ASL IX to locus as a modifier

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IX and Loci

- **IX**: pointing handshape used to refer to entities
- **Loci**: abstract location in signing space associated with referents not present in context

[Friedman 1975]
IX and Loci

$\text{IX}_A$: IX to locus A

vs. IX (‘neutral IX’, $\text{IX}_{\text{NEUT}}$)

(1) I MEET BOY $\text{IX}_A$ GIRL $\text{IX}_B$. $\text{IX}_A$ TIRED.
‘I met a boy and a girl. The boy was tired.’

(2) I MEET BOY. $\text{IX}_{\text{NEUT}}$ TIRED.
‘I met a boy. He was tired.’

IX analyzed as:

- Definite determiner [Irani 2016; MacLaughlin 1997; Neidle et al. 2000]
- Demonstrative [Koulidobrova & Lillo-Martin 2016]
- Pronoun [Lillo-Martin & Klima 1990; MacLaughlin 1997]
Loci as indices

Loci analyzed as overt instantiations of indices (Lillo-Martin & Klima 1990) that occur with pronouns.

(3) Jin$_1$ met Jimin$_2$. He$_1$ sang for him$_2$.

- $g = \{ <1, \text{jin}>, <2, \text{Jimin}> \}$
- $[\text{he}_1] = [x_1]^g = g(1) = \text{jin}$

$I_{\lambda A}$ is like $\text{he}_1$

Implications:

IX as demonstratives

Koulidobrova & Lillo-Martin 2016:
IX should be analyzed as **demonstratives**.

- Similar kind of markedness detected (Hinterwimmer & Bosch 2016; Roberts 2002; Wolter 2006)

(4)  MOTHER$_i$ PERSUADE MARY$_j$ MAKE SANDWICH$_k$.
a-IX$_{j,k,*i}$ GOOD

‘My mother persuaded my sister to make a sandwich. {She$_j$/it$_k$} is good.’
Preview

**Loci as indices**

[Lillo-Martin & Klima 1990]

- $IX_A$ is like $she_7$
- $IX$ is a pronoun

**IX as demonstratives**

[Koulidobrova & Lillo-Martin 2016]

- not definite determiner or pronoun
- $IX$ is marked in distribution

Proposal: **$IX_{LOC}$ is a modifier.**

- Not a pronoun with an index. $\rightarrow$ $IX_{LOC}$ tracks with contrast
- Not a demonstrative. $\rightarrow$ Introductory use is not definite
- $IX_{NEUT}$ is a pronoun. $\rightarrow$ $IX_{NEUT}$ lacks both of these properties
Loci as indices
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Loci as indices
[Lillo-Martin & Klima 1990]
- IX\textsubscript{A} is like she\textsubscript{7}
- IX is a pronoun

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[Koulidobrova & Lillo-Martin 2016]
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- IX is marked in distribution

Proposal: IX\textsubscript{LOC} is a modifier.
- Not a pronoun with an index. $\rightarrow$ IX\textsubscript{LOC} tracks with contrast
- Not a demonstrative. $\rightarrow$ Introductory use is not definite
- IX\textsubscript{NEUT} is a pronoun. $\rightarrow$ IX\textsubscript{NEUT} lacks both of these properties
Main advantages

- Uniform treatment of the introductory use
- Straightforward link to exophoric demonstratives in spoken languages

Preview:

1. $\llbracket \rightarrow A \rrbracket$ is a modifier in spoken languages
2. DEM in spoken languages takes $\llbracket \rightarrow A \rrbracket$ as an additional argument
3. ASL $IX_{LOC}$ is basically this modifier
Anaphoric expressions in ASL
Anaphoric expressions in ASL

- **Null argument** [Bahan et al. 2000; Koulidobrova 2012; Lillo-Martin 1986]

(5)  I MEET GIRL. TIRED.
‘I met a girl. She was tired.’

- **Bare noun** [Koulidobrova 2018]

(6)  I MEET GIRL. GIRL TIRED.

