A unified analysis of anaphoric expressions in spoken and signed languages

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Anaphoric expressions

Referential expressions that refer to familiar entities.
Dependent, but not syntactically bound (Safir 2004)

Familiar:

- Previous mention
- Familiar by common knowledge

How do we know which expression to use? A lot of options.

Anaphoric expressions

There are many anaphoric expressions.

(1) I met a girl. [DP] looked happy.

- *she* — pronoun
- *the girl* — definite description
- *that girl* — demonstrative description
- ∅ — null argument
- *girl* — bare noun

Anaphoric expressions

Anaphoric expressions are often **interchangeable**:

(2) I met a girl. {She, The girl} looked happy.

But we see an interaction:

(3) Every girl$_{i}$ thinks that Jin likes { her$_{i/j}$, the girl$_{*i/j}$ }. [reading]

(4) A girl entered the room. {She, The girl} looked happy. [processing]

Interaction

Processing studies:

Repeated Name Penalty	Repeated Noun Penalty	Overt Pronoun Penalty
Jin entered the stage. #Jin/He...	The singer entered. #The singer/He...	Jin entered the stage. #He/∅...
name > pronoun	noun > pronoun	overt > null

[cf. Gordon et al. 1993; Van Gompel et al. 2004]

Interaction

Referent tracking studies from corpus [Ariel 2001; Gundel et al. 1993]

(5) **Accessibility Hierarchy** [Ariel 2001]

full name > long definite description > short definite description > last name > first name > distal demonstrative + modifier > proximate demonstrative + modifier > distal demonstrative + NP > proximate demonstrative + NP > distal demonstrative > proximate demonstrative > stressed pronoun > unstressed pronoun > cliticized pronoun > verbal person inflections > zero

(6) **The Givenness Hierarchy** [Gundel et al. 1993]

in focus	>	activated	>	familiar
it		that, this, this N		that N
uniquely identifiable	>	referential	>	type identifiable
the N		indefinite this N		a N

No unified semantic analysis

she

pronoun

variables? hidden definite descriptions?

[Evans 1980; Kamp 1981]

the girl

definite description

uniqueness? familiarity? both?

[Heim 1982; Schwarz 2009]

that girl

demonstrative

pointing! Extended definites

[Kaplan 1969; King 2008]

∅

null argument

constraints on pro-drop, different interpretations

[Duguine 2014; Kurafuji 2019]

girl

bare noun

interpretations, constraints, unique vs. anaphoric

[Chierchia 1998b; Dayal 2009; Jenks 2015]

What we have so far

Semantics

Disjoint discussions on what each expression denotes

Language Use

Relative frequency and distribution; interaction in processing

How are these two related?

What are the underlying denotations that result in the distributional patterns we see?

Preview

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

Unified analysis of anaphoric expressions

- Share the underlying structure
- Differ only in restrictions

→ naturally derives a competition through independently motivated semantic economy principles

Preview

Enables a unified semantic account of independently observed phenomena across languages

Allows for systematic predictions for gradient properties such as cross-linguistic and individual variation

Has implications on current debates involving sign languages

Overview

Motivation: Bare Noun Blocking

A unified analysis

Spoken languages: Capturing gradience

- Cross-linguistic variation
- Variation across speakers

Sign languages: pointing

Motivation: Bare Noun Blocking

Bare argument languages

Languages that freely allow bare nouns as arguments to predicates.

- Excludes languages like English *'Dinosaurs are everywhere.'*

Languages investigated:

- Japanese, Mandarin, Korean, Thai, Turkish
- Russian, Belarusian, Polish
- Hindi
- American Sign Language (ASL)

Bare argument languages

Bare arguments in these languages can be definite.

[Dayal 2004; Jenks 2015; Jiang 2012; Schwarz 2009]

(7) mkamlaŋ hàw.
dog PROG bark
'The dog is barking.' [Thai;Jenks 2015]

But which definite?

Licensing definites

What does a definite denote?

- uniqueness (Frege 1892; Russell 1905) *'The moon is bright.'*
- familiarity (Heim 1982; Roberts 2002) *'I saw a mouse. The mouse..'*

Schwarz 2009, 2013: Both must be semantically distinguished.

	English	Fering	German	Thai [Jenks 2015]
UNIQUE	*the*	*a*	*im*	N
FAMILIAR	*the*	*di*	*in dem*	N CL DEM

Uniqueness

Bare arguments can be **uniqueness** denoting.

(8) Tsuki-ga ōkī.
moon-NOM big
'The moon is big.' [Japanese]

(9) ay parlak
moon shiny.3SG
'The moon is shining.' [Turkish]

(10) duaŋ-can sàwàaŋ mâak.
moon bright very
'The moon is very bright.' [Thai; Jenks 2015]

(11) chand chamak raha hai.
moon shine AUX.PROG AUX.PRS
'The moon is shining.' [Hindi]

Anaphoric bare nouns

New Observation:

Bare argument languages differ in the anaphoric ability of the bare noun in **intersentential anaphora**:

'I bought book. [Book] was expensive.'

ABN	*ABN
Korean, Turkish Japanese	Hindi, Thai

ABN: Anaphoric Bare Noun

Data: ABN languages

Languages that allow bare nouns in intersentential anaphora:

(12) watashi-wa hon-o kat-ta. **hon**-wa takaka-ta.
I-TOP book-ACC buy-PAST book-TOP expensive-PAST
'I bought a book. The book was expensive.' [Japanese]
[Ryoichiro Kobayashi, p.c.]

(13) ecey chayk-ul sa-ss-ta. **chayk**-un pissa-ss-ta.
yesterday book-ACC buy-PAST-DECL book-TOP expensive-PAST-DECL
'I bought a book yesterday. The book was expensive.' [Korean]

(14) bir kitap al-dı-m. **kitap** pahalı-ydı.
INDEF book buy-PAST-1SG Book expensive-PAST
'I bought a book. The book was expensive.' [Turkish]
[Deniz Satik, Hande Sevgi, p.c.]

Data: *ABN languages

Languages that disallow bare nouns in intersentential anaphora:

(15) Maine ek kitab kharid-i. ***(Vo) kitab** mehngi thi.
1SG.ERG one book.SGF buy-PAST.SGF (that) book.SGF expensive be.PAST.SGF
'I bought a book. The book was expensive.' [Hindi]
[Vyom Sharma p.c.]
[variation; discussed later]

(16) miawaan phom cee kap nakrian khon nin. **nakrian** chalaat maak.
yesterday I meet with student CLF INDEF student clever very
'Yesterday I met a student. Students are very clever.' [Thai; Jenks 2015]

Generalization

ABN	*ABN
Korean, Turkish Japanese	Hindi, Thai
Bare nouns allow anaphoric use	Bare nouns restrict anaphoric use

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[Q] Do bare nouns in *ABN languages block anaphoric uses?

Generalization

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[Q] Do bare nouns in *ABN languages block anaphoric uses?

→ No. This is a **derived property.**

*ABN: bare nouns blocked by **morphologically simplex pronoun**.

Bare Noun Blocking

Generalization:

If a bare argument language has morphologically simplex pronouns (‘simplex pronouns’) for third person reference,

bare nouns are blocked from intersentential anaphora when simplex pronouns can resolve the referent.

