How to be (non-)specific: diachronic tendencies and cross-linguistic variation

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A wealth of indefinites

Cross-linguistically, we witness a wealth of indefinite forms:

- English: *some*, *any*, *no*, ...
- German: *ein*, *irgendein*, ...
- Italian: *(un) qualche*, *qualunque*, *nessuno*, ...
- Spanish: *algún*, *cualquiera*, *ningun*, ...
- Russian: *koe-*, *-to*, *-nibud*, ...
- Náhuatl/Mexicano: *yeka*, *sente*, *olgo*, ...
- Kannada: *-oo*, *-aadaruu*, ...
- ...

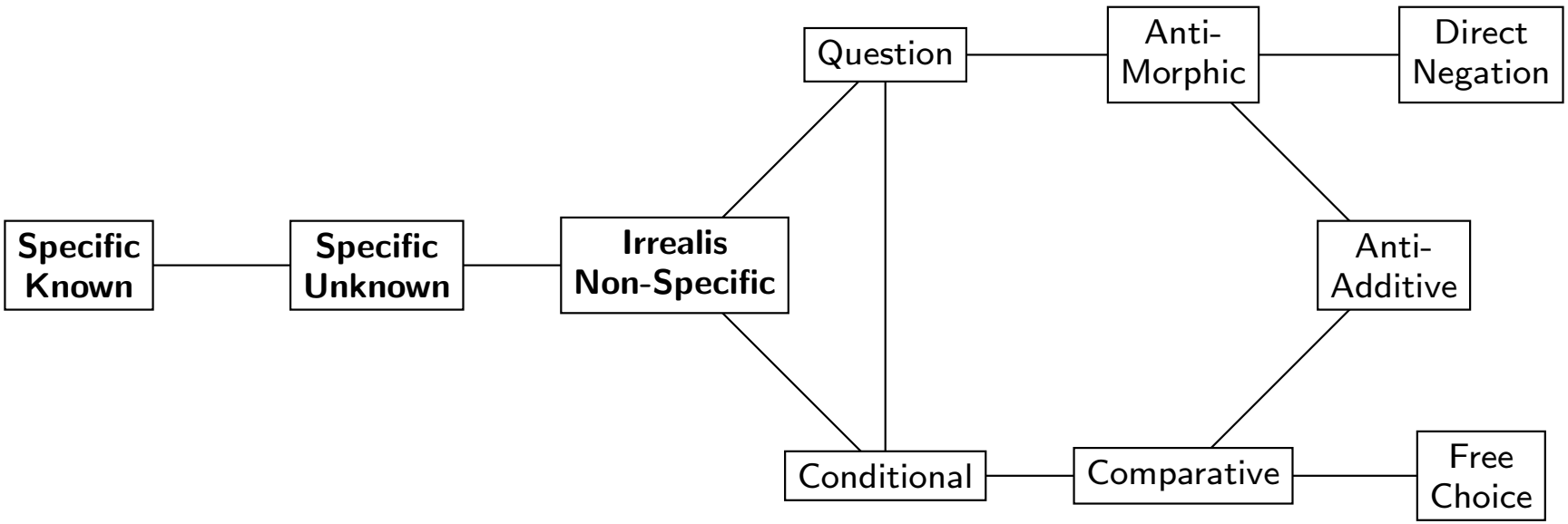
Why this variety? What do all these forms have in common? How to account for their differences in meaning and distribution?

What are possible indefinite meanings? What are possible diachronic developments?

Today's focus: scopal (specific vs non-specific) and epistemic (known vs unknown) uses of indefinites.

Haspelmath's Implicational Map

Haspelmath (1997)'s map: a useful typological tool to capture the functional distribution of indefinites



Haspelmath's map (extended, Aguilar et al 2011)

Haspelmath's implicational map makes predictions about

(i) possible indefinite forms cross-linguistically: only those occupying a contiguous area on the map;

(ii) their possible diachronic development: contiguous functions developed first.

Main goal: logical underpinning of Haspelmath's map

Scopal vs epistemic specificity (Farkas, 1996)

Scopal specificity

Indefinites used specifically tend to presuppose the existence of their referents, and introduce discourse referents:

(1) Ali wants to visit an Italian city.

a. **Specific**: There is a specific Italian city which Ali wants to visit [$\exists x/\Box$]
b. **Non-specific**: Ali wants to visit an Italian city, any Italian city would do [$\Box/\exists x$]

[Continuation *It is in the North-East close to Venice* only possible for (1a)]

Epistemic specificity

Indefinites marked for (un)known signal that the speaker does (not) know the identity of the referent

(2) A student called.

a. **Known**: The speaker knows which student called.
b. **Unknown**: The speaker doesn't know which student called.

Specific Known, Specific Unknown and Non-Specific

- **Specific known (SK)**: scopal specific & epistemic specific
- **Specific unknown (SU)**: scopal specific & epistemic non-specific
- **Non-specific (NS)**: scopal non-specific

Illustration

(3) Ali wants to visit an Italian city.

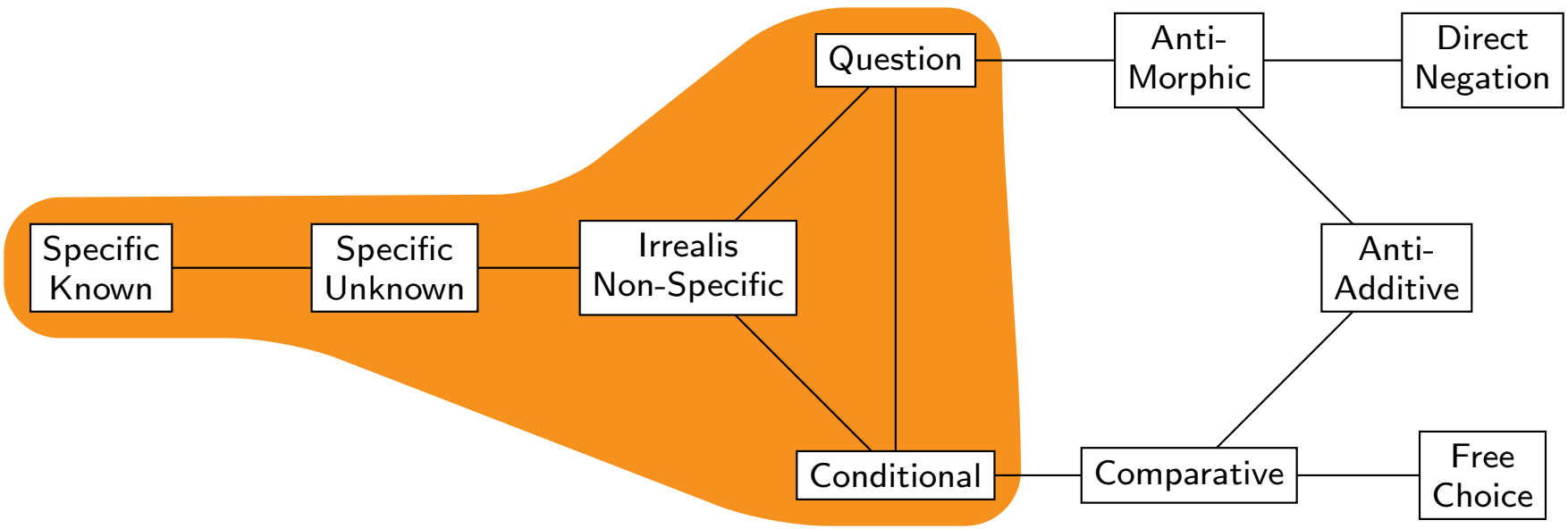
a. **SK**: There is a specific city which Ali wants to visit, and the speaker knows which

b. **SU**: There is a specific city which Ali wants to visit, but the speaker doesn't know which

c. **NS**: Ali wants to visit an Italian city, any Italian city would do

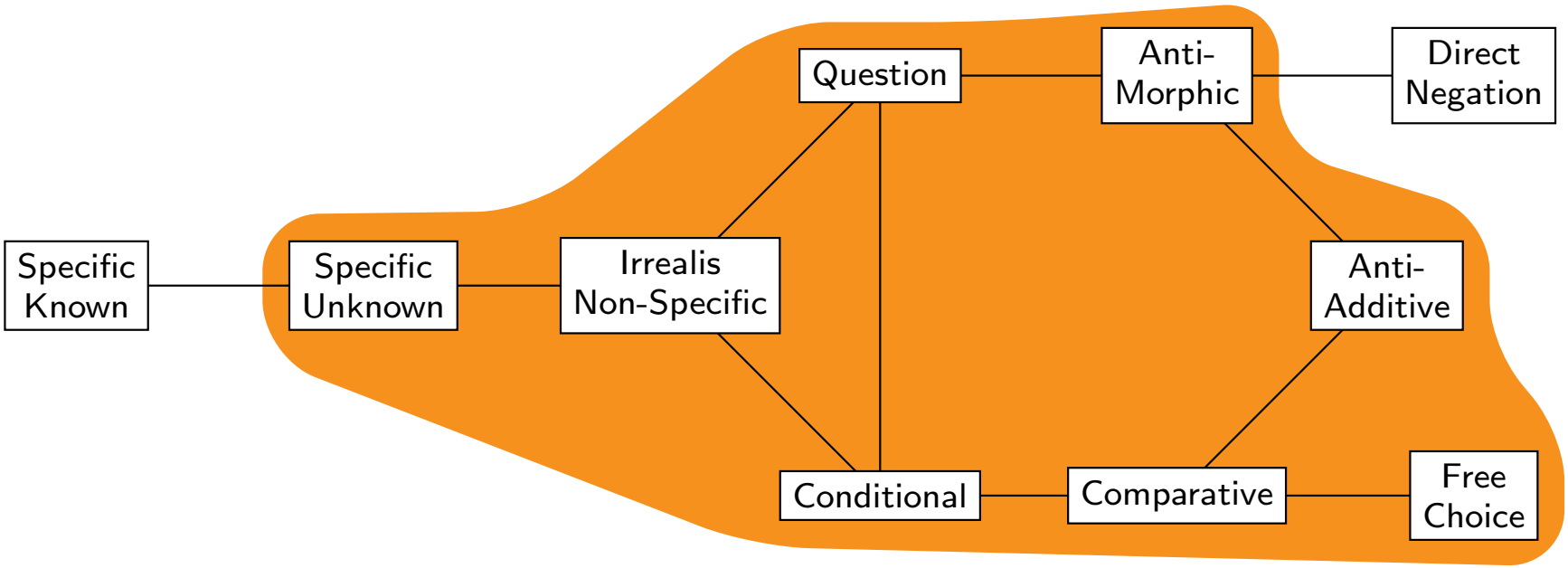
Cross-linguistically, languages developed lexicalized forms with restricted distributions with respect to these uses

