Compositionality in Quantifier Phrases and Quantifier Words
Lecture 2
Indefinites and universals decomposed

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- **Compositionality**
  The meaning of a complex expression is a function of the meanings of its parts and how they are put together.
- **What are the "parts"**?
  This question can be asked in many ways: Surface constituents? LF constituents? Only audible parts? Also phonetically empty ones? What about type shifters? Etc.
- **Our question**
  Are **phonological words** necessarily parts, even minimal (primitive) parts**,** that a compositional grammar should take into account? If not, what parts are to be recognized?

Lessons from Distributed Morphology and some versions of Minimalist Syntax

Distributed Morphology
(Halle & Marantz 1994; Embick 2010; and others)

Hierarchical syntactic structure all the way down to roots; Late Insertion of vocabulary items.

The architecture is compatible with various different theories of locality and linearization.

The typological differences between polysynthetic and isolating languages do not require the postulation of radically different mechanisms in UG.

The phonological word has no special status in semantic interpretation.

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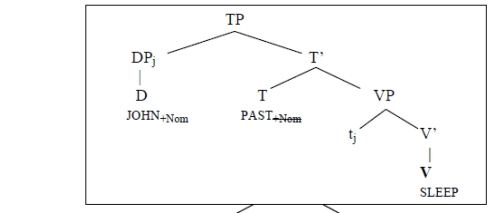
Example: *John slept* (Harley 2011)



Linearization, Morphological Merger, Late Insertion, Phonological constraints

SLEEP ⇔ /slEp/ [[PAST]T ___]
PAST ⇔ /d/
[[/dZAn/]DP [/slEpd/]VP]TP]
[>>dZAn >>slEpt]

LF Interpretation

VP: ιi[∃e[SLEEP(e, John) & DURING(e,i)]]
TP: BEFORE(utt-time, ιi[∃e[SLEEP(e, John) & DURING(e,i)]])

Lessons from Distributed Morphology and some versions of Minimalist Syntax

Some versions of Minimalist syntax
(Julien 2002; Kayne 2005a,b, 2010; Koopman 2005; Koopman & Szabolcsi 2000; Sigurðsson 2004; Starke 2009; many others)

Each syntactic head carries one and only one feature. Then, phonological words correspond to potentially large chunks of syntactic structure.

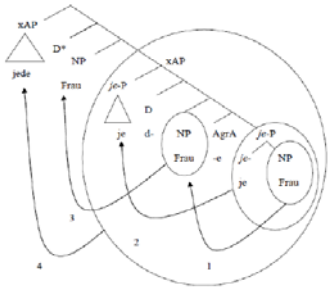
Especially when remnant movement is allowed, many words will not even correspond to complex heads assembled by head movement in syntax, because at least some of the building blocks are phrases.

Many words will not even correspond to complex heads assembled by head movement in syntax

Example: *jede Frau* `every woman' (Leu 2009)
jeder *je* `distributive particle'
d `relative complementizer
adjectival agreement

gut-**er** Mann
gut-**e** Frau
gut-**es** Kind
d-**er** Mann
d-**ie** Frau
d-**as** Kind

je–d–**er** Mann
je–d–**e** Frau
je–d–**es** Kind



Moral

- Words are not distinguished building blocks in syntax or morphology.
- Then, we do not expect words to be distinguished building blocks for compositional semantics.
- Specifically, word boundaries are neither upper bounds nor lower bounds for compositional semantics.

Not "lower bounds" "Words" are not compositional primitives. Complex meanings cannot be simply written into the lexical entries, without asking how the parts of the word contribute to them.

Not "upper bounds" Parts of a "word" may reach out to interact with, or operate on, the rest of the sentence.

Today's topic

In many languages, the same particles build quantifier words and serve as connectives, additive and scalar particles, question markers, existential verbs, etc.

Are these particles "the same" across the varied environments? If so, what is their stable meaning?

Or, are they lexicalized with various distinct meanings that bear a family resemblance?

Here are some first steps and preliminary results.