- **IX** [Lillo-Martin & Klima 1990; Neidle et al. 2000; Steinbach & Onea 2015]
  - IX in the neutral position

(7)  I MEET GIRL. IX\textsubscript{NEUT} TIRED.

- IX to a locus

(8)  I MEET GIRL IX\textsubscript{A}. IX\textsubscript{A} TIRED.
A lot of focus on $\text{IX}_{\text{LOC}}$

How frequent is $\text{IX}_{\text{LOC}}$?

- Referent tracking studies: not very frequent.
  
  [Czubek 2017; Frederiksen & Mayberry 2016]

<table>
<thead>
<tr>
<th></th>
<th>Null Arg</th>
<th>CL</th>
<th>N</th>
<th>$\text{IX}$</th>
<th>F-S</th>
<th>Total</th>
</tr>
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<tr>
<td>Maintained</td>
<td>.73 (219)</td>
<td>.20 (63)</td>
<td>.07 (21)</td>
<td>.02 (6)</td>
<td>.04 (1)</td>
<td>310</td>
</tr>
<tr>
<td>Reintroduced</td>
<td>.67 (20)</td>
<td>0 (0)</td>
<td>1 (10)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>30</td>
</tr>
</tbody>
</table>
Use of $\text{IX}_{\text{LOC}}$ tracks with contrast
Testing semantic factors

Ahn, Kocab, & Davidson 2019:
Naturalness rating with 3 native signers

IX\textsubscript{LOC} is not obligatory:

- when there are no competing referents
  \textbf{BOY} ENTER CLUB. SEE \textbf{GIRL} READ $\rightarrow$ IX\textsubscript{A} DANCE
  \textbf{BOY} ENTER CLUB. $\rightarrow$ (IX\textsubscript{NEUT}) DANCE

- when context tells you who did what
  MARY HANG-OUT SUE. $\rightarrow$ IX\textsubscript{A} PUSH IX\textsubscript{B}
  MARY HANG-OUT SUE. $\rightarrow$ (IX\textsubscript{NEUT}) PUSH (IX\textsubscript{NEUT})
  SUE SAY SOMETHING BAD.
  MARY ANGRY.
Results

Simplified (for details, see Ahn, Kocab, & Davidson 2019)

- When it is obvious who the referent is:
  - One referent
  - Narrative tells you who
  \[ \text{IX}_{\text{LOC}} \text{ not obligatory.} \]
  \[ \text{null or IX}_{\text{NEUT}} \text{ preferred.} \]
- When not obvious:
  \[ \text{IX}_{\text{LOC}} \text{ and bare noun preferred.} \]
- With inanimates
  \[ \text{IX}_{\text{LOC}} \text{ not licensed.} \]

(9) MARY IX\textsubscript{A} BUY BOOK ?IX\textsubscript{B}. ?IX\textsubscript{B} EXPENSIVE.
(intended) ‘Mary bought a book. The book was expensive.’
What we learn

**ASL IX\textsubscript{LOC} is sensitive to contrast and animacy.**

Not like the indices we use in formal representations of language:

- Indices are not sensitive to animacy.
- Indices are not sensitive to contrast.

→ Main role of IX\textsubscript{LOC} is in **DISTINGUISHING** between competing referents rather than **ANAPHORICALLY** referring to referents.
The distribution and interpretation of $IX_{\text{LOC}}$ align with demonstratives.

Koulidobrova & Lillo-Martin 2016: IX is a demonstrative.

- $IX_{\text{NEUT}}$ is different

Is $IX_{\text{LOC}}$ a demonstrative?

What are demonstratives?
Demonstrative?

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What are demonstratives?
Demonstratives

Approach 1: Exophoric approach [Kaplan 1977; Roberts 2002]

- Demonstratives denote deictic reference only

Approach 2: Markedness approach [Hinterwimmer & Bosch 2018; Wolter 2006]

- Demonstrative pronouns are pronouns with markedness constraint (anti-perspective holder, etc.)