Haspelmath Map



English *someone*

Haspelmath Map: epistemic indefinites



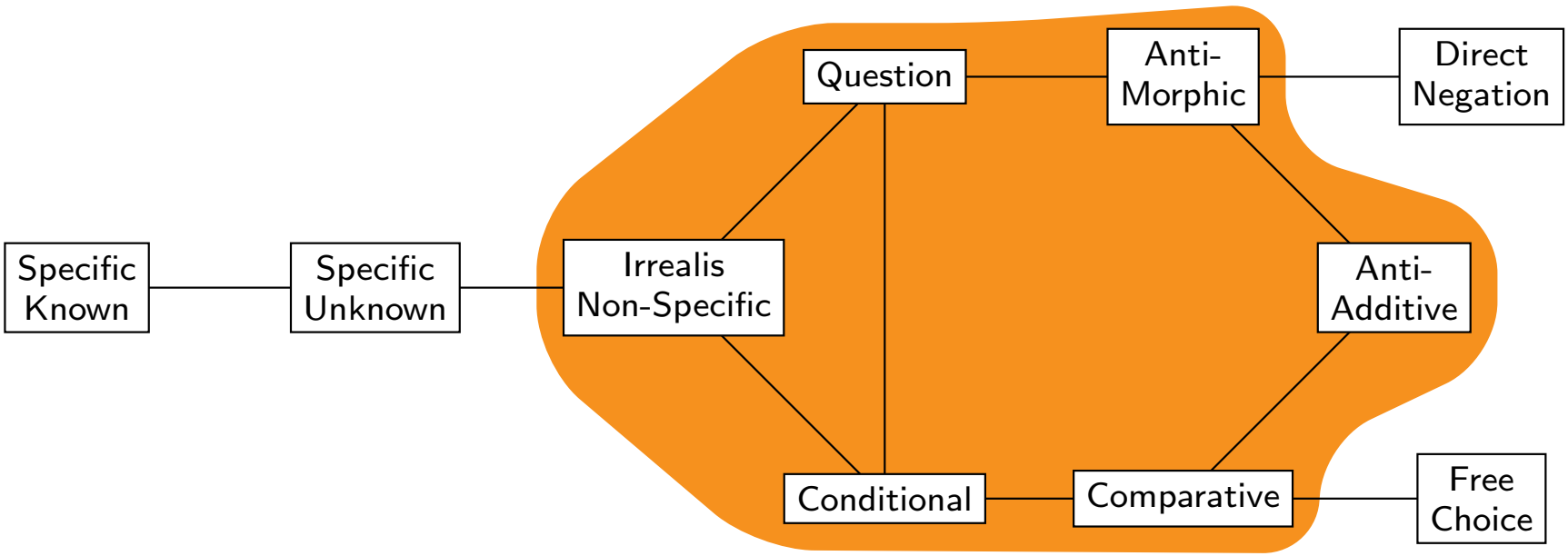
German *irgend-*

Undefeasible Ignorance Inference (in episodic contexts)

(4) *Ich habe irgendetwas verloren. # Rate mal, was!*
I have IRGEND-something lost Guess PRT, what!

'I lost something, but I don't know what.'

Haspelmath Map: non-specific indefinites



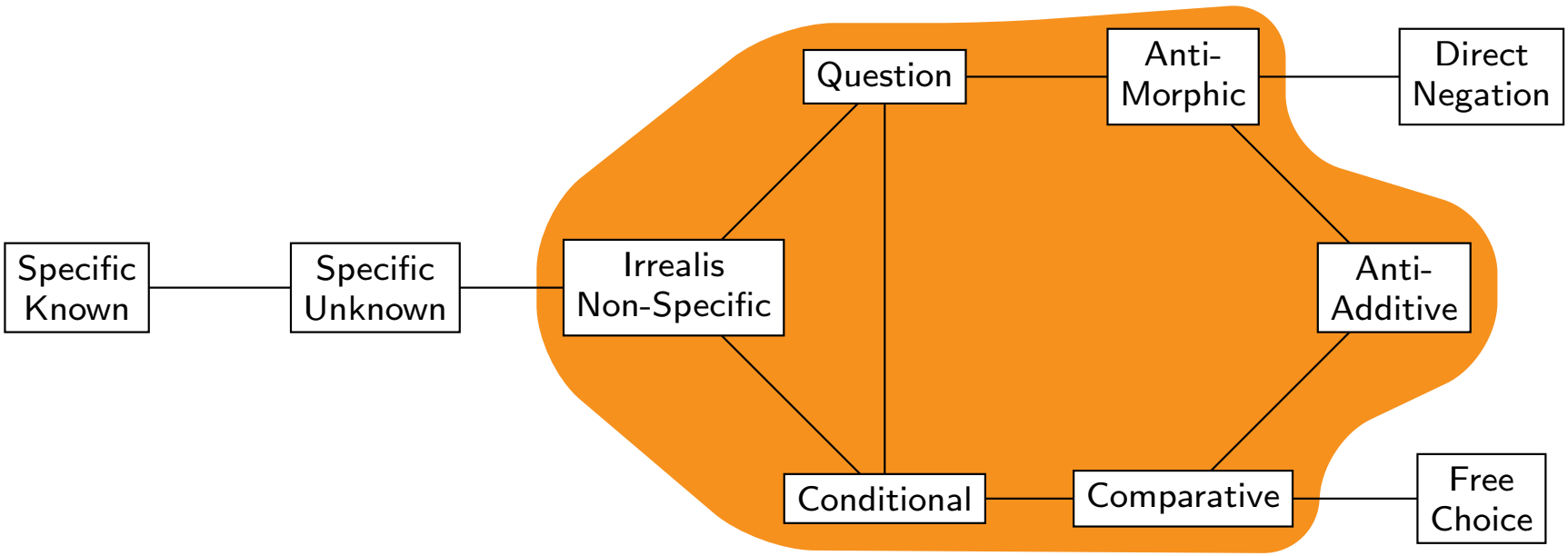
Russian *nibud'*

Ungrammatical in episodic sentences

(5) # *Ivan včera kupil kakuju-nibud' knigu.*
Ivan yesterday bought which-NIBUD' book.

'Ivan bought some book [non-specific] yesterday.'

Haspelmath Map: non-specific indefinites



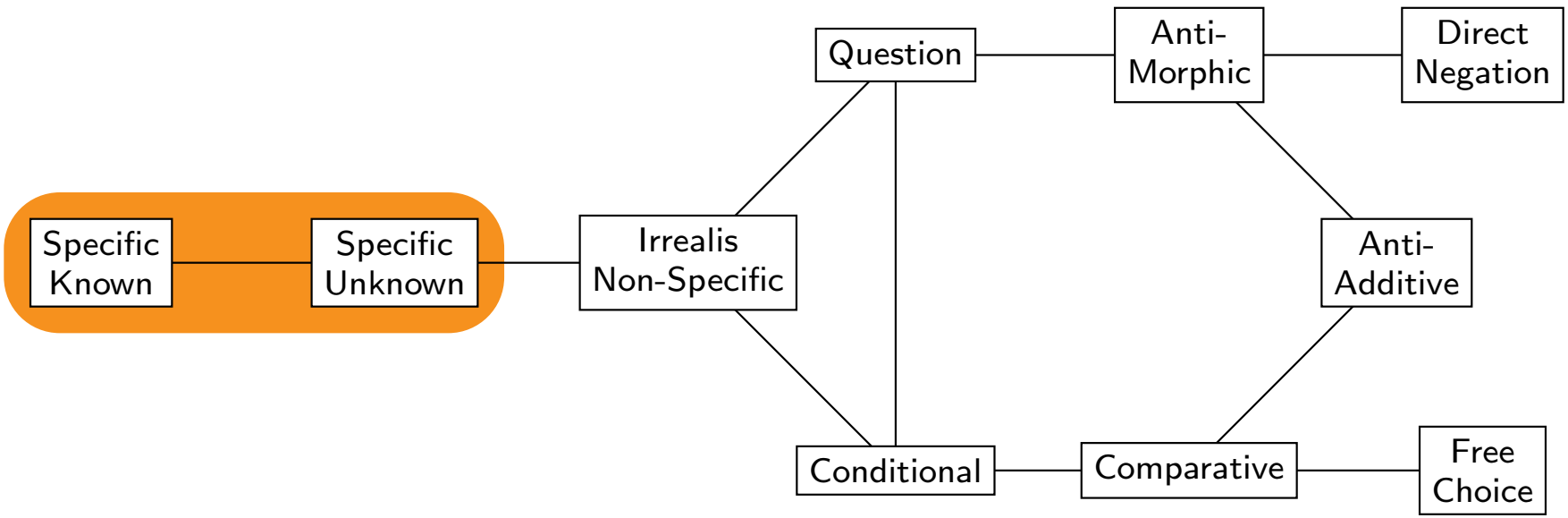
Russian *nibud'*

Obligatory scopally non-specific reading under operators

(6) *Ivan* **hotel** *spet'* *kakuju-nibud'* *pesniu.*
Ivan want-PAST sing-INF which-NIBUD' song.

