Irish Clefting and Information-Structure

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LFG09, Cambridge
This talk

1) Overview of the study
2) The Copula-Cleft Connection
3) Implementing Clefts
4) Clefting, a focusing device
5) Projecting Information-Structure in LFG
Overview of the study

- Theoretical goals:
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  - Clefting relies on the use of the copula - think about possible copula analyses in LFG
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- Look at how copula constructions are connected to clefting and how copula analysis can be expanded to account for clefting
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- Implement new copula analysis ✓
- Implement clefting in the Irish LFG grammar ✓
- Implement the interface to Information-Structure
Breaking down the issue

Clefting in Irish is done using the general pattern:

*copula* – *focus constituent* – *relative clause*
Breaking down the issue

- Clefting in Irish is done using the general pattern:
  \[ \text{copula} \rightarrow \text{focus constituent} \rightarrow \text{relative clause} \]

Example:

\[
\text{Is é an múinteoir a léigh leabhar inné.}
\]

COP.Pres AGR ART teacher COMP.Rel read.Past book yesterday

'It is the teacher who read a book yesterday.'
Breaking down the issue

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- Understanding simple copula predication is essential for understanding cleft constructions

- Question: How are simple Irish copula constructions to be analyzed in LFG?
Breaking down the issue

- Simple Irish copula predication involves the pattern: 
  \textit{copula} – \textit{predicate} – \textit{subject}
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Example:

\texttt{Is dochtúir é.}  
\texttt{COP.Pres doctor he}  
\texttt{'He is a doctor.'}
Breaking down the issue

- Simple Irish copula predication involves the pattern: *copula − predicate − subject*

Example:

Is dochtúir é.
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- LFG literature offers several analyses for copula predication
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**Example:**

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● LFG literature offers several analyses for copula predication


● Correct analysis depends on the findings in the language

● But: Can also contribute to cross-linguistic insights
Choosing an appropriate analysis

- Single-Tier analysis:
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  - Copula complement functions as sentential predicate
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  - Copula complement functions as sentential predicate
  - Copula complement subcategorizes for a subject:

\[
\begin{bmatrix}
\text{PRED} & 'dochtúir}' \\
\text{SUBJ} & 'é'
\end{bmatrix}
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- Single-Tier analysis:
  - Copula complement functions as sentential predicate
  - Copula complement subcategorizes for a subject:

\[
\begin{array}{c}
\text{PRED } \left\langle \text{'dochtúir} \left( \uparrow \text{SUBJ} \right) \right\rangle' \\
\text{SUBJ} \quad \left[ \text{PRED } \text{'é'} \right]
\end{array}
\]

→ Appropriate if COP may be dropped across constructions

→ not applicable in Irish (e.g. COP may not be dropped if inflected for tense)
Choosing an appropriate analysis

- Open Double-Tier analysis:
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Choosing an appropriate analysis

- **Open Double-Tier analysis:**
  
  - Copula complement is XCOMP with a subject
  - XCOMP’s subject functionally controlled by the main clause’s subject

  \[
  \begin{array}{c}
  \text{PRED} \quad \text{'COP} \langle (\uparrow \text{XCOMP}) \langle (\uparrow \text{SUBJ})' \\
  \text{SUBJ} \quad \text{PRED} \quad \text{'é'} 1 \\
  \text{XCOMP} \quad \text{PRED} \quad \text{'dochtúir} \langle (\uparrow \text{SUBJ})' \\
  \text{SUBJ} \quad [ ] 1
  \end{array}
  \]
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- **Open Double-Tier analysis:**
  - Copula complement is XCOMP with a subject
  - XCOMP’s subject functionally controlled by the main clause’s subject

```
[ PRED 'COP (↑ XCOMP) (↑ SUBJ) ' ]
[ SUBJ PRED 'é' 1 ]
[ XCOMP PRED 'dochtúir (↑ SUBJ)' ]
[ SUBJ ] 1
```

→ Appropriate if functional control is demanded by agreement between complement and subject → not applicable in Irish
Choosing an appropriate analysis