Approach 3: Extended Definite approach [Elbourne 2008; King 2008; Nowak 2014]

- Demonstratives are definites plus another property
  
  \[
  \text{[the } P \text{]} = \nu x. P(x) \quad \text{[that } P \text{]} = \nu x \; P(x) \land Q(x)
  \]
Demonstratives in Ahn 2019

Ahn 2019: Demonstratives realize a binary maximality operator.

- Pronouns and definites use regular unary maximality operator

\[
[sup] = \lambda P \ i z : \forall x \ [\forall y \ [P(y) \rightarrow y \sqsubseteq x] \ ] \rightarrow z \sqsubseteq x
\]

‘smallest individual x s.t. all individuals y that is P form part of x’

\[(10) \quad [\text{she}] = sup \ [\lambda x. \ \phi(x)]\]

\[(11) \quad [\text{the } P] = sup \ [\lambda x. \ \phi(x) \land P(x)]\]

- Demonstratives lexicalize a binary maximality operator

\[
[\text{bi-sup}] = \lambda P \ \lambda R \ i z : \forall x \ [\forall y \ [R(y) \land P(y) \rightarrow y \sqsubseteq x] \ ] \rightarrow z \sqsubseteq x
\]

\[(12) \quad [\text{that}_R] = \text{bi-sup} \ [\lambda x. \ \phi(x)] \ [R]\]

\[(13) \quad [\text{that}_R \ P] = \text{bi-sup} \ [\lambda x. \ \phi(x) \land P(x)] \ [R]\]
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\[ \llbracket \text{sup} \rrbracket = \lambda P \ i_z : \forall x \ [\forall y \ [P(y) \rightarrow y \sqsubseteq x] ] \rightarrow z \sqsubseteq x \]

'\text{smallest individual } x \text{ s.t. all individuals } y \text{ that is } P \text{ form part of } x' \]

(10) \[ \llbracket \text{she} \rrbracket = \text{sup} \ [\lambda x. \ \phi(x)] \]

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(13) \[ \llbracket \text{that}_R \ P \rrbracket = \text{bi-sup} \ [\lambda x. \ \phi(x) \land P(x)] \ [R] \]
Demonstratives

R occupied by: Relative clauses and $[\rightarrow]$
(and a familiar index as last-resort)

Accounts for:

1. Only demonstratives allow exophoric reference.

   (14) That $\rightarrow$ paper looks interesting.

   (15) *It $\rightarrow$ / The paper $\rightarrow$ looks interesting.

2. Only demonstratives allow restrictive relative clauses.

   (16) That which rolls gathers no moss.

   (17) *It which rolls gathers no moss.
What is $\rightarrow$?

$$\left[\rightarrow\right] = \lambda a. \lambda x. \ x \text{ is at } a$$

- Modifier that takes a location variable $a$ (always saturated) and individual $x$ and returns true iff $x$ is at $a$.

Different modality: visual-manual modality, gestural

- Claim: In spoken languages, only demonstratives readily allow composition with gestural information.
  as opposed to backgrounded information (cf. Esipova 2019; Schlenker 2018)

- This is possible because of the binary supremum operator.
That girl →

\[
\llbracket \text{that girl} \rightarrow A \rrbracket = \\
\text{DP} \\
\text{R} \quad \text{D'} \\
\lambda x. \llbracket \rightarrow \rrbracket (A)(x) \quad \text{bi-sup} \quad \text{NP} \\
\text{that} \quad \text{girl} \\
\]

\[
\llbracket \text{that} \rightarrow A \rrbracket = \\
\text{DP} \\
\text{R} \quad \text{D'} \\
\lambda x. \llbracket \rightarrow \rrbracket (A)(x) \quad \text{bi-sup} \quad \phi \\
\text{that} \\
\]

bi-sup \( [\lambda x. \llbracket \text{girl} \rrbracket (x)] [\lambda x. \llbracket \rightarrow \rrbracket (A)(x)] \)

‘the maximal individual \( x \) that is a girl and at \( A \)’
Going back to $IX_A$

$IX_{\text{LOC}}$ as a demonstrative?

$$\llbracket IX_A \rrbracket = \text{bi-sup } [\lambda x. \phi(x)] [\lambda x. \llbracket \rightarrow \rrbracket (A)(x)]$$

$$\llbracket IX_A \; P \rrbracket = \text{bi-sup } [\lambda x. \phi(x) \land P(x)] [\lambda x. \llbracket \rightarrow \rrbracket (A)(x)]$$

‘the maximal individual $x$ that is an entity (and $P$) and at $A$’

Not quite!
Going back to $\text{IX}_A$

$\text{IX}_{\text{LOC}}$ as a demonstrative?