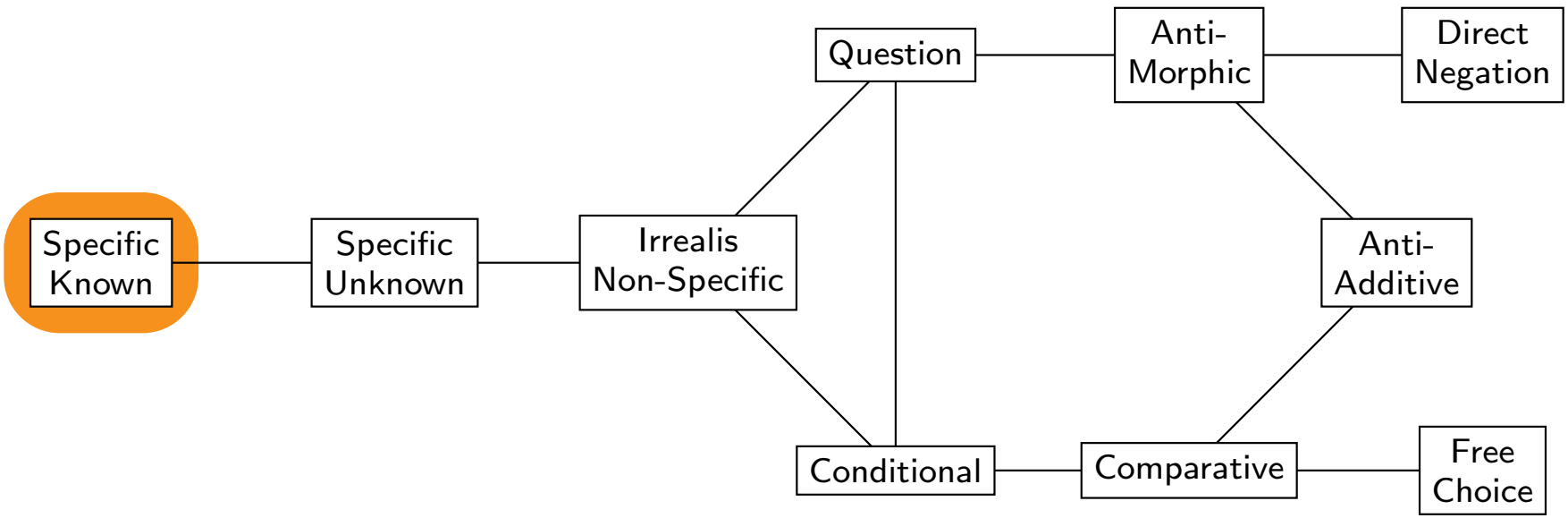
'Ivan wanted to sing some song [non-specific].'

Haspelmath Map: specific indefinites



Kazakh *älde*

Haspelmath Map: specific known indefinites



Russian *koe-*

Our Goals

(1) a logical characterization of the specific known (SK), specific unknown (SU) and non-specific (NS) functions; and a principled explanation of their position on Haspelmath's implicational map;

(2) a formal account of the variety of marked indefinites encoding SK, SU, and NS: **specific known, epistemic, specific and non-specific indefinites**; and their properties;

(3) identification of constraints on **possible diachronic developments**:

- German *irgend-*: from non-specific to epistemic (Port & MA, 2021)
- Italian *alcuno*: from epistemic to negative (Gianollo, 2020)

References

MA & Marco Degano, 2022. "(Non-)specificity across languages" SALT 32.

Marco Degano, 2024. "Indefinites and their values." PhD thesis, ILLC, UvA.

Angelika Port & MA, 2021. "The diachronic development of German *irgend*-indefinites". Manuscript, ILLC, University of Amsterdam

Marked Indefinites

Possible **marked indefinites** based on Specific Known (SK), Specific Unknown (SU) and Non-specific (NS):

TYPE OF INDEFINITE	FUNCTIONS			EXAMPLE
	SK	SU	NS	
(i) unmarked	✓	✓	✓	Italian *qualcuno*
(ii) specific	✓	✓	✗	Georgian *-ghats*
(iii) non-specific	✗	✗	✓	Russian *-nibud*
(iv) epistemic	✗	✓	✓	German *irgend-*
(v) specific known	✓	✗	✗	Russian *koe-*
(vi) SK + NS	✓	✗	✓	unattested
(vii) specific unknown	✗	✓	✗	Kannada *-oo*

Marked indefinites: cross-linguistic variety

Possible **marked indefinites** based on Specific Known (SK), Specific Unknown (SU) and Non-specific (NS):

TYPE OF INDEFINITE	FUNCTIONS			EXAMPLE
	SK	SU	NS	
(i) unmarked	✓	✓	✓	Italian *qualcuno*
(ii) specific	✓	✓	✗	Georgian *-ghats*
(iii) non-specific	✗	✗	✓	Russian *-nibud*
(iv) epistemic	✗	✓	✓	German *irgend-*
(v) specific known	✓	✗	✗	Russian *koe-*
(vi) SK + NS	✓	✗	✓	unattested
(vii) specific unknown	✗	✓	✗	Kannada *-oo*

What are possible indefinites cross-linguistically?

Why (ii)-(v) common? Why (vi) unattested? Why (vii) rare?

Marked Indefinites: meaning and distribution

Possible **marked indefinites** based on Specific Known (SK), Specific Unknown (SU) and Non-specific (NS):

TYPE OF INDEFINITE	FUNCTIONS			EXAMPLE
	SK	SU	NS	
(i) unmarked	✓	✓	✓	Italian *qualcuno*
(ii) specific	✓	✓	✗	Georgian *-ghats*
(iii) non-specific	✗	✗	✓	Russian *-nibud*
(iv) epistemic	✗	✓	✓	German *irgend-*
(v) specific known	✓	✗	✗	Russian *koe-*
(vi) SK + NS	✓	✗	✓	unattested
(vii) specific unknown	✗	✓	✗	Kannada *-oo*

How to account for meaning and distribution of marked indefinites?

How to derive the restricted distribution of non-specific indefinites; obligatory ignorance in epistemic indefinites; . . . but also their exceptional scope?

Marked Indefinites: diachronic pathways

Possible **marked indefinites** based on Specific Known (SK), Specific Unknown (SU) and Non-specific (NS):

TYPE OF INDEFINITE	FUNCTIONS			EXAMPLE
	SK	SU	NS	
(i) unmarked	✓	✓	✓	Italian *qualcuno*
(ii) specific	✓	✓	✗	Georgian *-ghats*
(iii) non-specific	✗	✗	✓	Russian *-nibud*
(iv) epistemic	✗	✓	✓	German *irgend-*
(v) specific known	✓	✗	✗	Russian *koe-*
(vi) SK + NS	✓	✗	✓	unattested
(vii) specific unknown	✗	✓	✗	Kannada *-oo*

What are possible diachronic developments?

Why diachronically non-specific indefinites tend to turn into epistemic ones (German, French)? What about the opposite direction?

Indefinites in a two sorted team semantics

Main idea: Indefinites are sensitive to *dependence* and *non-dependence* relationships in their value assignments (Brasoveanu & Farkas 2011, 2020).

Implementation: Two-sorted team semantics with dependence atoms.

Team semantics: formulas are interpreted wrt **sets** of evaluation points (*teams*) rather than single points (Väänänen 2007; Galliani 2015)

In two-sorted team semantics (TS2):

(i) possible worlds introduced as second sort of entities (with special **world variables** which can be quantified over);

(ii) v as **designated variable** over worlds, representing alternative ways things might be (epistemic possibilities);

(iii) a **team** is a set of assignment functions mapping individual variables $x, y, \ldots$ to individuals in D & world variables $v, w, \ldots$ to worlds in W (with $M = \langle D, W, I \rangle$)

designated variable ⇒	**v**	x	w	y	...	⇐ other variables
	v_1	a	w_1	b_1	...	
	v_2	a	w_2	b_2	...	
possible values ⇒	v_3	a	w_3	b_3	...	⇐ possible values
	...	a	...	...	...	
	v_n	a	w_n	b_n	...	

Two-sorted team semantics

designated variable ⇒	**v**	x	w	y	...	⇐ other variables
	v_1	a	w_1	b_1	...	
	v_2	a	w_2	b_2	...	
possible values ⇒	v_3	a	w_3	b_3	...	⇐ possible values
	...	a	...	...	...	
	v_n	a	w_n	b_n	...	

