

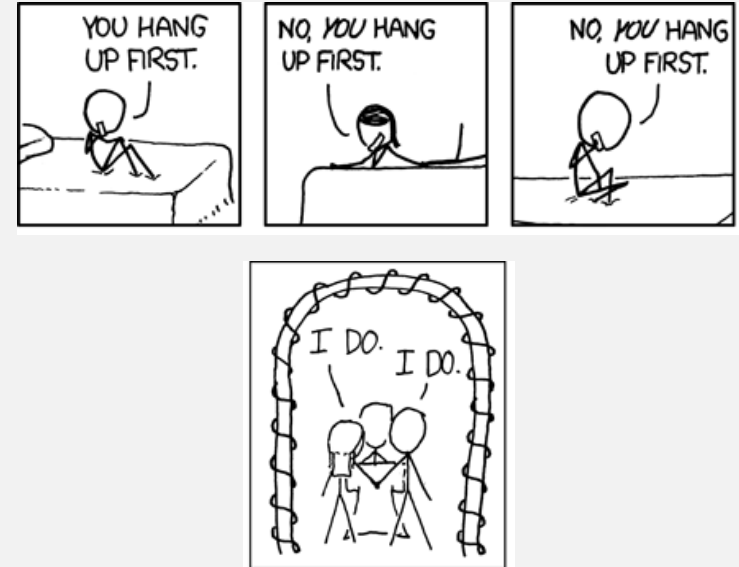
# The Indexical Component of Evidentiality

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*Meaning as Use: Indexicality, Expressives, and Self-Reference*

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Excerpts from <http://xkcd.com/698/>, <http://xkcd.com/310/>

## Introduction: Indexicals

Pure indexicals in English: *I, you, here, now, today, ...*

- In declaratives, indexicals anchored to speech act: *I* to the agent of the speech act (speaker), *you* to the addressee, ...

(1) [Dale and Albert are sitting at a cafe. The waitress, Shelley, comes up and asks them what they'd like.]

- a. Dale: *I'd like a coffee.*
- b. Albert: *I'd like a coffee.*

- In interrogatives, indexicals still anchored to speech act

(2) [Dale is in the hospital. He wakes up, asks the nurse:]

- a. Dale: *Was I shot?* cf. *I was shot.*

(3) *Are you here today?* cf. *You are here today.*

## Introduction: Evidentials

The encoding of source of information (Aikhenvald 2004)

- Cheyenne, a Plains Algonquian language spoken in Montana

- Evidentials in declaratives, anchored to speaker

(4) *É-hó'táheva-séstse Floyd.*

3-win-RPT.3SG.A Floyd

'Floyd reportedly won.' / 'Floyd won, **I** hear.'

- Evidentials in interrogatives, anchored to addressee

(5) *Mó=é-hó'táheva-séstse Floyd?*

y/n=3-win-RPT.3SG.A Floyd

'Did Floyd reportedly win?' /

'Given what **you** heard, did Floyd win?'

- interrogative flip (see, e.g., Speas and Tenny 2003)

## Introduction: Talk Overview

- The Cheyenne reportative has an *anaphoric* indexical component: the (reportative) evidence holder
  - slightly less constrained than pure indexicals
  - more constrained than general anaphora
- Pure indexicals and anaphoric indexicals cannot be represented the same way
- One flips in interrogatives, the other doesn't
 

(6) *Mó=ná-hó'táheva-máse?*  
 y/n=1-win-RPT.1SG  
 'Did I reportedly win?' /  
 'Given what **you** heard, did **I** win?'

## Outline

- 1 Properties of English Pure Indexicals
- 2 Cheyenne Evidentials as Anaphoric Indexicals
- 3 Formal Implementation
- 4 Related Phenomena
- 5 Summary

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## Pure Indexicals: Different from Anaphors

- Felicitous discourse initially
 

(7) [Discourse initial:] ✓ *I won the contest.*  
 (8) [Discourse initial:] # *She won the contest.*
- Different speakers → different content, even in same discourse context
 

(9) Three lawmen are sitting around talking about a girl who was murdered, Laura.