$\llbracket \text{IX}_A \rrbracket = \text{bi-sup} \ [\lambda x. \phi(x)] \ [\lambda x. \llbracket \to \rrbracket (A)(x)]$

$\llbracket \text{IX}_A \ P \rrbracket = \text{bi-sup} \ [\lambda x. \phi(x) \land P(x)] \ [\lambda x. \llbracket \to \rrbracket (A)(x)]$

‘the maximal individual $x$ that is an entity (and $P$) and at $A$’

Not quite!
Unique property of \(I_X_{\text{LOC}}\): it has to be introduced first!

(18) \text{GIRL } I_X^A \text{ SIT-IN CLASS. } I_X^A \text{ DANCE.}  \\
\text{‘A girl}^i \text{ was sitting in class. She}^i \text{ danced.}

(19) \text{GIRL SIT-IN CLASS. } ?I_X^A \text{ DANCE.}

- \(I_X_{\text{LOC}}\) cannot be analyzed as an anaphoric expression.
  - Introductory use would need a separate account.

Proposal: \(I_X_{\text{LOC}}\) is a modifier.
Proposal:

\[ \text{\(IX_A\)} = \sup [\lambda x. \phi(x)] [\lambda x. \rightarrow](A)(x) \]

‘the maximal entity that meets \(\phi\)-features and is at \(A\)’

‘is at \(A\)’

\[ \text{\(IX_{LOC}\)} = \rightarrow = \lambda a. \lambda x. \text{x is at a} \]

\(IX_A\) DANCE.

\(\emptyset\) \(IX_A\) DANCE.

‘the entity that is at \(A\) danced.’

\[ \sup [\lambda x. \text{entity}(x) \land \text{at-A}(x)] \]
Proposal:

\[ [IX_A] = \sup [\lambda x. \phi(x)] [\lambda x. [\rightarrow] (A)(x)] \]

‘the maximal entity that meets \( \phi \)-features and is at \( A \)’

‘is at \( A \)’

\[ [IX_{LOC}] = [\rightarrow] = \lambda a. \lambda x. x \text{ is at } a \]

\( IX_A \text{ DANCE.} \)

\( \emptyset \text{ DANCE.} \)

‘the entity that is at \( A \) danced.’

\[ \sup [\lambda x. \text{entity}(x) \wedge \text{at-}A(x)] \]
Proposal:

$[[\text{IX}_A]] = \sup [\lambda x. \phi(x)] [\lambda x. \leftarrow](A)(x)]$

‘the maximal entity that meets $\phi$-features and is at A’

‘is at A’

$[[\text{IX}_{\text{LOC}}]] = [\leftarrow] = \lambda a. \lambda x. x$ is at a

\textbf{IX}_A \text{ DANCE.}

$\emptyset \text{ IX}_A \text{ DANCE.}$

‘the entity that is at A danced.’

$\sup [\lambda x. \text{entity}(x) \land \text{at-}A(x)]$
Proposal:

\[[\text{IX}_A]\] = \sup [\lambda x. \phi(x)] [\lambda x. [\rightarrow](A)(x)]

‘the maximal entity that meets \(\phi\)-features and is at \(A\’

‘is at \(A\’

\[[\text{IX}_{\text{LOC}}]\] = [\rightarrow] = \lambda a. \lambda x. x \text{ is at } a

\mathbf{IX}_A \text{ DANCE.}

\emptyset \mathbf{IX}_A \text{ DANCE.}

‘the entity that is at \(A\) danced.’

\(\sup [\lambda x. \text{entity}(x) \land \text{at-A}(x)]\)
**Introductory use: supplementary**

**JIN IX**

SIT-IN CLASS.  \( \emptyset \mathbf{IX}_A \) DANCE.