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  - Copula subcategorizes for SUBJ and PREDLINK
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  - PREDLINK contains the copula complement

\[
\begin{array}{c}
\text{PRED} & \text{'COP}((↑ \text{SUBJ}), (↑ \text{PREDLINK}))' \\
\text{SUBJ} & \text{[PRED 'é']} \\
\text{PREDLINK} & \text{[PRED 'dochtúir']} \\
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\]

Also applicable in cases of copula dropping using a null-pred
Functional control not necessary, but can optionally be implemented (in effect: XCOMP)
→ Most flexible analysis for copula predication
→ chosen analysis for Irish (in line with e.g. Attia (2008), Butt et al. (1999))
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The bigger picture

- Now we know about simple copula predication
Now we know about simple copula predication
How does this help us with analyzing cleft sentences?
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- In fact, certain types of copula sentences look very similar to clefts
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How does this help us with analyzing cleft sentences?

In fact, certain types of copula sentences look very similar to clefts

→ Particularly interesting: Identification sentences equating two NPs and cleft sentences with focus NP
The bigger picture

- Compare identification sentences to clefts with an NP in the focus position
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**Identification sentence, equating two NPs:**

```
Is é mo dheartháir an fear a bhí tinn.
COP.Pres AGR my brother ART man COMP.Rel be.Past sick
'My brother is the man who was sick.'
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**Cleft sentence, NP in focus position:**

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**Cleft sentence, NP in focus position:**

| Is é an fear a bhí tinn |
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→ Cleft seems to differ only in absence of nominal head for second NP!
The bigger picture

- Where is the second NP?
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- Stenson (1981): If there is no surface head, the NP is understood to be human
  - Head of human NP may surface in form of noun *an té* 'the one'
  - In NPs where head is non-human, another noun *has* to surface as head, e.g. *an rud* 'the thing'
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- Stenson (1981): If there is no surface head, the NP is understood to be human
  - Head of human NP may surface in form of noun *an té* 'the one'
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The result are pseudo-cleft sentences with two NPs:

```
Is é mo dheartháir an té a bhí tinn
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What is the conclusion?

→ Cleft sentences are derived from pseudo-cleft sentences by deletion of the second NP head

Cleft sentences are formed according to the pattern:

\[ \text{COP [XP]}_{\text{focus/predicate}} \ [\text{relative clause}]_{\text{subject}} \]
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  - Use *one* syntactic analysis for both cleft sentences and copula constructions
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  - Expand PREDLINK analysis to account for clefting
Projecting PREDLINK to clefts

- Question: What should the f-structure look like?
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Answer follows in a straightforward way from the clefting pattern.
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Cleft sentences are formed according to the pattern:

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The constituent in the predicate position is mapped to the PREDLINK function
Overview of the study  The Copula-Cleft Connection  Implementing Clefts  Clefting, a focusing device  Projecting I-Str in LFG

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\]

- The constituent in the predicate position is mapped to the PREDLINK function
- The whole relative clause is mapped to the SUBJ function as a sentential subject
Projecting PREDLINK to clefts

Sample analysis:

Is leabhar a léigh sí inné.
COP.Pres book COMP.Rel read.Past she yesterday
'It is a book that she read yesterday.'
Projecting PREDLINK to clefts

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(simplified) F-structure:

```
[ PRED 'is <léigh, leabhar>'
  [ PRED 'léigh' <sí, leabhar>'
    [ SUBJ [ PRED 'sí' ]
    [ OBJ [ PRED 'leabhar' ]
    [ ADJUNCT [ PRED 'inne' ]

  [ PREDLINK 'leabhar']
```
Projecting PREDLINK to clefts

Summary:
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- Copula predication in simple copula sentences is not different from copula predication in cleft sentences
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  - Copula is used to link a predicate to its subject in both cases
- Therefore, the same analysis can be used for both cases
→ The PREDLINK analysis is flexible enough to account for clefting
Clefting, a focusing device

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- Discourse functions can encode *Information-Structure* of a sentence.
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- Discourse functions can encode **Information-Structure** of a sentence.
- Information-Structure encoded on top of syntactic processing.
Clefting and Information-Structure

- Clefting: *Syntactic* means to focus part of a sentence
Clefting and Information-Structure

- **Clefting**: *Syntactic* means to focus part of a sentence
  - Constituent in copula predicate position is assigned $\uparrow$FOC function, as it is new and prominent information

Example:

Is leabhar a l´eigh s´í inn´e.

