Obligatory implicatures
The case of epistemic indefinites

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(joint work with Angelika Port)

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**Introduction**

**Epistemic Indefinites:**

**Definition:** Epistemic indefinites are indefinites that have specific unknown (SU) readings, but no specific known (SK) readings (Haspelmath 1997)

(1)  
- a. I heard *irgendjemand*, but I couldn’t tell who it was. (SU)  
- b. *Irgendjemand* called. Guess who? (SK)

(2)  
- a. I heard *somebody*, but I couldn’t tell who it was. (SU)  
- b. *Somebody* called. Guess who? (SK)
Plan of today’s talk:

1. The distribution of German *irgend-*
2. The ”old” pragmatic account of *irgend-*
3. Problems of the pragmatic approach
4. The distribution of Italian *un qualche*
5. Alternative dynamic account using conceptual cover (CC) shifts
6. Potential problems of CC account
7. Conclusion
**Irgend- indefinites: The data**

### The distribution of *Irgend- indefinites*

- *Irgend-* has a particular wide distribution (Port)

- focus on central contexts and compare with *any*
  - episodic sentences (SU)
  - Free choice (FC)
  - negative contexts (NPI)
Irgend- indefinites: The data

Episodic sentences (SU)

- Can occur in episodic sentence

(3)  
  a. *Irgendjemand* hat angerufen.
  b. *Anybody* has called.

- **Reading**: ambiguous between an ignorance reading and an indifference reading.

(4)  
  a. *Somebody called and the speaker doesn’t know who.*
  b. *Somebody called and the speaker doesn’t care who.*
Free choice with epistemic modals (epFC)

- *Irgend* can occur with epistemic modals:

  (5)  
  a. *Irgendjemand* muss angerufen haben.  
  b. *Somebody/* *Anybody* must have called.

  (6)  
  a. Vielleicht hat *irgendjemand* angerufen.  
  b. Possibly *somebody/* *anybody* has called.

- **Reading**: ignorance reading
**Irgend- indefinites: The data**

**Free choice with deontic modals (deoFC)**

- *irgend*- can occur with deontic modals/imperatives:

  (7)   a. Maria muss *irgendeinen* Arzt heiraten.  
          b. Mary darf *irgendeinen* Arzt heiraten.

  **Reading:** ambiguous between the FC reading and an epistemic reading.

  (8)   a. *The speaker doesn’t know/doesn’t care which doctor is a permitted marriage option for Maria.*  
          b. *Any doctor is a permitted marriage option for Maria.*
Irgend- indefinites: The data

**Negative Contexts (NPI)**

- Can occur in negative contexts (not under direct negation)

\[(9) \quad \text{a. Paul bezweifelt dass irgendetjemand angerufen hat.} \]
\[\text{b. Paul doubts that anybody called.} \]

- **Reading:** \( \forall x \text{NEG-OP}(\phi) \equiv \text{NEG-OP}(\exists x \phi) \)
The Pragmatic Approach

- Kratzer & Shimoyama, 2002, Kratzer 2005
- Alonso-Ovalle & Menéndez-Benito 2009
- Schulz 2005, Schulz & van Rooij 2006
The Pragmatic Approach

The approach in a nutshell

<table>
<thead>
<tr>
<th>Semantics</th>
<th>(maximal) domain widening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\llbracket \text{irgendein} \rrbracket = \lambda Q \lambda P. \exists x \in D_{\text{max}}(Qx \land Px)$</td>
</tr>
<tr>
<td>Alternatives</td>
<td>subdomains</td>
</tr>
<tr>
<td></td>
<td>$\forall D' \subseteq D_{\text{max}} : \lambda Q \lambda P. \exists x \in D'(Qx \land Px)$</td>
</tr>
<tr>
<td>Gricean maxims</td>
<td>there is a reason for choosing weaker claim</td>
</tr>
<tr>
<td></td>
<td>(i) S doesn’t know that stronger claim holds</td>
</tr>
<tr>
<td></td>
<td>(ii) S doesn’t consider stronger claim relevant</td>
</tr>
<tr>
<td>Competence</td>
<td>speaker knows the exact extension of the predicate under discussion</td>
</tr>
<tr>
<td>Pragmatics</td>
<td>FC-inferences of <em>irgend</em></td>
</tr>
</tbody>
</table>

Obligatory implicatures
The Pragmatic Approach

The SU reading

(10) Irgendein Student hat angerufen.