Bare Noun Blocking

Thai: *ABN language that has simplex pronouns.

Pronouns

	SG	PL
1	chăn	rao
2	kun	
3	kăo, man	pûak kăo

Demonstratives

- dtó nán (‘table that’)
- pronominal uses possible

[https://www.thailanguagehut.com]

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Hindi: No morphological distinction, but fully productive use of pronominal demonstrative *vo*

- *vo kitab* (‘that book’)
- *vo* (‘he’, ‘she’, ‘it’)

Bare Noun Blocking

Korean: ABN language that does *not* have simplex pronouns

Pronouns

	SG	PL
1	na	wuli
2	ne	nehuy
3	ku NP	ku NP-tul

Demonstratives

- ku chayksang (‘that desk’)

- pronominal use restricted

(17) a. *kyay*: *ku ay* (‘that kid’) reduced
b. *ku salam* (‘that person’) DEM N
c. *ku kes* (‘that thing’) DEM N

Bare Noun Blocking

Other ABN languages

Japanese: All pronouns are (reduced forms of) adnominal demonstratives [Ryoichiro Kobayashi, Michael Erlewine, pc]

(18) a. *ano hito* ('that person') DEM N
b. *ko/so/a-itsu* ('this/that guy') DEM CL

Turkish: Distal demonstrative description with *o* used; pronominal use restricted to animate entities

(19) Bir kitap al-dı-m. {Kitap / *o / o kitap} pahalı-ydı.
INDEF book buy-PAST-1SG Book 3SG that book expensive-PAST
'I bought a book. The/that book was expensive.' [Turkish]
[Deniz Satik, Hande Sevgi, p.c.]

Bare Noun Blocking

focusing on [3rd person] [sg]

		Simplex Pronouns	Adnominal Anaphors
ABN	Korean	*non-existent/restricted*	*ku salam*
	Turkish		*o kişi*
	Japanese		*ano hito*
*ABN	Hindi	*vo*	*vo kitab*
	Thai	*kăo, mán*	*nan* nakrian

Only in the languages that lack simplex pronouns,
bare nouns are used anaphorically.

How does this generalization work?

Recall:

she

pronoun

variables? hidden definite descriptions?

[Evans 1980; Kamp 1981]

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Combine into a unified theory!

A unified analysis

Unified theory

Idea: All anaphoric expressions share the same semantic structure

sup	[λx. entity(x) ∧ …]
supremum operator	restrictions

‘the maximal x such that x is an entity and …’

Unified theory

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supremum operator	restrictions

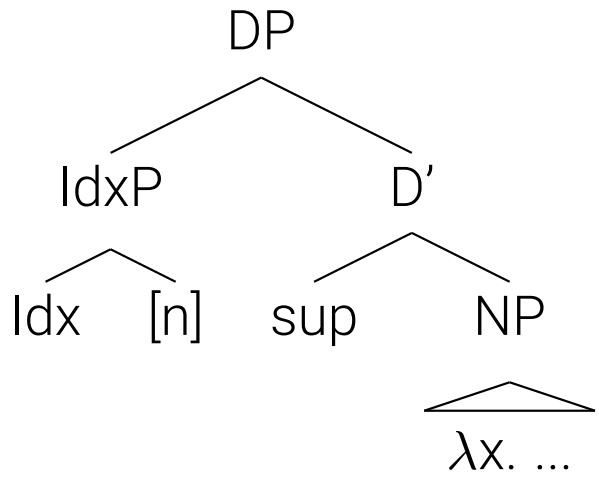
‘the maximal x such that x is an entity and …’

↑

kind and number of restrictions

Anaphoric DP structure

$[\![DP_n]\!]$ =

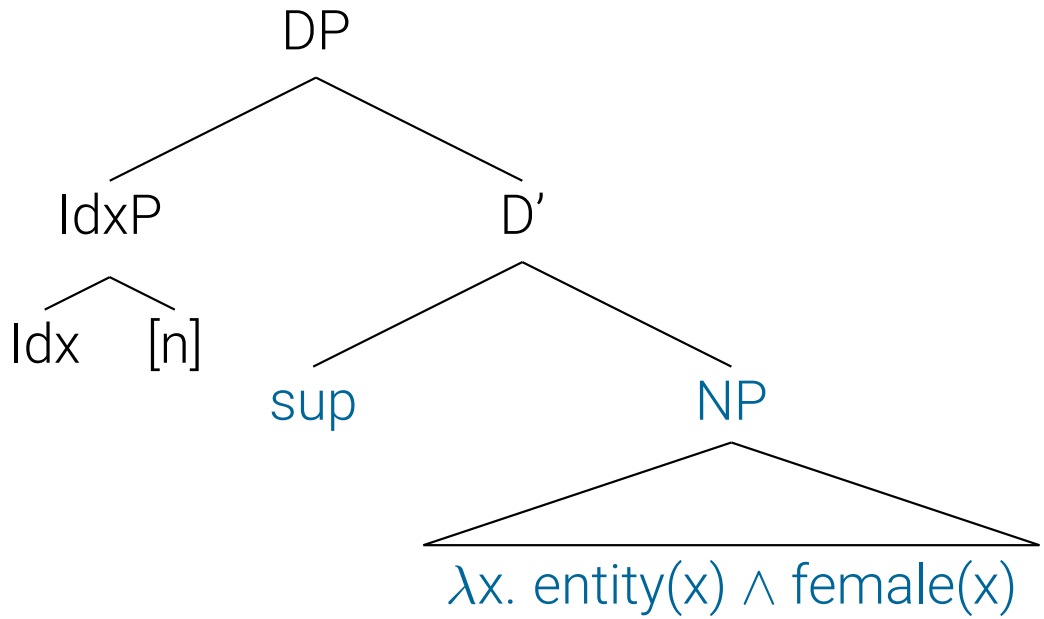


$[_{DP}$ [n] [sup $[_{NP}\ \lambda x$: entity(x) $\wedge$ female(x) ...]]

