A team semantics for FC indefinites and their grammaticalization

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Plan of the talk

1. Indefinites and FC
2. Grammaticalization
3. Team Semantics
4. Formal Diachronic Analysis
5. Conclusion

Outline

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Indefinite Pronouns

The English *some*-series, a canonical example of indefinite pronoun:

(1) John bought **something** yesterday.

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However, cross-linguistically indefinites display a **great variety in form and meaning**. For instance, the specific -ღაც (*-ghats*) vs the non-specific -მე (*-me*) in Georgian:

(2) ჯონმა გუშინ რაღაც/*რამე იყიდა
John-ERG yesterday raghats/*rame buy-PST.3SG
'John bought something yesterday.'

(3) ჯონს გუშინ რაღაც-ის/რამე-ის ყიდვა სურდა
John-DAT yesterday raghats/rame-GEN buy-INF want-PST.3SG
'John wanted to buy something yesterday.'

Indefinites and Free Choice

(4) a. You can take any book.
b. You can take a book and **every book is a possible option**.

[Aloni 2007; Chierchia 2013; Dayal 1998; Giannakidou 2001; Jayez and Tovena 2005; Menéndez-Benito 2005]

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    b. You can take a book and **every book is a possible option**.

They are quite frequent cross-linguistically:

English *anyone*
Spanish *cualquier(a)*
Japanese *daredemo*
Italian *qualunque*
Dutch *wie dan ook*
Hebrew *kol*
...

[Aloni 2007; Chierchia 2013; Dayal 1998; Giannakidou 2001; Jayez and Tovena 2005; Menéndez-Benito 2005]

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...	

They normally cannot occur freely, but they display restricted distributions (e.g., they are licensed by modals):

(5) a. *Anyone fell.
b. Anyone could fall.

[Aloni 2007; Chierchia 2013; Dayal 1998; Giannakidou 2001; Jayez and Tovena 2005; Menéndez-Benito 2005]

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Grammaticalization Patterns

The grammaticalization of *wh*-based FC indefinites has been studied in several diachronic works:

A broad cross-linguistic generalization of the grammaticalization process:

1. Unconditional phase
2. Appositive phase
3. Indefinite phase

[Company Company and Loyo 2006; Degano 2022; Degano and Aloni 2021; Halm 2021; Haspelmath 1997; Pescarini 2010; de Vos 2010]

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To illustrate this trend, we will use the Dutch indefinite *wie dan ook* as a representative item, while keeping the rest of the simplified examples in English.

[Company Company and Loyo 2006; Degano 2022; Degano and Aloni 2021; Halm 2021; Haspelmath 1997; Pescarini 2010; de Vos 2010]

Unconditional phase

First phase: Unconditional headed by a *wh*-element. Typically in combination with other elements (e.g., *dan ook* in the case of *wie dan ook*) will then be part of the grammaticalized indefinite.

(6) UNCONDITIONAL
Wie dan ook comes to the talk, I should present well.
Whoever comes to the talk, I should present well.

Appositive phase

Intermediate phase: the expression occurs as appositive often marked by two commas. Two typical anchors:

1. the anchor is a 'referential expression' (e.g., a proper name), as in (7);
2. the anchor is a non-referential expression (e.g., a plain indefinite), as in (8).

(7) John, *wie dan ook*, passed the exam.
Ignorance: John passed the exam and the speaker does not know who John is.

(8) A student, *wie dan ook*, can pass the exam.
Free Choice: Any student can pass the exam.

Indefinite phase

Final phase: full-fledged determiner or pronoun:

(9) *Wie dan ook* can pass the exam.
Free Choice: Anyone can pass the exam.

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Team Semantics

In team semantics, formulas are evaluated wrt a **set of evaluation points**, called **team**.

T	x	y
i_1	d_1	d_1
i_2	d_1	d_1
i_3	d_2	d_1
i_4	d_2	d_1

A team T: a set of assignments $i : V \to M$

[Hodges 1997; Väänänen 2007]

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This allows us to express relationships of functional **dependence** between variables.

Dependence Atom:

$$M, T \models dep(\vec{x}, y) \Leftrightarrow \text{ for all } i, j \in T : i(\vec{x}) = j(\vec{x}) \Rightarrow i(y) = j(y)$$

[Hodges 1997; Väänänen 2007]

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$dep(x, y)$ ✓ $dep(\varnothing, y)$ ✓ $dep(y, x)$ ✗

[Hodges 1997; Väänänen 2007]

Teams as information states

Aloni and Degano (2022): two-sorted team semantics, with v as designated variable for the actual world.

