility of taking the train, but ended up not taking the train, and that at the same time (2) is true. Then there is a time interval posterior to i, i', such that, for some world w', *Jane can take the train* is false at w' and i' (since at that point Jane has already not taken the train) and for some world w'' *Jane can take the train* is true at w'' and i'. But, by the meaning of the perfective, *Jane can take the train* holds at exactly the same time intervals throughout the worlds in $\text{HIST}_{w,i}$. Contradiction.

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Clause-internal coherence: A look at deverbal adjectives

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Intro. Theories of discourse structure propose a set of coherence relations (e.g. Explanation, Result, Background) to define how a discourse coheres: a discourse is coherent iff its *discourse units* are related by at least one coherence relation. While there is no consensus on the definition of 'discourse unit,' Afantenos et al. (2012) propose that an 'elementary discourse unit' (EDU) is a description of a single eventuality. Most previous research has focused on clausal EDUs and especially on cross-sentential relations between them. However, sentence-internal coherence relations are also possible, and recent work has investigated subordinate clauses, e.g., relative clauses (Rohde et al., 2011; Jasinskaja, 2016; Hunter & Asher, 2016; Göbel, 2019; Hoek et al., 2021) and complements of attitude verbs (Hunter, 2016; Cumming, 2021). Furthermore, there is no requirement that an EDU must be associated with a verb or verb phrase; Asher & Lascarides (1998) argue that the presuppositional properties of nominals enable them to serve as EDU cores. Similarly, it has been observed that, e.g., *A widow stuck a knife into her husband* exemplifies a clause-internal coherence relation (Anscombe, 1979), as does *A jogger was hit by a car* (cf. *A teacher was hit by a car*) (Hobbs, 2010).

Beyond such documentation, little work on clause-internal coherence exists (Kehler, 2019). We know little about the typology of such relations, how they are triggered, or how they compare to cross-clausal relations. In this paper, we build an experimentally-grounded foundation for clause-internal coherence research. Via two offline interpretation studies in English, we investigate the potential of deverbal adjectives within DPs to trigger clause-internal coherence relations. Our findings suggest that: (i) speakers may use deverbal adjectives and verbs to establish coherence relations between eventualities described within a clause, (ii) a given adjective-verb pair may participate in more coherence relations than its verb-verb counterpart, and (iii) causal inferences pattern differently in clause-internal vs. cross-sentential contexts. This raises novel questions with important implications for the analysis of deverbal adjectives and the application of coherence relations to explain clause-internal phenomena.

Experiment 1. We used a Likert scale task to gauge the strength of the clause-internal inferences speakers draw between deverbal adjectives and verbs, compared to cross-sentential verb-verb inferences. We crossed NUMBER OF SENTENCES {1, 2} with COHERENCE RELATION {EXPLANATION, RESULT} for 40 experimental items (1). We chose causal relations because naïve speakers' interpretations of them are fairly straightforward to probe (Singer et al., 1992).

(1) **a.** 2-SENT EXPLANATION: A child was drenched. She got hit by a water balloon.
b. 1-SENT EXPLANATION: A drenched child got hit by a water balloon.
c. 2-SENT RESULT: A water balloon hit a child. She was drenched.
d. 1-SENT RESULT: A water balloon hit a drenched child.

Participants (N=65) were recruited via Prolific. On a 1-4 scale, they responded to questions of the form, "How likely do you think it is that the child was drenched because she got hit by the water balloon?" Ratings are plotted in Fig. 1. Results were analyzed in R with maximal Bayesian cumulative link mixed effects models (Bürkner, 2017; Carpenter et al., 2017):

(2) **Main effect**: 2-SENT conditions were rated more likely than 1-SENT (2.34, [1.79,2.95]). Further, this held for EXPLANATION (1.80, [1.21,2.42]) and RESULT (2.95, [2.32,3.59]).

(3) **Interaction**: Ratings were higher for 2-SENT RESULT than 2-SENT EXPLANATION, but the opposite in 1-SENT conditions (1.17, [0.67, 1.68]), e.g. participants found a causal interpretation more likely in (1c) than in (1a), but less likely in (1d) than in (1b).

Ratings were fairly high across all experimental conditions, but there was no experiment-wide ceiling effect—ratings for 42 fillers that were balanced for causal link strength (strong, medium, weak) spanned the full scale (Fig.1). While these results suggest that deverbal adjectives may trigger clause-internal coherence inferences, they cannot be fully interpreted based solely on this study. For instance, participants may have rated 1-SENT stimuli lower than 2-SENT stimuli because they did not infer a coherence relation at all, or because they inferred a

Background, which holds when a described state is understood to be the background for (and therefore temporally overlaps) the described event (Lascarides & Asher, 1993).

Expt 2. We used a forced-choice task (N=64) to determine whether Background is a significant competitor for Explanation/Result interpretations in clause-internal contexts. Using the same design and stimuli as Expt. 1, we asked participants to choose between a causal interpretation and a (non-causal) Background interpretation, e.g., for (1b) we asked participants to choose the most accurate description of what happened: *The child was drenched **{because vs. when}** she got hit by the water balloon*. We hypothesized that this competition contributed to (2), predicting that the Background interpretation would be chosen at a higher rate for 1-SENT vs. 2-SENT conditions. Maximal Bayesian mixed effects linear regression models showed that our prediction was borne out (Fig.3), with an interaction analogous to Expt. 1:

(4) **Main effect**: Background was chosen at a higher rate for 1-SENT conditions than 2-SENT conditions (3.52, [2.60,4.59]). The difference held for both EXPLANATION (2.92, [1.93,4.08]) and RESULT (4.56, [3.37,6.13]).

(5) **Interaction**: Background was chosen at a lower rate for 2-SENT RESULT than 2-SENT EXPLANATION, but the reverse held in 1-SENT conditions (1.69, [0.57,2.94]).