index — maximality operator — restrictions

Anaphoric DP structure

$[\![\text{she}_7]\!]$ =

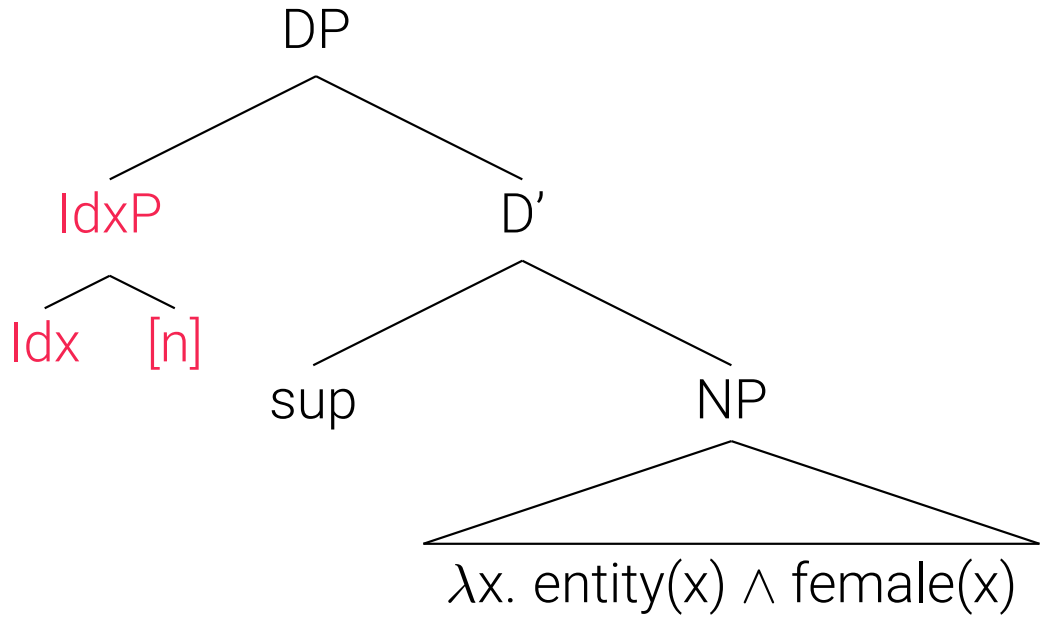


$[\![\text{sup}]\!] = \lambda P\, \iota z.\, \forall x\, [\forall y\, [P(y) \rightarrow y \sqsubseteq x] \rightarrow z \sqsubseteq x]$

'smallest individual *x* such that all individuals *y* that is *P* form part of *x*'

Anaphoric DP structure

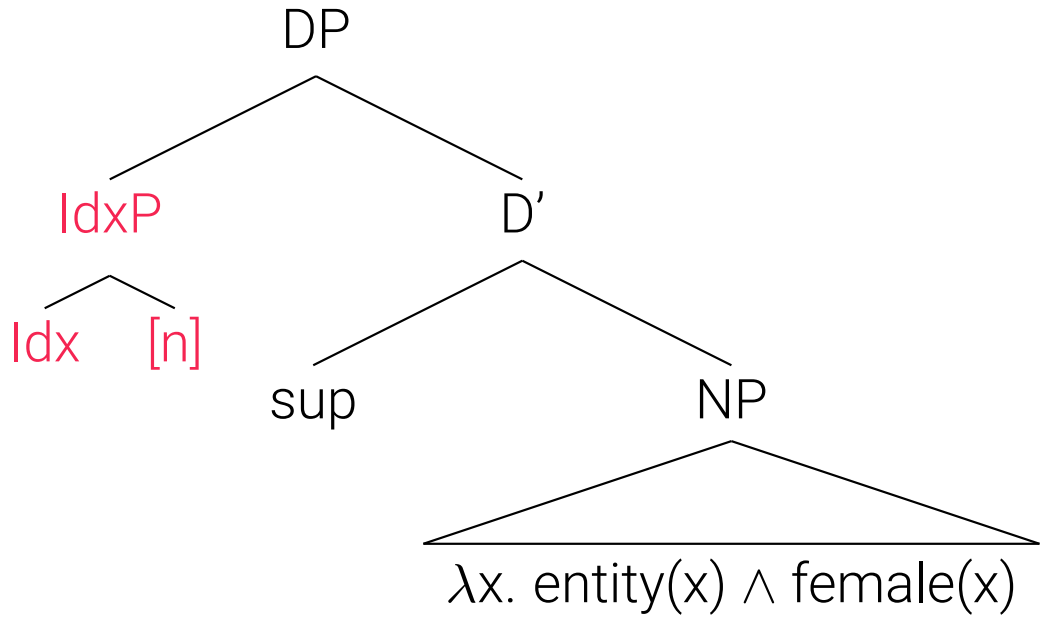
⟦she$_7$⟧ =



⟦Idx⟧ = λn. λx$_e$: x = g(n). x

Anaphoric DP structure

⟦she$_7$⟧ =



⟦Idx⟧ = λn. λx$_e$: x = g(n). x

the (plural) individual that consists of all females

defined iff x = g(7)

Semantic restrictions

entity(x)	true if x is an entity
ϕ(x)	true if x meets the ϕ feature requirements (gender, number, etc.)
⟦NP⟧(x)	true of x if ⟦NP⟧(x)=1
R(x)	true of x if R(x)=1

Denotations: Universal

a. λx. entity(x)
b. λx. entity(x) $\wedge$ ϕ(x)
c. λx. entity(x) $\wedge$ ⟦NP⟧(x)
d. λx. entity(x) $\wedge$ R(x)
e. λx. entity(x) $\wedge$ ⟦NP⟧(x) $\wedge$ R(x)
f. ...

Language-specific lexicalizations

English

$[\![\text{she}]\!] = \text{sup}\,[\lambda x.\ \text{entity}(x) \wedge \phi(x)]$

$[\![\text{the girl}]\!] = \text{sup}\,[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge [\![\text{girl}]\!](x)]$

$[\![\text{that}_R\ \text{girl}]\!] = \text{sup}\,[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge [\![\text{girl}]\!](x) \wedge R(x)]$

{ *she*, *the girl*, *that girl* }

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{ *she*, *the girl*, *that girl* }

Korean

$[\![\text{sonye}]\!] = \text{sup}\,[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge [\![\text{girl}]\!](x)]$

$[\![\text{ku}_R\ \text{sonye}]\!] = \text{sup}\,[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge [\![\text{girl}]\!](x) \wedge R(x)]$

$\{\ \text{N}_{\text{DEF}},\ \text{DEM}\ \ \text{N}\ \}$

Implications

A pronoun differs from a definite *only* in **its restrictions**.

$[\![\text{she}]\!]$ = sup $[\lambda x.\ \text{entity}(x) \wedge \phi(x)]$
$[\![\text{the girl}]\!]$ = sup $[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge \text{girl}(x)]$

Implications

A pronoun differs from a definite *only* in **its restrictions**.

⟦she⟧ = sup [λx. entity(x) $\wedge$ ϕ(x)]
⟦the girl⟧ = sup [λx. entity(x) $\wedge$ ϕ(x) $\wedge$ girl(x)]

Different from:

- general assumptions [Heim & Kratzer 1998]
  ⟦she⟧ = x_n
  ⟦the girl⟧ = ιx. girl(x)
- e-type analyses [Elbourne 2005; Evans 1980]
  ⟦she⟧ = ⟦the ~~girl~~⟧ = ιx. girl(x)
  ⟦the girl⟧ = ιx. girl(x)

Implications

1. Independently motivated economy principles like *Minimize Restrictors!* [Schlenker 2005] can be applied directly.

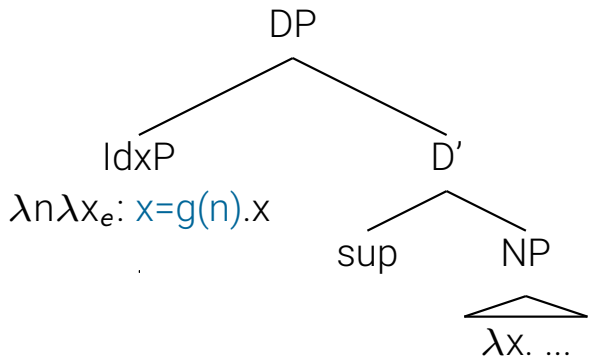
Recall redundancy: {She > #The girl} looked happy.