A sampler from Hungarian

ki is an "indeterminate pronoun"

ki
who

vala-ki someone	*X* ***vagy*** *Y* X or Y	***vagy*** *hat* approx. 6	***Vala/vagy****-on víz.* [there] was/is water
bár-ki anyone$_{FC}$		***Bár*** *esik…* although [it] rains	
mind*-en-****ki*** everyone		***mind*** *X,* ***mind*** *Y* both X and Y	*Ti* ***mind*** *VP.* you all VP
se*-n-****ki*** noone		***se*** *X,* ***se*** *Y* neither X nor Y	

…

[*vagyon>van* in the last 300 yrs]

Japanese KA
somewhat similar to *vala/vagy*

dare-**ka**	`someone'
gakusei-no dare-**ka**	`some student' (=one of the …)
jyuu-nin-to-**ka**-no gakusei	`some ten students' (=approximately)
Tetsuya-**ka** Akira(-**ka**)	`Tetsuya or Akira'
Dare-ga odorimasu **ka**	`Who dances?'
Akira-ga odorimasu **ka**	`Does Akira dance?'

Japanese MO
somewhat similar to *mind*

dare-**mo**	`everyone/anyone' (depending on stress)
jyuu-nin-**mo**-no gakusei	`as many as ten students'
Tetsuya-**mo** Akira-**mo**	`both Tetsuya and Akira'
Tetsuya-**mo**	`also/even Tetsuya' (depending on stress)

Chinese DOU
somewhat similar to *mind* and *mo*

tā nǎ-gè xuéshēng **dōu** xǐhuān `every student'

tāmen **dōu** mǎi-le yì-bù chēzi `they all VP'

yí-gè-rén **dōu** méi xiào `not a single person'

tā shíwǔ-gè píngguǒ **dōu** chī-le `as many as ten'

wǒ [xuěgāo]$_F$ **dōu** xiǎng chī `even icecream'

ngo^5 [syut^3 gou^1]$_F$ **dou**^{1} soeng^2 sik^6 `icecr. too'

Questions

Do the roles of each particle form a natural class? If yes, what is the unifying syntax/semantics?

Is the particle aided by additional, overt or covert, elements in fulfilling its varied roles? If yes, what are those elements?

What do we learn from the cross-linguistic similarities and differences in the distribution and interpretation of these particles?
E.g. ka ≠ vala/vagy, mo ≠ mind ≠ dou, …

Unifying option 1: Boolean semantics

Everyone dances, $\forall x[\text{dance}(x)]$ iff
Kate dances, **and** Mary dances, **and** Joe dances,
$\text{dance}(k) \wedge \text{dance}(m) \wedge \text{dance}(j)$

Someone dances, $\exists x[\text{dance}(x)]$ iff
Kate dances, **or** Mary dances, **or** Joe dances,
$\text{dance}(k) \vee \text{dance}(m) \vee \text{dance}(j)$

Universal quantification and conjunction are special cases of the Boolean **intersection (lattice-theoretic meet)** operation, and existential quantification and disjunction are special cases of the Boolean **union (lattice-theoretic join)** operation.

Meet and join

[A, ≥] is a partially ordered set iff ≥ is a reflexive, transitive, anti-symmetrical relation on the set A.

- For any subset X of A, b∈A is a lower bound for X iff for every x∈X, x≥b.
  The greatest of these, if there is one, is the **glb** (infimum) of X.
- For any subset X of A, c∈A is an upper bound for X iff for every x∈X, c≥x.
  The least of these, if there is one, is the **lub** (supremum) of X.

Let a two-element subset of A be {d,e}.
The glb (infimum) of {d,e} is the meet of d and e, written as d∧e.
The lub (supremum) of {d,e} is the join of d and e, written as d∨e.

Conjunction of propositions (p∧q) and intersection of sets (P∩Q) are special cases of meet.
Disjunction (p∨q) and union (P∪Q) are special cases of join.

Universals and existentials

[[everyone]] is the intersection of the properties P of the individuals in the universe
{ {P: P(k)} ∩ {P: P(m)} ∩ {P: P(j)} } or, equivalently
{ P: P(k) ∧ P(m) ∧ P(j) }

[[someone]] is the union of the properties P of the individuals in the universe
{ {P: P(k)} ∪ {P: P(m)} ∪ {P: P(j)} } or, equivalently
{ P: P(k) ∨ P(m) ∨ P(j) }

Supplements to the Boolean option

How does KA as a question-marker fit in?
Questions denote the sets of their possible answers.