Discussion. (4) suggests that there can be a many-to-one correspondence between the relations inferred in deverbal adjective-verb contexts and verb-verb contexts. Moreover, (5) points to an intriguing clausal asymmetry. Both have important theoretical implications, especially given a well-established interpretative default: infer a causal link between adjacent eventualities when possible (e.g., Graesser et al., 1994, Zwaan et al., 1995, Schlöder, 2018). In the paper, we consider whether Asher & Lascarides' (1998) SDRT analysis of presupposition may explain (4)-(5). We hypothesize that, e.g., *drenched* presupposes an event that leads to the described state, and this content constitutes an EDU π_1. π_1 is related via a coherence relation R to π_2, which characterizes the assertion of the utterance in which *drenched* appears. In (1b), the causal default is respected and R is pragmatically enriched to an Explanation. In (1d), the causal default leads to Result, which, unlike Background, is coordinating (Asher & Lascarides, 2003). Assuming that presuppositions require subordinating relations (Asher et al, 2007), we explain why the causal default is blocked here. Assuming further that, in (1c), coherence is established by each verb contributing to an EDU, the causal default isn't overridden.

Conclusion. While our SDRT analysis may explain the differences between RESULT conditions in both experiments, it doesn't explain why the same differences held between EXPLANATION conditions. In the paper, we consider other semantic and pragmatic factors (e.g., stativity) that may help account for this. We also consider ways of experimentally testing our analysis, which crucially assumes that the presuppositional properties of deverbal adjectives enable them to serve as EDU cores, even from within DPs. If this is the case, we would expect deverbal adjective-verb relations to affect discourse structure in the same way as verb-verb relations. For instance, the adjectival EDU in a clause-internal Explanation, as the first argument in a subordinating relation, should be accessible to subsequent discourse units, as in *A drenched child got hit by a water balloon. There was even water inside her shoes.* Informal intuition polling suggests that this prediction is borne out. Moreover, we expect that a (non-presuppositional) analog to (1d) which allows a clause-internal Result, i.e., the first argument in a coordinating relation, would shift the Right Frontier and be inaccessible to subsequent discourse units, as in *A water balloon hit a drenched child. It caught her square between the shoulders.* Our polling suggests that a verb-verb Elaboration is available here, but crucially only if the verb-adjective relation in the first sentence is interpreted as a Background, not a Result. Our current studies suggest that the inferences drawn between deverbal adjectives and verbs are at least comparable to canonical coherence relations. Our ongoing work further tests whether non-propositional expressions can truly contribute to EDUs, or trigger inferences that, while resembling those in discourse, have sources independent of coherence.

For all figures: □ = 2-SENT, △ = 1-SENT.

Figure 1. *Mean ratings for items and fillers, Expt. 1. Error bars show a 95% confidence interval.*

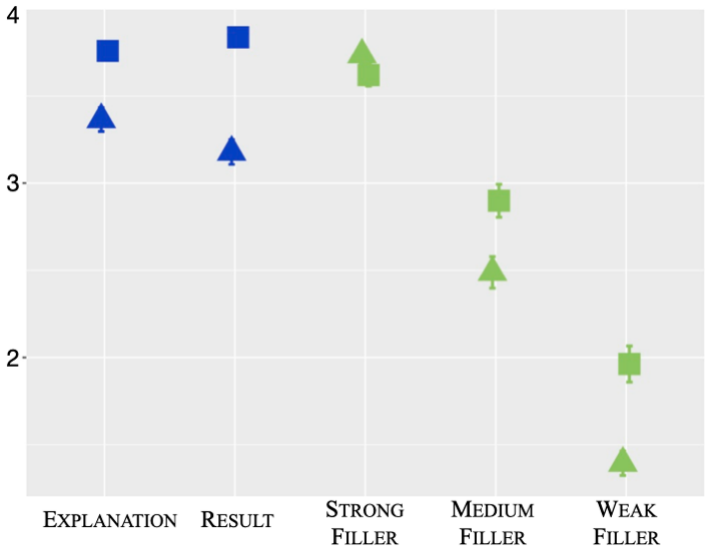
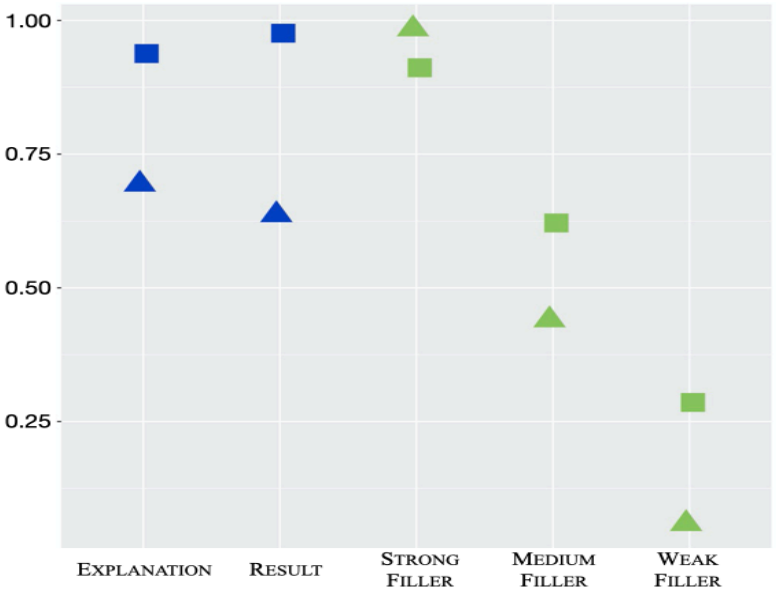


Figure 2. *Proportion of causal interpretation choices for items and fillers, Expt. 2.*



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English does too have a [REVERSE,+] polarity particle!

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Introduction. Farkas & Bruce (2010) and Roelofsen & Farkas (2015) argue that response particles across languages (such as English *yes* and *no*) realize two types of polarity features: absolute and relative. A particle realizing one of the absolute polarity features [+] or [-] presupposes that the polarity of its prejacent is positive or negative, respectively, while a particle realizing one of the relative polarity features [AGREE] or [REVERSE] presupposes that its prejacent has the same or opposite polarity, respectively, as its antecedent. English *yes* can realize [AGREE] or [+], while *no* can realize [REVERSE] or [-], as evidenced by the fact that *yes* occurs in [AGREE,+], [AGREE,-], and [REVERSE,+] responses, while *no* occurs in [REVERSE,-], [REVERSE,-], and [REVERSE,+] responses.