COP.Pres book COMP.Rel read.Past she yesterday

'It is a book that she read yesterday.'

$\rightarrow \uparrow$FOC:

\{ leabhar \}

$\rightarrow \uparrow$TOP:

\{ l´eigh, s´í, inn´e \}
Clefting and Information-Structure

- **Clefting**: *Syntactic* means to focus part of a sentence
  - Constituent in copula predicate position is assigned ↑FOC function, as it is new and prominent information
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→ ↑FOC: {leabhar}
Clefting and Information-Structure

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'It is a book that she read yesterday.'

→ ↑FOC: {leabhar}
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Clefting and Information-Structure

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  - Constituent in copula predicate position is assigned \( \uparrow \text{FOC} \) function, as it is new and prominent information
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\( \rightarrow \ \uparrow \text{FOC}: \{\text{leabhar}\} \)
\( \rightarrow \ \uparrow \text{TOP}: \{\text{léigh, sí, inné}\} \)

Several papers have asked: How can I-Structure be integrated in LFG?
Discourse functions in the f-structure

- Bresnan (2001): Discourse functions are directly encoded in f-structure
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- But: Standard annotation results in too wide scope for certain types of focusing (King 1997)
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Example from Russian:

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(ex. from King 1997)
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→ Focus in this case is on the verb only, not its arguments
Discourse functions in the f-structure

- An annotation like \((\downarrow \text{PRED}) \in (\uparrow \text{FOC})\) would yield:
Discourse functions in the f-structure

An annotation like $(\downarrow \text{PRED}) \in (\uparrow \text{FOC})$ would yield:

```
PRED 'read ⟨(↑ SUBJ), (↑ OBJ)⟩'
SUBJ [PRED 'she']
OBJ [PRED 'book']
FOC \{ 'read ⟨(↑ SUBJ), (↑ OBJ)⟩' \}
```

Scope is too wide: Only the verb is supposed to be in $\uparrow \text{FOC}$. 

---

---
Discourse functions in the f-structure

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\[
\begin{align*}
\text{PRED} & \quad \text{'read} \langle (\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle' \\
\text{SUBJ} & \quad \text{[PRED} \quad \text{'she'}] \\
\text{OBJ} & \quad \text{[PRED} \quad \text{'book'}] \\
\text{FOC} & \quad \{ \text{'read} \langle (\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle' \}
\end{align*}
\]

→ Scope is too wide: *Only* the verb is supposed to be in \(\uparrow \text{FOC}\)
An additional level – I-structure

- Another approach: I-structure (see e.g. King 1997, Butt and King 1998)
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  - The same type of functional annotation is used as for f-structure annotation
  - For head-focusing and sub-constituent focus, the PRED FN notation can be used
An additional level – I-structure

Example:

Is leabhar a léigh sí inné.
COP.Pres book COMP.Rel read.Past she yesterday
'It is a book that she read yesterday.'
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Simple example: Copula predicate contains single PRED, which is mapped to ↑FOC
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- I-structure:

```
[FOC {leabhar}]
[TOP {léigh, sí, inné}]
```
Head and sub-constituent focus

Example (contrastive focus):

Is SA leabharlann a léigh sí inné.
COP.Pres in.Def library COMP.Rel read.Past she yesterday
'It is IN the library that she read yesterday.' (and not on the library)
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→ How can we assign ↑FOC to the preposition only?
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- PRED FN notation can strip predicate of its arguments (King 1997):
Head and sub-constituent focus

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  - PRED \( 'i<((\uparrow\text{OBJ})>)' \) → PRED FN \( 'i' \)
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→ Resulting i-structure:

\[
\begin{bmatrix}
\text{FOC} \{i\} \\
\text{TOP} \{léigh, sí, inné\} \\
\text{BCK} \{leabharlann\}
\end{bmatrix}
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- *leabharlann* 'library': Background since it is neither focus nor topic
C-structure to i-structure is one-to-many