Semantics

\[ \exists x \in D_{\text{max}} (S(x) \land C(x)) \]

Alternatives

\[ \forall D' \subseteq D_{\text{max}} : \exists x \in D'(S(x) \land C(x)) \]

Gricean maxims

there is a a reason for choosing weaker claim

(i) s. doesn’t know that stronger claim holds

(ii) s. doesn’t consider stronger claim relevant

Competence

= Pragmatics

Obligatory implicatures
The Pragmatic Approach

The SU reading

(10) Irgendein Student hat angerufen.

- **Semantics**
  \[ \exists x \in D_{\text{max}}(S(x) \land C(x)) \]

- **Alternatives**
  \[ \forall D' \subseteq D_{\text{max}} : \exists x \in D'(S(x) \land C(x)) \]

- **Gricean maxims**
  there is a reason for choosing weaker claim
  (i) \[ \forall D' \subseteq D_{\text{max}} : \neg \square \exists x \in D'(S(x) \land C(x)) \]
  (ii) ...

- **Competence**

= **Pragmatics**
The Pragmatic Approach

The SU reading

(10) Irgendein Student hat angerufen.

Semantics

\[ \exists x \in D_{\text{max}}(S(x) \land C(x)) \]

Alternatives

\[ \forall D' \subseteq D_{\text{max}} : \exists x \in D'(S(x) \land C(x)) \]

Gricean maxims

there is a reason for choosing weaker claim

(i) \[ \forall D' \subseteq D_{\text{max}} : \neg \Box \exists x \in D'(S(x) \land C(x)) \]

(ii) ...

Competence

speaker knows who called

= Pragmatics
The Pragmatic Approach

The SU reading

(10) Irgendein Student hat angerufen.

Semantics

\[ \exists x \in D_{\text{max}}(S(x) \land C(x)) \]

Alternatives

\[ \forall D' \subseteq D_{\text{max}} : \exists x \in D'(S(x) \land C(x)) \]

Gricean maxims

there is a reason for choosing weaker claim

(i) \[ \forall D' \subseteq D_{\text{max}} : \neg \Box \exists x \in D'(S(x) \land C(x)) \]

(ii) ...

Competence

CANCELED: inconsistent with answer given

= Pragmatics
The Pragmatic Approach

The SU reading

(10) Irgendein Student hat angerufen.

<table>
<thead>
<tr>
<th>Semantics</th>
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</tr>
<tr>
<td>Competence</td>
<td>CANCELED: inconsistent with answer given</td>
</tr>
<tr>
<td>ignorance</td>
<td>$\forall d \subseteq D_{max} : \Diamond (Student(d) \rightarrow Called(d))$</td>
</tr>
</tbody>
</table>
The Pragmatic Approach

The epistemic FC reading

(11)  Irgendein Student muss angerufen haben.

Semantics

\[ \Box \exists x \in D_{\text{max}} (S(x) \land C(x)) \]

Alternatives

\[ \forall D' \subseteq D_{\text{max}} : \Box \exists x \in D'(S(x) \land C(x)) \]

Gricean maxims

s. doesn’t know that alternatives true

\[ \forall D' \subseteq D_{\text{max}} : \neg \Box \Box \exists x \in D'(S(x) \land C(x)) \]

Competence

competence about \[ \Box \]

= Pragmatics
The Pragmatic Approach

The epistemic FC reading

(11) Irgendein Student muss angerufen haben.

\[ \Box \exists x \in D_{max}(S(x) \land C(x)) \]

Semantics

\[ \forall D' \subseteq D_{max} : \Box \exists x \in D'(S(x) \land C(x)) \]