(1) Peter passed the test.
   a. Yes, he did. / #No, he did. [AGREE,+]
   b. #Yes, he didn't. / No, he didn't. [REVERSE,-]

(2) Peter didn't pass the test.
   a. Yes, he didn't. / No, he didn't. [AGREE,-]
   b. Yes, he DID. / No, he DID. [REVERSE,+]

Although some languages are known to have polarity particles that realize [REVERSE, +], such as French *si* and German *doch*, it is assumed by Farkas & Bruce, Roelofsen & Farkas, and others that English does not. I argue that English does in fact have such a particle, namely *too*, but that *too* is sensitive not only to (relative or absolute) polarity features, but also to what the speaker assumes about the addressee's discourse commitments. To account for this, I propose a new pair of polarity features, [CONFIRM] and [REFUTE], such that refutational *too* can be analyzed as realizing [REVERSE,+,REFUTE]. I speculate that further cross-linguistic research may uncover polarity particles that realize other combinations of [COFIRM] or [REFUTE] with the absolute and relative polarity features.

***Too* as a polarity particle.** The use of *too* that functions as a polarity particle is the one that Schwenter & Waltereit (2010) call the refutational use. An example is shown in (3).

(3) Context: A and B live together. B is supposed to feed their dog, Fido, every day. One day, A comes home and sees Fido lying next to his empty bowl, looking hungry.
   a. A: You didn't feed Fido. B: I did too! [REVERSE,+]

Although refutational *too*, unlike *yes* and *no*, never occurs sentence-initially and cannot form a complete response by itself, it nonetheless exhibits what I take to be the crucial properties of a polarity particle: anaphoric reference to a salient antecedent sentence (which is either identical to or the negation of the prejacent) and sensitivity to the polarity of that antecedent. When an appropriate antecedent is not salient in the discourse context, refutational *too* is infelicitous. Thus (4-a) sounds odd in (4) since *You didn't feed Fido* is merely implicated by A rather than asserted.

(4) A: Fido looks hungry. B: #I did too feed him!

The polarity sensitivity of refutational *too* is evidenced by the fact that it can occur in a wide range of [REVERSE,+] responses, but never in [AGREE] or [-] responses. Some examples of *too* in responses to sentence forms other than falling declaratives can be seen in (5-a), a response to a negated rising declarative, and in (5-b), a response to a low negation polar question. The infelicity of *too* in [AGREE] and [-] responses is demonstrated by the data in (6) and (7).

(5) Context: Same as (3).
   a. A: You didn't feed Fido? B: I did too! [REVERSE,+]
   b. A: Did you not feed Fido (yet)? B: I did too! [REVERSE,+]

(6) a. A: You fed Fido! B: I did (#too)! [AGREE, +]
   b. A: Did you feed Fido? B: I did (#too)! [AGREE, +]

(7) a. A: You didn't feed Fido. B: I didn't (#too)! [AGREE, -]

b. A: You fed Fido. B: #I didn't too! [REVERSE,-]

Sensitivity to projected discourse commitments. What distinguishes *too* from other polarity particles cross-linguistically is its sensitivity to the addressee's discourse commitments. Unlike *yes* and *no*, refutational *too* can only be used by a speaker who believes the addressee to be at least weakly committed to the negation of the prejacent. Evidence for this is the fact that *too* is felicitous in the responses in (5), but not in (8-a) and (8-b). All of these are [REVERSE,+] responses, but *too* is not appropriate in (8) because there is no disagreement between the interlocutors: The teacher in (8-a) cannot be taken to believe that Paris is not the capital of France, and speaker A in (8-b) has expressed a belief that it is indeed raining.

(8) a. Student: Marseille is the capital of France.
Teacher: Paris isn't the capital of France?
Student: #It is too! [REVERSE,+]

b. A: If we take a walk, we better bring our umbrellas.
B: I don't need my umbrella.
A: Is it not raining?
B: #It is too! (I just don't care if I get wet.) [REVERSE,+]

In contrast, the rising declarative in (5-a) does convey that A is inclined to believe that B did not feed Fido, as does the negated question in (5-b) (at least when uttered with an appropriately accusatory tone). Refutational *too* seems to be felicitous in these contexts because A clearly has an epistemic bias against *too*'s prejacent despite not having fully committed to its negation.

These kinds of tentative commitments, when incurred by speakers of rising declaratives, have been modeled by Gunlogson (2008) as "contingent commitments" and by Malamud & Stephenson (2015) as "projected discourse commitments" of the speaker, which I take to be propositions that a speaker believes but wishes to delay commitment to. Farkas & Roelofsen (2017) argue on the basis of rising declaratives in contexts like (8-a), contra Malamud & Stephenson, that the addition of a proposition to the speaker's projected discourse commitments cannot be the conventional effect of rising declaratives (see also Rudin 2018). Nonetheless, to account for the distribution of refutational *too*, I assume that interlocutors' projected discourse commitments are indeed tracked on the conversational scoreboard, but that an interlocutor's projected discourse commitments do not arise solely from the conventional effects of particular sentence forms, instead often being inferred pragmatically (cf. Gunlogson 2008). For example, B infers that *B did not feed Fido* is a projected discourse commitment of A in (5-b), but this cannot be a conventional effect of low negation polar questions since *It is not raining* cannot be taken to be a projected discourse commitment of A after A utters *Is it not raining?* in (8-b).

I propose that refutational *too* realizes the feature [REVERSE,+,REFUTE], where REFUTE is a new feature that presupposes that the negation of its prejacent is a member of the set $DC_{Ad}*$ of the addressee's projected discourse commitments, as shown in (9).

(9) Presupposition of [REFUTE]: $\neg[\![\text{prejacent}]\!] \in DC_{Ad}*$

Typological considerations. The existence of a [REFUTE] feature opens the possibility of an opposing feature, [CONFIRM], which presupposes that its prejacent (rather than its negation) is a member of the addressee's projected discourse commitments. If [REFUTE] and [CONFIRM] are indeed features that polarity particles can realize, then languages should be expected to have particles that realize [REFUTE] or [CONFIRM] in different combinations with the absolute and relative polarity features. This prediction seems to be at least partially borne out in English, as some English speakers have a polarity particle realizing [REVERSE,-,REFUTE]: refutational *either*.