Teams as information states of speakers. In initial teams only factual information is represented.The world variable v captures the speaker's epistemic state.

Initial team: A team T is *initial* iff $Dom(T) = \{v\}$.

v
v_1
v_2
$\dots$
v_n

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v_1	a
v_2	a
$\dots$	a
v_n	a

Discourse information is added by operations of assignment extensions.

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v_2	a	w_2
$\dots$	a	$\dots$
v_n	a	w_n

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v	x	w	y
v_1	a	w_1	b_1
v_2	a	w_2	b_2
...	a	...	...
v_n	a	w_n	b_n

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v_2	a	w_2	b_2	$\dots$
$\dots$	a	$\dots$	$\dots$	$\dots$
v_n	a	w_n	b_n	$\dots$

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v_1	a	w_1	b_1	...
v_2	a	w_2	b_2	...
...	a	...	...	...
v_n	a	w_n	b_n	...

Discourse information is added by operations of assignment extensions.

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

Aloni & Degano (2022) - Basics

Indefinites are treated as **strict** existentials (i.e., extensions of the form $T \rightarrow D$):

(10) **Someone** called.
$\exists_{\mathbf{s}}\mathbf{x}\ \phi(x, v)$

v	x
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Universal quantifiers are captured via **universal extensions**:

(11) **Everyone** called.
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v	x
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v_1	d_2
v_2	d_1
v_2	d_2

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v_2	d_1
v_2	d_2

Existential modals are treated as **lax** existentials (i.e., extensions of the form $T \to \wp(W) \setminus \{\varnothing\}$)

(12) John **may** walk.
$\exists_{l}\mathbf{w}\ \phi(j, w)$

v	w
v_1	w_1
v_2	w_1
v_2	w_2

Aloni & Degano (2022) - Marked Indefinites

In Aloni & Degano (2022), marked indefinites trigger the obligatory activation of particular atoms, responsible for their enriched meaning and restricted distribution:

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

Marked (Non)-specific Indefinites

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Marked (Non)-specific Indefinites

Can we extend the account to free choice indefinites?

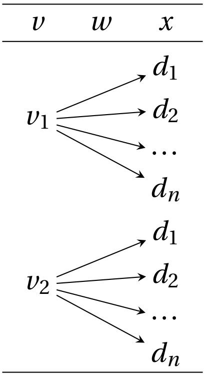
Generalized Variation

Generalized Variation Atom

$M, T \models VAR_n(\vec{z}, u) \Leftrightarrow$ for all $i \in T: |\{j(u) : j \in T$ and $i(\vec{z}) = j(\vec{z})\}| \geq n$

$M, T \models VAR_{|D|}(v, x) \Leftrightarrow$ for all $i \in T: |\{j(x) : j \in T$ and $i(v) = j(v)\}| = |D|$

(13) You can take anything.
$\exists_l w \exists_s x(\phi(x, w) \wedge VAR_{|D|}(v, x))$



[Galliani 2012; Väänänen 2022]

Some facts

FC indefinites are ungrammatical in episodic contexts, since we analyze them as strict existentials with a total variation component:

(14) *John took anything
$\exists_s x(\varphi(x, v) \wedge VAR_{|D|}(v, x))$

v	x
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FC indefinites cannot be licensed by *bona-fide* quantifiers:
$VAR_{|D|}(v\vec{y}, x)$

(15) *Everyone took anything
$\forall y \exists_s x(\varphi(x, v) \wedge VAR_{|D|}(vy, x))$

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General Plan

Phases	Total Variation
1. Unconditional	Pragmatic inference $VAR_{\|D\|}(\varnothing, x)$
	↓ conventionalization
2. Appositive	Conventional NON-AT-ISSUE $VAR_{\|D\|}(\varnothing, x)$
	↓ strengthening
	Conventional NON-AT-ISSUE $VAR_{\|D\|}(v, x)$
	↓ integration
3. Indefinite	Conventional AT-ISSUE $VAR_{\|D\|}(v, x)$

Conjecture on **grammaticalization** processes:

Total variation as an **originally pragmatic** inference.