Alternatives

s. doesn’t know that alternatives true

\[ \forall D' \subseteq D_{max} : \neg \Box \Box \exists x \in D'(S(x) \land C(x)) \]

Gricean maxims

Trivial: s. competent on own belief state

\[ \forall D' \subseteq D_{max} : \neg \Box \exists x \in D'(S(x) \land C(x)) \]

Competence

= Pragmatics

Maria Aloni and Katrin Schulz (joint work with Angelika Port)
The Pragmatic Approach

The epistemic FC reading

(11) Irgendein Student muss angerufen haben.

| Semantics | □∃x ∈ D_{max}(S(x) ∧ C(x)) |
| Alternatives | ∀D' ⊆ D_{max} : □∃x ∈ D'(S(x) ∧ C(x)) |
| Gricean maxims | s. doesn’t know that alternatives true |
| Competence | Trivial: s. competent on own belief state |

= ignorance

∀d ⊆ D_{max} : ◻(S(d) → C(d))
The Pragmatic Approach

The deontic FC reading

(12) Maria muss irgendeinen Professor heiraten.

Semantics

\[ \Delta_A \exists x \in D_{\text{max}} (P(x) \land M(x)) \]

Alternatives

\[ \forall D' \subseteq D_{\text{max}} : \Delta_A \exists x \in D'(P(x) \land M(x)) \]

Gricean maxims

there is a reason for choosing weaker claim

\[ \forall D' \subseteq D_{\text{max}} : \neg \Box \Delta_A \exists x \in D'(P(x) \land M(x)) \]

Competence

S is competent on \( \Delta_A \) (not trivial)

\[ \forall D' \subseteq D_{\text{max}} : \neg \Delta_A \exists x \in D'(P(x) \land M(x)) \]

= deontic FC

\[ \forall d \subseteq D_{\text{max}} : \nabla_A (P(d) \rightarrow M(d)) \]
Summary

- SU (ignorance and indifference)
- epistemic FC
- deontic FC
- NPI

⇒ the perfect approach!!!
Problems of the Pragmatic Approach

- wrong predictions
- Is this a Gricean approach? (not today)
- Are the inferences conversational implicatures?
Problems of the Pragmatic Approach

Wrong predictions I: Free Choice for possibility modals

(13) Possibly *irgendein* student called.

\[ \Diamond_s \exists x \in D_{\text{max}}(S(x) \land C(x)) \]

\[ \forall D' \subseteq D_{\text{max}} : \Diamond_s \exists x \in D'(S(x) \land C(x)) \]

\[ \forall D' \subseteq D_{\text{max}} : \neg \Box_s \Diamond_s \exists x \in D'(S(x) \land C(x)) \]

\[ \forall D' \subseteq D_{\text{max}} : \neg \Diamond_s \exists x \in D'(S(x) \land C(x)) \]

= Semantics \hspace{1cm} all implicatures get cancelled!

Potential Solutions

▶ there is no FC for epistemic possibility modals
▶ redefine the alternatives (minimize knowledge: Schulz 2005, ...)
▶ different semantics for possibility modals
▶ avoid false exhaustivity (Kratzer & Shimoyama)
Problems of the Pragmatic Approach

**Wrong predictions 1:** Free Choice for possibility modals

(14) Mary may marry *irgendein* professor.

<table>
<thead>
<tr>
<th>Semantics</th>
<th>( \nabla_A \exists x \in D_{\text{max}}(S(x) \land C(x)) )</th>
</tr>
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<tr>
<td>Alternatives</td>
<td>( \forall D' \subseteq D_{\text{max}} : \nabla_A \exists x \in D'(S(x) \land C(x)) )</td>
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<td>Gricean maxims</td>
<td>( \forall D' \subseteq D_{\text{max}} : \neg \Box_S \nabla_A \exists x \in D'(S(x) \land C(x)) )</td>
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<tr>
<td>Competence</td>
<td>( \forall D' \subseteq D_{\text{max}} : \neg \nabla_A \exists x \in D'(S(x) \land C(x)) )</td>
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</table>

