Theoretical background

- The reference of an indexical is determined by the utterance context—e.g. in *I am hungry*, *I* refers to the speaker, and PRS of *am* to the speech time.
- Since Kaplan (1978), indexical and anaphoric reference has been analyzed in terms of two parameters: (1) (static) utterance context for indexicals, and (2) (static or dynamic) variable assignment for anaphors.
- On this static view, indexical reference involves context dependence only. This view is still widely accepted, not only in static theories, which ignore context change (e.g. Schlenker 2003), but also in dynamic theories, where anaphors refer to current values of antecedent variables, but indexicals still refer to static contextual anchors (e.g. Kamp 1981, 1985).
- A competing dynamic view is implicit in the ‘commonplace effect’ of Stalnaker (1978) and is empirically motivated and formally implemented in Bittner (2011, 2014b). On this view, indexical reference is a form of discourse reference, because as soon as a speech event begins, this too becomes a discourse referent. So both indexical and anaphoric reference crucially involve not only context dependence, but also context change.

Dynamic view in a nutshell

- Anaphors as well as indexicals, refer to currently salient entities:
  - mentioning something focuses on the mentioned entity and thereby makes the mentioned entity available for discourse reference by anaphors (e.g. Groz et al. 1995, Bittner 2001)
  - speaking up focuses on the speech event and thereby makes this speech event available for discourse reference by indexicals (Stalnaker 1978, Bittner 2011, 2014b)
- *No Kaplan dichotomy*: Both indexicals and anaphors refer to discourse referents (drefs) made salient by prior updates.
- *Unified analysis*: Instead of two formally independent parameters, the same dynamically updated dref hierarchy accounts for both types of discourse reference.

This talk (Bittner 2014b)

- **Goal**: Argue for the Dynamic View, based on empirical evidence from Kalaallisut (Eskimo-Aleut) and Slavey (Northern Athapaskan).
- In Kalaallisut, grammatical centering marks indexical persons as ‘inherent topics’. This is expected on the Dynamic View, but is a mystery on the static view.
- In Slavey, certain indexicals in the scope of certain attitude verbs (e.g. ‘want’) can take the perspective of the attitude holder instead of the speaker. This, too, is expected on the Dynamic View, if we assume that Slavey has:
  - shiftable indexicals, interpreted from the perspective of the currently central view point, which need not be the current speech event.
  - indexical-shifting attitude verbs, which temporarily update the central view point to the attitudinal state of the subject (attitude holder’s point of view) for the duration of the complement.
Outline

1. Anaphora and indexicality (Kalaallisut evidence)
2. Unified analysis in Update with Centering
3. Mystery solved: Indexicals as ‘inherent topics’
4. Attitude states as perspectival referents (Slavey)
5. Concluding remarks

1.1 Kalaallisut: Grammatical centering system

- Kalaallisut subject/object/possessor expressed by PERSON INFLATIONS
- For 3\textsuperscript{rd} person, topical (T) v. background (⊥) status marked by:
  - T-form v. ⊥-form of 3\textsuperscript{rd} person inflection
    - ‘ni’ 3\textsuperscript{rd} v. ‘a(f)’ 3\textsuperscript{rd} (a.k.a. ‘proximate 3\textsuperscript{rd} v. ‘obviative 3\textsuperscript{rd}’)
  - MATRIX MOOD marks illocutionary force in relation to T-subject, e.g.
    - ‘pu’ DEC\textsuperscript{T} for assertion of at-issue fact abt. T-subject
    - ‘pa’ DEC\textsuperscript{T} for assertion of at-issue fact abt. (T-subject, ⊥-object)
  - DEPENDENT MOOD marks context-setting or elaborating updates
    - ‘ga’ FCT\textsuperscript{T} v. ‘mm’ FCT\textsuperscript{⊥} for not-at-issue fact about T v. ⊥
    - ‘gu’ HYP\textsuperscript{T} v. ‘pp’ HYP\textsuperscript{⊥} for hypothesis about T v. ⊥
    - ‘gaanga’ HAB\textsuperscript{T} v. ‘gaang’ HAB\textsuperscript{⊥} for not-at-issue habit of T v. ⊥
    - ‘llu’ ELA\textsuperscript{T} v. ‘tu’ ELA\textsuperscript{⊥} for elaboration of T v. ⊥
- Full NP’s (a.k.a. ‘subject’, ‘object’, ‘possessor’) are recentering updates, i.e. updates of T- or ⊥-antecedents for anaphoric 3\textsuperscript{T} or 3\textsuperscript{⊥} inflections.