- Consider the same sentence again:
Overview of the study
The Copula-Cleft Connection
Implementing Clefts
Clefting, a focusing device
Projecting I-Str in LFG

C-structure to i-structure is one-to-many

- Consider the same sentence again:

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Is sa leabharlann a léigh sí inné.
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There are in fact several possible i-structures for this sentence (assuming we have no further phonological information, e.g. in a text)
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  - On the whole PP (*sa leabharlann* 'in the library')
  - Just on the preposition’s object (*leabharlann* 'library')
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  - On the whole PP (sa leabharlann 'in the library')
  - Just on the preposition’s object (leabharlann 'library')
  - Just on the preposition itself (sa 'in (the)')
C-structure to i-structure is one-to-many

- Not possible to disambiguate using syntax alone
C-structure to i-structure is one-to-many

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→ **Suggestion:**
C-structure to i-structure is one-to-many

- Not possible to disambiguate using syntax alone
- **Suggestion:**
  - Assume a one-to-many mapping between c-structure and i-structure
C-structure to i-structure is one-to-many

- Not possible to disambiguate using syntax alone

→ Suggestion:

- Assume a one-to-many mapping between c-structure and i-structure

- Let grammar generate multiple i-structures for later disambiguation
C-structure to i-structure is one-to-many

Example:

Is sa leabharlann a léigh sí leabhar inné.
COP.Pres in.Def library COMP.Rel read.Past she book yesterday
'It is in the library that she read a book yesterday.'
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'It is in the library that she read a book yesterday.'

- I-structure 1: PPfoc: ↓ &epsilon; i(↑FOC)

  FOC {i, leabharlann}

  TOP {léigh, sí, leabhar, inné}
C-structure to i-structure is one-to-many

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  \[
  \begin{aligned}
  &\text{FOC} \{ i, \text{leabharlann} \} \\
  &\text{TOP} \{ \text{léigh, sí, leabhar, inné} \}
  \end{aligned}
  \]

- ↑FOC is assigned to whole PP in focus position
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I-structure 2: PPfoc: (↓PRED FN) ∈ i(↑FOC)

\[
\begin{align*}
&\text{FOC} \{ i \} \\
&\text{TOP} \{ léigh, sí, leabhar, inné \} \\
&\text{BCK} \{ leabharlann \}
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Example:

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Example:

\[
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\text{COP.Pres in. Def library COMP.Rel read.Past she book yesterday}
\end{array}
\]

'It is in the library that she read a book yesterday.'

- I-structure 3: \( \text{PPfoc: } (\downarrow \text{OBJ PRED}) \epsilon i(\uparrow \text{FOC}) \)

\[
\begin{cases}
\text{FOC}\{\text{leabharlann}\} \\
\text{TOP}\{\text{léigh, sí, leabhar, inné}\} \\
\text{BCK}\{i\}
\end{cases}
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C-structure to i-structure is one-to-many

Example:

Is sa leabharlann a léigh sí leabhar inné.
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'It is in the library that she read a book yesterday.'

- I-structure 3: PPfoc: (↓OBJ PRED) ∈ i(↑FOC)

  FOC {leabharlann}

  TOP {léigh, sí, leabhar, inné}

  BCK {i}

- ↑FOC is assigned to the preposition’s OBJ only
Disambiguating i-structures

- One sentence can be mapped to different i-structures
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  → Disambiguation has to be done in further processing
Disambiguating i-structures

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- Syntax is only able to produce these structures
  → Disambiguation has to be done in further processing
  → Possible tools include discourse analysis, optimality theory, statistical methods...
Yet another approach...

- O’Connor (2004):
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  - No direct mapping from c-structure to i-structure
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  - No direct mapping from c-structure to i-structure
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  - Argues that one-to-one mapping between discourse functions and constituents is often not possible
  - Work seems highly relevant, but has to be further investigated
Further work

Possible further work includes:

Finally implement the i-structure interface proper using the XLE parsing system.

Look at other clefting constructions, find out about implications for i-structure.

Investigate possible disambiguation methods, applicable to the syntax output.
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Thank you!
References