= Ignorance  

*competence implicatures get cancelled!*

**Potential Solutions**

- redefine the alternatives (minimize knowledge: Schulz 2005, ...)
- different semantics for possibility modals
- avoid false exhaustivity (Kratzer & Shimoyama)
Wrong predictions II: Embedded Free Choice

- **Observation:** ignorance can be relative to the top-most agent

  (15)  
  a. Peter believes that *irgendein* student called.  
  b. *Peter doesn’t know who called.*

- **Prediction:** assuming competence of the speaker on beliefs of Peter the pragmatic approach can account for this observation
Problems of the Pragmatic Approach

Wrong predictions II: Embedded Free Choice

▷ Problem 1: given the necessary competence assumption we can "dig up" epFC/ deoFC from arbitrarily deep epistemic embeddings

(16) a. Peter thinks that Mary believes that Sue must marry \textit{irgendein} doctor.
    b. ?Any doctor is a permissible option.

▷ Problem 2: approach cannot predict truly embedded readings

(17) a. Peter thinks that Mary believes that Sue must marry \textit{irgendein} doctor.
    b. Peter thinks that Mary believes that (Sue must marry a doctor and that any doctor is a permissible option).
Problems of the Pragmatic Approach: Implicatures?

Properties of conversational implicatures

- Non-Detachability
- Enforceability
- Cancellability
- Universality
Problems of the Pragmatic Approach: Implicatures?

Non-Detachability:
items with same semantics should give rise to same implicatures

- notoriously difficult to access (you need identical semantics!)
- but for other indefinites (*ein, jemand*) very similar FC readings are available

⇒ detachability seems o.k.
Problems of the Pragmatic Approach: Implicatures?

**Enforceability:**
implicature can be made explicit without that the utterance looses acceptability

- surprisingly, you cannot use *but* as with the enforcement of standard implicatures

(18)  
a. *Irgendjemand* has called. I don’t know who.  
b. I ate some of the cookies, BUT not all of them.  
c. *?Irgendjemand* has called, BUT I don’t know who.

⇒ enforceability is questionable
Problems of the Pragmatic Approach: Implicatures?

Cancellability:
The inferences are defeated by information to the contrary.

- independent contextual information that contradicts the implicature should cancel it
  - true for SU and epFC, but not for deoFC

(19) a. *Irgendjemand* hat angerufen, aber nicht Deine Mutter.
    b. *Irgendjemand* muss angerufen haben, es war aber sicher nicht deine Mutter.
    c. ??Maria muss *irgendeinen* Arzt heiraten, aber sie darf nicht Dr. House heiraten.
Cancellability:

Is complete cancellation possible?

(20)  
  a. *Irgendein* student called.
  b. *It was Peter.*
  c. In fact, it was Peter.

(21) (wife to husband, after talking to somebody at the door)
  *Irgendeiner* of your brothers wants to talk to you.

- If the context cancels the implicature, we do not get the plain semantic meaning, but the sentence becomes odd!!

⇒ cancellability is questionable and certainly out for deoFC
Problems of the Pragmatic Approach: Implicatures?

**Universality:**
The inferences should occur cross-linguistically for all items with this meaning

- How to explain the clearly different distribution of indefinites in other languages?

<table>
<thead>
<tr>
<th></th>
<th>SU</th>
<th>epFC</th>
<th>deoFC</th>
<th>NPI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>qualunque</strong></td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>any</strong></td>
<td>no</td>
<td>(no)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>irgend</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>un qualche</strong></td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>si</strong></td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>
Problems of the Pragmatic Approach: Implicatures?

Summary

- **Non-Detachability** o.k.
- **Enforceability** questionable
- **Cancellability** questionable, certainly not deoFC
- **Universality** not o.k.
Intermediate Conclusions

How to cluster the distribution?

SU  NPI

epFC  deoFC
Intermediate Conclusions

How to cluster the distribution?

- Haspelmath map

```
SU  NPI
epFC deoFC
```
Intermediate Conclusions

How to cluster the distribution?