  - a. Dale: *Did you know Laura?*
  - b. Harry: *I knew her.* [Harry knew Laura]
  - c. Andy: *I knew her.* [Andy knew Laura]
- Harry and Andy have uttered the same sentence, but have said different things – not because of the anaphor *her*

## Indexicals: Different from Anaphors

- Always the speech event: pure indexicals do not shift in embedded contexts or questions (only in direct quotes, performance)
 

(10) *Dale believes that I am the murderer.*
- Not in general bindable (but: *Only I did my homework*)
- Pure indexicals do not have anaphoric uses
 

(11)  $A^m$  man came in.  $He_m$ / $The_m$  man sat down.  
 (12)  $A^n$  speaker came in.  $\#I_n$  sat down.

## Interim Summary

	Felicitous discourse initially?	Different speakers, different content?	Always the speech event?	Bindable?	General anaphoric uses?
Pure indexicals	✓	✓	✓	×	×
'General' anaphors	×	×	×	✓	✓

## Kaplan (1978, 1989) Contexts

- Pre-Kaplan (1978, 1989): Sentences are evaluated with respect to a world  $w$  and time  $t$  of evaluation, and the assignment function  $f$ 
  - Modals shift  $w$ , temporal operators shift  $t$ , quantifiers shift  $f$ 

(13) *I could be taller than I actually am.*
- Kaplan (1978, 1989): pure indexicals such as  $I$  and  $you$  always refer to something in the **(speech) context  $c$** :
  - $c_W$  (world of  $c$ )
  - $c_A$  (agent of  $c$ )
  - $c_P$  (position of  $c$ )
  - $c_T$  (time of  $c$ ), ...

## Kaplan (1978, 1989) Contexts to Content

- How can one sentence in different contexts express different contents?
  - The 'character' of a linguistic expression is a function from contexts to contents
  - Kaplan (1978): "In different contexts, an utterance of [(14)] expresses different contents (propositions)."
- (14) *I am here now*
- $\llbracket I \rrbracket_{cftw} = c_A$
  - $\llbracket here \rrbracket_{cftw} = c_P$
  - $\llbracket now \rrbracket_{cftw} = c_T$

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## Background on Cheyenne

- Cheyenne
  - a Plains Algonquian language
  - ~1000 speakers, in Montana and Oklahoma
  - data from my fieldwork, plus Cheyenne Grammar (Leman 1980) and dictionary (Fisher et al. 2006)
- Evidentiality in Cheyenne:
  - part of the matrix illocutionary mood paradigm (not syntactically embeddable)
  - four-way evidential distinction: direct, conjectural, reportative, narrative
  - this talk: reportative

## Cheyenne Reportative

- The Cheyenne reportative: secondhand reports only
- Thirdhand reports: ‘conjectural’/ indirect evidential
- Shorthand example:
  - Dale to Harry: *Bob is the murderer-DIR*
  - Harry to Andy: ✓ *Bob is the murderer-RPT* , # DIR
  - Andy to Lucy: ✓ *Bob is the murderer-CNJ* , # RPT
- Different from, e.g., English *reportedly* which is not restricted in this way

## Reporting Self Ascriptions

- The Cheyenne reportative: secondhand reports only
- Reports of self-ascriptions: direct evidential
- Shorthand example:
  - Pranav to Hans: *I am hungry-DIR*
  - Hans to Eric: ✓ *Pranav is hungry-DIR* , # RPT
  - Eric to Stephen: ✓ *Pranav is hungry-RPT* , # DIR
  - Stephen to Sarah: ✓ *Pranav is hungry-CNJ* , # RPT
- Different from English *reportedly*?

## The Reportative: Source versus Recipient

- Two individuals involved in the reportative evidential:
  - Source of original report (evidence source) and recipient of original report (evidence holder)
- Declarative:
 

(15) Dale: *Bob é-néehóvé-séstse tsé-na'-sené-stse.*  
 Bob 3-be.that-RPT.3SG.A DEP-kill-IMPER-DEP  
 ‘Bob is reportedly the murderer.’ /  
 ‘Bob is the murderer, I hear.’

  - Evidence source: who knows!
  - Evidence holder: the speaker, Dale
- Evidence holder component is indexical

## Evidentials as Indexical

- Felicitous discourse initially, like pure indexicals
- Different speakers → different content
 

(15) *Bob é-néehóvé-séstse tsé-na'-sené-stse.*  
 Bob 3-be.that-RPT.3SG.A DEP-kill-IMPER-DEP  
 ‘Bob is reportedly the murderer.’ /  
 ‘Bob is the murderer, I hear.’