Does Kate dance? à la Hamblin/Karttunen
{p: p = ^dance(kate) ∨ p =^¬dance(kate)}
`the set of propositions that are identical to "Kate dances" or to "Kate doesn't dance"'

Who dances? à la Hamblin/Karttunen
{p: p=^dance(k) ∨ p=^dance(m) ∨ p=^dance(j)}
`the set of propositions that are identical to "Kate dances," or to "Mary dances," or to "Joe dances"'

Notation:
^dance(k) = λw[dance(w)(k)] = {w: dance(w)(k)}

Supplements to the Boolean option

How does MO as *also/even* fit in?

Kate also dances

Even Kate dances

both entail "someone other than Kate dances, **and** Kate dances"

But "someone other than Kate dances" is thought to be a presupposition, so formalizing its presence using `and' is not straightforward.

Note also: Neither MO, nor the Hungarian/Chinese counterparts express plain `and'.

Unifying option 2:
alternatives and issue-raising

Who dances? à la Hamblin/Karttunen:
{p: p=^dance(k) ∨ p=^dance(m) ∨ p=^dance(j)}
same as {^dance(k), ^dance(m), ^dance(j)}

[KATE]$_F$ dances, à la Rooth:
ordinary meaning: ^dance(k)
focus alternatives:
{^dance(k), ^dance(m), ^dance(j)}

Kate dances, or Mary dances, or Joe dances,
re-interpreted à la Alonso-Ovalle:
{^dance(k), ^dance(m), ^dance(j)}

Someone dances, re-interpreted à la AnderBois:
{^dance(k), ^dance(m), ^dance(j)}

Hamblin-style alternative semantics
(Rooth, Kratzer & Shimoyama)

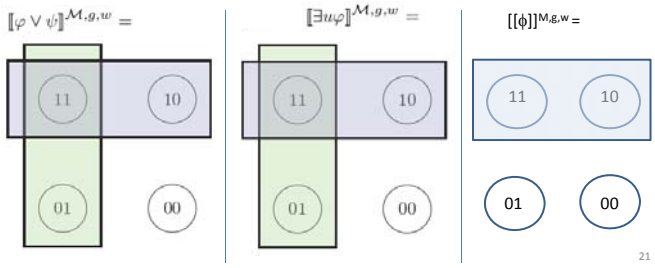
Indeterminate pronouns contribute multiple alternatives that project up (here, from *dare* to *dare nemutta*).
Other expressions yield singleton sets of alternatives ("Hobson's choice").
Propositional operators apply to the result.

[[**dare**]]w,g = { x: human(x)(w) }
[[**nemutta**]]w,g = { λx λ w'. slept(x)(w') }
[[**dare nemutta**]]w,g = { p: ∃x [human(x)(w) & p = λw'. slept(x)(w')] }

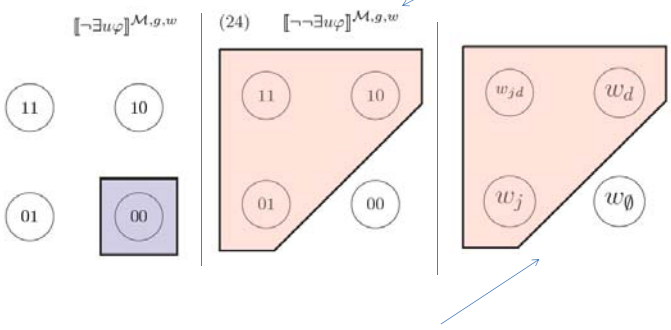
[∃](A) = {the prop. that is true in all worlds in which some prop. in A is true}
[∀](A) = {the prop. that is true in all worlds in which every prop. in A is true}
[Neg] (A) = {the prop. that is true in all worlds in which no prop. in A is true}
[Q](A) = A, i.e Question retains the set of propositions in A

Inquisitive semantics
(Groenendijk, Roelofsen, AnderBois, ...)