- Pattern of FC-inferences: the pragmatic approach

Diagram:

- SU
- NPI
- epFC
- deoFC
Intermediate Conclusions

How to cluster the distribution?

- Pattern of Cancellability/Stress/Cross-linguistic distribution

![Diagram showing clusters of distribution with labels SU, NPI, epFC, deoFC]
**Un qualche: the data (Zamparelli 2007)**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><em>irgend</em></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><em>un qualche</em></td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

(22) Maria ha sposato un qualche professore, (??cioè Vito). [SU]
Maria has married a some professor, (??namely Vito). [#SK]
‘Maria married some professor, I don’t know who’

(23) Maria deve aver sposato un qualche professore. [epFC]
Maria must have married a some professor
‘Maria must have married some professor, I don’t know who’

(24) Antonio crede che Maria abbia sposato un qualche professore.
Antonio believes that Maria has_{subj} married a some professor
a. ‘Antonio believes that Maria married some professor, I don’t know who’

b. ‘Antonio believes that Maria married some professor, Antonio doesn’t know who’ [agent-oriented epFC]
Un qualche: the data (Zamparelli 2007)

<table>
<thead>
<tr>
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<th>SU</th>
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<th>NPI</th>
<th>deoFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>irgend</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>un qualche</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

(25) ??Nessuno ha risposto a una qualche domanda.  
Nobody has answered to a some question.  
#‘Nobody answered any question’

(26) Maria deve/può sposare un qualche professore.  
Maria must/can marry a some professor.  

a. ‘There is some professor Maria must/can marry, I don’t know who’
b. #‘Maria must/can marry a professor, any professor is a permissible option’
An alternative analysis for epistemic indefinites

- Epistemic indefinites \(\leftrightarrow\) existentials with two characteristics:
  
  1. **Domain Shift**: induce an obligatory domain shift
  2. **Felicity Condition**: express conditions on the input context that must be satisfied for the indefinite to be felicitous

- *Ignorance inference* as result of lexically encoded felicity condition rather than Gricean reasoning (cf. dynamics of presupposition)
  
  \(\Rightarrow\) **cancelable, reinforceable**

- Fossilized implicatures: inferences, pragmatic in origin, become part of lexically encoded meaning via historical processes of conventionalization
  
  \(\Rightarrow\) **non-detachable**

- Difference between different indefinites in terms of different domain shifts they can induce
  
  \(\Rightarrow\) **universal**

[cf. Kadmon & Landman 1993]
Domain shift triggered by epistemic indefinites

- Epistemic indefinites block context induced domain selections:
- Two ways in which context determine quantificational domains:
  - Contextual domain restriction (Westerståhl 1984):
    (27) Everybody passed the exam.  [e.g. everybody in my class]
    Blocking $\mapsto$ domain widening (DW)
  - Pragmatic selection of a method of identification (Aloni 2001):
    (28) The card scenario: Two face-down cards, the ace of hearts and the ace of spades. You know that the winning card is the ace of hearts, but you don’t know whether it’s the card on the left or the one on the right.
    (29) You know which card is the winning card.  [True or false?]
    Blocking $\mapsto$ Shift of identification method or conceptual cover shift (CC-shift)
Conceptual Covers

- Identification methods formalized as *conceptual covers* [Aloni 2001]
- A conceptual cover \( CC \) is a set of concepts such that in each world, every individual instantiates exactly one concept in \( CC \).
- The card scenario

\[
\begin{align*}
\mathcal{w}_1 \mapsto & \heartsuit \spadesuit \\
\mathcal{w}_2 \mapsto & \spadesuit \heartsuit
\end{align*}
\]