(10) A: It's the Callaway house. Nobody's lived there for years. It's haunted.
B: It isn't **either**! (Corpus of Contemporary American English)

Further cross-linguistic research can reveal if the full typology includes particles that realize other feature combinations such as $[\text{AGREE}, +, \text{CONFIRM}]$ or $[\text{AGREE}, -, \text{CONFIRM}]$.

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"Quasi-ECM" constructions in Modern Greek: Evidence for semantic lowering

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Overview: We argue that in Modern Greek (MG) proleptic constructions, unlike in other languages described so far, can have *de dicto* readings, even though the accusative object is base-generated in the matrix clause. We provide an analysis in terms of semantic lowering.

"Quasi-ECM": MG displays certain attitudinal constructions where an attitude verb may take an accusative object (henceforth ACC DP) followed by a subjunctive CP. Kotzoglou and Papangeli (2007) dub this the "quasi-ECM" construction. Hadjivassiliou et al. (2000); Kotzoglou and Papangeli (2007); Kotzoglou (2013, 2017) provide considerable evidence that the ACC DP is base-generated in the matrix clause. Firstly, PPs may modify the matrix verb even when occurring to the right of the ACC DP. This contrasts with an ordinary attitude report, where the embedded subject is nominative (NOM). Secondly, when the ACC DP is an NPI, it is not licensed by the negation in the CP; but when the NPI is in NOM it is licensed. Thirdly, the ACC DP may occur even when the NOM subject of the embedded clause is expressed with an overt anaphor. This shows that the ACC DP and the lower NOM do not occupy the same position. Finally, we argue that the anaphor linked to the ACC DP can be inside a coordinated DP island:

(1) *Maria's dad usually does not like to meet her boyfriends, but yesterday he wanted Maria and her boyfriend to come for dinner some day. Today, he changed his mind again.*

O	babas	tis	ithele	ti	Maria$_i$/*i	Maria$_i$	chtes	na
The	dad	hers	want-PST	the-ACC	Maria-ACC/*the-NOM	Maria-NOM	yesterday	to

erthi	afti$_i$	kai	to	aghori	tis	ghia	faghito	mia	mera.
come-subj	she-NOM	and	the-NOM	boy-NOM	hers	for	food	one	day.

'Her dad wanted yesterday Maria and her boyfriend to come for dinner one day.'

The DP is good in the ACC, but not in the NOM, suggesting that in the former case there is no movement. Thus, this pattern is an instance of prolepsis, as studied for instance in German (Salzmann, 2017), Tiwa (Dawson and Deal, 2019), and Nez Perce (Deal, 2018).

Semantic interpretations of the DP: Unlike proleptic constructions in other languages described so far, we argue that in quasi-ECM in MG the DP may be read *de dicto*. In addition to this, it may also have a *de re* or a *third* reading. Thus, even though it is base-generated in the matrix clause, both low-scope and opaque readings are allowed. We see a *de dicto* reading in (2). This attitude report does not commit the speaker to the existence of green dogs; in Fodor's terms (Fodor, 1970), the embedded subject is read opaquely.

(2) *Little Petros is in kindergarten and he and his friends believe that green dogs exist. One day they are talking about green dogs and Petros bets that exactly three of them will show up at his party.*

O	Petrakis	theli	akrivos	tris	prasinus	skilus	na	erthun
The	Petros-dim	want-PRS	exactly	three-PL	green-ACC-PL	dog-ACC-PL	to	come-subj-pl

sto	parti.
in-the	party.

'Little Petros wants exactly three green dogs to come to the party.'

Alongside *de dicto* readings, classic *de re* readings (found in prolepsis in all languages that semanticists have studied to date) are also permitted, as shown in the following:

(3) *Maria is on an apostolic mission in Egypt during the pandemic, while working remotely. She started this job during COVID and thus never got to meet her colleagues, John and Chris. It just so happens that John and Chris are also in Egypt and Maria has met them without knowing they are her colleagues. She tried to convince them to become catholic.*

I Maria theli kathe tis sinadhelfo na ine katholikos.
The Maria want-PRS every-ACC her-GEN colleague-ACC to be-subj catholic.
'Maria wants every colleague of hers to be catholic. '

Finally, just like Dawson and Deal (2019) describe for Tiwa, quasi-ECM in MG may have low-scope, third readings. However, this is not surprising for MG, given that it has both *de dicto* and *de re* readings and that the third reading is a combination of the two. Consider the following:

(4) *Katerina is attending a 100m race at the Olympics. Three contestants are talking to each other before the start. Unbeknownst to Karetina, these three contestants are my friends. She thinks to herself that she wants one of those three people to win the race, because they seem motivated.*

I Katerina theli enan filo mu na kerdhisi ton aghona.
The Katerina want-PRS a-ACC friend-ACC mine-GEN to win-subj the-ACC race-ACC.
'Katerina wants a friend of mine to win the race.'

This is an instance of a third reading, because the quantifier has low-scope but it's restrictor is interpreted transparently. She does not have any beliefs about friends of mine, but these people she has a belief about have to exist in the evaluation world.