Examples of translations in a two-sorted language:

(7) Everyone smiles $\mapsto \forall x S(x, v)$

Everyone must smile $\mapsto \forall w \forall x S(x, w)$

Everyone can smile $\mapsto \exists_l w \forall x S(x, w)$ [Two existentials: strict ($\exists_s$) & lax ($\exists_l$)]

INDEFINITE smiles $\mapsto \exists_s x(S(x, v) \wedge$ ATOMS$)$ [Dependence & variation ATOMS]

(a) strict

T	x
i_1	d_1
i_2	d_2

(b) lax

T	x
i_1	d_2
i_2	d_1
	d_2

Table: Illustration strict vs lax extensions

Teams as information states

Teams represent information states of speakers;

- The *designated world variable* v captures the speaker's epistemic possibilities;
- In *initial teams* (only v defined) only factual information is represented;
- Singleton teams are teams of *maximal information*.

Illustration

Assume: a smiles in $w_a \mapsto S(a, w_a)$ & b smiles in $w_b \mapsto S(b, w_b)$

(8) $\begin{array}{c} \mathrm{v} \\ \hline w_a \\ w_b \end{array}$ $\Rightarrow$ info that a smiles or b smiles [$\Leftarrow$ *initial team*]

(9) $\begin{array}{c} \mathrm{v} \\ \hline w_a \end{array}$ $\Rightarrow$ info that a smiles [$\Leftarrow$ *initial team of max info*]

Initial teams encode factual information by constraining the possible values of v

- **Felicitous sentence:** A sentence is *felicitous/grammatical* if there is an initial team which supports it.

Teams as information states: non-initial teams

Non-initial teams encode info about the values of more variables

(10)

v	x
w_a	a
w_b	a
w_c	a

$\Rightarrow$ value of x is **known** [value of x is constant]

(11)

v	x
w_a	a
w_b	b
w_c	c

$\Rightarrow$ **unknown** but **specific** [value of x co-varies with v]

(12)

v	x
w_a	a
w_a	b
w_a	c

$\Rightarrow$ **non-specific** [x does not functionally depend on v]

Linguistically relevant distinctions that we can characterise using dependence & variation atoms:

- $dep(\vec{z}, x)$: x functionally depends on $\vec{z}$
- $var(\vec{z}, x)$: x does not functionally depend on $\vec{z}$

Dependence and variation atoms

CONSTANCY: the value of x is constant

(13)

v	x
...	a
...	a

$\Rightarrow$ **known** $\mapsto dep(\varnothing, x)$

VARIATION: the value of x is not constant

(14)

v	x
...	a
...	b

$\Rightarrow$ **unknown** $\mapsto var(\varnothing, x)$

v-CONSTANCY: x functionally depends on v

(15)

v	x
w_1	a
w_2	b

$\Rightarrow$ **specific** $\mapsto dep(v, x)$

v-VARIATION: x doesn't functionally depend on v

(16)

v	x
w_1	a
w_1	b

$\Rightarrow$ **non-specific** $\mapsto var(v, x)$

Application I: SK, SU and NS functions

CONSTANCY ↦ known	$dep(\varnothing, x)$	v | x … | d_1 … | d_1
VARIATION ↦ unknown	$var(\varnothing, x)$	v | x … | d_1 … | d_2
v-CONSTANCY ↦ specific	$dep(v, x)$	v | x w_1 | d_1 w_2 | d_2
v-VARIATION ↦ non-specific	$var(v, x)$	v | x w_1 | d_1 w_1 | d_2

Specific Known, Specific Unknown, Non-specific functions

v	…	x
w_1	…	a
w_2	…	a

Specific known (SK)
↦ CONSTANCY
$dep(\varnothing, x)$

v	…	x
w_1	…	a
w_2	…	b

Specific unknown (SU)
↦ v-CONSTANCY + VARIATION
$dep(v, x) + var(\varnothing, x)$

v	…	x
w_1	…	a
w_1	…	b

Non-specific (NS)
↦ v-VARIATION
$var(v, x)$

Indefinites as existentials

The interpretation of an existential involves the extension of a team with a fresh variable, which can be in different dependence relations with other variables in the team (including v).

Our proposal

1. Indefinites are **strict existentials** ($\exists_s x$);

(a) strict

T	x
i_1	d_1
i_2	d_2

(b) lax

T	x
i_1	d_2
i_2	d_1
	d_2

Table: Illustration strict vs lax

2. They are interpreted *in-situ*. **Dependence atoms** used to model their exceptional scope behaviour;

3. Marked indefinites trigger the obligatoriness of **(v-)constancy/variation atoms**, responsible for their scopal and epistemic interpretations.

(For scope, our system parallels Brasoveanu and Farkas (2011)'s treatment, see also Schlenker 2006).

Application II: Exceptional Scope of Indefinites

Indefinites violate rules of standard quantifier behaviour, e.g, can escape syntactic islands (Reinhart 1979, Abush 1993, . . .)

(17) Every kid$_x$ ate every food$_z$ that a doctor$_y$ recommended.

a. Wide-Scope $[\exists y/\forall x/\forall z]$: $\forall x \forall z \exists_s y(\phi \wedge dep(v, y))$

b. Intermediate-Scope $[\forall x/\exists y/\forall z]$: $\forall x \forall z \exists_s y(\phi \wedge dep(vx, y))$

c. Narrow-Scope $[\forall x/\forall z/\exists y]$: $\forall x \forall z \exists_s y(\phi \wedge dep(vxz, y))$

v	x	z	y
v_1	. . .	. . .	b_1
v_1	. . .	. . .	b_1
v_1	. . .	. . .	b_1
v_1	. . .	. . .	b_1

WS: $dep(v, y)$

v	x	z	y
v_1	a_1	. . .	b_1
v_1	a_1	. . .	b_1
v_1	a_2	. . .	b_2
v_1	a_2	. . .	b_2

IS: $dep(vx, y)$

v	x	z	y
v_1	a_1	c_1	b_1
v_1	a_1	c_2	b_2
v_1	a_2	c_3	b_3
v_1	a_2	c_4	b_4

NS: $dep(vxz, y)$

Indefinites interpreted *in-situ*. Exceptional scope behaviour captured using dependence atoms

Application III: Variety of Indefinites

TYPE	FUNCTIONS			REQUIREMENT	EXAMPLE
	SK	SU	NS		
(i) unmarked	✓	✓	✓	none	Italian *qualcuno*
(ii) specific known	✓	✗	✗	$dep(\varnothing, x)$	Russian *-koe*
(iii) specific	✓	✓	✗	$dep(v, x)$	Georgian *-ghats*
(iv) epistemic	✗	✓	✓	$var(\varnothing, x)$	German *-irgend*
(v) non-specific	✗	✗	✓	$var(v, x)$	Russian *-nibud*
(vi) SK + NS	✓	✗	✓	$dep(\varnothing, x) \mathbin{\not\vee} var(v, x)$	unattested
(vii) specific unknown	✗	✓	✗	$dep(v, x) \wedge var(\varnothing, x)$	Kannada *-oo*

Marked indefinites trigger the obligatoriness of (v-)constancy or (v-)variation atoms, responsible for their scopal and epistemic interpretations

Application III: Variety of Indefinites

TYPE	FUNCTIONS SK	SU	NS	REQUIREMENT	EXAMPLE
(i) unmarked	✓	✓	✓	none	Italian *qualcuno*
(ii) **specific known**	✓	✗	✗	$dep(\varnothing, x)$	Russian *-koe*
(iii) specific	✓	✓	✗	$dep(v, x)$	Georgian *-ghats*
(iv) epistemic	✗	✓	✓	$var(\varnothing, x)$	German *-irgend*
(v) non-specific	✗	✗	✓	$var(v, x)$	Russian *-nibud*
(vi) SK + NS	✓	✗	✓	$dep(\varnothing, x) \veebar var(v, x)$	unattested
(vii) specific unknown	✗	✓	✗	$dep(v, x) \wedge var(\varnothing, x)$	Kannada *-oo*

Specific known indefinites: strict existential + constancy

$$\exists_s x(\phi(x, v) \wedge dep(\emptyset, x))$$

Prediction: speaker knowledge inference

v	...	x
w_1	...	a
w_2	...	a

Specific known (SK) ✓

v	...	x
w_1	...	a
w_2	...	b

Specific unknown (SU) ✗

v	...	x
w_1	...	a
w_1	...	b

Non-specific (NS) ✗

Application III: Variety of Indefinites

TYPE	FUNCTIONS SK	SU	NS	REQUIREMENT	EXAMPLE
(i) unmarked	✓	✓	✓	none	Italian *qualcuno*
(ii) specific known	✓	✗	✗	$dep(\varnothing, x)$	Russian *-koe*
(iii) **specific**	✓	✓	✗	$dep(v, x)$	Georgian *-ghats*
(iv) epistemic	✗	✓	✓	$var(\varnothing, x)$	German *-irgend*
(v) non-specific	✗	✗	✓	$var(v, x)$	Russian *-nibud*
(vi) SK + NS	✓	✗	✓	$dep(\varnothing, x) \curlyvee var(v, x)$	unattested
(vii) specific unknown	✗	✓	✗	$dep(v, x) \wedge var(\varnothing, x)$	Kannada *-oo*