Appositive phase as a **conventionalization** bridge for **integrating** total variation into the semantic content of the indefinite.

Unconditionals

The antecedent of an unconditional denotes an **interrogative clause**, analyzed as a set of alternatives/teams.

(16) UNCONDITIONAL
  a. Whoever comes to the talk, I should present well
  b. $?\, x\phi(x, v) \Rightarrow \psi(v)$

[1] A similar analysis can be put forward for unconditionals of the form 'whether Mary or John will come to talk, ...', since inquisitive disjunction is definable with dependence atoms:

$$\phi \mathbin{\rotatebox[origin=c]{180}{$\forall$}} \psi \equiv \exists x \exists y (dep(\emptyset, x) \wedge dep(\emptyset, y) \wedge (x = y \wedge \phi) \vee (x \neq y \wedge \psi))$$

[Ciardelli 2016; Rawlins 2008]

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Proposal: an unconditional requires for *all* alternatives T' of the antecedent, that their intersection with the initial team T supports the consequent.[1]

$$M,T \models \phi \Rightarrow \psi \Leftrightarrow \forall T' \in Alt(\phi): M,T \cap T' \models \psi$$

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How to define $Alt(\phi)$?

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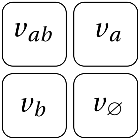
[Ciardelli 2016; Rawlins 2008]

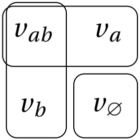
Questions and Team Semantics

A team-based system gives naturally rise to a treatment of questions by taking teams as set of alternatives.

The framework is expressive enough to take different theoretical choices (partition semantics, inquisitive semantics, ...).



Partion



Inq Sem (mention-some)

[Ciardelli 2022; Ciardelli, Groenendijk, and Roelofsen 2018]

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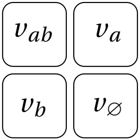

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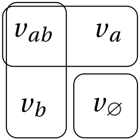


Inq Sem (mention-some)

Preliminary observation: *Wh*-questions are typically associated with **existential presuppositions**: ‘Who danced?’ presupposes that ‘Someone danced’.

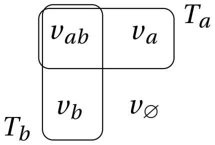
[Ciardelli 2022; Ciardelli, Groenendijk, and Roelofsen 2018]

Illustration

Whoever comes to the talk, I should present well.

$$M, T \models ?x\phi(x, v) \Rightarrow \psi(v) \Leftrightarrow \forall T' \in Alt(?x\phi(x, v)) : M, T \cap T' \models \psi(v)$$

Take an initial team $T^v = \{v_a, v_b\}$ with $D = \{a, b\}$.



$Alt(?x\phi(x, v))$

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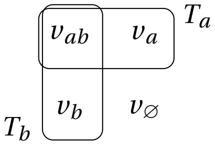


$Alt(?x\phi(x,v))$

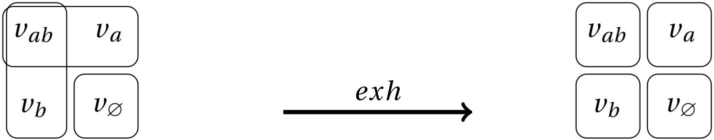
However, consider $T^v = \{v_{ab}\}$. Felicitous even in a context in which we *know* that both a and b come to talk.

Exhaustification

Two possible routes:

(i) We adopt a partion treatment of questions from the beginning;

(ii) We add an exhaustification operator.



Non-Empty Requirement

Whoever comes to the talk, I should present well.

$M, T \models ?x\phi(x, v) \Rightarrow \psi(v) \Leftrightarrow \forall T' \in Alt(?x\phi(x, v)) : M, T \cap T' \models \psi(v)$

$$\begin{array}{cc} \boxed{v_{ab}} & \boxed{v_a} \\ \boxed{v_b} & v_\varnothing \end{array}$$

However, consider $T^v = \{v_b\}$. Note that $M, \varnothing \models \psi(v)$.

[2] Conditional antecedents are typically taken to be consistent with the context set (Stalnaker 1976, Gillies 2004).

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$\boxed{v_{ab}}$	$\boxed{v_a}$
$\boxed{v_b}$	$v_{\varnothing}$

However, consider $T^v = \{v_b\}$. Note that $M, \varnothing \models \psi(v)$.