[Ahn 2019]	[Heim & Kratzer 1998]	[Elbourne 2005]
sup[entity(x) $\wedge$ ϕ(x)]	x_n	ιx. girl(x)
sup[entity(x) $\wedge$ ϕ(x) $\wedge$ girl(x)]	ιx. girl(x)	ιx. girl(x)
Minimize Restrictors! [Schlenker 2005] no redundant restrictions *my father > #my tall father*	N/A	N/A

Implications

2. The competition can also be subsumed under *Maximize Presupposition!* [Heim 1991].

[Ahn 2019]	[Heim & Kratzer 1998]	[Elbourne 2005]
sup[entity(x) ∧ ϕ(x)]	x_n	ιx. girl(x)
sup[entity(x) ∧ ϕ(x) ∧ girl(x)]	ιx. girl(x)	ιx. girl(x)
Maximize Presupposition!		
[Heim 1991]	N/A	N/A



sup[female(x)] = g(n) ⇒ sup[girl(x)] = g(n)

Going back to Bare Noun Blocking

***ABN Languages:**

Simplex pronouns are **simpler** than bare nouns.

- Less semantic content — no NP property

⟦kăo⟧ = sup [λx. entity(x) ∧ animate(x)] [Thai]

⟦nakrian⟧ = sup [λx. entity(x) ∧ animate(x) ∧ student(x)]

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When both are possible, **the more complex form is blocked**
due to semantic economy (*Minimize Restrictors!*, Efficiency [Meyer 2014]).

{ *kăo* , ~~*nakrian*~~ , ... }

Going back to Bare Noun Blocking

ABN Languages:
No simplex pronouns that can block bare nouns.

I met student. Student was clever.

$[\![\text{haksayng}]\!] = \sup\,[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge \text{student}(x)]$ [Korean]

Adnominal anaphors: higher in the scale (additional property R)

$[\![\text{ku haksayng}]\!] = \sup\,[\lambda x.\ \text{entity}(x) \wedge \phi(x) \wedge \text{student}(x) \wedge R(x)]$

{ ***haksayng*** , *ku haksayng* }

Bare Noun Blocking

ABN languages	***ABN languages**
N_{def}	pronoun
	~~N_{def}~~

- Not that bare nouns disallow anaphoric uses in *ABN languages.
- Simplex pronouns in *ABN languages block bare nouns.

Advantage

Context-sensitivity can be captured.

- As soon as we add another possible referent in the context, bare noun can be used in *ABN languages.

  [see Jenks 2015 for discussions in Thai]

Hindi (Vyom Sharma, pc):

I bought book$_i$. Book was expensive. *kitab*$_{*i}$

I bought book$_i$ and cup$_j$. Book was expensive. *kitab*$_i$

(20) Maine ek kitab aur ek cup kharid-a. **Kitab** mehngi thi.
1SG.ERG one book.SGF and one cup buy-PAST.SGF book.SGF expensive be.PAST.SGF
'I bought a book and a cup. The book was expensive.'

Summary

1. A unified semantic account of anaphoric expressions
    - extensionally equivalent
    - differs in restrictions
2. Semantic economy principles can derive competitions
    - Bare Noun Blocking
    - (null vs. overt pronouns in Romance)
    - (personal vs. demonstrative pronouns in German)

Summary

1. A unified semantic account of anaphoric expressions
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   - Bare Noun Blocking
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→ Spoken languages: capturing gradience

→ Sign languages: implications on semantic analyses of pointing

Spoken languages: Capturing gradience

Deriving more fine-grained differences

1. Cross-linguistic variation

- When does the competition lead to a penalty vs. a blocking?

Penalty vs. Blocking

2. Variation across speakers

- Anaphoric ability of bare noun depends on pronoun status

Variation at individual level

1. Going back to processing penalties

Repeated Noun/Name Penalty

- Adult English speakers take longer to process repeated nouns/names than pronouns.[Almor 1999; Gordon et al. 1993; Song & Fisher 2005]

A doctor walked with Jin. The doctor told Jin a story. **longer!**

A doctor walked with Jin. She told Jin a story.

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[Ahn 2019]: Use of higher elements in the scale has semantic consequences. (domain accommodation)

Accommodation

I met a doctor. {She, The doctor} looked happy.

- Presupposition of *the doctor* is weaker than that of *she*.
- Use of the weaker expression results in an anti-presupposition

  [Heim 1991; Sauerland 2008]
- Use of *the doctor* implies that there was no unique female entity

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Domain widening as accommodation.

$$\{ j_3 \} \rightarrow \{ j_3, k_7 \}$$

- constrained by/indicated by **focus** that triggers alternatives.

[The doctor] / [That doctor] looked happy.
the DOCTOR THAT doctor

Processing costs of accommodation

- Processing costs of presupposition accommodation

  [cf. Domaneschi & Di Paola 2018; Schwarz 2014; Singh et al. 2016; Tiemann et al. 2015, a.o.]

Semantics
Shared structure
Competition

Language Use
Processing penalties

Domain widening

$\{ j_3 \} \rightarrow \{ j_3, k_7 \}$

Penalty vs. Blocking

A girl walked in. {She / The girl / That girl} looked happy.

processing penalty

Penalty vs. Blocking

A girl walked in. {She / The girl / That girl} looked happy.

processing penalty

I met student. {kăo, ~~nakrian~~} was clever.

blocked

Penalty vs. Blocking

A girl walked in. {She / The girl / That girl} looked happy.

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I met student. {kǎo, ~~nakrian~~} was clever.

blocked

[Q] What determines whether competition leads to a penalty vs. a complete blocking?

The status of bare nouns in bare argument languages.

Bare nouns

Something we know about bare nouns in these languages:

[Chierchia 1998b; Dayal 2004; Déprez 2005; Jenks 2015; Jiang 2017]

(21) *nakrian*: the student / a student / ∩STUDENT / students

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- The use of a bare noun might signal the alternative readings
  → generic reading in Thai; indefinite in Hindi

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English: *the doctor* does not have non-definite readings.
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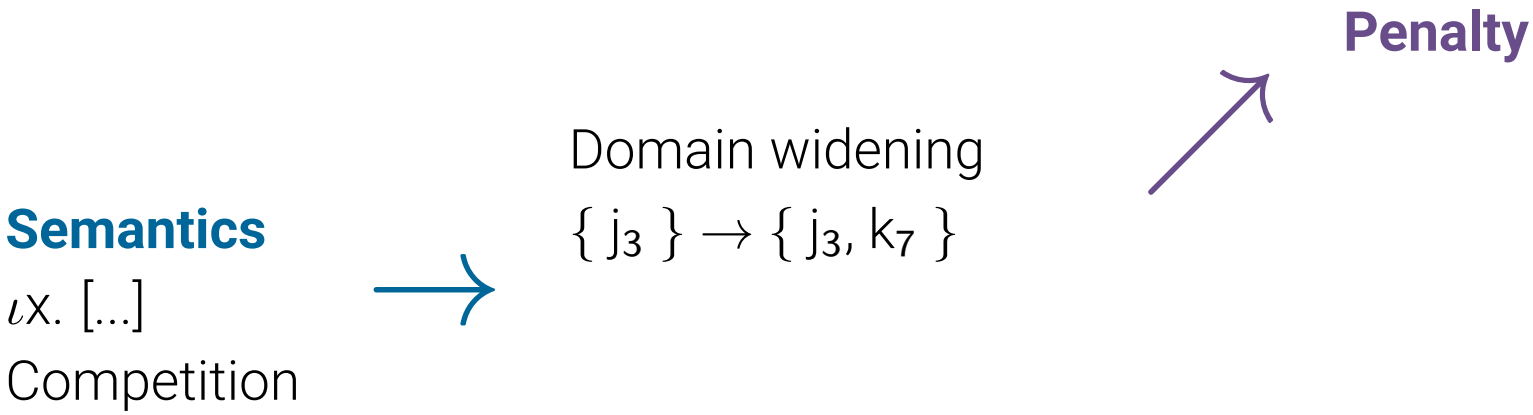
Thai: *nan nakrian* (only anaphoric) is not blocked.