1.2 Kalaallisut: 3\textsuperscript{rd} person anaphora

i. Ippassaaq atuartut qimussir-llu-tik sukanniut-pu-t.
yesterday school.kids\textsuperscript{T} drive.dog.sled-ELA\textsuperscript{-3P}\textsuperscript{T} race.e.o-DEC\textsuperscript{-3P}
(at elaboration of T) (at issue fact about T)
Yesterday the school kids\textsuperscript{T} had a dogsled race.

ii. Ole-p ikinnguta-a ajugaa-ga-mi nuannaar-pu-q.
[Ole-ERG\textsuperscript{T} friend-3S\textsuperscript{⊥}]\textsuperscript{T} win-FCT\textsuperscript{-3S}\textsuperscript{T} happy-DEC\textsuperscript{-3S}
(n.a.i. fact abt T) (at issue fact about T)
Ole’s friend\textsuperscript{T} won, so he\textunderscore T (= the friend) was happy.

iid. Ole-p ikinngun-nil ajugaa-mm-at nuannaar-pu-q.
[Ole-ERG\textsuperscript{T} friend-3S\textsuperscript{⊥}]\textsuperscript{4} win-FCT\textsuperscript{-3S}\textsuperscript{4} happy-DEC\textsuperscript{-3S}
(n.a.i. fact abt ⊥) (at issue fact about T)
Ole’s friend\textsuperscript{⊥} won, so he\textunderscore ⊥ (= Ole) was happy.
1.3 Kalaallisut: Indexicals as ‘inherent topics’

Observation 1: 1st & 2nd persons select T-moods.

Context: Yesterday the school kids had a dogsled race.

(2) a. Ajugaa-*ga-ma* nuannaar-*pu-nga.
   win-*fct* -1\(\text{s}\) happy-*dec* -1\(\text{s}\)
   I won, so I was happy.

b. Ajugaa-*ga-ma* Ole nuannaar-*pu-q.
   win-*fct* -1\(\text{s}\) Ole\(\text{T}\) happy-*dec* -3\(\text{s}\)
   I won, so Ole\(\text{T}\) was happy.

c. *Ajugaa-*mm-ma* ...
   * for *fct*/hyp/hab-
   win-*fct* -1\(\text{s}\)

Observation 2: ... 1st & 2nd persons don’t compete for T-status.

Context: Yesterday the school kids had a dogsled race.

(4) a. Aka-*ajugaa-vvigi-*ga-mi-ngaa* nuannaar-*pu-q.
   win-*fct* -1\(\text{s}\) happy-*dec* -3\(\text{s}\)
   Aka\(\text{T}\) beat me, so he\(\text{,}\) was happy.

b. Aka *ajugaa-vvigi-*ga-*n-ni* nuannaar-nngit-*la-q.
   win-*fct* -1\(\text{s}\) -1\(\text{s}\) happy-not-*dec* -3\(\text{s}\)
   I beat Aka\(\text{,}\) so he\(\text{,}\) wasn’t happy.

c. Ajugaa-vvigi-*ga-kklit* nuannaar-nngit-*la-tlit.
   win-*fct* -1\(\text{s}\) -2\(\text{s}\) happy-not-*dec* -2\(\text{s}\)
   I beat you\(\text{,}\) so you\(\text{,}\) aren’t happy.

1.4 Kalaallisut: Indexicals as ‘inherent topics’

Observation 2: 3rd persons compete for T-status, whereas ...

Context: Yesterday the school kids had a dogsled race.

(3) a. Aka-*p* Bo *ajugaa-vvigi-*ga-mi-uk* nuannaar-*pu-q.
   Aka-*erg* Bo\(\text{,}\) win-*fct* -3\(\text{s}\) -3\(\text{s}\) happy-*dec* -3\(\text{s}\)
   Aka\(\text{T}\) beat Bo\(\text{,}\) so he\(\text{,}\) was happy.

b. Bo Aka-*p* *ajugaa-vvigi-*mm-a-nii* nuannaar-nngit-*la-q.
   Bo\(\text{T}\) Aka-*erg* win-*fct* -3\(\text{s}\) -3\(\text{s}\) happy-not-*dec* -3\(\text{s}\)
   Aka\(\text{T}\) beat Bo\(\text{,}\) so he\(\text{,}\) wasn’t happy.

c. * ... ajugaa-vvigi-*ga-mi-ni* ...
   win-*fct* -3\(\text{s}\) -3\(\text{s}\)

1.5 Kalaallisut: Indexicals as ‘inherent topics’

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2.1 Simple Update with Centering (UC₀)

**Update semantics** (Veltman 1996):

“You know the meaning of a sentence if you know the change it brings about in the information state of anyone who accepts the news conveyed by it.’