We thus require that all alternatives in the antecedent intersect with the inital team T: $T \cap T' \neq \varnothing$.[2]

$M, T \models ?x\phi(x, v) \Rightarrow \psi(v) \Leftrightarrow \forall T' \in Alt(?x\phi(x, v)) : M, T \cap T' \models \psi(v)$ and $T \cap T' \neq \varnothing$.

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Unconditionals and variation

(17) UNCONDITIONAL
Wie dan ook comes to the talk, I should present well.
Whoever comes to the talk, I should present well.

$M, T \models (?x\phi(x, v)) \Rightarrow \psi(v) \Leftrightarrow \forall T' \in Alt(?x\phi(x, v)) : M, T \cap T' \models \psi(v)$ and $T \cap T' \neq \varnothing$.

Unconditionals and variation

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Wie dan ook comes to the talk, I should present well.
Whoever comes to the talk, I should present well.

$M, T \models (?x\phi(x,v)) \Rightarrow \psi(v) \Leftrightarrow \forall T' \in Alt(?x\phi(x,v)) : M, T \cap T' \models \psi(v)$ and $T \cap T' \neq \varnothing$.

This non-empty requirement gives us that the following must hold in the initial team T:

$$M, T \models \exists_s x(\phi(x,v) \wedge VAR_{|D|}(\varnothing, x))$$

In other words, an unconditional is felicitous if we are in a situation where any individual might satisfy the antecedent.

We classify the $VAR_{|D|}(\varnothing, x)$ condition as a form of **'pragmatic' inference**, as it follows from the non-empty requirement operative in the unconditional.

Appositives

Appositives contribute to **non-at-issue** dimension of semantic meaning:

(18) John, the postman, walks.

a. AT-ISSUE: $W(j)$

b. NON-AT-ISSUE:: $P(j)$

[Potts 2005; Schlenker 2010; Wang, Reese, and McCready 2005]

Appositives

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(18) John, the postman, walks.

a. AT-ISSUE: $W(j)$

b. NON-AT-ISSUE:: $P(j)$

In the diachronic data, we find similar appositive constructions:

(19) 'REFERENTIAL APPOSITIVE'

John, *wie dan ook*, passed the exam.

Ignorance: John passed the exam and the speaker does not know who John is.

(20) 'NON-REFERENTIAL APPOSITIVE'

A student, *wie dan ook*, can pass the exam.

Free Choice: Any student can pass the exam.

[Potts 2005; Schlenker 2010; Wang, Reese, and McCready 2005]

Proper Names

Proper names refer to the same individual in a particular epistemic possibility of the speaker: $dep(v, j)$ holds for any name j.

But the value of proper names may **differ across epistemic possibilities**.

(21) a. John passed the exam.
b. $P(j, v)$

v	j
v_1	d_1
v_2	d_2
v_3	d_2
v_4	d_3

Appositives and Proper Names

Proposal: the variation condition $VAR_{|D|}(\varnothing, x)$ we discussed for the unconditional now represents the contribution of the appositive at a non-at-issue level:

(22) John, *wie dan ook*, passed the exam.
  a. At issue: $P(j, v)$
  b. Non at-issue: $VAR_{|D|}(\varnothing, j)$

v	j
v_1	d_1
v_2	d_2
...	...
v_n	d_n

Appositives and non-referential expressions

(23) A student, *wie dan ook*, can pass the exam.

a. At issue: $\exists_l w \exists_s x\ \phi(x, w)$

b. Non at-issue: $VAR_{|D|}(\emptyset, x)$

v	w	x
v_1	w_1	d_1
v_2	w_2	d_2
...	...	...
v_n	w_n	d_n

v	w	x
v_1	w_1	d_1
v_1	...	...
v_2	...	...
v_2	w_n	d_n

v	w	x
v_1	w_1	d_1
v_1	w_2	d_2
v_1	...	...
v_1	w_n	d_n

(a) corresponds to a specific use of total ignorance, while (c) is the non-specific narrow-scope reading conveying free choice.

Strengthening of $VAR_{|D|}(\emptyset, x)$ to $VAR_{|D|}(v, x)$:

❶ Disambiguation: $VAR_{|D|}(v, x)$ only compatible with narrow-scope.

❷ Conventionalization of the strongest possible meaning.