Specific indefinites: strict existential + v-constancy

$$\exists_s x(\phi(x, v) \wedge dep(v, x))$$

Prediction: incompatible with scopally non-specific readings (required functional dependence of x on v)

v	...	x
w_1	...	a
w_2	...	a

Specific known (SK) ✓

v	...	x
w_1	...	a
w_2	...	b

Specific unknown (SU) ✓

v	...	x
w_1	...	a
w_1	...	b

Non-specific (NS) ✗

Application III: Variety of Indefinites

TYPE	FUNCTIONS SK	SU	NS	REQUIREMENT	EXAMPLE
(i) unmarked	✓	✓	✓	none	Italian *qualcuno*
(ii) specific known	✓	✗	✗	$dep(\varnothing, x)$	Russian *-koe*
(iii) specific	✓	✓	✗	$dep(v, x)$	Georgian *-ghats*
(iv) **epistemic**	✗	✓	✓	$var(\varnothing, x)$	German *-irgend*
(v) non-specific	✗	✗	✓	$var(v, x)$	Russian *-nibud*
(vi) SK + NS	✓	✗	✓	$dep(\varnothing, x) \veebar var(v, x)$	unattested
(vii) specific unknown	✗	✓	✗	$dep(v, x) \wedge var(\varnothing, x)$	Kannada *-oo*

Epistemic indefinites: strict existential + variation

$$\exists_s x(\phi(x, v) \wedge var(\emptyset, x))$$

Predictions: ignorance inference in specific readings; non-specific readings allowed (including negative ones)

v	...	x
w_1	...	a
w_2	...	a

Specific known (SK)

✗

v	...	x
w_1	...	a
w_2	...	b

Specific unknown (SU)

✓

v	...	x
w_1	...	a
w_1	...	b

Non-specific (NS)

✓

Application III: Variety of Indefinites

TYPE	FUNCTIONS SK	SU	NS	REQUIREMENT	EXAMPLE
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(iv) epistemic	✗	✓	✓	$var(\varnothing, x)$	German *-irgend*
(v) **non-specific**	✗	✗	✓	$var(v, x)$	Russian *-nibud*
(vi) SK + NS	✓	✗	✓	$dep(\varnothing, x) \veebar var(v, x)$	unattested
(vii) specific unknown	✗	✓	✗	$dep(v, x) \wedge var(\varnothing, x)$	Kannada *-oo*

Non-specific indefinites: strict existential + v-variation

$$\exists_s x(\phi(x, v) \wedge var(v, x))$$

Predictions: only scopally non-specific readings allowed (including negative ones); restricted distribution (ungrammatical in episodic sentences)

v	...	x
w_1	...	a
w_2	...	a

Specific known (SK)

✗

v	...	x
w_1	...	a
w_2	...	b

Specific unknown (SU)

✗

v	...	x
w_1	...	a
w_1	...	b

Non-specific (NS)

✓

Impossible to satisfy v-variation unless an operator intervenes between v and x (strict existentials do not allow branching)

Cross-linguistic variation: tendencies and constraints

TYPE	FUNCTIONS SK	SU	NS	REQUIREMENT	EXAMPLE
(i) unmarked	✓	✓	✓	none	Italian *qualcuno*
(ii) specific known	✓	✗	✗	$dep(\varnothing, x)$	Russian *-koe*
(iii) specific	✓	✓	✗	$dep(v, x)$	Georgian *-ghats*
(iv) epistemic	✗	✓	✓	$var(\varnothing, x)$	German *-irgend*
(v) non-specific	✗	✗	✓	$var(v, x)$	Russian *-nibud*
(vi) SK + NS	✓	✗	✓	$dep(\varnothing, x) \veebar var(v, x)$	unattested
(vii) specific unknown	✗	✓	✗	$dep(v, x) \wedge var(\varnothing, x)$	Kannada *-oo*

Why (ii)-(v) common? Why (vi) unattested? Why (vii) rare?

common

(ii)-(v): $\mapsto$ expressed by simple atoms organised in a

DEPENDENCE SQUARE OF OPPOSITION

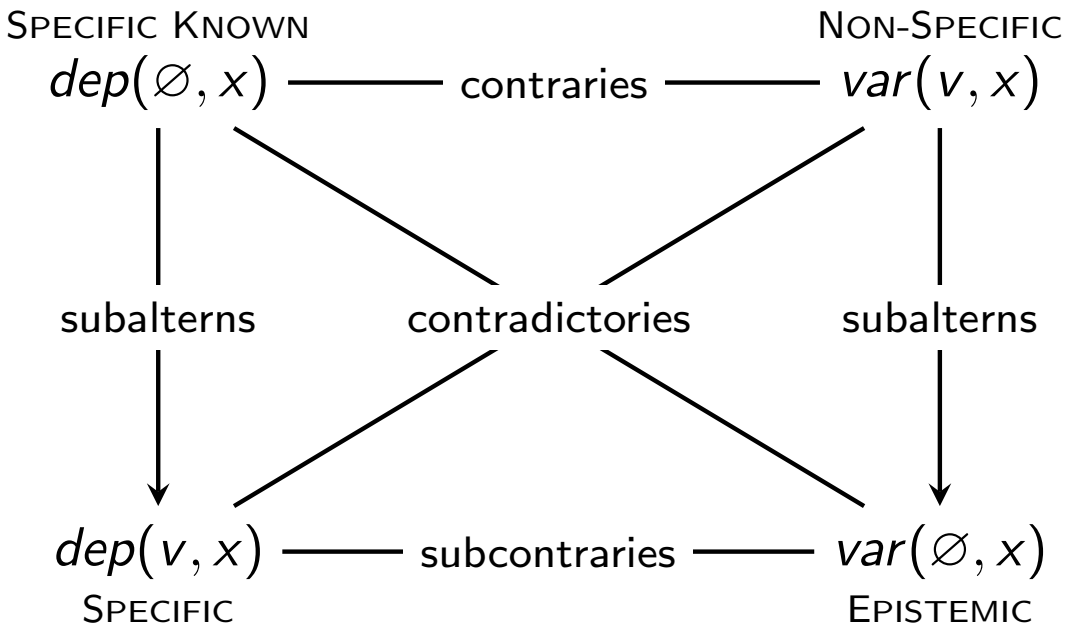
unattested

(vi) SK + NS: violation of CONVEXITY [Gardenfors 2014]

rare

(vii) specific unknown: increased complexity, violation of monotonicity

Dependence Square of Opposition



DEPENDENCE SQUARE OF OPPOSITION

- Contraries: can be both false, but not both true.
- Contradictories: cannot be both true and they cannot be both false.
- Subcontraries: they cannot both be false but can both be true.
- Subalternation:
  A subalternates B iff
  A implies B.

Traditional Square of Opposition

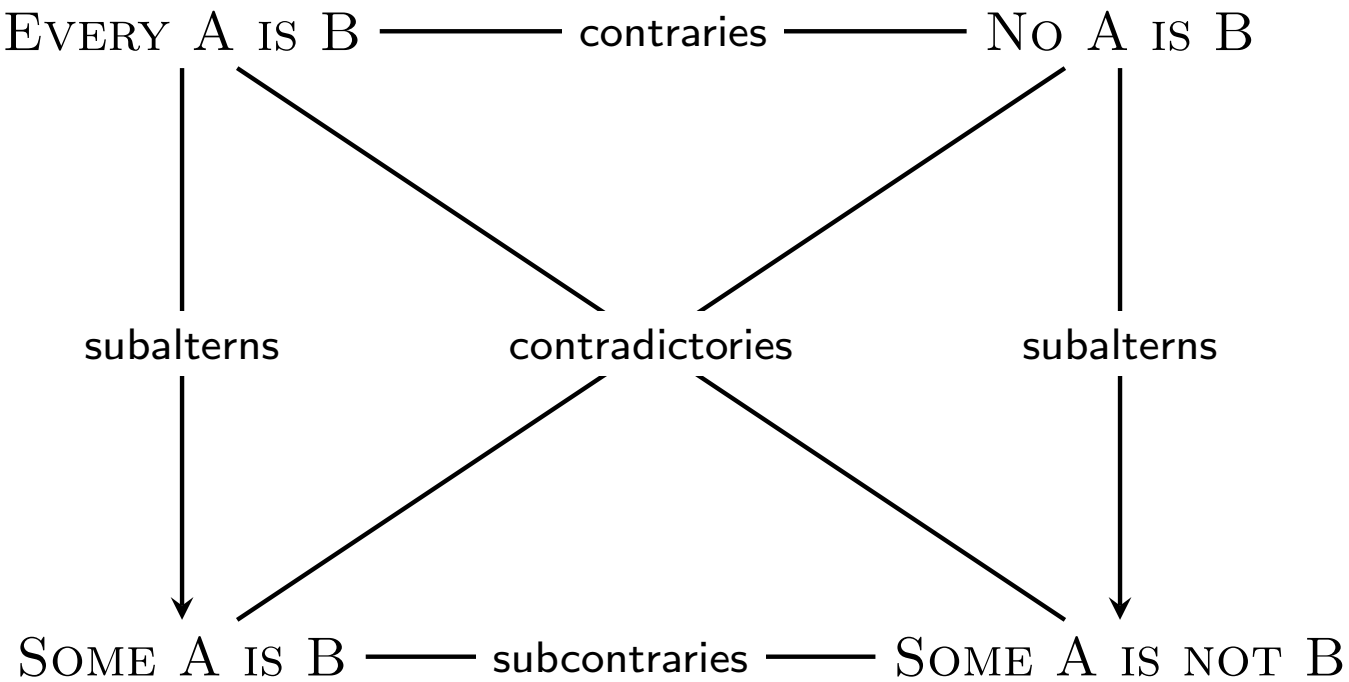


Figure: Aristotle's Square of Opposition

- Contraries: can be both false, but not both true.
- Contradictories: cannot be both true and they cannot be both false.
- Subcontraries: they cannot both be false but can both be true.
- Subalternation: A subalternates B iff A implies B.