  - Dale: (15) → Dale heard that Bob is the murderer.
  - Albert: (15) → Albert heard that Bob is the murderer.
- Not bindable (the evidence holder component)
- Evidence holder is not generally anaphoric

## Evidence Holder Cannot be Anaphoric

- (16) i. *Tsé-h-méo-vóona'o ná-hko'éehe é-ho'eééstse-Ø*  
 DEP-PST-early-morning 1-mother 3-incoming.call-DIR  
 ‘Early this morning, my mother called’
- ii. *Ného'éehe é-vóonomóhtahe-séstse*  
 1.father 3-be.sick.all.night-RPT.3SG.A  
 ‘My father was reportedly sick all night’  
 # ‘[She was told] my father was sick all night’
- The evidence holder in (16ii) cannot be the speaker’s mother
  - (If she had said something to me with the reportative, I couldn’t repeat it with the reportative)
  - Different for English *reportedly* and evidence source

## Evidentials Differ from Pure Indexicals

- Almost always the speaker: Cheyenne evidentials do not embed (morphosyntactic reasons), but they do shift in questions (and direct quotes, performance)
- Evidentials in interrogatives, anchored to addressee
 

(17) *Bob mó=é-néehóvé-séstse tsé-na'-sené-stse?*  
 Bob y/n=3-be.that-RPT.3SG.A DEP-kill-IMPER-DEP  
 ‘Is Bob reportedly the murderer?’ /  
 ‘Given what you hear, is Bob the murderer?’

  - Evidence source: Who knows!
  - Evidence holder: the addressee
- True of evidentials in interrogatives crosslinguistically

## Embedded Evidentials

Evidentials can embed in certain languages

- Tibetan evidentials (Garrett 2001)
  - Restricted set of embedding predicates: “verbs of speech or thought”
  - Evidential anchored to matrix subject
- German reportative *sollen* (Schenner 2008)
  - Restricted set of embedding predicates: “communication, (semi-)factive, certain negative (denial/doubt)”
  - Evidential either anchored to the speaker or anchored to matrix subject

This is still a restricted set of interpretations – not generally anaphoric (Similar to shifted indexicals, logophors; see Rice 1986, Anand 2006, McCready 2007, Schlenker to appear, a.o.)

## Interim Summary

	Felicitous discourse initially?	Different speakers, different content?	Always the speech event?	Bindable?	General anaphoric uses?
Pure indexicals	✓	✓	✓	×	×
Anaphoric indexicals	✓	✓	✗	×	×
‘General’ anaphors	×	×	×	✓	✓

## Evidentials and Indexicals in Declaratives

(18) [I am summoned to the police office where they tell me that I am the murderer that they have been looking for. They arrest me. You come to visit me in my cell and ask why I have been arrested. I say:]

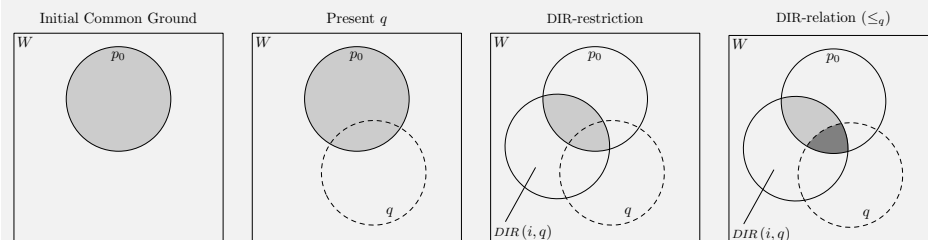
*Ná-néehóvé-máse tsé-na'-sené-stse.*  
 1-be.that-RPT.1SG DEP-kill-IMPER-DEP

‘I am reportedly the murderer.’ /  
 ‘[They say] I am the murderer.’  
 → I hear that I am the murderer

- Kaplanian analysis of both indexicals: ✓
- $q = \lambda w[be.the.murderer(w, i)]$  (see Murray 2010 for analysis of evidentials)
- $q' = \lambda w[RPT(w, i, q)]$