Appositives and non-referential expressions

(23) A student, *wie dan ook*, can pass the exam.

a. At issue: $\exists_l w \exists_s x\ \phi(x, w)$

b. Non at-issue: $VAR_{|D|}(\varnothing, x)$

v	w	x
v_1	w_1	d_1
v_2	w_2	d_2
...	...	...
v_n	w_n	d_n

v	w	x
v_1	w_1	d_1
v_1	...	...
v_2	...	...
v_2	w_n	d_n

v	w	x
v_1	w_1	d_1
v_1	w_2	d_2
v_1	...	...
v_1	w_n	d_n

(a) corresponds to a specific use of total ignorance, while (c) is the non-specific narrow-scope reading conveying free choice.

Strengthening of $VAR_{|D|}(\varnothing, x)$ to $VAR_{|D|}(v, x)$:

1. Disambiguation: $VAR_{|D|}(v, x)$ only compatible with narrow-scope.
2. Conventionalization of the strongest possible meaning.

Non-specific uses are only possible in (modal) embedded contexts.

Merging at-issue and non-at-issue

We merge AT-ISSUE and NON-AT-ISSUE semantic content to preserve the anaphoric relations between the two dimensions.[3]

$T \models merge(\phi_{\text{at-issue}} \mathbin{/\!\!\!\wedge} \phi_{\text{non-at-issue}})$ iff
T $\models \phi_{\text{at-issue}}$ and there is a T' s.t. $T[\phi_{\text{at-issue}}]T'$ and $T' \models \phi_{\text{non-at-issue}}$

(24) A student, *wie dan ook*, can pass the exam.
   a. At issue: $\exists_l w \exists_s x(\phi(x, w))$
   b. Non at-issue: $VAR_{|D|}(v, x)$

v
v_1
...
v_n

$\rightarrow$

v	w	x
v_1	w_1	d_1
...	...	...
v_n	w_n	d_n

$\rightarrow$

v	w	x
v_1	w_1	d_1
...	...	...
v_n	w_n	d_n

[3] See Appendix B for a Dynamic Team Semantics which behaves accordingly.

Free Choice

In the last phase, the strengthened $VAR_{|D|}(v, x)$ is integrated into the semantics of the indefinite.

(25) a. *Wie dan ook* can pass the exam.

b. $\exists_l w \exists_s x(\phi(x, v) \wedge VAR_{|D|}(v, x))$

v	w	x
	$\vdots$	d_1
v_1	$\vdots$	d_2
	$\vdots$	$\dots$
	$\vdots$	d_n

Outline

1. Indefinites and FC

2. Grammaticalization

3. Team Semantics

4. Formal Diachronic Analysis

5. Conclusion

Trajectory of Semantic Change

Our proposal suggests the following trajectory of semantic change

1. 'Pragmatic' inference $VAR_{|D|}(\varnothing, x)$
2. NON-AT-ISSUE meaning $VAR_{|D|}(\varnothing, x)$
3. Strengthening of NON-AT-ISSUE meaning to $VAR_{|D|}(v, x)$
4. AT-ISSUE meaning $VAR_{|D|}(v, x)$

NON-AT-ISSUE content in (2) and (3) as a **conventionalization** bridge for the integration of an originally pragmatic inference into at-issue semantic content.

Conclusion

THANK YOU!

Conclusion

THANK YOU!

1. Indefinites and FC
   - 1.1 Indefinite Pronouns
   - 1.2 Indefinites and Free Choice
2. Grammaticalization
   - 2.1 Grammaticalization Patterns
   - 2.2 Unconditional phase
   - 2.3 Appositive phase
   - 2.4 Indefinite phase
3. Team Semantics
   - 3.1 Team Semantics
   - 3.2 Teams as information states
   - 3.3 Aloni & Degano (2022)
   - 3.4 Generalized Variation
   - 3.5 Some Facts
4. Formal Diachronic Analysis
   - 4.1 General Plan
   - 4.2 Unconditionals
   - 4.3 Questions and Team Semantics
   - 4.4 Unconditionals and variation
   - 4.5 Appositives
   - 4.6 Proper Names
   - 4.7 Appositives and Proper Names
   - 4.8 Appositives and non-referential expressions
   - 4.9 Merging at-issue and non-at-issue
   - 4.10 Free Choice
5. Conclusion
   - 5.1 Trajectory of Semantic Change