Main interest: sentences that leave alternatives open (are inquisitive), rather than use up alternatives by quantifying over them.
Disjunctions, questions, sentences with indefinites denote issues (sets of multiple alternatives), unlike conjunctions, negations, universal claims, etc.
[The figures are from S. AnderBois, forthc. Yucatec Maya..., *NALS*]



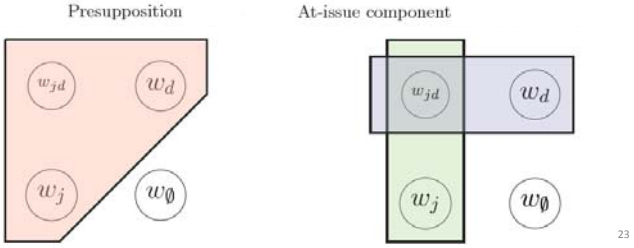
Non-inquisitive closure (!): $[\![!\varphi]\!] := [\![\neg\neg\varphi]\!] = \{\bigcup [\![\varphi]\!]\}$



Presupposition of the Focus/Cleft for (33): !∃x:drink-atole′(x)

Sentences with disjunctions / indeterminate pronouns, used as questions when ∃ presupposition of focus eliminates the informative content, and whole universe is covered with alternatives

→ [Juan *wáa* Daniel]$_F$ uk' le sa'-o'
Juan OR Daniel drink.AGENT.FOCUS DEF atole-DISTAL
'Was it Juan who drank the atole or was it Daniel?'
→ [máax]$_F$ uk' le sa'-o'
someone/who drink.AGENT.FOCUS the atole-DISTAL
'Who drank the atole?'



How do the Boolean and the Inquisitive perspectives relate to each other?

Heyting algebra: distributed lattice with top and bottom. Has meet and join, but "relative pseudo-complement" instead of complement. Doesn't have double-negation elimination.

But if the pseudo-complement is a complement, the Heyting algebra is also a Boolean algebra.

Def.: *a's pseduo-complement relative to b* is $a \to b$: $(a \to b) \wedge a \leq b$, and moreover $a \to b$ is the greatest such in that if $c \wedge a \leq b$ then $c \leq a \to b$.

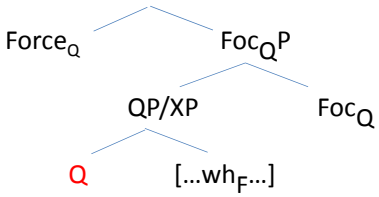
E.g., [{0, ½, 1}, ≥] is a Heyting algebra, but not a Boolean algebra.

Slade 2011
building on Jayaseelan, Kishimoto, Yatsushiro, den Dikken, Cable, a.o.

Syntax and semantics of Q-particles in
Sinhala *da* (*ho, hari*, ...),
Malayalam *-oo*,
Tlingit *ge, sa, khach'u*,
Japanese *ka* (*no, kai, kadooka, ndai*, ...)

Q-particle is present when alternatives are introduced. Q "domesticates" alternatives.

Cable 2010: wh ≠ Q ≠ Force



Q as it occurs in wh-questions and wh-indefinites, as *sa* does in Tlingit

What we used to call wh-movement is QP (or Q) mvmnt.
Q is a choice function variable.
QP (or Q) moves to Foc$_Q$P to be near Force$_Q$.
Force$_Q$ Agrees with Q, ∃-closes Q and forms set of props.

Force$_{Qi}$ = λp . ∃f . p=[[YP]]$^{g(i/f)}$ (single-wh question)

Slade 2011

Q as it occurs in yes/no questions, wh-questions, wh-indefinites, declarative disjunctions, alternative qu's.

Wh-words (indeterminate pronouns) and disjunctions (headed by Junction) have sets of alternatives as their ordinary semantic values.

Q-particle is a choice function. Applies to Hamblinian alternative sets and delivers Montagovian types. (Similar to Cable 2010, but with a different motivation.)

[[C-INT_i XP]]g = λp[∃f$_{CH}$. p=[[XP']]g(f/i)]
[[-e]] (focus suffix on V) adds ∃ presupposition

Recap: Choice functions cf

A choice function cf looks at every set and chooses an element of that set. **dog(cf(dog)) always true**

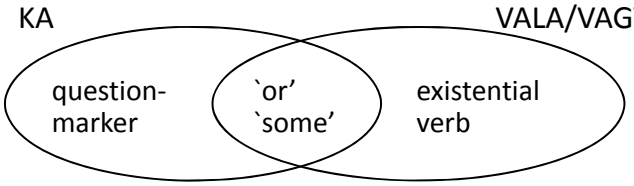
cf_1(dog)= Fido	cf_2(dog)=Spot	...
cf_1(cat)=Max	cf_2(cat)=Tiger	...
cf_1(city)=Paris	cf_2(city)=LA	...
cf_1(two-dogs)= {Fido, Spot}	cf_2(two-dogs)= {King, Spot}	...
...	...	...

also with sets whose elements are not individuals:
two-dogs' = { {Fido, Spot}, [King, Spot}, {Spike,King}, {Fido,King}, {Fido,Spike}, {Spike,Spot} }

Why are Q-particles present in all these constructions, cross-linguistically?