**supplemental**

\[ [\text{JIN IX}_A] = [\text{jin [who is at A]}] \]

\[ [\mathbf{IX}_A] = [\emptyset \mathbf{IX}_A] = \nu x. \ x \text{ is at A} \]

\('Jin'\)

\('the one at A'\)


- Null-head relative clauses found in Mandarin

(20) \( \text{Wo mai-de hen gui.} \)

I buy-RC HEN expensive

\('The thing I bought was expensive.' [Yuyin He, pc] \)
Introductory use: supplementary

\[ \text{JIN IX}_A \text{ SIT-IN CLASS. } \emptyset \text{ IX}_A \text{ DANCE.} \]

supplemental       restrictive

‘Jin (who is at A) .. The entity that is at A ..’

\[ [\text{JIN IX}_A] = [jin \ [\text{who is at A}]] \]

\[ [\text{IX}_A] = [\emptyset \text{ IX}_A] = \nu x. \ x \text{ is at A} \]

‘Jin’

‘the one at A’


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Supplementary nature of JIN IX\textsubscript{A}

\[ [\text{JIN IX}_{A}] = [jin \ [\text{who is at } A] \ ] \quad \text{‘Jin’} \]

What does it mean for \([\text{who is at } A]\) to be supplemental?

- Supplements can be new information
- Addressee can accommodate
- Similar uses:
  - There is this boy, Jin, who...
  - My friend, A, decided to call my other friend, B, but B didn’t pick up because B didn’t want to talk to A.
  - There is this woman, \{let’s call her A / who I’ll call A\}
\( \mathbf{IX}_{\text{LOC}} \) across modalities
IX\textsubscript{LOC} in spoken languages

IX\textsubscript{LOC} also exists in spoken languages.

Without demonstratives, often supplemental:

(21) Jin\rightarrow_{A} looks happy. ‘Jin looks happy; he is at location A’

(22) One woman is my friend. She\rightarrow_{A} plays soccer.

   ‘The friend plays soccer; she is at A’ [Ahn & Davidson 2018]

With demonstratives, obligatorily restrictive:

(23) That boy\rightarrow_{A} looks happy. ‘The boy at A looks happy.’
Signed vs. Spoken languages

Extension to anaphoric uses:

**Spoken languages**: the pointing gesture removed

That\(_A\) linguist is happy.

I met a linguist\(_7\). That\(_7\) linguist was happy.

(marked, acquired later [Ahn & Arunachalam 2019])

*If you point, anaphoric link breaks! [Ahn & Davidson 2018]

**Signed languages**: pointing to abstract locus

IX\(_R\) TIRED

‘The person at R is tired.’

I MEET LINGUIST IX\(_A\). IX\(_A\) TIRED

‘The person at A is tired.’
Conclusion
Summary

1. IX_{LOC} traditionally analyzed as pronouns carrying indices.
2. Properties of IX_{LOC} that are incompatible:
   - Low frequency
   - Tracking with contrast
   - Not licensed with inanimates
3. IX_{LOC} must be introduced, making it less like a demonstrative.
4. Analyzing IX_{LOC} as a modifier (relative clause) better accounts for distribution and interpretation.
Advantage

1. Simpler analysis
   - $IX_{LOC} = \rightarrow$
   - Can be applied to both introductory and anaphoric $IX_{LOC}$.

2. Accounts for markedness.
   - Highest in the scale
   - Used only when other anaphoric expressions are not available.

3. Cross-modal picture
   - Composition with exophoric pointing gesture
Thank you!

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Consultation participants: Brittany Farr, Shana Gibbs, Karlee Gruetzner, Jillian Gruetzner, and Kate Henninger


Esipova, Masha. 2019. Composition and projection in speech and gesture.
Koulidobrova, Elena. 2018. Counting (on) bare nouns: Revelations from ASL. *BECL*.