**Attention-guided anaphora** (Bittner 2001f; cf. Grosz et al. 1995)
- update keeps track of ranked drefs in **center** & **background** of attention
- entity-level anaphoric terms: \( T \) (ctr), \( ⊤ \) (2ry ctr), \( \perp \) (bck), \( ⊥' \) (2ry bck)

\[
c_{0} \leftarrow \left\langle \emptyset, \emptyset \right\rangle
\]

\[\text{dref hierarchy anaphoric terms}\]

\[\text{ctr. drefs bck. drefs}\]
\[\left\langle a_{1}, a_{2}, ..., a_{n} \right\rangle, \left\langle b_{1}, b_{2}, ..., b_{m} \right\rangle \]

\[\left( \right\langle, \left\langle \right\rangle \)

\[\text{minimal info-state (no drefs)}\]

\[\text{initial info-state (no relevant drefs)}\]

\[\text{Model } M:\]
\[\left[\text{ole}\right] = \emptyset\]
\[\left[\text{win}\right] = \{\bullet\}\]
\[\left[\text{happy}\right] = \emptyset\]

\[(5) \ c_{0} \leftarrow \left\langle \emptyset, \emptyset \right\rangle\]

\[\text{(6) Ole’s friend won, so he was happy.}\]

\[\left[\text{ole-ERG}\right] = \left\langle \text{friend-3s,} \right\rangle\]
\[\left[\text{win}\right] = \left\langle \text{friend}\right\rangle\]
\[\left[\text{happy}\right] = \left\langle \text{friend}\right\rangle\]

\[\text{Typed discourse entities}\]
- type \( a = \delta \) (individuals), \( ε \) (events), \( σ \) (states)
- variable \( u_{a} : x \rightarrow ε \rightarrow s \)

\[\text{Typed anaphoric terms}\]

\[\text{dref hierarchy typed anaphoric terms}\]

\[\left( \right\langle, \left\langle \right\rangle \)

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2.5 Minimal info-state in UC$_\varepsilon$

*Start-up update:* Speaking up (e$_0$) focuses attention, giving rise to $e_0$-minimal info-state: $\langle\langle e_0,\langle\rangle\rangle$

cf Stalnaker 1978 on ‘commonplace effect’ of speech acts:

“… when I speak, I presuppose that others know I am speaking [...]. This fact, too, can be exploited in the conversation, as when Daniels says I am bald, taking it for granted that his audience can figure out who is being said to be bald. I mention this commonplace way that assertions change the context in order to make clear that the context on which an assertion has its essential effect is not defined by what is presupposed before the speaker begins to speak, but will include any information which the speaker assumes his audience can infer from the performance of the speech act.” (p. 323)

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2.6 English indexicals in UC$_\varepsilon$

(7) I am hungry.

\[ s \ni_{\text{PRS}} \text{hungry}, \langle s, \top \rangle \]

\[ c_1 \ni_{\langle e_0, \langle s_1 \rangle \rangle} \]

Model for (7)

*Discourse ref.* | *Symbol: Description*
---|---
$\vdash$ | $e_0$-speaker speaks up

$e_0$-speaker speaks up

\[ \langle\langle e_0,\langle\rangle\rangle \]

\[ e_0 \text{-speaker speaks up} \]

3rd persons compatible with $\top$-Moods & $\bot$-Moods, whereas ...

(1') a. Aka$^\top$ won, so ...

\[ \text{Aka} \]

\[ \text{ajugaa-\text{ga-mi} ...} \]

\[ \text{Aka} \]

\[ \text{win-\text{fct},-3s} \]

\[ \top [x | x = \text{aka}; [e | \text{win} (e, \top \delta), e < \top \varepsilon]; \top [s | s = \top \varepsilon]; ... \]

\[ \langle\langle e_0,\langle\rangle\rangle \]

\[ \langle\langle e_0,\langle e_1 \rangle\rangle \]

\[ \langle\langle s_1,\ominus, e_0,\langle e_1 \rangle\rangle \]

b. Aka$^\bot$ won, so ...