I met student. {kăo, ~~nakrian~~, nan nakrian} was clever.
blocked possible

1. Processing vs. Blocking - Summary



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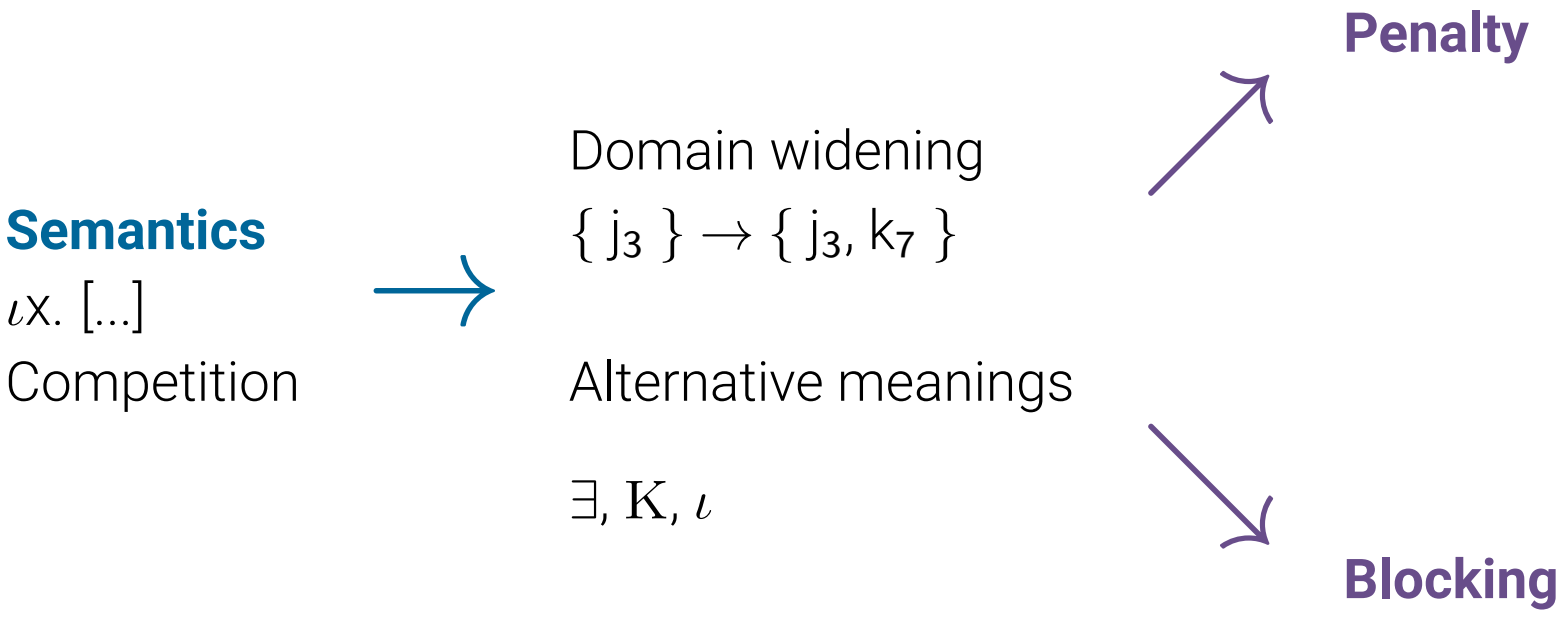

2. Variation across speakers

Variation in Mandarin and Hindi:

Mandarin

- Subject bare noun anaphoric, but not objects [Jenks 2018]
- Non-subject bare nouns can be anaphoric [Dayal & Jiang in prep]

Hindi

- 3 speakers rejected anaphoric bare nouns
- 1 speaker allowed anaphoric bare nouns
- 1 speaker showed variation

Variation in Bare Noun Blocking

Present theory can predict variation in Hindi and Mandarin.

(And *specifically* in Hindi and Mandarin, not others)

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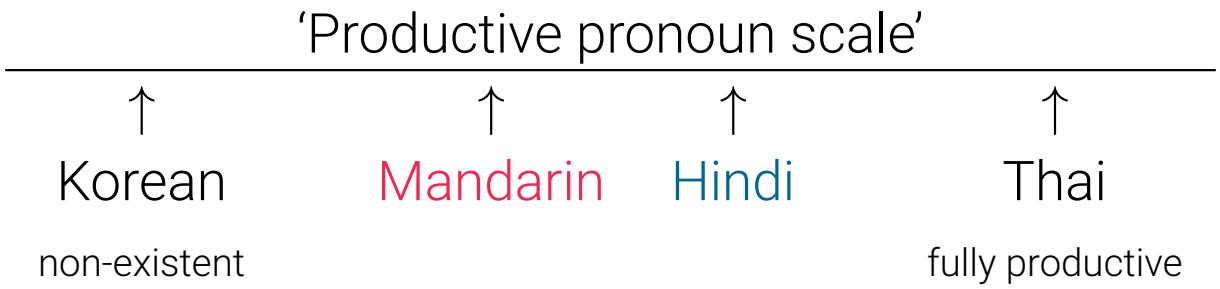


- Mandarin has simplex pronouns (*ta*) but mixed status
- Hindi lacks distinct simplex pronouns but productively used

Interaction at the individual level

Interaction at the individual level

Hindi speaker:

(22) Maine ek kitab kharid-i. **Kitab** mehngi
1SG.ERG one book.SGF buy-PAST.SGF book.SGF expensive
thi.
be.PAST.SGF
'I bought a book. **The book** was expensive.'

(23) Maine ek paudha kharid-a. maiN *__paudhe__-ko roz
1SGM.ERG one plant.SGM buy-PAST.SGM 1SGM plant-DAT daily
pani de-ta huN.
water give-IMPRF.SGM be.PRS.1SG
'I bought a plant. I water **the plant** everyday.'

Grammaticality depends on availability of pronouns

(22) ‘I bought a book. { **book**, ***vo** } was expensive.’

(23) ‘I bought a plant. I water { ***plant**, **use** } everyday.’

Grammaticality depends on availability of pronouns

(22) ‘I bought a book. { **book**, ***vo** } was expensive.’

(23) ‘I bought a plant. I water { ***plant**, **use** } everyday.’

Variation on pronoun status → variation on anaphoric bare nouns.

- The competition still applies categorically.
- But the alternatives may vary in a gradient way.
    - Animacy, information structure, pragmatic constraints, etc.