Alternate analyses

**MacLaughlin 1997**: post-nominal IX is an adverbial

- current proposal is only for $IX_{\text{LOC}}$ and not $IX_{\text{NEUT}}$
- not restricted to post-nominal IX

**Kuhn 2015**: loci are features

- current proposal different because Kuhn’s features are mostly syntactic features that trigger agreement
- $IX_{\text{LOC}}$ as a whole could be seen as notional features, but Kuhn analyzes loci only as features.
- Similar challenge in analyzing the introductory use
Ahn 2019: *THAT thesis: A Competition-based mechanism for anaphoric expressions*

- The interpretive and distributional properties of an anaphoric expression is a result of *semantic/pragmatic competition*.

- The interpretation and the distribution of an anaphoric expression *depends* on the presence of other anaphoric expressions in the language.
Main idea

1. Anaphoric expressions share one basic structure.

\[
[she_7] = \]

\[
\lambda n \lambda x_e: x = g(n).x
\]

\[
[DP \quad [n] \quad [sup \quad [NP \quad \lambda x: \text{entity}(x) \land \text{female}(x) \ldots ]] \quad ] \quad ]
\]

index supremum restrictions
2. They differ on how much information they carry.

\[
\text{[\text{she}]} = \sup [\lambda x. \text{entity}(x) \land \text{female}(x)]
\]

\[
\text{[the girl]} = \sup [\lambda x. \text{entity}(x) \land [\text{girl}](x)]
\]

\[
\text{[\emptyset]} = \sup [\lambda x. \text{entity}(x)]
\]

Semantically primitive properties that are universally available, for language-specific realizations
Main idea

3. An economy principle requires that the **minimally informative** / redundant form be used.

Derivable from Grice’s Brevity, Efficiency (Meyer 2014),
Related to *Minimize DP!* (Patel-Grosz & Grosz 2017)

A boy walked in. \{He, The boy, That boy\} looked happy.
\{ j₁ \}

A boy invited a man. \{He, The boy, That boy\} looked happy.
\{ j₁, k₂ \}

Use of a higher element has consequences!

- Domain widening as accommodation
  - covert vs. overt pronouns in Romance [Mayol 2010]
  - dem. pro. in German [Hinterwimmer & Bosch 2018; Wiltschko 1998]
The subset of properties realized in ASL:

\[[\emptyset]\] = \sup [\lambda x. \text{entity}(x)]

\[[\text{IX}_{\text{NEUT}}]\] = \sup [\lambda x \text{entity}(x) \land \phi(x)]

\[[\text{NP}]\] = \sup [\lambda x. \text{entity}(x) \land \text{NP}(x)]

What about \text{IX}_{\text{LOC}}?

- \[[\text{IX}_{\text{LOC}}]\] = \sup [\lambda x. \text{entity}(x) \land \phi(x) \land R(x)]

What is R?
The subset of properties realized in ASL:

\[ [\emptyset] = \sup \lambda x. \text{entity}(x) \]

\[ [\text{IX}_{\text{NEUT}}] = \sup \lambda x \; \text{entity}(x) \land \phi(x) \]

\[ [\text{NP}] = \sup \lambda x. \text{entity}(x) \land \text{NP}(x) \]

What about IX\text{LOC}?

- \[ [\text{IX}_{\text{LOC}}] = \sup \lambda x. \text{entity}(x) \land \phi(x) \land R(x) \]

What is R?
The subset of properties realized in ASL:

\[
[\emptyset] = \sup [\lambda x. \ \text{entity}(x)]
\]

\[
[I_{\text{NEUT}}] = \sup [\lambda x \ \text{entity}(x) \land \phi(x)]
\]

\[
[NP] = \sup [\lambda x. \ \text{entity}(x) \land \text{NP}(x)]
\]

What about \( I_{\text{LOC}} \)?

\[
[I_{\text{LOC}}] = \sup [\lambda x. \ \text{entity}(x) \land \phi(x) \land R(x)]
\]

What is \( R \)?
**What is \( R \)?**

Ahn 2019: \( R \) is an additional property demonstratives carry.

Extension of Extended Definite Approach (Elbourne 2008; King 2008)

**Observation:** Demonstratives allow exophoric reference.

(24) That\( \rightarrow \) paper looks interesting.