Choice functions have been used
... to account for the island-free scope of indefinites (but those cfs always reside inside the island; neither move, nor are attached to the island), or
... to be skolemized and thus encode how indefinites are dependent on particular quantifiers (is it perhaps useful for pair-list readings, not discussed in this literature?).
Why do alternatives have to be "domesticated"? Existential and other quantifiers could operate directly on sets of alternatives.
Maybe the choice-functional analysis of Q is not the last word, and a different role can be found for Q.

Cross-linguistic variation: semantic or morpho-syntactic?



KA present in all inquisitive contexts!

Is VALA/VAGY non-inquisitive (maybe !∃), or just morpho-syntactic-ally distinct?

	Mod. Sinh	Old Mal	Mod Mal	Tlin	Jap
y/n-ques.	də	-oo	-oo	gé	ka, no, kai, kadooka
wh-ques.	də	-oo	–	sá	ka, no, ndai
wh-indef.	də (aff.), hari (aff.), vat(neg.)	-oo	-oo	sá	ka
decl. disj.	hari (aff.), vat (neg.)	-oo	-oo	khach'u	ka
interr. disj.	də	-oo	-oo	gé… gwáa	[ka]

Slade 2011

Distribution of Q-particles in Sinhala, Malayalam, Tlingit, and Japanese

Cross-linguistic distribution, syntactic feature account (Slade)

ModColl Sinhala

Category	Feature(s)
C-INT	uQ[ ], iInt[+]
wh-pronoun	
də	iQ[+]
hari	
J	

Tlingit

Category	Feature(s)
C-INT	uQ[ ], iInt[+]
wh-pronoun	
sá	iQ[+]
gé	iQ[+], uJunc[ ], uInt[ ]
khach'u	uJunc[ ], iInt[-]
J	iJunc[+], uInt[ ]

Japanese

Category	Feature(s)
C-INT	uQ[ ], uInt[+]
wh-pronoun	iWh[+]
ka	iQ[+]
no	iQ[+], uInt[ ]
ndai	iQ[+], uInt[ ], uWh[ ]
kai/kadooka	iQ[+], uInt[ ], uJunc[ ]
J	iJunc[+]

E.g. uQ[] C-INT needs iQ[+] *da/sa/ka*.
The latter help, but don't need, C-INT.

How do DOU/MO/MIND fit in this picture?

Are they operators over propositional alternatives, à la Kratzer & Shimoyama?

Or unrelated operators,
distributivity à la Lin,
maximality à la Giannakidou & Cheng and Xiang,
additivity à la Kobuchi-Philip,
...?

Dou

Lee, Lin, Giannakidou & Cheng, Xiang

Dou resides in the syntactic Dist head; it is a generalized distributivity operator that distributes the VP-content over elements of a cover of the set denoted by the preposed XP.

Dou gives rise to different meanings by applying maximality to a contextually determined plural set. This could be a set of covers, a set of focus-induced alternatives, or a set of degrees ordered on a scale [with the aid of *lian*].

Mo

Kobuchi-Philip

(gakusei-ga) John-**mo** hashitta — additive prspp
`(Among the students,) John also ran'

(gakusei-ga) [John-to Mary]-**mo** hashitta — additive prspp
`(Among the students,) John and Mary also ran'

(gakusei-ga) John-**mo** Mary-**mo** hashitta — reciprocally satisfy prspp
`(Among the students,) both John and Mary ran'

(gakusei-ga) dono-hito-**mo** hashitta — reciprocally satisfy prspp
`(Among the students,) every person ran'

Mind -- *Is* -- *És*

Szabolcsi, Whang, & Zu

Kati **is**	`Kati-**mo** (also/even)'
[Kati **és** Mari] **is**	`[Kati-**to** Mari]-**mo** (also/even)'
Kati **is** (**és**) Mari **is**	`Kati-**mo** Mari-**mo** (both)'
mind Kati, **mind** Mari	`Kati-**mo** Mari-**mo** (both)'
mind-en-ki	`dono-hito-**mo** (every)'
A fiúk **mind** VP.	ca. `the boys **dou** VP (all)'

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