Analysis: We propose that the three different readings are derived by different entries of the verb, each time changing the type of the second argument. Following Dawson and Deal (2019), we account for *de re* and *third* readings by positing a binding operator in the CP binding a type *e* or *GQ-type* pronoun respectively. Here is how the *de re* reading of (3) is derived:

(5) a. λw [every colleague$_w$-ACC] 2 [Maria wants$_w$ t_2 [OP$_1$ $\lambda w'$ pro$_1$ be-catholic$_{w'}$]

b. $[\![$ want$_1$ $]\!] = \lambda P_{\langle e,st\rangle}.\lambda y.\lambda x.\lambda w.\forall w' \in BUL(x,w) : P(y)(w') = 1$

c. $[\![3]\!]$ = $\lambda w.\forall x$ [x is a colleague of Maria in w & $\forall w' \in BUL$(Maria, w): x is catholic in w']

The *third* reading in (4) is derived in a similar way, by having the pronoun be of *GQ-type*:

(6) a. λw Katerina [a friend-of-mine$_w$-ACC] wants$_w$ [OP$_1$ $\lambda w'$ pro$_1$ win$_{w'}$ the race$_{w'}$]

b. $[\![$ want$_2$ $]\!] = \lambda P_{\langle e,st\rangle}.\lambda Q_{\langle et,t\rangle}.\lambda x.\lambda w.\forall w' \in BUL(x,w) : Q(\lambda y.P(y)(w')) = 1$

c. $[\![4]\!]$ = $\lambda w.\forall w' \in BUL$(Katerina, w): $\exists x$ [x is a friend of mine in w & x wins the race in w']

How about the *de dicto* reading in (2)? Here is where MG differs from Tiwa. We argue that the pronoun has an *intensional-GQ-type* $\langle s, ett\rangle$ in *de dicto* cases:

(7) a. λw Petros [$\lambda w''$ exactly 3 green dogs$_{w''}$-ACC] wants$_w$ [OP$_1$ $\lambda w'$ pro$_1$ come$_{w'}$ to the party$_{w'}$]

b. $[\![$ want$_3$ $]\!] = \lambda P_{\langle e,st\rangle}.\lambda Q_{\langle s,\langle et,t\rangle\rangle}.\lambda x.\lambda w.\forall w' \in BUL(x,w) : [[Q(w')](\lambda y.P(y)(w'))] = 1$

c. $[\![2]\!]$ = $\lambda w.\forall w' \in BUL$(Petros, w) : $\exists 3x$ [x are green dogs in w' & x come to the party in w']

In this analysis, the attitude verb is inherently relational. MG completes the cross-linguistic typology, while showing us that, contrary to what has been described up to now, proleptic constructions may have *de dicto* readings. Based on German and Nez Perce, the entry in (5b) is needed; based on Tiwa, (6b) is also necessary to account for third readings; and we argued that based on MG, (7b) is needed to derive *de dicto* readings. This suggests an implicational typology, predicting

that if a language has the higher-typed entry in (7b), it has the other two as well. (7b) implies (6b), which in turn implies (5b).

Conclusions: MG shows that proleptic constructions are not always interpreted transparently. The availability of *de dicto* readings demonstrates that quantifiers in certain constructions may be interpreted lower than their base-generation site, both w.r.t. scope and w.r.t. the world argument of their NP restrictor. This suggests that, contrary to Tiwa, semantic reconstruction mechanisms are not restricted to $\langle et, t\rangle$ traces in MG, but may also apply to their $\langle s, ett\rangle$ intensions.

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Modeling the context dependence of artifact noun interpretation

"Probably almost every predicate is both vague and context-dependent to some degree" [5], and artifact nouns (*vehicle*, *electronic device*) are no exception: they admit of edge cases (e.g. is a skateboard a *vehicle*?), and interpreter judgments regarding category membership change across contexts [7, 4, 11]. Whereas the context dependence of single dimensional gradable adjectives (*tall*, *open*) has been extensively modeled in the computational pragmatics literature [10, 8, 9], modeling the context dependence of artifact noun category boundary judgments is an under-developed enterprise – in part because the effect of context on interpretation is under-explored empirically. Prescriptive rules that express requirements/prohibitions and feature artifact nouns (e.g. *No vehicles allowed in the town square*) provide a novel, tractable domain for exploring effects of context on category boundary judgments. Taking inspiration from a normative debate surrounding the proper role of context (in particular, legislative intent) in legal interpretation (see [1] for review), we show experimentally that contextual information as to a rule's purpose systematically modulates interpreter beliefs about the category boundaries of artifact nouns contained within the rule. We support this claim with a quantitative evaluation of probabilistic pragmatic models of linguistic interpretation couched within the Rational Speech Act (RSA) framework [2]. Our analysis constitutes a first computational pragmatic foray into a vast and complex corner of linguistic vagueness.

Experiment: Participants (n = 200; 188 after exclusions) completed 12 trials, each of which featured a researcher-designed rule containing an artifact noun (7 prohibitions, e.g. *No electronic devices are allowed in the theater*; 5 requirements, e.g. *Shoes must be worn in the courtyard*). For each rule, participants were assigned to 1 of 4 possible 'goal' conditions, which differed as to the relevant authority's motivation for issuing the rule. In the 'None' goal condition, participants read the rule with no preceding context; the other 3 conditions identified the authority's goal in passing the rule. For example, for the *No electronic devices...* rule, one 'goal' condition featured the following text above the rule: "The managers of a theater are concerned that certain objects, when brought into the theater, emit light that could distract audience members and performers." Each rule was associated with a unique set of 12 images kept constant across goal conditions. For prohibitions, participants were instructed to select each item that violates the rule; for requirements, the instruction was to select each item that satisfies the rule. The experiment was preregistered.

Norming studies: N1: Objects were normed for category membership (n = 40, see Fig. 2). **N2:** Beliefs about policy goal-relevant features of experimental items (e.g. whether or not an object emits light or could be used to record live performances) were elicited in a feature attribution norming study (n = 120, see Fig. 3). **N3, N4:** Rules (n = 40) and goals (n = 120) were normed for plausibility. **N5:** Images (12 per rule; 144 total) were normed for nameability (n = 40).

Results: Object selection rates across goal conditions for 1 of the 12 rules are shown in Fig. 1. Mean selection rates correlate with category membership norms (Fig. 4), but a priori category membership cannot explain any observed variance between the goal conditions (Fig. 5).

Computational model: An RSA model that incorporates contextual information as to the policy goal outperforms a baseline model that does not (see also, e.g., [6] for a similar model applied to metaphor). At the base of the recursion, the 'literal' L_0 interpreter observes a rule and a goal g and infers whether an object o is in the scope of the rule's prohibition/requirement. f^g returns normed feature attribution values from **N2**, and $P_{NOM}(o)$ – the prior probability that o is in the scope of the rule (by virtue of belonging to the category denoted by noun *NOM*) – is defined via **N1**.