2. Variation - Summary

- Hard-wired categorical restrictions
  - Mandarin non-subject nouns do not allow anaphoric reading.
    [Jenks 2018]
- Wide range of gradient data:
  - Context sensitivity (number of referents)
  - Individual-level variability

The competition mechanism allows for a more systematic account for variation than hard-wired restrictions.

- depends on the availability of alternatives, which is determined in a gradient nature.

Spoken languages: summary

There are many patterns we see in language use. These result from combinations of categorical rules and gradient factors.

The unified theory allows us to make systematic predictions on such gradient patterns: processing penalties, competition, and variation.

$\rightarrow$ Empirical advantage over hard-wired principles.

Sign languages: pointing

Implications

1. Anaphoric expressions have the same semantic function.
Implemented by sharing the same underlying structure.

2. The interpretation of an anaphoric expression depends on the presence of *other* expressions.
Implemented by semantic economy

→ Cross-linguistic semantic typology
Analysis of pointing in sign languages

Anaphoric expressions in ASL

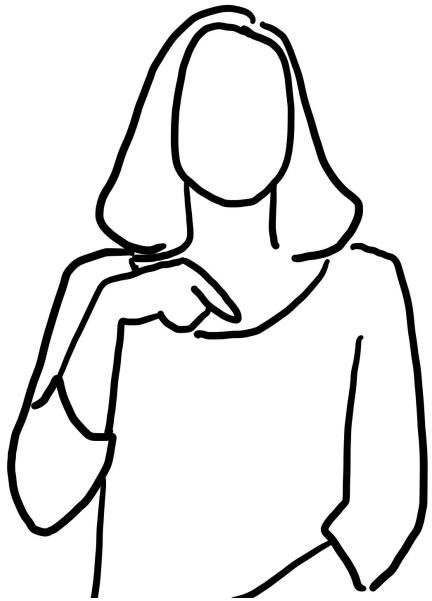
- Null argument [Bahan et al. 2000; Koulidobrova 2012; Lillo-Martin 1986]
- Bare noun
- IX_{NEU} [Koulidobrova & Lillo-Martin 2016; Neidle et al. 2000; Steinbach & Onea 2015]
- IX_{LOC} [Barberà & Zwets 2013; Lillo-Martin & Klima 1990; Schlenker 2011]

Anaphoric expressions in ASL

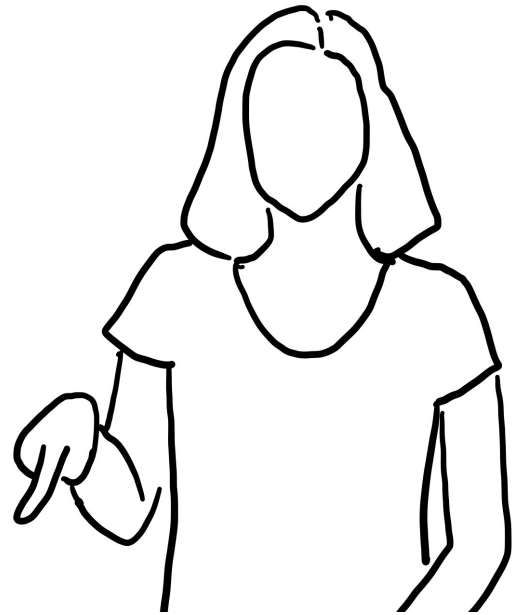
- Null argument [Bahan et al. 2000; Koulidobrova 2012; Lillo-Martin 1986]
- Bare noun
- IX_{NEU} [Koulidobrova & Lillo-Martin 2016; Neidle et al. 2000; Steinbach & Onea 2015]
- IX_{LOC} [Barberà & Zwets 2013; Lillo-Martin & Klima 1990; Schlenker 2011]

→ Considering the relative distributional pattern allows for a simpler analysis of IX_{LOC}.

IX



IX_1



IX_A

- **IX**: indexical pointing handshape used to refer to entities

Loci

IX can refer to entities not present in the context (IX_{LOC})

[Friedman 1975]

(24) YESTERDAY JOHN IX_A MEET IX_B DOCTOR. IX_B BUSY. [ASL]

'Yesterday John met a doctor. The doctor was busy.'

IX_{LOC}

Setting up referents in space

[Lillo-Martin & Klima 1990]:

loci: overt instantiations of **indices** that occur with pronouns

(25) Jin_1 met $Jimin_2$. She_1 helped her_2.

- g = { <1, *jin*>, <2, *jimin*> }
- $[\![she_1]\!]^g = [\![x_1]\!]^g = g(1) = jin$

IX_A is like she_1

[cf. Barberà & Zwets 2013; Schlenker 2011; Schlenker et al. 2013; Steinbach & Onea 2015]

A puzzle

[Ahn, Kocab, & Davidson 2019] **An odd case of anaphoric indices**

(At least not the one we assume for spoken languages)

- indices assigned to *every* discourse referent
  - present in every anaphoric relation
- loci: marked in distribution and interpretation

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☝ other anaphoric expressions available

null arguments, bare nouns, IX_{NEUT}

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    null arguments, bare nouns, IX_{NEUT}
  - 🤚 infrequent in natural production data
    6/340 tokens [Czubek 2017; Frederiksen & Mayberry 2016]

Production data

Natural production studies [Czubek 2017; Frederiksen & Mayberry 2016]
12 native ASL signers; 6-panel picture

Production data

How frequent is IX_{LOC}?

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

	Null Arg	CL	N	**IX**	F-S	Total
Maintained	.73 (219)	.20 (63)	.07 (21)	**.02 (6)**	.04 (1)	310
Reintroduced	.67 (20)	0 (0)	1 (10)	**0 (0)**	0 (0)	30

IX is more frequent in more complex discourse. [Czubek 2017]

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Felicity judgments

Felicity judgments [3 native ASL signers] [Ahn, Kocab, & Davidson 2019]

IX_{LOC} is not obligatory or preferred:

- when it is obvious who the referent is (null or IX_{NEUT} preferred)

#BOY IX_A ENTER CLUB. IX_A DANCE.

BOY IX_A ENTER CLUB. SEE GIRL IX_B READ. IX_A DANCE.

'A boy entered a club. (He saw a girl read). He danced.'

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IX_{LOC} is not licensed:

- with inanimate referents.

MARY IX_A BUY BOOK ?IX_B. ?IX_B EXPENSIVE.
(intended) 'Mary bought a book. The book was expensive.'

IX_{LOC} is not an index

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IX_{LOC}: a restriction!

IX_{LOC} as a restriction

$[\![\text{that linguist}_R]\!] = \text{sup}\ [\lambda x.\ \text{entity}(x) \wedge \text{linguist}(x) \wedge R(x)]$

- Exophoric demonstratives in spoken languages:
  R is filled with a locational restriction provided by 👉

  (26) [That bottle] $_{\rightarrow}$  is blue.

- $[\![\text{that bottle}_{\rightarrow A}]\!] = \text{sup}\ [\lambda x.\ \text{entity}(x) \wedge \text{bottle}(x) \wedge [\![\rightarrow_A]\!](x)]$
- $[\![\rightarrow]\!] = \lambda a_l.\ \lambda x_e.$ x is at a
  (note that ***a*** is always saturated as soon as you point)

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  (note that ***a*** is always saturated as soon as you point)

Idea: $[\![IX_A]\!] = [\![\rightarrow_A]\!] = \lambda x.$ x is at a

👉

IX_{LOC} as an anaphoric expression

(27) IX_A DANCE.