## Evidentials as Not-at-issue Content (Murray 2010)

(19) *I am the murderer-DIR*  $q = \lambda w[be.the.murderer(w, i)]$   
 $q' = \lambda w[DIR(w, i, q)]$



- Some properties of evidentials due to not-at-issue status, and how not-at-issue information is interpreted (direct restriction)
- Some due to particular evidential relation, i.e.  $DIR(w, i, q)$

## Evidentials and Indexicals in Interrogatives

(20) [A warrant is issued for my arrest, but I don't know why. I am hiding out at your house, and the police call. I hear you ask them: *Is Sarah the murderer?*, but I don't hear their reply. When you hang up, I ask:]

*Mó=ná-néehóvé-máse tsé-na'-sené-stse.*  
y/n=1-be.that-RPT.1SG DEP-kill-IMPER-DEP

'I am reportedly the murderer.' /  
'[They say] I am the murderer.'  
→ I hear that I am the murderer

- Kaplanian analysis of both indexicals: ☠
- $q = \lambda w[be.the.murderer(w, i)]$   
 $q' = \lambda w[RPT(w, i, q)]$  ← wrong prediction

## Proposal: Two Kinds of Indexicals

- Pure indexicals
  - specialized constant (function), a la Kaplan (1978)
  - refers to (agent of) the speech event
  - $q = \lambda w[be.the.murderer(w, i)]$
- Anaphoric indexicals
  - refer to (agent of) the currently topical event
  - usually the speech event
  - can be overridden by other 'topical events', e.g., questions, perhaps propositional attitude verbs in some languages
  - $q' = \lambda w[RPT(w, AGT(e), q)]$

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## Two Kinds of Context

- Two kinds of context (Partee 1989, Condoravdi and Gawron 1996, Bittner 2011, ...):
  - utterance context: the external context of the utterance, a la Kaplan (1978)
  - discourse context: information state, a la Karttunen (1976), Kamp (1981), ...
- Pure indexicals refer to the utterance context ( $c$ ), represented by the speech event
- Anaphoric indexicals refer to the discourse context ( $s$ ), to the currently topical event

## Background: Anaphora and Centering

- Conversational dynamics, dynamic semantics: Lewis 1979, Stalnaker 1978; Kamp 1981, Heim 1982, Groenendijk & Stokhof 1991
- Discourse referents represent objects under discussion, potential antecedents for anaphora (Karttunen 1976)
- Grammatical centering (Grosz et al. 1995), ranked discourse referents
- Anaphora and centering, centering across domains (Stone 1997, Stone and Hardt 1999)
- Top/bottom centering contrast across domains, center vs. periphery of attention (Bittner 2001 et seq.)

## Update with Centering (UC, Bittner 2011)

- UC: an update semantics with centering based anaphora
  - models information (propositions, what is added to the common ground) as well as discourse reference
- I use a fragment with discourse referents for individuals, worlds, events, and propositions
- incorporates analysis of evidentials, simple English sentences, parentheticals in Murray (2010)

## Utterance Context and Discourse Context

- Utterance context  $u$ : a pair of a common ground  $p_0$  and a speech event  $e_0$ :  $u = \langle p_0, e_0 \rangle$  (Bittner 2011)
- Discourse context: Information state, set of lists of discourse referents for individuals, events, worlds, propositions
- Two sub-lists of discourse referents: top (foreground), bottom (background) :  $s = \{ \langle \dots \rangle \langle \dots \rangle \}$ 
  - top list for keeping track of common ground, foregrounded events and individuals
  - bottom list for keeping track of content of sentences, backgrounded events and individuals
  - Sample list of discourse referents:  $\langle \langle a, w_1, p_0, e_0 \rangle \langle p_2, d, e_1, p_1, w_2 \rangle \rangle$

## Discourse Initial Update

- Stalnaker (1978) ‘secondary’ or ‘commonplace’ effect of assertion:
 

“... the context ... will include any information which the speaker assumes his audience can infer from the performance of the speech act.”
- $u = \langle p_0, e_0 \rangle$  where  $p_0 = \{w_0, w_1\}$
- Discourse initial update to  $s_0$ , after Stalnaker (1978), ‘start-up update’ (e.g., Bittner 2011)

$$\frac{s_0}{\langle \langle w_0, p_0, e_0 \rangle \rangle}$$

$$\langle \langle w_1, p_0, e_0 \rangle \rangle$$

$e_0$  is the speech event  
 $p_0$  is the context set  
 $w_0, w_1$ : worlds in the common ground (context set)