Model details and example: (terms marked with * are excluded from the baseline $L_{\text{0-no-goal}}$)

- $L_0(o \text{ prohibited} | \text{"No elec. devices..."}, g) \propto f^g(o)^* \cdot P_{\text{elec.-device}}(o)$
- $L_0(o \text{ not prohibited} | \text{"No elec. devices..."}, g) \propto \big(1 - f^g(o)\big)^* \cdot \big(1 - P_{\text{elec.-device}}(o)\big)$

- $S_1(u|g,s) \propto exp\big((\alpha \cdot log(L_0(s|g,u)) - C(u))\big)$
  (where $u \in \{$"No elec. devices...", $silence\}$; $s \in \{o$ prohibited, o not prohibited$\}$)
- $L_1(o$ prohibited|"No elec. devices...", $g) \propto S_1$("No elec. devices..."$|g, o$ prohibited$)\cdot P_{\text{elec.-device}}(o)$

The probability with which an object is selected in the experiment is equal to the L_1 posterior probability that the object is inferred to be prohibited (required) given observation of the rule and goal. The L_1 model has high overall predictive accuracy (Fig. 6) and outperforms a baseline $L_{1-\text{no-goal}}$ model (Bayes Factor > 18), which is identical save for the fact that its literal interpreter $L_{0\text{-no-goal}}$ encodes prior beliefs from $P_{NOM}(o)$ but not information about goal-relevant object features. The predictive advantage of the goal-sensitive L_1 is driven by that model's ability to predict selection behavior for objects that showed the highest variance in selection rate across goal conditions. (For top 1/3 highest-variance objects, R^2 = 0.56 for L_1, vs. R^2 = 0.36 for $L_{1-\text{no-goal}}$). This suggests that contextual information as to a rule's goal modulates rule interpretation.

Discussion: How can we be sure that goal information actually modulated beliefs about the category boundaries of the artifact nouns of interest? On one alternative analysis, policy goal information merely suggests that the rule extends to a particular restricted domain of entities (but the extension of, e.g., *electronic device* is invariant across goal contexts). Domain restriction (DR) almost certainly played some part in participants' interpretation of the rules. (For example, a pacemaker could have been considered an *electronic device* in the context of interpretation but nonetheless an exception to the rule itself). However, an analysis that focuses entirely on DR is in tension with the observation that the decision-making contexts tested in the experiment would permit explicit meta-linguistic commentary as to what 'counts as' a member of the category denoted by the noun as in (1), similar to contexts where thresholds of comparison for vague gradable adjectives may be explicitly negotiated as in (2). This suggests that in (1) and (2), resolving uncertainty as to what 'counts as' an *N* is relevant for satisfying the speaker's wishes. The first sentence in (3), however, intuitively involves DR to a discourse-salient set of bottles (ones bought for the party), but what 'counts as' a bottle of Heineken is not up for negotiation (nor is it negotiated via the DR):

(1) No electronic devices are allowed in the theater. (By the way: for our purposes, a flashlight [counts / doesn't count] as an electronic device.)

(2) Get me a long ladder. (By the way: for our purposes, 20 feet counts as long for a ladder.)

(3) (Planning a party): Put all the bottles of Heineken in the fridge. (# By the way: for our purposes, something only counts as a bottle of Heineken if we bought it for our party.)

Conclusion: We have provided a novel quantitative analysis of how one contextual feature – policy goal – affects nominal category boundary judgments in the interpretation of rules. Of course, our RSA analysis of artifact noun interpretation is an incomplete account, insofar as it relies on, e.g., empirically-elicited prior beliefs regarding the status of objects as nominal category members. Understanding the source of such beliefs, including, e.g., the role of prototypes in the determination of nominal category extensions [5], is itself an open and longstanding question for natural language semantics. Empirical studies such as ours contribute to that conversation by shedding light on the division of labor between context and conventional meaning in nominal interpretation.

Moreover, our data highlight the need for semantic theories of nominal expressions that advance the analytic aims of the compositional Fregean program while engaging meaningfully with the vagueness and context sensitivity of these expressions [12]. The standard proposal treats expressions such as *vehicle* as (intensionalized) <e,t>-type functions, but this idealization obscures the fact that interpreter beliefs about nominal category membership are both graded and context sensitive. Data such as ours underscore the need for a formal semantic analysis whereby the <e,t>-type function denoted by an artifact noun depends on the valuation of free semantic parameters. (See, e.g., [3] for a proposal towards this end).

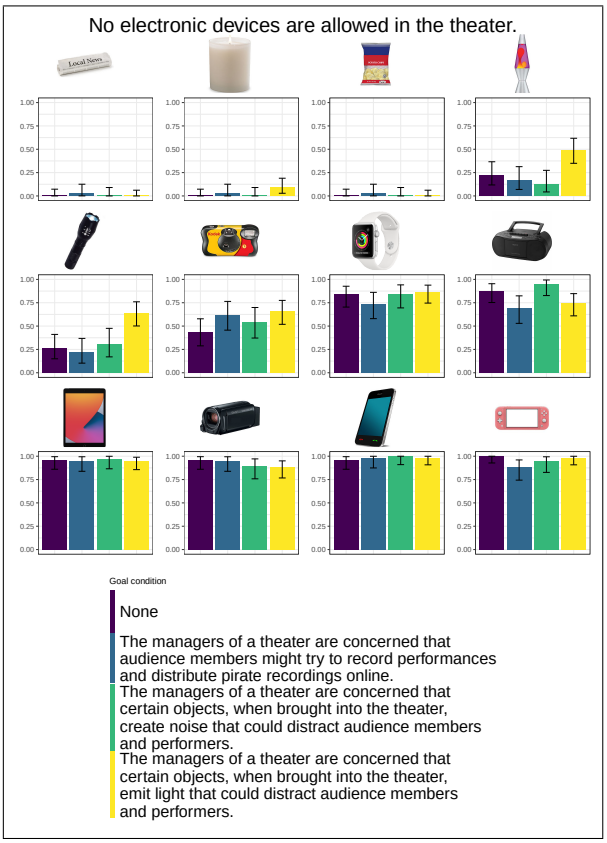

Figure 1: results from 1 of 12 scenes of the study. Y-axis: proportion of participants that selected each object in each of the 4 goal conditions associated with the scene; error bars are 95% binomial confidence intervals.