Violation of convexity

- Convexity often assumed as a constraint on concept formation and lexicalization [Gardenfors 2014]
  - A region in a (conceptual) space is convex iff for every two points in the region, the line connecting them is also within the region (no gaps allowed!)
- Example: colour space
  - Colour words (*blue, red, . . .*) denote convex areas in colour space
  - *"Blue or red"* and *"not red"* instead do not denote convex areas $\mapsto$ not natural concepts, not lexicalized
- Convexity without conceptual space: we need a relevant ordering
  - A meaning X is convex iff given $A < B < C$: $A \in X$ & $C \in X \Rightarrow B \in X$
- Example: generalised quantifiers ($\mapsto$ sets of sets) $\Rightarrow$ ordering given by $\subseteq$ [van Benthem 1984]
  - *someone; everyone; ...* (convex); *less than* 2 *or more than* 4 *N* (not convex)
- Indefinite functions SK, SU, NS $\mapsto$ sentential meanings
  - In classical semantic theory, sentential meanings $\mapsto$ sets of possible worlds. Unclear how worlds should be ordered.
  - In team semantics: sentential meanings $\mapsto$ sets of teams: we can use $\subseteq$ as relevant ordering

Violation of convexity

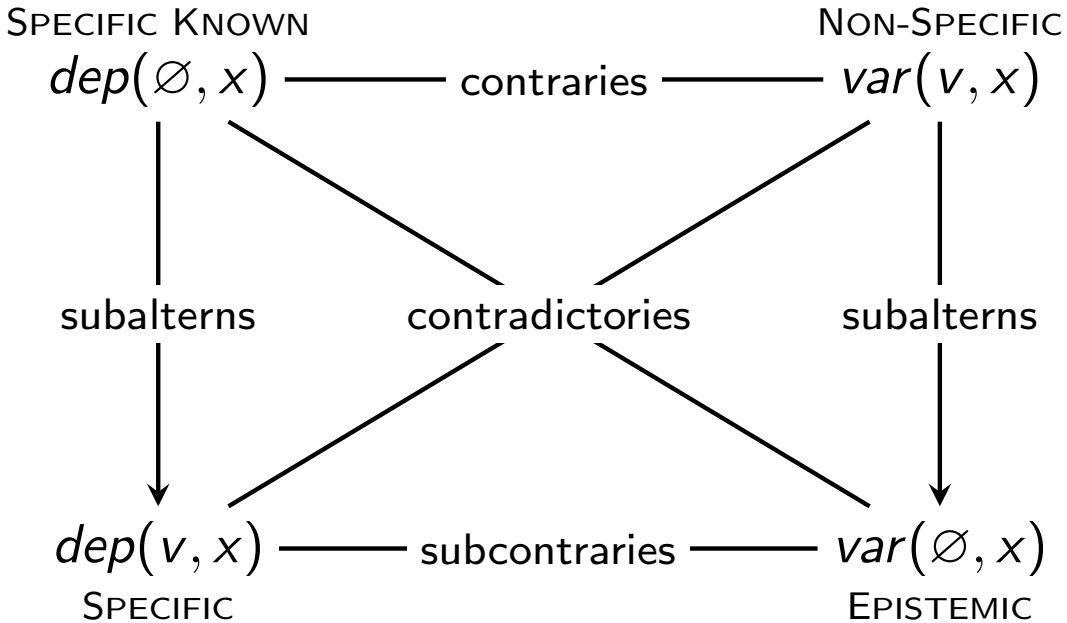
- **Convex meanings (= sets of teams)**:
  - A set of teams M is convex iff for all T_1, T_2, T_3 such that $T_1 \subseteq T_2 \subseteq T_3$, if $T_1 \in M$ and $T_3 \in M$, then $T_2 \in M$.
- The Boolean union of the formulas associated with the SK and NS cells in our map does not satisfy convexity:
  - SK + NS: $dep(\varnothing, x) \mathbin{\mathbb{V}} var(v, x)$ **[not convex]**
- The other two combinations instead define convex sets:
  - SK + SU: $dep(\varnothing, x) \mathbin{\mathbb{V}} (var(\varnothing, x) \wedge dep(v, x)) \equiv dep(v, x)$ [convex]
  - SU + NS: $(var(\varnothing, x) \wedge dep(v, x)) \mathbin{\mathbb{V}} var(v, x) \equiv var(\varnothing, x)$ [convex]
- A reasonable constraint on implicational maps: contiguous cells must denote convex meanings (no gaps allowed!)
- This gives us a principled explanation of the specific ordering among functions assumed in the original Haspelmath's map:

SK-SU-NS (✓)

SU-SK-NS (✗)

SK-NS-SU (✗)

Diachronic tendencies

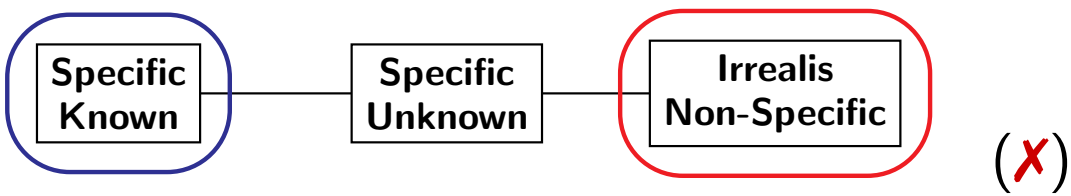


Dependence Square of Opposition

Hard logical constraints

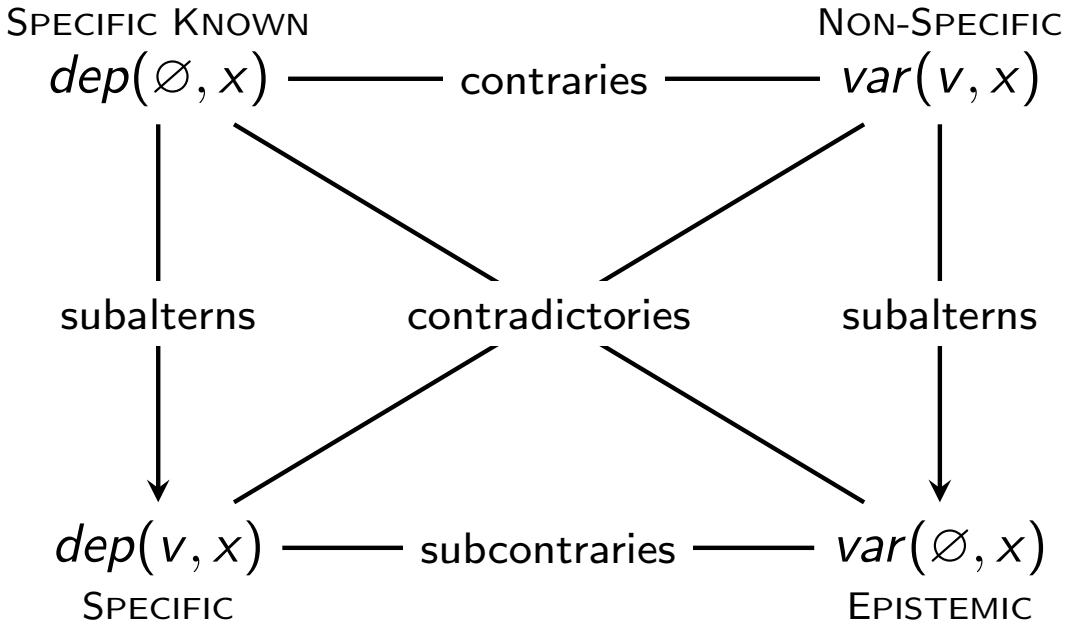
No changes between **contradictories**.

No changes between **contraries** (violation of convexity).