## Adding Individuals and Information

Initial state  $s_0$ :  $\frac{s_0}{\langle\langle w_0, p_0, e_0 \rangle\rangle \langle\langle w_1, p_0, e_0 \rangle\rangle}$   $e_0$  is the speech event  
 $p_0$  is the context set  
 $w_0, w_1$ : worlds in the common ground (context set)

- New individuals add a referent to a list
  - $a$  to the top list  $\top$ ,  $b$  to the bottom list  $\perp$ :

$$\frac{s_1}{\langle\langle a, w_0, p_0, e_0 \rangle\rangle \langle\langle a, w_1, p_0, e_0 \rangle\rangle}$$

- Assertions add information
  - modeled by reducing the context set (eliminating rows)
  - adding the information that  $q$  where  $q$  is true in  $w_1$  and  $w_2$ :

$$\frac{s_2}{\langle\langle a, w_1, p_0, e_0 \rangle\rangle \langle\langle b \rangle\rangle}$$

## Discourse Initial Update and Indexicals

Initial state  $s_0$ :  $\frac{s_0}{\langle\langle w_0, p_0, e_0 \rangle\rangle \langle\langle w_1, p_0, e_0 \rangle\rangle}$   $e_0$  is the speech event  
 $p_0$  is the context set  
 $w_0, w_1$ : worlds in the common ground (context set)

- Referring to the speech event:  $\overrightarrow{\top \epsilon}$   
 = rightmost  $\rightarrow$  event  $\epsilon$  in top list  $\top$
- Referring to the speaker:  $\text{AGT}(\overrightarrow{\top \epsilon})$
- Referring to the currently topical event:  $\top \epsilon$   
 = most prominent event  $\epsilon$  in top list  $\top$
- Referring to the agent of the currently topical event:  $\text{AGT}(\top \epsilon)$
- By default,  $\text{AGT}(\top \epsilon) = \text{AGT}(\overrightarrow{\top \epsilon})$

## New Topical Events and Indexicals

Initial state  $s_0$ :  $\frac{s_0}{\langle\langle w_0, p_0, e_0 \rangle\rangle \langle\langle w_1, p_0, e_0 \rangle\rangle}$   $e_0$ : the speech event  
 $p_0$ : the context set  
 $w_0, w_1$ : worlds in context set

- Certain elements may introduce a new topical event:

$$\frac{s_1}{\langle\langle e_1, w_0, p_0, e_0 \rangle\rangle \langle\langle e_1, w_1, p_0, e_0 \rangle\rangle}$$

- In this case,  $\text{AGT}(\top \epsilon) \neq \text{AGT}(\overrightarrow{\top \epsilon})$ 
  - $\top \epsilon = e_1$
  - $\overrightarrow{\top \epsilon} = e_0$
- $\top \epsilon$  can change, while  $\overrightarrow{\top \epsilon}$  will always pick out  $e_0$ , the speech event

## Evidentials and Indexicals in Declaratives

Initial state  $s_0$ :  $\frac{s_0}{\langle\langle w_0, p_0, e_0 \rangle\rangle \langle\langle w_1, p_0, e_0 \rangle\rangle}$   $e_0$ : the speech event  
 $p_0$ : the context set  
 $w_0, w_1$ : worlds in context set

(21) *Ná-hó'táheva-máse*  
 1-win-RPT.1SG  
 'Given what I heard, I won'

$$\frac{s_1}{\langle\langle w_0, p_0, e_0 \rangle\rangle \langle\langle q_1, w_1, e_1 \rangle\rangle \langle\langle w_1, p_0, e_0 \rangle\rangle \langle\langle q_1, w_1, e_1 \rangle\rangle}$$

$e_1$ : winning event  
 $q_1$ : proposition that I won  
 $w_1$ : world where I won

- First person pronoun:  $\text{AGT}(\overrightarrow{\top \epsilon}) = \text{agent of } e_0$
- Reportative:  $\text{RPT}(w, \text{AGT}(\top \epsilon), p) = \text{agent of } e_0$

## Evidentials and Indexicals in Interrogatives

Initial state  $s_0$ :  $\frac{s_0}{\langle\langle w_0, p_0, e_0 \rangle \rangle \langle\langle w_1, p_0, e_0 \rangle \rangle}$   $e_0$ : the speech event  
 $p_0$ : the context set  
 $w_0, w_1$ : worlds in context set

(22) *Mó=ná-hó'táheva-máse?*

y/n=1-win-RPT.1SG

‘Did I reportedly win?’ /

‘Given what **you** heard, did **I** win?’