Only two covers definable in this model:

\[
\begin{align*}
\text{(30)} & \quad \lambda w. [\iota x. \text{ON-THE-LEFT}(x)] w, \lambda w. [\iota x. \text{ON-THE-RIGHT}(x)] w \\
\text{(31)} & \quad \lambda w. [\iota x. \text{ACE-OF-SPADES}(x)] w, \lambda w. [\iota x. \text{ACE-OF-HEARTS}(x)] w \\
\text{(32)} & \quad \#\lambda w. [\iota x. \text{ON-THE-LEFT}(x)] w, \lambda w. [\iota x. \text{ACE-OF-HEARTS}(x)] w
\end{align*}
\]
Context Dependence

- Interpretation often depends on the assumed method of identification.
- Different methods of identification selected at different occasions:

(33) A: Who is Lee Jackson?
    B: ??Lee Jackson is Lee Jackson. [Naming]
    B: She [pointing at her] is Lee Jackson. [Ostension]

(34) Context: A is compiling a bibliography:
    A: Who is the author of *Semantic Structures*?
    B: Lee Jackson. [Naming]
    B: ??That lady over there. [Ostension]

(35) Context: A wants to meet the author of *Semantic Structures*:
    A: Who is the author of *Semantic Structures*?
    B: ??Lee Jackson. [Naming]
    B: That lady over there. [Ostension]
Puzzle of specific unknown uses:

(36) Devo incontrare un qualche professore.
I-must meet a some professor
‘I must meet a certain professor, but I don’t know who he is.’

- Specific: speaker has someone in mind ⇒ speaker can identify
- But unknown: speaker doesn’t know who ⇒ speaker cannot identify

Allowing different identification methods:
- Speaker can identify on one identification method (specific)
- But not on another (unknown)
**Epistemic indefinites & identification methods**

- Ranking on methods of identification (Aloni 2001):
  
  (37)  
  \[ \text{ostension} > \text{naming} > \text{description} \]

- **Observation**: identification method required for knowledge must be higher in order than method required for specific use (Port 2010)

  (38)  
  Ich muss irgendeine bestimmte Sprecherin vorstellen.  
  I have to introduce irgend-one particular speaker.

  (39)  
  a. Her name is Lee Jackson, but I don’t know who she is.  
  b. \text{know-who} = \text{[Ostension]}, \text{have-in-mind} = \text{[Naming]}

  (40)  
  a. She is the writer of *Semantic Structures*, but I don’t know her name.  
  b. \text{know-who} = \text{[Naming]}, \text{have-in-mind} = \text{[Description]}

  (41)  
  a. ??That lady over there, but I don’t know her name.  
  b. ??\text{know-who} = \text{[Naming]}, \text{have-in-mind} = \text{[Ostension]}
Epistemic indefinites & identification methods

▶ Same effect in Italian:

(42) Devo incontrare un qualche professore.
   I have to meet a qualche professor
   a. \textit{know-who} = \textit{[Ostension]}, \textit{have-in-mind} = \textit{[Naming]}
   b. \textit{know-who} = \textit{[Naming]}, \textit{have-in-mind} = \textit{[Description]}
   c. ??\textit{know-who} = \textit{[Naming]}, \textit{have-in-mind} = \textit{[Ostension]}

▶ Lambada example [Alonso-Ovalle & Menendez-Benito 2003]

(43) a. Look! Some professor is dancing lambada on his table!
   b. Look! ??Un qualche/algun professor is dancing lambada on his table!
   c. ??\textit{know-who} = \textit{[Naming]}, \textit{have-in-mind} = \textit{[Ostension]}
Proposal

- Epistemic indefinites: existentials with two characteristics:
  1. Induce obligatory domain-shift \((D \rightarrow D')\):
     - *un qualche*: CC-shift
     - *irgendein*: CC + DW
  2. Are felicitous in context \(\sigma\) iff domain-shift is for a reason:
     (i) *Necessary weakening*: otherwise speaker state would not support statement:

     \[
     (44) \quad \sigma \models \ldots \exists x_{D'} \ldots, \text{ but } \sigma \not\models \ldots \exists x_D \ldots \quad [\text{Quality}]
     \]

     (ii) *Strengthening*: creates a stronger statement:

     \[
     (45) \quad \ldots \exists x_{D'} \ldots \models \ldots \exists x_D \ldots \quad [\text{Quantity}]
     \]