\[ \text{Aka} \]

\[ \text{ajugaa-\text{mm-at} ...} \]

\[ \text{Aka} \]

\[ \text{win-\text{fct},-3s} \]

\[ [x | x = \text{aka}; [e | \text{win} (e, \bot \delta), e < \varepsilon]; \top [s | s = \bot \varepsilon], 1s \neq \bot \delta; ... \]

\[ \langle\langle e_0,\langle\rangle\rangle \]

\[ \langle\langle e_0,\langle e_1 \rangle\rangle \]

\[ \langle\langle s_1,\ominus, e_0,\langle e_1 \rangle\rangle \]

3.1 Kalaallisut Obs. 1 explained: (1’) in UC$_\varepsilon$

\[ \langle\langle e_0,\langle\rangle\rangle \]

\[ \langle\langle e_0,\langle e_1 \rangle\rangle \]

\[ \langle\langle s_1,\ominus, e_0,\langle e_1 \rangle\rangle \]
3.2 Kalaallisut Obs. 1 explained: (2) in $\text{UC}_\varepsilon$

- ... indexicals refer to $f(\top \varepsilon) \Rightarrow$ select $\text{T-MOODS}$

(2) a/b. I won, so ...

- Ajugaa-$\text{ga-ma}$ ...
  - $\text{win-fct}_\top -1s$
    - $[e|\text{win}(e, \top \varepsilon), e < \top \varepsilon]; \top[s|s = \downarrow \varepsilon]; ...$
    - $\langle e_0, e_1 \rangle$
  - $\langle e_0, e_1 \rangle$

b.* Ajugaa-$\text{mm-ma}$ ...
  - $\text{win-fct}_\top -1s$

3.3 Kalaallisut Obs. 2 explained: (3) in $\text{UC}_\varepsilon$

- 3rd persons compete for $\top \delta$-status, whereas ...

(3) a. Aka$^\top$ beat Bo$^\downarrow$, so ...

- Aka$^\top$ Bo$^\downarrow$ ajugaa-vvigi-$\text{ga-mi-uk}$ ...
  - $\text{Aka-ERG}_\top$ Bo$^\downarrow$ $\text{win-tv-fct}_\top -3s -3s$
  - $\top[x|\text{v}
  - [\top \delta \neq \downarrow \delta]; [e|\text{beat}(e, \top \delta, \downarrow \delta), ...]; \top[s| ...]$
    - $\langle a, e_0 \rangle$
    - $\langle b \rangle$
    - $\langle e_0, e_1 \rangle$
    - $\langle e_1, b \rangle$

b.* ... ajugaa-vvigi-$\text{ga-mi-ni}$ ...
  - $\text{win-tv-fct}_\top -3s -3s$
    - $\top \delta \neq \top \delta$
  - $c_n$
    - $\emptyset$

3.4 Kalaallisut Obs. 2 explained: (4) in $\text{UC}_\varepsilon$

- ... indexicals refer to $f(\top \varepsilon) \Rightarrow$ don't compete for $\top \delta$-status

(4) a. Aka$^\top$ beat me, so ...

- Aka$^\top$ ajugaa-vvigi-$\text{ga-mi-nga}$ ...
  - Aka$^\top$-$\text{ERG}^\top$ $\text{win-tv-fct}_\top -3s -3s$
  - $\top[x|\text{v}$
  - [\top \delta \neq \top \delta]; [e|\text{beat}(e, \top \delta, \top \varepsilon), ...]; $\top[s|s = \downarrow \varepsilon]$
    - $\langle a, e_0 \rangle$
    - $\langle e_0, e_1 \rangle$
  - $\langle e_1, b \rangle$

b. I beat Aka$^\top$, so ...

- Aka$^\top$ ajugaa-vvigi-$\text{ga-n-ni}$ ...
  - Aka$^\top$ $\text{win-tv-fct}_\top -3s -3s$
  - $\top[x|\text{v}$
  - [\top \delta \neq \top \delta]; [e|\text{beat}(e, \top \varepsilon, \top \delta), ...]; $\top[s|s = \downarrow \varepsilon]$
    - $\langle a, e_0 \rangle$
    - $\langle e_0, e_1 \rangle$
  - $\langle e_1, b \rangle$

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4.1 ‘Commonplace effect’ for attitude states

- Recall ‘commonplace effect’ of speech acts (Stalnaker 1978, p. 323):
  “... when I speak, I presuppose that others know I am speaking [...]. This fact, too, can be exploited in the conversation, as when Daniels says I am bold; taking it for granted that his audience can figure out who is being said to be bald.”