(25) *It\( \rightarrow \) / The paper\( \rightarrow \) looks interesting.

**Claim:** Demonstratives realize a binary supremum.

- sup with two arguments [NP restrictions] and [\( \rightarrow \)]
- What is \( \rightarrow \)?
I. Loci are not obligatory.

All anaphoric expressions felicitous when there is only one referent.

- Assigning a locus is possible.

(26) **BOY I_X A ENTER CLUB. MUSIC-ON. I_X A DANCE.**

- But null, bare noun, and neutral IX are also possible.

- Neutral IX was the preferred choice with one referent.

(27) **BOY ENTER CLUB. MUSIC-ON. { Ø, BOY, IX } DANCE.**
II. Loci are not always licensed.

IX_{LOC} is bad for inanimate referents.

(28) \text{GIRL } I_XA \text{ BUY BOOK } I_XB. \text{ } I_XA \text{ HAPPY.}

‘A girl bought a book. She was happy.’

(29) \text{GIRL } I_XA \text{ BUY BOOK } I_XB. \text{ } I_XB \text{ ABOUT PIRATES.}

‘A girl bought a book. It was about pirates.’

- Assigning a locus for an inanimate referent was unnatural.
- Not just for small items; for buildings too.
III. $\mathbf{IX}_{\mathbf{LOC}}$ is licensed in contexts of contrast.

(30) BOY ENTER CLUB. SEE GIRL READ. MUSIC-ON. $\{\emptyset, \mathbf{IX}\} \text{DANCE.}$

(31) BOY ENTER CLUB. SEE GIRL READ. MUSIC-ON. $\{\mathbf{BOY}\} \text{DANCE.}$

(32) BOY $\mathbf{IX}_A$ ENTER CLUB. SEE GIRL $\mathbf{IX}_B$ READ. MUSIC-ON. $\mathbf{IX}_A \text{DANCE.}$
IV. $\mathbf{IX}_{\mathbf{LOC}}$ is licensed in contexts with no narrative.

(33) SUE HANG-OUT MARY. ?{ $\emptyset$, IX } PUSH { $\emptyset$, IX }.

(34) SUE $\mathbf{IX}_A$ HANG-OUT MARY $\mathbf{IX}_B$. $\mathbf{IX}_A$ PUSH $\mathbf{IX}_B$.

- With a narrative, neutral IX or null is okay:

(35) SUE HANG-OUT MARY. MARY SAY SOMETHING. SUE ANGRY. { $\emptyset$, IX } PUSH { $\emptyset$, IX }.
V. $\text{IX}_{\text{NEUT}}$ marks animacy?

forward pointing

downward/index pointing
Summary of Data

Anaphoric expressions differ in their licensing conditions

- With no contrast, $\emptyset$ or IX okay.
- With contrast, bare noun or $\text{IX}_{\text{LOC}}$ is licensed.

$\rightarrow \text{IX}_{\text{NEUT}} \neq \text{IX}_{\text{LOC}}$

Locus is neither obligatory nor licensed in all anaphoric contexts.

- Not the preferred choice when there is no competing referent.
- Not felicitous for inanimates

$\rightarrow$ Locus is not necessary when it is clear who did what.
$\rightarrow$ Implications for loci=indices analysis!
Advantages

1. A single DP structure with parallel semantics for all anaphoric expressions
   - Only differ in the kind and number of restrictions
2. Competition is naturally derived from the meaning
3. Unified account for a wide range of anaphoric expressions without having to stipulate a lexically-specific restrictions
   - Avoid Pronoun Constraint [Chomsky 1981]
   - Little pro in Romance that compete with overt pronouns
   - Disjoint reference effects
   - Demonstratives
   - Loci (use of space for referent tracking)
Demonstratives with RRC

\[
\left[ \text{those who read/he who reads} \right] =
\]

\[
\text{bi-sup } (\lambda x. \text{entity}(x)) (\lambda x. \left[ \text{read} \right](x))
\]

‘the maximal individual \( x \) that reads’