$\frac{s_1}{\langle\langle e_2, w_0, p_0, e_0 \rangle \langle q_1, w_1, e_1 \rangle \rangle \langle\langle e_2, w_1, p_0, e_0 \rangle \langle q_1, w_1, e_1 \rangle \rangle}$   $e_2$ : question answering event  
 $e_1$ : winning event

- The interrogative introduces a new topical event  $e_2$
- First person pronoun:  $AGT(\vec{T}\epsilon) = \text{agent of } e_0$  (speaker)
- Reportative:  $RPT(w, AGT(\top\epsilon), p) = \text{agent of } e_2$  (addressee)

## Summary of Analysis

- Pure indexicals:
  - refer to (agent of) the speech event
  - e.g.,  $AGT(\vec{T}\epsilon)$
- Anaphoric indexicals:
  - refer to (agent of) the currently topical event
  - e.g.,  $AGT(\top\epsilon)$
- Typically, the speech event is the currently topical event
  - usually  $\vec{T}\epsilon = \top\epsilon$
  - can be overridden by other ‘topical events’, e.g., interrogatives, perhaps propositional attitude verbs in some languages
  - if so, then  $\vec{T}\epsilon \neq \top\epsilon$

## Summary of Analysis

- Pure indexicals and anaphoric indexicals are distinguished, but by default are the same
  - Both looking for similar antecedents (topical events)
- One meaning for the reportative that works in both declaratives and interrogatives:  $RPT(w, AGT(\top\epsilon), p)$

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## Related Phenomena

- (23) *That was fun.* [for me]  
 (24) *Was that fun?* [for you]  
 (25) *Bob might be the murderer.* [e.g., my epistemic state]  
 (26) *Might Bob be the murderer?* [e.g., your epistemic state]  
 (27) *It is raining.* [in place of speaker]  
 (28) *Is it raining?* [in place of addressee]  
 (29) *A local bar is selling cheap beer.* [place of speaker]  
 (30) *Is a local bar selling cheap beer?* [place of addressee]  
 (Partee 1989, Condoravdi and Gawron 1996, McCready 2007, ...)

## Evidence Holder = 'Tasty' Judge?

- Is the evidence holder the judge argument of predicates of personal taste? (as in Deal and OConnor 2011)  
 (15) Dale: *É-péhéve-éno'e-nése.*  
 3-good-taste-RPT.3SG.B  
 'It [coffee] reportedly tastes good.' /  
 'It tastes good, I hear.'
- Who is the reportative evidence holder? the speaker, Dale
- Who is the judge for 'tastes good'? evidence source!
- So, the reportative evidence holder and the judge cannot be represented in the same way, e.g., as both picking out a judge  $j$  from the context  $c$

Properties of Implicit Arguments, as in *Local*

- Felicitous discourse initially  
 (31) [Discourse initial:] ✓ *A local bar is selling cheap beer.*
- Different speakers → different content  
 (32) Harry (Washington): *A local bar is selling cheap beer.*  
 (33) Dale (Pennsylvania): *A local bar is selling cheap beer.*
- Not always the speech event:  
 (34) a. Harry (Washington): *I am seriously drunk.*  
 b. Dale (Pennsylvania): *Is a local bar selling cheap beer?*

(After Partee 1989, Condoravdi and Gawron 1996, ...)

## Properties of Implicit Arguments

- Bindable:  
 (35) *Every sports fan watched the Superbowl in a local bar.*
- General anaphoric uses:  
 (36) *A reporter for the Times got seriously drunk. A local bar was selling cheap beer.*

(After Partee 1989, Condoravdi and Gawron 1996, ...)