- Implementation in Dynamic Semantics.
- Predictions:

<table>
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<tr>
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Maria Aloni and Katrin Schulz (joint work with Angelika Port)
Epistemic Indefinites in Dynamic Semantics with CC

- Specific uses of indefinites introduce discourse referents
- In dynamic semantics with conceptual covers, discourse referents are elements of a pragmatically determined conceptual cover as

\[
\begin{array}{c|c}
\text{w}_1 & \exists x_n \\
\text{w}_2 & \end{array}
\]

\[
\begin{array}{c|c|c}
\text{w}_1 & a & \text{x}_n \\
\text{w}_2 & a & \end{array}
\]

rigid cover

\[
\begin{array}{c|c|c}
\text{w}_1 & b & \text{x}_n \\
\text{w}_2 & b & \end{array}
\]

non-rigid cover

Simplifying:
- Knowing who: requires rigid cover
- Specific uses: compatible with non-rigid covers
- Epistemic indefinites signal obligatory shift to a non-rigid cover (CC-shift)
- If CC-shift is not trivial, use of indefinite entails not knowing who

Maria Aloni and Katrin Schulz (joint work with Angelika Port) Obligatory implicatures
Un qualche (only CC-shift): SU

- Specific indefinites introduce as discourse referents elements of a salient cover (normally rigid):
  \(\exists x_n \phi(x_n)\)

- Un qualche-indefinites induce shift to a non-rigid cover (CC-shift):
  \(\exists x_n \phi(x_n)\) \(n\) must be non-rigid

- Knowledge requires rigid covers (simplification):
  \(\neg \exists y_m \square \phi(y_m)\) \(m\) must be rigid

- If shift from rigid to non-rigid is not trivial:
  \(\exists x_n \phi(x_n) \models \neg \exists y_m \square \phi(y_m)\)
  \(\phi \models_p \psi\) iff \(\forall \sigma:\ \phi, \psi\) felicitous in \(\sigma\) & \(\sigma \models \phi \Rightarrow \sigma \models \psi\)
Un qualche (only CC-shift): epFC

- **EpFC speaker-oriented:**

  (50)  
  a. Maria deve aver sposato un qualche professore.
  b. Maria must have married some professor ⇒ *Speaker* doesn’t know who.
  c. $\Box \exists x_n \phi(x_n) \models_P \neg \exists y_m \Box \phi(y_m)$
  d. $\sigma[\Box \phi]\{i \in \sigma \mid \sigma \models \phi\}$ [Veltman 1997]

- **EpFC agent-oriented:**

  (51)  
  a. Antonio crede che Maria abbia sposato un qualche professore.
  b. Antonio believes that Maria married some professor ⇒ *Antonio* doesn’t know who
  c. $\Box_a \exists x_n \phi(x_n) \models_P \neg \exists y_m \Box_a \phi(y_m)$
  d. $\sigma[\Box_a \phi]\{i \in \sigma \mid F(i)_a \models_P \phi\}$
Un qualche (only CC-shift): #NPI and # deoFC

- Cover shifts are trivial in negative and deontic contexts:

\[(52)\]

\(\forall n, m: \neg \exists x_n \phi \equiv \neg \exists x_m \phi\)

\(\forall n, m: \Delta \exists x_n \phi \equiv \Delta \exists x_m \phi\)

- We correctly predict #NPI & #deoFC (no reason here for CC-shift):

\[(53)\]

\(\text{a. } \text{??Non ho risposto a una qualche domanda. } \quad \text{[#NPI]} \)

\(\text{b. } \text{#'I didn’t answer any question’} \)

\(\text{c. } \neg \exists x_n \phi \)

\(\text{d. } \sigma[\neg \phi]\{i \in \sigma \mid \neg \exists \sigma'' : \sigma[\phi]\sigma'' \land i \prec \sigma''\}\)

\[(54)\]

\(\text{a. } \text{Maria deve sposare un qualche professore. } \quad \text{[# deoFC]} \)