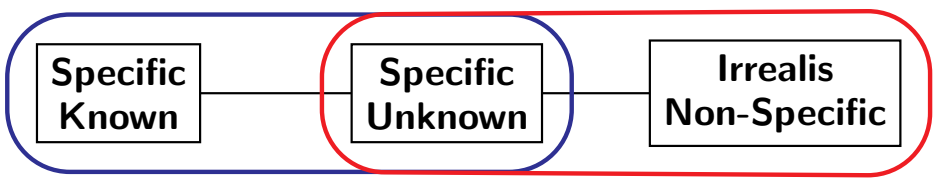
Implicational map of functions

Diachronic tendencies



Dependence Square of Opposition

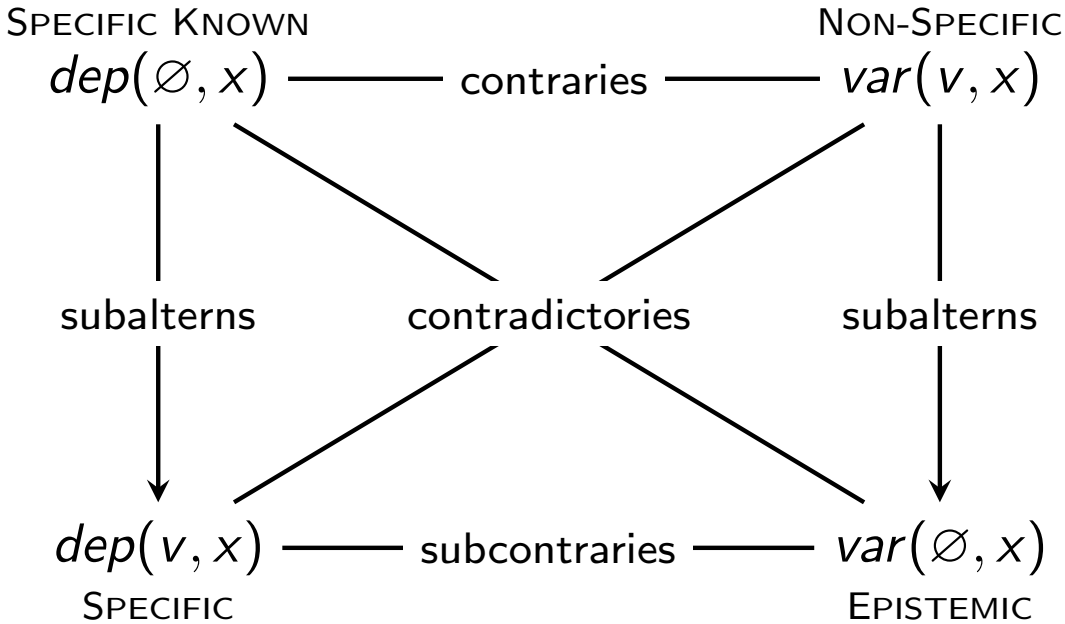
Changes between **subcontraries** logically possible, but the indefinite must both gain and lose a function. **Functional gain/loss** should be gradual.



(✗)

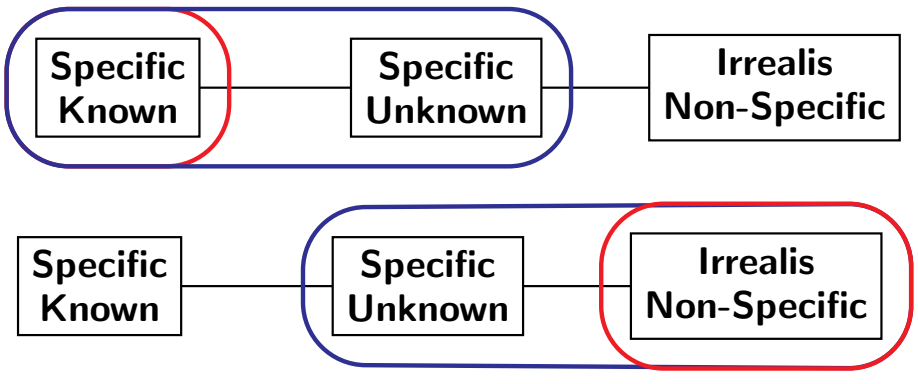
Implicational map of functions

Diachronic tendencies



Dependence Square of Opposition

Changes into subalterns correspond to semantic weakening (Heine 1997; Traugott and Dasher 2002; Hopper and Traugott 2003)



Diachronic tendencies

A further constraint: concreteness

- The representation of **known vs unknown** requires reference to speaker epistemic states (sets of abstract entities);
- Conjecture: 3 phases of development (reflected by our implementations):
  - Only individual quantification ($\forall x/\exists x$): [Farkas & Brasoveanu 2011]

    specific vs non-specific distinctions wrt to individual quantifiers
  - Adding quantification over worlds ($\forall w/\exists w$):

    specific vs non-specific also wrt modal operators [only root modals]
  - Adding reference to epistemic states (designated v):

    also **known vs unknown** [also epistemic modals]
- It is reasonable to assume that individual quantification (concrete) precedes world quantification (abstract) and therefore reference to epistemic states (abstract + indexical):

$$\text{concrete} > \text{abstract} > \text{abstract} + \text{indexical}$$

  which gives us:

$$(\text{NON-})\text{SPECIFIC} > (\text{UN})\text{KNOWN}$$

Diachronic tendencies

OLD INDEFINITE	NEW INDEFINITE	**logic**	**function-** al gain	**concre-** teness	example
specific known	specific	$\Rightarrow$	[+1]	✗	unattested
specific known	epistemic	$\bot$	[-1+2]	-	unattested
specific known	non-specific	convexity	[-1+1]	✗	unattested
specific known	unmarked	$\Rightarrow$	[+2]	-	unattested
specific	specific known	$\Leftarrow$	[-1]	✓	unattested
specific	epistemic	$\not\Rightarrow/\not\Leftarrow$	[-1+1]	✓	unattested
specific	non-specific	$\bot$	[-2+1]	-	unattested
specific	unmarked	$\Rightarrow$	[+1]	-	**English** *one*
epistemic	specific known	$\bot$	[-2+1]	-	unattested
epistemic	specific	$\not\Rightarrow/\not\Leftarrow$	[-1+1]	✗	unattested
epistemic	non-specific	$\Leftarrow$	[-1]	✗	Italian *alcuno*
epistemic	unmarked	$\Rightarrow$	[+1]	-	**Icelandic** *nokkur*
non-specific	specific known	convexity	[-1+1]	✓	unattested
non-specific	specific	$\bot$	[-1+2]	-	unattested
non-specific	epistemic	$\Rightarrow$	[+1]	✓	**German** *irgendein*
non-specific	unmarked	$\Rightarrow$	[+2]	-	unattested

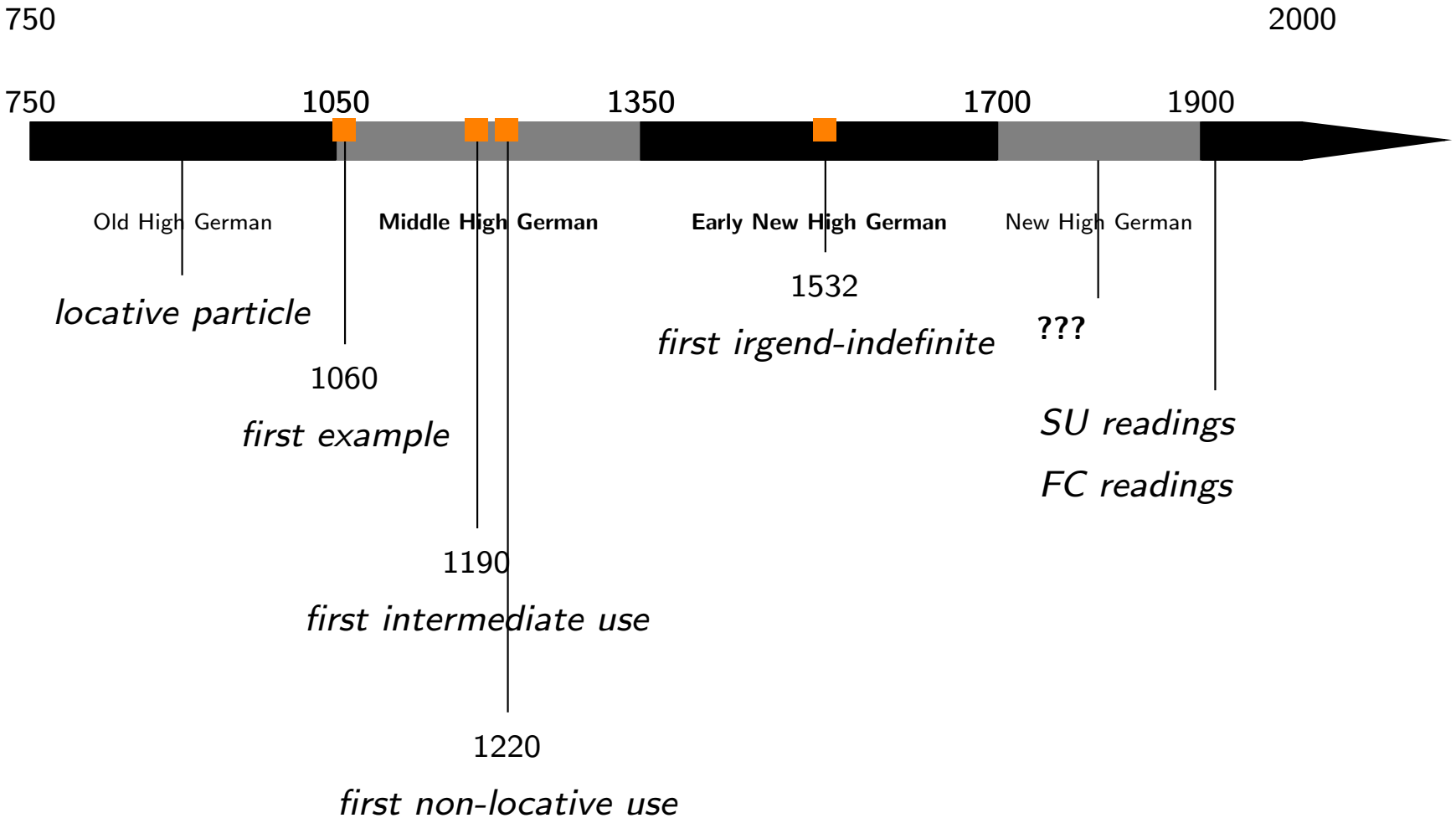
Table: Adapted from Degano 2024.

Two predictions

- NON-SPECIFIC > EPISTEMIC (✓): frequent diachronic tendency (e.g. French *quelque* (Foulet 1919) and German *irgendein* (Port and Aloni 2015))
- EPISTEMIC > NON-SPECIFIC (✗): but what about Italian *alcuno*?