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# Summary

	Felicitous discourse initially?	Different speakers, different content?	Always the speech event?	Bindable?	General anaphoric uses?
Pure indexicals	✓	✓	✓	×	×
Anaphoric indexicals	✓	✓	✗	×	×
Implicit arguments	✓	✓	×	✓	✓
‘General’ anaphors	×	×	×	✓	✓

# Summary

- Implicit arguments and anaphors can be interpreted with respect to a variety of things.
- However, implicit arguments, unlike general anaphors, can be interpreted with respect to the speech event
- Implicit arguments more like definite descriptions than anaphors: (Partee 1989, Condoravdi and Gawron 1996, ...)
- Different levels of restrictedness: pure indexicals, anaphoric indexicals, implicit arguments, pronouns...

# Summary

- All indexicals are related to topical events
  - the speech event:  $\vec{T}\epsilon$
  - the currently topical event:  $T\epsilon$
  - What can introduce topical events is limited, could vary by language, construction
- One meaning for the reportative that works in both declaratives and interrogatives:  $RPT(w, AGT(T\epsilon), p)$
- Indexicals like English *I* and the Cheyenne reportative evidential draw on things that are guaranteed to be provided in any discourse, unlike pronouns such as *he*

Thanks!



Google Maps extra geeky t-shirt

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## Appendix: Template of the Cheyenne Verb

I II III IV V VI VII VIII IX  
 PRS-TNS-(DRC)-(prefix<sup>+</sup>)-root-(suffix<sup>+</sup>)-[VOICE]-ARG<sup>+</sup>-MOOD

- PRS: person, e.g., first, second, one argument of the verb
- TNS: tense, e.g., present/recent past (default), distant past
- DRC: directional, e.g., toward the speaker, away from speaker
- prefixes, suffixes: derivation, e.g., intensifiers, manner
- VOICE: for transitive verbs, relationship between arguments
- ARG: argument agreement, e.g., person, number, obviation
- MOOD: illocutionary mood, e.g., interrogative, imperative

## Appendix: Template of the Cheyenne Verb

I II III IV V VI VII VIII IX  
 PRS-TNS-(DRC)-(prefix<sup>+</sup>)-root-(suffix<sup>+</sup>)-[VOICE]-ARG<sup>+</sup>-MOOD

(37) *Né- sta- evá-hose- voom -átse -me -Ø*  
 2- FUT+TRL- back-again- see<sub>A</sub> -1:2 -2PL -DIR  
 I II+III IV V VII VIII IX

‘I will see you all again soon.’

(38) *Ná- hene'ena -Ø tsé- ohké-heše-ame- emöhóné -stse*  
 1- know -DIR DEP- hab-that-along- hunt -DEP  
 I V IX I IV V IX

‘I know that he’s been hunting.’ (Leman 1980: 194)

## Appendix: Definitions for “rightmost entity”

Syntax:  $\vec{\top}a, \vec{\perp}a \in Term_{sa}$  if  $a \in DR(\Theta)$

Semantics:  $\llbracket \vec{\top}a \rrbracket^g(i) \doteq ((\top i)_a)_n$  where  $n = length((\top i)_a)$  if  $i \in D_s$   
 $\llbracket \vec{\perp}a \rrbracket^g(i) \doteq ((\perp i)_a)_n$  where  $n = length((\perp i)_a)$  if  $i \in D_s$

(Alternatively, as in Python, we could use negative indices to mean ‘count backwards from end of the sequence (list)’, but the syntactic definition for  $\vec{\top}a, \vec{\perp}a$  would have to be changed.)

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(39) *Ná-hó'táheva-máse.*

1-win-RPT.1SG

‘I reportedly won.’ /  
‘Given what I heard, I won.’
$$\underbrace{[ew|sang_w \langle e, AGT(\overline{T}\epsilon) \rangle]}_{\text{(present at-issue proposition } q)}; \underbrace{[p|p = \perp \omega]}_{\text{(not-at-issue restriction)}}; \underbrace{[RPT_{T\omega} \langle AGT(\overline{T}\epsilon), \perp \Omega \rangle]}_{\text{(new cg)}}; \underbrace{(\overline{T}[p|p = \overline{T}\omega])}_{\text{(new cg)}}$$

See Murray (2010) for definitions and further details of the analysis of evidentials (in a fragment without events)

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