\(\text{b. } \text{#'Maria must marry a professor, any professor is a permissible option’} \)

\(\text{c. } \Delta \exists x_n \phi \)

\(\text{d. } \sigma[\Delta \phi]\{i \in \sigma \mid F(i)_D \vdash \phi\}\)
The case of *irgend*-indefinites: CC+DW

- SU, epFC: as for *un qualche*
- NPI: via DW + strengthening:

(55)  
| a. Niemand hat *irgendjemand* angerufen. |
| b. ‘Nobody called anybody’ |
| c. $\neg \exists x_m \exists x_n \phi$ |
| d. Prediction: *irgend* felicitous, no epistemic effect |

- DeoFC: problem!

(56)  
| a. Marie muss *irgendeinen* Doktor heiraten. |
| b. ’Mary has to marry *irgend*-one doctor’ |
| c. $\Delta \exists x_n \phi$ |
| d. Prediction: *irgend* unfelicitous |
The case of *irgend*-indefinites: CC+DW

**Predictions**

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**Possible solutions**

- Kratzer & Shimoyama’s anti-exhaustivity inference:
  - FC inference as ‘pragmatic’ effect
  - Felicity: add new option in felicity condition, e.g. avoidance false exhaustivity inference
- Performative analysis of deontic modals (Lewis 79, Veltman 09):
  - FC inference as semantic entailment
  - Felicity via strengthening
- ...
Conclusions

- Pragmatic approach: parsimonious, but empirical problems
- CC-dynamic approach:
  - SU ≡ epFC ↔ obligatory ignorance effects (via CC-shift)
  - epFC ≠ deoFC (via dynamic analysis of modality)

Future plans
- deoFC
- SU ≠ epFC: the case of Czech -si
Appendix

- The Semantics (building on Aloni 2001, chapter 3)

\[ \sigma[Rt_1, \ldots, t_n] \sigma' \iff \sigma' = \{ i \in \sigma \mid \langle i(t_1), \ldots, i(t_n) \rangle \in i(R) \}; \]
\[ \sigma[\neg \phi] \sigma' \iff \sigma' = \{ i \in \sigma \mid \neg \exists \sigma'' : \sigma[\phi] \sigma'' \& i < \sigma'' \}; \]
\[ \sigma[\phi \land \psi] \sigma' \iff \exists \sigma'' : \sigma[\phi] \sigma''[\psi] \sigma'; \]
\[ \sigma[\exists x_n \phi] \phi \sigma' \iff \sigma[x_n/c][\phi] \phi \sigma' \text{ for some } c \in \wp(n) \]
\[ \sigma[\Box \phi] \sigma' \iff \sigma' = \{ i \in \sigma \mid \sigma \models \phi \} \]
\[ \sigma[\Box_a \phi] \sigma' \iff \sigma' = \{ i \in \sigma \mid F(i)_a \models (P) \phi \} \]
\[ \sigma[\Box_D \phi] \sigma' \iff \sigma' = \{ i \in \sigma \mid F(i)_D \vdash \phi \} \]

where \[ F(\langle g, w \rangle)_x = \{ (g, w') \mid wR_x w' \} \]
Appendix

- **Support:**

\[ \sigma \models \phi \text{ iff } \exists \sigma' : \sigma[\phi]\sigma' \& \forall i \in \sigma : i \prec \sigma' \]

\[ \sigma \models_p \phi \text{ iff } \sigma \models \phi \& \phi \text{ felicitous in } \sigma \]

- **Truth:**

\[ \sigma \vdash \phi \text{ iff } \forall i \in \sigma : \exists \sigma' : \sigma[\phi]\sigma' \& i \prec \sigma' \]

- **Entailment:**

\[ \phi \models \psi \text{ iff } \forall \sigma : \sigma \models \phi \Rightarrow \sigma \models \psi \]

\[ \phi \models_p \psi \text{ iff } \forall \sigma : \phi \& \psi \text{ felicitous in } \sigma : \sigma \models \phi \Rightarrow \sigma \models \psi \]