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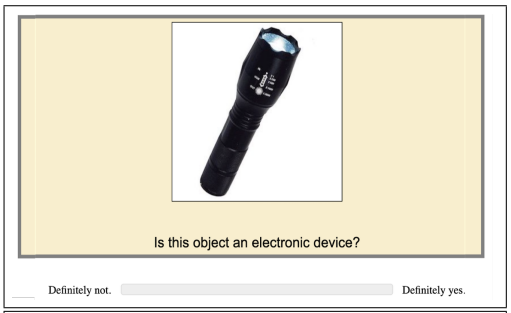

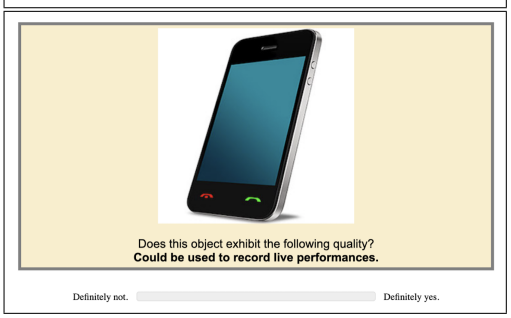

Figure 2 (top): sample screen from the category membership norming study N1; Figure 3 (bottom): sample screen from the feature attribution norming study N2.

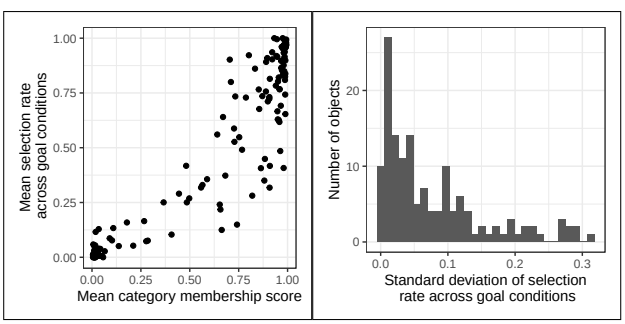

Figure 4 (left): mean responses from the category membership norming study N1, plotted against mean selection rates from the main experiment (each point represents a single object seen in the study); Figure 5 (right): standard deviation of object selection rates across goal conditions.

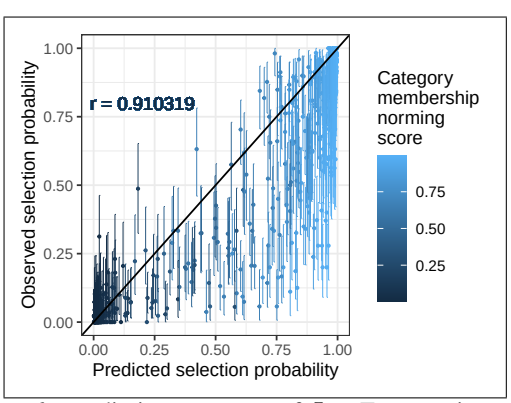

Figure 6: prediction accuracy of L_1. Every point represents a single object shown in a single goal condition.

Distribution Relative to Events in Dynamic Semantics

[Synopsis]: In this study I propose to extend a dynamic system of semantics [Hei82, Kam81] (and followers) to account for novel data I present from Japanese and English. A new apparatus to explain *distributivity* will be proposed.

[Data]: The data to be discussed in this study is shown in (1). It contains two key features: the **conjunction** in (1a), and the **singular** pronoun ***sore*** in (1b). There, the pronoun refers to a donkey and a monkey at the same time, as can be seen from the interpretation of the sentence: '***sore***' means 'the monkey' for Alex, and 'the donkey' for Bill. The parallel construction is obtained in English too as in (2a), although the degree of acceptability varies among speakers. The construction is also productive to the extent that it is obtained in the temporal domain as in (2b) (*then* refers to *five* and *six*). Furthermore, notice that the interpretation in question is dependent on the existence of a quantifier. If the quantifiers *dotiramo*/*each* are replaced with non-quantifiers like *futari*/*they*, the acceptability of the interpretation is degraded.

(1) a. *Alex-wa saru-o (mi-te), Bill-wa roba-o mi-ta.*
Alex-TOP monkey-ACC (see-AND) Bill-TOP donkey-ACC see-PAST.
'Alex saw a monkey, and Bill saw a donkey.'

b. *{ Dotiramo / ??Futari-wa }* ***sore****-o tsukamae-ta.*
{ each / two-TOP } **it**-ACC catch-PAST.
Lit.: 'Each caught **it**.' ⇝ 'Alex caught the monkey, and Bill caught the donkey.'

(2) a. Alex saw a monkey, and Bill saw a donkey. { Each (of them) / ??They } caught **it**.

b. Alex was in the park at five, and Bill was in the station at six. { Each (of them) / ??They } got a phone call **then**.

[The Issue]: Although (1)/(2) are reminiscent of (3), which is discussed by [Sto92, Elb01, Elb05, Bra07] and for which a dynamic analysis if offered by [Bra07] with the indexation shown, the analysis does not extend to (1)/(2). This is because the analysis is based on the assumption that disjunction is internally static (i.e. non-dynamic), which is not the case for conjunction. I will illustrated this point a bit more detail (but informally, due to the limitation of space).

(3) If Alex^1 sees a^2 monkey or a^2 donkey, he$_1$ waves to **it**$_2$.

As assumed under the system of [Bra07], suppose that sentences are analyzed as pluralized context change potential, a pair of a set I of input assignments i and a set J of output assignments j. Indefinites and proper nouns induce an introduction of a discourse referent (specified as a superscript), which updates I to J in a specific way. For instance, the antecedent of the conditional in (3) updates each $i \in I$ to $j \in J$ so that j assigns Alex to 1 and a monkey *or* a donkey to 2. Minimally, the resultant output set J can be represented as (4a). The consequent takes each j *individually* as its input and test if the referent of 1 waves to the referent of 2. In this way, *it* refers to a monkey and a donkey simultaneously.

(4)

a.

J	1	2	
j_1	a	d	⇐ He$_1$ waves to **it**$_2$
j_2	a	m	⇐ He$_1$ waves to **it**$_2$

b.