- Extend this idea to attitude states (Bittner 2011, cf. Lewis 1979)
  When I believe or want something, I am aware of being in this attitudinal state. This fact, too, can be used to characterize the propositional object of my attitude. For example, if I want to win, I am in a state of desire that will be satisfied if and when the experiencer of this mental state wins. I can be aware of having this de se desire, even if I suffer from amnesia and don’t know who I am. All I need to be aware of is the attitudinal state itself.

4.2 Slavey attitudes: Overview

Rice (1986) on Slavey (Northern Athapaskan)
- In complements of attitude verbs, some person inflections may take the perspective of the subject (attitude holder) instead of the speaker.
- Indexical adverbs (e.g. ‘today’, ‘tomorrow’) never shift
- The attitude verb determines which persons, if any, may shift, e.g. 
  *SHIFT: -egodjhsho ‘know’ always: speaker’s 1, 2, 3
  IV-SHIFT: yenjwé ‘want’ ✓: subject’s (i.e. attitude holder’s) 1, 3, but always speaker’s 2
  TV-SHIFT: -udeli ‘want’ ✓: subject’s (i.e. attitude holders) 1, 3, but always speaker’s 2 matrix: object = complement arg

4.3 Slavey attitudes: *SHIFT vs. IV-SHIFT

All Slavey examples in (8)–(10) from Rice (1986)

(8) John ?erákiiwi wíhsj gú kodihshq. *SHIFT
  John [parka 1s.make 3s.know]
  John knows that I made a parka. (speaker’s ‘1s’)

(9) a. hjdowedziñe k’e rírawohjá yenjwé. IV-SHIFT
  [tomorrow on 1s.OPT.return] 3s.want
  He wants to return tomorrow. (subject’s ‘1s’, speaker’s ‘tomorrow’)
  b. bets’ę ràwòdi yenjwé.
     [3s.to 2s.OPT.help] 3s.want
     He wants you to help me/her. (subject’s ‘3s’, speaker’s ‘2s’)

4.4 Slavey attitudes: IV-SHIFT vs. TV-SHIFT

(9) b. bets’ę ràwòdi yenjwé. IV-SHIFT
    [3s.to 2s.OPT.help] 3s.want
    He wants you (speaker’s ‘2s’) to help me/her (subject’s ‘3s’)

(10) a. sets’ę ràwòdi sudeli. TV-SHIFT
    [1s.to 3s.OPT.help] 3s.want.1s
    He wants me (= subject’s ‘3s’) to help him (subject’s ‘1s’)
  b. bets’ę ràwòdi sudeli.
     [3s.to 2s.OPT.help] 3s.want.1s
     He wants you (speaker’s ‘2s’) to help me (= subject’s ‘3s’)
4.5 Slavey shifts as perspectival recentering

- Slavey pronouns are anchored to the *highest perspectival dref* (either the current speech event $T\epsilon$, or currently central attitude state $T\sigma$) for which their function is defined (i.e. function $l(\cdot)$ for 1st and 3rd, $i(\cdot)$ for 2nd)
- Indexical-shifting attitude verbs optionally update the highest perspectival dref to their own attitude state ⇒ complement 1st and 3rd are anchored to $\uparrow T\sigma$ (attitude holder’s 1st or 3rd, as in (9)–(10))
- Attitude states have no addressee ⇒ $\downarrow T\sigma$ undefined ⇒ complement 2nd refers to $\downarrow T\epsilon$ (speaker’s 2nd, i.e. addressee, as in (9b), (10b))
- tv-shift attitudes are de re, i.e. relate attitude holder ($\uparrow T\sigma$) to object res, e.g. in (10), matrix obj. $\mathfrak{a}s$ (speaker) = compl. $\mathfrak{s}s$ (attitude holder’s res: ‘her’)

5 Concluding remarks

- Evidence from Kalaallisut and Slavey favors the Dynamic View of indexicality — as a form of discourse reference, just like anaphora, except that the relevant discourse referent is normally introduced simply by the act of speaking up.
- In the grammatical centering system of Kalaallisut, the dynamic view explains parallels between indexical reference (to 1st & 2nd persons) and topic-oriented anaphora (to topical 3rd, $\uparrow 3$)
- In addition, indexical shifts in Slavey attitude reports suggest that, not only speech events, but also attitude states can serve as perspectival referents for indexicals.
- General point: Evidence from under-studied languages may substantially change our view of much studied phenomena, such as indexicality and discourse anaphora.
References

• Bittner, Maria. 2014b. Perspectival discourse referents for indexicals. Proc. of SULA 7. [also available at http://www.rci.rutgers.edu/~mbittner]

References (ctd)