The case of *irgend* (Angelika Port)

- Phase 1: Locative particle with non-specific existential meaning in Old High German till Early Middle High German
- Phase 2: loss of locative meaning in Classical Middle High German
- Phase 3: a non-specific indefinite modifier in New High German
- Phase 4: an epistemic indefinite with emphatic FC uses in Present Day German



Phase 1 (Old High German till Early Middle High German)

Locative particle with non-specific (but no negative) existential meaning

Proposed analysis

- Lexical contribution of *irgend*$_1$: locative + s-existential + *v*-variation
- Implementation: with x_L ranging over locations

$$\textit{irgend}_1 \mapsto \lambda P \exists_s x_L (P(x) \wedge \textit{var}(v, x))$$

- Predictions: only locative meaning; distribution restricted to non-specific contexts (including negative ones)
- Conjecture: no negative uses due to competition with *nirgens*

Functions	**nirgend** (negative)	**irgend**$_1$ (non-specific)
DN	OK	out
IN	OK	out
other non-specific contexts	?	OK

At this stage, *nirgend* has both direct and indirect negation uses, as typical of n-words in a Negative Concord (NC) language. Middle High German is only at the beginning of its transition from a NC language to a Double Negation language. [Port & MA 2021]

Phase 2 (Classical Middle High German)

Loss of locative meanings; first emergence of indefinite modifier uses and negative existential meanings

Proposed analysis

- Lexical contribution of *irgend*$_2$: s-existential + *v*-variation

$$\textit{irgend}_2 \mapsto \lambda P \exists_s x(P(x) \wedge \textit{var}(v, x))$$

- Predictions: non-locative meanings allowed; distribution restricted to non-specific contexts (including negative ones)
- Conjecture: emergence of negative uses possibly explained by the removal of early blocking effects caused by *nirgens*, which **never acquired non-locative meaning**

Functions	**nirgend** (negative)	**irgend**$_1$ (non-specific)
DN	OK	out
IN	OK	OK
other non-specific contexts	?	OK

Phase 3 (Early New High German)

The particle *irgend* starts modifying indefinites and in the process loses its existential force and keeps non-specificity as its only lexical contribution

Proposed analysis

- Lexical contribution of $irgend_3$: v-variation (semantic variation)

$$irgend_3 + ein \mapsto \lambda P \exists_s x(P(x) \wedge var(v, x))$$

- Predictions: distribution restricted to non-specific contexts (including negative ones)
- *Irgendein* enters now into the paradigm of German indefinites

functions	ein	kein	irgendein
SK	OK	out	out
SU	OK	out	out[1]
DN	out	OK	out
IN	OK	OK[2]	OK
non-specific	OK	out	OK

[1] Only one example of SU use which we assume is not yet fully established.

[2] IN still possible for *kein* because, we conjecture, Early New High German is still in transition from a NC to a Double Negation phase.

Phase 4 (Present Day German)

From a non-specific to an epistemic indefinite with very frequent specific unknown (SU) uses as well as emphatic free choice (FC) uses

Proposed analysis

- Lexical contribution of *irgend*$_4$: variation (pragmatic variation)

$$\textit{irgend}_4 + \textit{ein} \mapsto \lambda P \exists_s x(P(x) \wedge \textit{var}(\emptyset, x))$$

- Predictions: ignorance inference in specific uses; co-variation in non-specific uses (including negative ones)
- Emphatic FC readings derived as obligatory implicatures triggered by Domain Widening (contributed by stress) (Port & MA 2021):
  - DW comes with a strengthening condition (DW licensed only if it leads to stronger meanings), which is only satisfied in negative or FC readings
- Alternative explanation for FC presented by Degano (2024) involves using total variation function ($\textit{var}_{|D|}(v, x)$)

Summary development of *irgend*

- Conjectured bleaching in lexical contribution of *irgend*:
  1. Locative particle: locative + existential + non-specificity (= v-variation)
  2. Loss of locative meaning: existential + non-specificity
  3. Indefinite modifier: non-specificity
- Shift from non-specific to epistemic:
  4. from v-variation to variation (weakening (✓) + concreteness (✓))
- Interaction with negative contexts explained in terms of blocking caused by alternative forms:
  - In phase 1, IN uses blocked by n-word competitor *nirgens*
  - In phase 4, only DN uses blocked by competitor *kein*
- FC uses explained either as obligatory implicatures triggered by DW (contributed by stress) (alternative explanation in Degano (2024)))

Summary development of *irgend*

EXPRESSION	FUNCTIONS					LEXICAL CONTRIBUTION
	SK	SU	NS	IN	FC	
(i) irgend$_1$	✗	✗	✓	blocked	✗	$\exists_s$ + $var(v, x)$ + locative
(ii) irgend$_2$	✗	✗	✓	✓	✗	$\exists_s$ + $var(v, x)$
(iii) irgend$_3$	✗	✗	✓	✓	✗	$var(v, x)$
(iv) irgend$_4$	✗	✓	✓	✓	✗	$var(\varnothing, x)$
(v) IRGEND$_4$	✗	DW-strengthng[3]		✓	✓	$var(\varnothing, x)$ + DW

From (i) to (iii): bleaching (+ removal of early blocking)

From (iii) to (iv): from non-specific to epistemic (weakening (✓))

From (iv) to (v): effect of domain widening triggered by stress

[3] Strengthening condition triggered by DW not satisfied.

The case of *aliquis* and *alcuno* (Gianollo 2020)

- Latin *aliquis* is an epistemic indefinite with late emergence of negative uses:
  - only epistemic (Classic Latin) > epistemic + negative (Late Latin)
- In our framework it can be analized as a s-existential triggering variation:
  - Predictions: obligatory ignorance inference in positive episodic sentences; non-specific readings allowed (including negative ones)
  - Conjecture: Late emergence of negative uses possibly explained by the removal of early blocking effects caused by other determiners like *nullus*, 'no' (Gianollo 2020).
- Italian *alcuno*: retained only negative uses
  - epistemic + negative (Late Latin) > negative (Italian)
- The broader picture from Romance:

epistemic + negative	**only epistemic**	**only negative**
Spanish *algún*	Catalan *algun*	Italian *alcuno*
Portuguese *algum*		French *aucun*

From *aliquis* to *alcuno*

The change from epistemic (*aliquis*) to negative (*alcuno*):

- not explained by our framework (neither weakening nor concreteness apply) but also not contrary to our predictions;
- 2 possible explanations: (similarly for French *aucun*)
  - (a) emergence of DW (just like the change from *irgend*$_4$ to IRGEND$_4$);
  - (b) blocking due to competition with positive epistemic indefinite *un qualche*.

EXPRESSION	FUNCTIONS					REQUIREMENT
	SK	SU	NS	IN	FC	
(i) aliquis (classic)	✗	✓	✓	blocked[4]	✗	$var(\varnothing, x)$
(ii) aliquis (late)	✗	✓	✓	✓	✗	$var(\varnothing, x)$
(iii-a) alcuno	✗	strengthening[5]		✓	blocked[6]	$var(\varnothing, x)$ + DW
(iii-b) alcuno	✗	blocked[7]		✓	✗	$var(\varnothing, x)$

[4] By *nullus*
[5] Strengthening condition triggered by DW not satisfied.
[6] By *qualunque* (or *n'importe qu* in French)
[7] By *un qualche* (or *quelque* in French, Jayez & Tovena, 2011).

Conclusions of diachronic tendencies

- Change from non-specific to epistemic:
  - predicted by our framework (weakening + concreteness) [*irgend*, *qualque*]
- Change from epistemic to negative:
  - can be explained by DW and/or blocking [*alcuno, aucune*]

EXPRESSION	FUNCTIONS					REQUIREMENT
	SK	SU	NS	IN	FC	
(i) non-specific	✗	✗	✓	✓	✗	$var(v, x)$
(ii) epistemic	✗	✓	✓	✓	✗	$var(\varnothing, x)$
(iii-a) negative	✗	DW-strengthng		✓	blocked	$var(\varnothing, x)$ + DW
(iii-b) negative	✗	blocked		✓	✗	$var(\varnothing, x)$

Conclusions of diachronic tendencies

- The change from epistemic to non-specific instead less plausible:
  - (a) weakening (✗); concreteness (✗);
  - (b) DW does not help (also NS would be ruled out by strengthening);
  - (c) blocking would be quite implausible:
    - The blocking expression would have to be a form specialised for SU readings (which are rare because too complex)
    - Assumption on blocking: blocking expression specialised for a subset of the functions of the blocked item (specific indefinites cannot block here)

EXPRESSION	FUNCTIONS					REQUIREMENT
	SK	SU	NS	IN	FC	
(i) epistemic	✗	✓	✓	✓	✗	$var(\varnothing, x)$
(ii-a) non-specific	✗	✗	✓	✓	✗	$\#var(v, x)$
(ii-b) non-specific	✗	#streng	✓	✓	✗	$var(\varnothing, x)$ + #DW
(ii-c) non-specific	✗	#blocke	✓	✓	✗	$var(\varnothing, x)$

Conclusions

We have developed a **two-sorted team semantics** framework accounting for indefinites cross-linguistically.

In this framework, **marked indefinites** trigger the obligatoriness of dependence or variation atoms, responsible for their scopal and epistemic interpretations.

We have applied the framework to characterize the **typological variety of indefinites** in the case of (non-)specificity, as well as their **diachronic tendencies**.

Future work: better integration of negative and free choice uses in general framework; better understanding of constraints on blocking; more (diachronic) data to further test our predicitons.

THANK YOU![8]

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