- $[\![IX_A]\!] = [\![\varnothing\ IX_A]\!] = \sup [\text{entity}(x) \wedge \text{at-A}(x)]$ ‘the one at A’

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- $[\![IX_A]\!] = [\![\varnothing\ IX_A]\!] = \sup [\text{entity}(x) \wedge \text{at-A}(x)]$ 'the one at A'

IX_{LOC} must be introduced first.

JIN IX_A SIT-IN CLASS. **$\varnothing$ IX_A** DANCE.

supplementary restrictive

'Jin (who is at A) .. The entity that is at A ..'

$[\![\mathbf{IX_A}]\!] = [\![\varnothing\ \mathbf{IX_A}]\!]$

A modifier with a null head noun?

- English: *the rich* [Beatrice Santorini, pc]
- Relative clauses with null heads possible

(28) Wo mai-de hen gui.
I buy-DE very expensive
'The one I bought was expensive.' [Mandarin; Yuyin He, pc.]

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- Deverbal anaphors in Nicaraguan Sign Language

[Senghas 1995]

Deverbal anaphors

[Senghas 1995] Nicaraguan Sign Language (NSL)

‘a reduced, truncated form of a recently-signed verb... to refer back to the referent in the narrative that last served as the most salient argument of that verb’ (p.139).

(29) MAN FALL-DOWN-[iterative].
‘The man falls down head-over-heels.’

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'The bird laughs.'

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BIRD LAUGH.
'The bird laughs.'
[COLLECT]$_N$ LOOK UP.
'**The collector** looks up.' [NSL]

IX_{LOC} as a modifier

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

marked ✓

- ☝ modifier added when referent not salient
- ✌ *Minimize Restrictors!* [Schlenker 2005]

IX_{LOC} as a modifier

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

marked ✓

- modifier added when referent not salient
- *Minimize Restrictors!* [Schlenker 2005]

intro. ✓

- modifier can attach to familiar and new nouns
- modifier can be restrictive or supplementary

Jin, who is at A

⟦JIN IX$_A$⟧ = [*jin* [who is at A]] ‘Jin’

What does it mean for Jin to be ‘at A’ though?

Jin, who is at A

⟦JIN IX_A⟧ = [*jin* [who is at A]] ‘Jin’

What does it mean for Jin to be ‘at A’ though?

Pragmatic extension of exophoric reference [Ahn 2020]

- Evident that Jin is not there
- Addressee accommodates; takes it as a label

Pragmatic extension

Using an abstract label in speech:

- 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}
- Jin$_{\rightarrow A}$ was talking to Jimin$_{\rightarrow B}$ and she$_{\rightarrow B}$ kicked her$_{\rightarrow A}$.

Sign languages: summary

IX and loci

- Analysis of loci as overt indices
- Led to discussions on whether sign language makes meaning more visible than spoken languages [Schlenker 2018]

Proposal

- Evaluating IX_{LOC} in relation to other anaphoric expressions in ASL suggests that IX_{LOC} isn't an anaphoric index.
- IX_{LOC} is a modifier (just like 👉$_{A}$ in spoken languages)
- an additional restriction added to help resolve referent
- No sign language-specific mechanism necessary!

General Discussion

1. A unified semantic structure for all anaphoric expressions
    - Only differ in the kind and number of restrictions
2. Competition is naturally derived from the meaning
    - Bare Noun Blocking pronoun vs. N
3. In spoken languages: we can capture the gradient nature of the competition more systematically
    - Processing vs. Blocking
    - Cross-linguistic/individual variation
4. In sign languages, the analysis of IX_{LOC} can be simplified to a locational restriction

Thank you!

References

Ahn, Dorothy. 2019. *THAT* thesis: A competition mechanism for anaphoric expressions. Doctoral dissertation, Harvard University.

Ahn, Dorothy. 2020. ASL IX to locus as a modifier. *Proceedings of North East Linguistic Society 50* .

Ahn, Dorothy, Annemarie Kocab, & Kathryn Davidson. 2019. Closer look at ASL IX: Locus as contrast-triggering modifier. In *Universal Grammar and Its Cross-linguistic Instantiations: Proceedings of the 12th Generative Linguistics in the Old World in Asia*, ed. Sae-Youn Cho, 1–20. Seoul: Dongguk University.

Almor, Amit. 1999. Noun-phrase anaphora and focus: The informational load hypothesis. *Psychological review* 106:748.

Ariel, Mira. 2001. Accessibility theory: An overview. *Text representation: Linguistic and psycholinguistic aspects* 8:29–87.

Bahan, Benjamin, Judy Kegl, Robert G Lee, Dawn MacLaughlin, & Carol Neidle. 2000. The licensing of null arguments in American Sign Language. *Linguistic Inquiry* 31:1–27.

Barberà, Gemma, & Martine Zwets. 2013. Pointing and reference in sign language and spoken language: Anchoring vs. identifying. *Sign Language Studies* 13:491–515.

Chierchia, Gennaro. 1998b. Reference to kinds across language. *Natural Language Semantics* 6:339–405.

Czubek, Todd. 2017. A comprehensive study of referring expressions in ASL. Doctoral dissertation, Boston University.

Dayal, Veneeta. 2004. Number marking and (in) definiteness in kind terms. *Linguistics and Philosophy* 27:393–450.

Dayal, Veneeta. 2009. Bare noun phrases .

Dayal, Veneeta, & Li Jiang. in prep. The puzzle of anaphoric bare nouns in Mandarin. *unpublished ms, Yale univ and invited of Hawaii* .

Déprez, Viviane. 2005. Morphological number, semantic number and bare nouns. *Lingua* 115:857–883.

Domaneschi, Filippo, & Simona Di Paola. 2018. The processing costs of presupposition accommodation. *Journal of psycholinguistic research* 47:483–503.

Duguine, Maia. 2014. Argument ellipsis: a unitary approach to pro-drop. *The Linguistic Review* 31:515–549.

Elbourne, Paul D. 2005. *Situations and individuals*, volume 90. Mit Press Cambridge, MA.

Evans, Gareth. 1980. Pronouns. *Linguistic inquiry* 11:337–362.

Frederiksen, Anne Therese, & Rachel I Mayberry. 2016. Who's on first? Investigating the referential hierarchy in simple native ASL narratives. *Lingua* 180:49–68.

Frege, Gottlob. 1892. On sense and reference. *P. Geach and M. Black (eds), Translations from the Philosophical Writings of Gottlob Frege* 56–78.

Friedman, Lynn A. 1975. Space, time, and person reference in American Sign Language. *Language* 940–961.

Gordon, Peter C, Barbara J Grosz, & Laura A Gilliom. 1993. Pronouns, names, and the centering of attention in discourse. *Cognitive science* 17:311–347.

Gundel, Jeanette K, Nancy Hedberg, & Ron Zacharski. 1993. Cognitive status and the form of referring expressions in discourse. *Language* 69:274–307.

Heim, Irene. 1982. The semantics of definite and indefinite noun phrases .