J	1	2	3	4	
j_1	a	m	b	d	⇐ ... caught **it**$_{??}$
j_2	...	...	...	...	

(a = Alex, b = Bill, m = a monkey, d = a donkey)

The parallel analysis does not extend to (1)/(2). Since conjunction is internally dynamic, if the two indefinites are coindexed the second indefinite overwrites the information specified by the first one. Hence they must be contraindexed, resulting in the indexation as (5), which in turn produces

the output represented in (4b). It can be seen that no single index on *it* achieves the reference being pursued even updating each $j \in J$ individually.

(5) Alex[1] saw a[2] monkey, and Bill[3] saw a[4] monkey. Each caught it$_{??}$

[Proposal]: I will propose a new apparatus to handle *distributivity* that allows the reading in question with a single index on pronouns. The proposal is described in the following way. Suppose, following [vE01, Nou03, Nou07], that an assignment is taken as a *stack* of n-number of referents, with each element being numbered as $0, ..., n-1$. Indefinites and names induce 'push-down' addition of a new referent to the last position of the stack. Suppose further that verbs add an *event referent* to this stack (cf. [Kam79, Kam81, Kam17, Chi20]). Then (1a) induces the stack s in (6).

(6)

	0	1	2	3	4	5
s	a	$\mathtt{e}_1$	m	b	$\mathtt{e}_2$	d

($\mathtt{e}_1$ = a seeing of m by a, $\mathtt{e}_2$ = a seeing of d by b)

Suppose the LF-structure of (1b) in (7), where the trace of Quantifier Raising and the pronoun in question are indexed as shown. I propose that the quantifier is anaphoric to events $\mathtt{e}_1$ and $\mathtt{e}_2$, and that it triggers the following operation. It first evokes *minimal stacks* of s w.r.t. $\mathtt{e}_1$ and $\mathtt{e}_2$. A minimal stack $s_{\mathtt{e}}$ of s w.r.t. e, I propose, is a stack (with an arbitrary order of the elements) such that the elements of $s_{\mathtt{e}}$ are a subset of the elements in s; $s_{\mathtt{e}}$ contains e, all the participants of e, and nothing else. Here, $s_{\mathtt{e}_1}$ and $s_{\mathtt{e}_2}$ will look like the stacks in (8). Notice that, since $s_{\mathtt{e}_1}$ and $s_{\mathtt{e}_2}$ are distinct stacks from s, they name their elements as $0, ..., 2$. Then for each stack in (8), it is *individually* tested by the clause IP if the referent of 1 caught the referent of 2. It achieves the anaphoric relations where the pronoun refers to the two indefinites with a single index.

(7) [each [$_{\text{IP}}$ t_1 caught it$_2$]]

(8)

	0	1	2
$s_{\mathtt{e}_1}$	$\mathtt{e}_1$	a	m

$\Leftarrow$ ... t_1 caught it$_2$

	0	1	2
$s_{\mathtt{e}_2}$	$\mathtt{e}_2$	b	d

$\Leftarrow$ ... t_1 caught it$_2$

Finally, if $s_{\mathtt{e}_1}$ and $s_{\mathtt{e}_2}$ pass the test, the merger of s, $s_{\mathtt{e}_1}$, and $s_{\mathtt{e}_2}$ are returned as an output. The merger ensures that the output does not lose any information of s or any new information added to $s_{\mathtt{e}_1}$ and $s_{\mathtt{e}_2}$ (here, the event referents of *caught*). Merger of two lists is defined so that it pushed down each referent in one list to the other. Thus the output looks like (9).

(9)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13
s'	a	$\mathtt{e}_1$	m	b	$\mathtt{e}_2$	d	$\mathtt{e}_1$	a	m	$\mathtt{e}_3$	$\mathtt{e}_2$	b	d	$\mathtt{e}_4$

($\mathtt{e}_3$ = a catching of m by a, $\mathtt{e}_4$ = a catching of d by b)

The idea will be formalized based on Incremental Dynamics proposed by [vE01], which contains in itself a *stack* illustrated as above, and the merging operation. I will add the event component to the dynamics, which is independently supported [Kam79, Kam81, Kam17, Chi20]. What is new in the proposal is the operations of making minimal stacks and individually updating them. Formally, I take stacks of type s, one of the primitive types [Mus96]. Sentences are of type $\langle s, \langle s, t\rangle\rangle$, pronouns are of type $\langle s, e\rangle$. Then the distributive quantifier is defined as follow (anaphoricity to the events is expressed not by numbers for readability), where $^\wedge$ is the merging operation defined in [vE01]. A minimal stack $s_{\mathtt{e}}$ of s w.r.t. e is defined as (12), where $s[n]$ is the $n$the element of stack s, $|s|$ is the length of s, and $\mathtt{participants}(\mathtt{e})$ is a set containing the participants (the agent, theme, recipient, etc.) of e. The extension of the analysis to the temporal domain will be discussed in the talk.

(10) $each_{\mathtt{e}_1,\mathtt{e}_2}$ / $dotiramo_{\mathtt{e}_1,\mathtt{e}_2} \rightsquigarrow \lambda p.\lambda s.\lambda s'.\ \exists s_{\mathtt{e}_1} \exists k\ [p(s_{\mathtt{e}_1})(k)] \wedge \exists s_{\mathtt{e}_2} \exists l\ [p(s_{\mathtt{e}_2})(l)] \wedge s' = s^\wedge k^\wedge l$

(11) a. $s_{\mathtt{e}}$ is defined iff there is an n such that $s[n] = \mathtt{e}$, and
b. $s_{\mathtt{e}}[0] = \mathtt{e}$, and
c. for all m $(0 \leq m \leq |s| - 1)$: if $s[m] \in \mathtt{participants}(\mathtt{e})$ then there is k such that $s_{\mathtt{e}}[k] = s[m]$, and
d. For all l $(0 \leq |s_{\mathtt{e}}| - 1)$: if $s_{\mathtt{e}}[l] \in D_e$ then $s_{\mathtt{e}}[l] \in \mathtt{participants}(\mathtt{e})$

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