Heim, Irene. 1991. Artikel und definitheit. *Semantik: ein internationales Handbuch der Zeitgenössischen forschung* 487–535.

Heim, Irene, & Angelika Kratzer. 1998. *Semantics in Generative Grammar*, volume 13. Blackwell Oxford.

Jenks, Peter. 2015. Two kinds of definites in numeral classifier languages. In *Semantics and Linguistic Theory*, volume 25, 103–124.

Jenks, Peter. 2018. Articulated definiteness without articles. *Linguistic Inquiry* 49:501–536.

Jiang, Li. 2012. Nominal arguments and language variation. Doctoral dissertation, Harvard University.

Jiang, Li. 2017. Definiteness in Nuosu Yi and the theory of argument formation. *Linguistics & Philosophy* .

Kamp, Hans. 1981. A theory of truth and semantic representation. *Formal semantics-the essential readings* 189–222.

Kaplan, David. 1969. Quantifying in. *In Davidson, D. and Hintikka, J. (eds.) Words and Objections* .

King, Jeffrey C. 2008. Complex demonstratives, QI uses, and direct reference. *Philosophical Review* 117:99–117.

Koulidobrova, Elena. 2012. Parallelism revisited: The nature of the null argument in ASL as compared to the Romance-style pro. *Sign Language & Linguistics* 15:259–270.

Koulidobrova, Elena, & Diane Lillo-Martin. 2016. A 'point'of inquiry: The case of the (non-)pronominal IX in ASL. *The Impact of Pronominal Form on Interpretation* 125:221–250.

Kurafuji, Takeo. 2019. A choice function approach to null arguments. *Linguistics and Philosophy* 42:3–44.

Lillo-Martin, Diane. 1986. Two kinds of null arguments in American Sign Language. *Natural Language & Linguistic Theory* 4:415–444.

Lillo-Martin, Diane, & Edward S Klima. 1990. Pointing out differences: ASL pronouns in syntactic theory. *Theoretical issues in Sign Language Research* 1:191–210.

Meyer, Marie-Christine. 2014. Deriving Hurford's Constraint. In *Semantics and Linguistic Theory (SALT) 24*, ed. Todd Snider, Sarah D'Antonio, & Mia Wiegand, 577–596. LSA and CLC Publications.

Neidle, Carol Jan, Judy Kegl, Benjamin Bahan, Dawn MacLaughlin, & Robert G Lee. 2000. *The syntax of American Sign Language: Functional categories and hierarchical structure*. Cambridge, MA/London: MIT press.

Roberts, Craige. 2002. Demonstratives as definites. In *Information sharing: Reference and presupposition in language generation and interpretation*, ed. Kees van Deemter & Roger Kibble, 89–196. Stanford, CA: CSLI Press.

Russell, Bertrand. 1905. On denoting. *Mind* 479–493.

Safir, Ken. 2004. *The syntax of anaphora*. Oxford University Press on Demand.

Sauerland, Uli. 2007. Flat binding: Binding without sequences. *Interfaces+ Recursion= Grammar* 197–254.

Sauerland, Uli. 2008. On the semantic markedness of φ-features. *φ-features* .

Schlenker, Philippe. 2005. Minimize restrictors! In *Proceedings of Sinn und Bedeutung 9*, ed. Emar Maier, Corien Bary, & Janneke Huitink, 385–416. Nijmegen Centre of Semantics.

Schlenker, Philippe. 2011. Donkey anaphora: the view from sign language (ASL and LSF). *Linguistics and Philosophy* 34:341–395.

Schlenker, Philippe. 2018. Visible meaning: Sign language and the foundations of semantics. *Theoretical Linguistics* 44:123–208.

Schlenker, Philippe, Jonathan Lamberton, & Mirko Santoro. 2013. Iconic variables. *Linguistics and philosophy* 36:91–149.

Schwarz, Florian. 2009. Two types of definites in natural language. Doctoral dissertation, University of Massachusetts Amherst.

Schwarz, Florian. 2013. Two kinds of definites cross-linguistically. *Language and Linguistics Compass* 7.

Schwarz, Florian. 2014. *Experimental perspectives on presuppositions*, volume 45. Springer.

Senghas, Ann. 1995. Children's contribution to the birth of Nicaraguan Sign Language. Doctoral dissertation, Massachusetts Institute of Technology, Cambridge.

Singh, Raj, Evelina Fedorenko, Kyle Mahowald, & Edward Gibson. 2016. Accommodating presuppositions is inappropriate in implausible contexts. *Cognitive Science* 40:607–634.

Song, Hyun-joo, & Cynthia Fisher. 2005. Who's" she"? discourse structure influences preschoolers' pronoun interpretation. *Journal of Memory and Language* 52:29–57.

Steinbach, Markus, & Edgar Onea. 2015. A DRT analysis of discourse referents and anaphora resolution in sign language. *Journal of Semantics* 33:409–448.

Tiemann, Sonja, Mareike Kirsten, Sigrid Beck, Ingo Hertrich, & Bettina Rolke. 2015. Presupposition processing and accommodation: An experiment on wieder ('again') and consequences for other triggers. In *Experimental perspectives on presuppositions*, 39–65. Springer.

Van Gompel, Roger PG, Simon P Liversedge, & Jamie Pearson. 2004. Antecedent typicality effects in the processing of noun phrase anaphors. *The On-line Study of Sentence Comprehension: Eyetracking, ERP and Beyond. Psychology Press, New York* 119–137.

Slavic languages

Russian, Belarusian, Polish

- Rich set of grammatically gendered pronouns
- Allow bare nouns
  (at varying degrees – less good for Polish)

(30) Ja kupil-a knig-u včera. Knig-a byl-a dorog-aja.
1SG buy-PST.F book-ACC yesterday Book-NOM be-PST.F expensive-F
'I bought a book yesterday. The book was expensive.' [Russian]
[Lena Borise, Katia Gushchanskaya, Yury Kukushkin, pc]

(31) Wczoraj kupiłam mapę. Mapa była droga.
yesterday bought-1SG-PST map.ACC be.3SG.F.PST expensive.F
'Yesterday I bought a map. The map was expensive.' [Polish]
[Zuzanna Fuchs, Marek Majer, pc]

Counterexample?

Grammatical gender

- Slavic pronouns: **grammatically gendered**
- takes the arbitrary gender of the NP

Suggests that the NP is present in the underlying structure.

[Sauerland 2007]

$[\![\text{aná}]\!] = [\![\text{aná } \sout{\text{kniga}}]\!] = \iota x.\ \text{entity}(x) \wedge \phi(x) \wedge \textbf{book}(x)$ [Russian]

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⟦aná⟧ = ⟦aná ~~kniga~~⟧ = ιx. entity(x) $\wedge$ ϕ(x) $\wedge$ **book**(x) [Russian]

Hindi and Thai: naturally gendered pronouns (animacy)

- Even though Hindi nouns have grammatical gender

Another competition

[Jenks 2018]: strong vs. weak distinction in Mandarin

- Unique definite: N
- Familiarity definite: DEM CL N

Index!: Index as much as possible.

Idea: Maximally specify which interpretation out of

{ unique, anaphoric, indef, kind }

Two competitions:

1. Don't Overdeterminate! [anaphoric expressions]
2. Index! [noun interpretation]