Bodyguards Under Cover: The Status of Individual Concepts

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  1. lexicon (Montague)
  2. derived during semantic composition (Lasersohn 2005)
  3. propose: perspective on the individuals (pragmatics)
- virtues of the pragmatic analysis
- problems with abstract values (*temperature, price*)

Montague (PTQ): Lexicon

- (at a given index , t) nouns denote:
  not just sets of individuals: $\langle e, t\rangle$
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(3) The temperature is rising.
$\exists \mathbf{x}[\forall \mathbf{y}[\mathbf{temperature}_{(\mathbf{w},\mathbf{t})}(\mathbf{y}) \leftrightarrow \mathbf{x} = \mathbf{y}] \wedge \mathbf{rise}_{(\mathbf{w},\mathbf{t})}(\mathbf{x})]$

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- value - talk about the extensions of these individual concepts:

(4) The temperature is ninety.
$\exists \mathbf{x}[\forall \mathbf{y}[\mathbf{temperature}_{(\mathbf{w},\mathbf{t})}(\mathbf{y}) \leftrightarrow \mathbf{x} = \mathbf{y}] \wedge \mathbf{x}(\mathbf{w}, \mathbf{t}) = \mathbf{90F}]$

The Problem of the Doubled Index Dependence

Dowty, Wall, Peters (1981), attributed to Anil Gupta (p.c.), in a version from Löbner (1981):

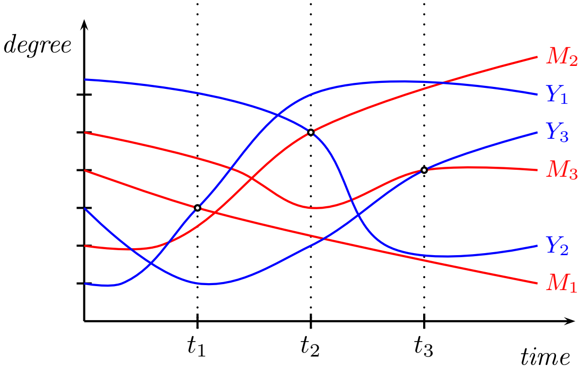
(5) At all worlds and times, the temperature of the air in my refrigerator is the same as the temperature of the air in your refrigerator.

(6) The temperature of the air in my refrigerator is rising.

intuitively: $\Rightarrow$; *prediction Montague*: $\not\Rightarrow$

(7) The temperature of the air in your refrigerator is rising.

Counterexample: model with $W = \{w\}$, $T = \{t_1, t_2, t_3\}$



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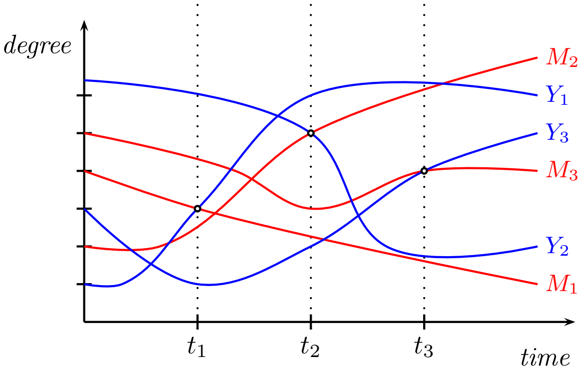


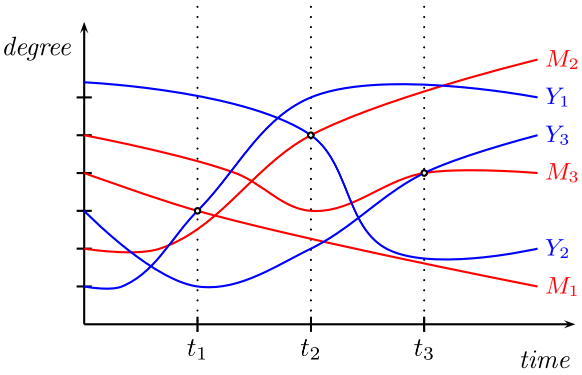
At all worlds and times, the temp-of-my-ref is the temp-of-your-ref.

$[\![$**temp-of-my-ref**$]\!](w, t_1) = \{M_1\}$,

$M_1 = \{\langle (w, t_1), 15\rangle, \langle (w, t_2), 12\rangle, \langle (w, t_3), 8\rangle\}$

$[\![$**temp-of-your-ref**$]\!](w, t_1) = \{Y_1\}, \ldots$

Counterexample: model with $W = \{w\}$, $T = \{t_1, t_2, t_3\}$

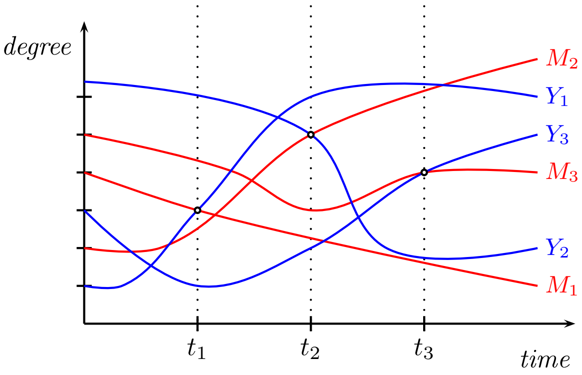


The temperature in my refrigerator is rising.

$[\![$**my ref-temp**$]\!](w, t_2) = \{M_2\}$,

$M_2 = \{\langle (w, t_1), 12.5\rangle, \langle (w, t_2), 25\rangle, \langle (w, t_3), 30\rangle\}$

Counterexample: model with $W = \{w\}$, $T = \{t_1, t_2, t_3\}$



The temperature in your refrigerator is rising.

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Locating the Problem $\langle s, \langle\langle s, e\rangle, t\rangle\rangle$

- at a fixed index, *temperature* denotes a set functions that assign individuals (degrees) to indices (individual concepts) - inner index dependence (IID)
- at different indices, it can denote different such sets - outer index dependence (OID)

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various ways out, here:

1. meaning postulate (= give up *outer index dependence*)
2. intensions of Fregean definite descriptions (Lasersohn 2005) (= give up *inner index dependence*)
3. conceptual covers: *outer index dependence* = semantics, *inner index dependence* = pragmatics

Montague's Forgotten Meaning Postulate

- constrain *outer index dependence*:
- cf. Dowty, Wall, Peters (1981); spelt out as (8) by Lasersohn (2005):

(8) $\forall \mathbf{x} \Box \lambda(\mathbf{w}, \mathbf{t})[\alpha_{(\mathbf{w},\mathbf{t})}(\mathbf{x}) \rightarrow \Box \lambda(\mathbf{w}, \mathbf{t}) \alpha_{(\mathbf{w},\mathbf{t})}(\mathbf{x})]$,
where $\alpha =$ **temperature** or **price**

- needs to be refined to take into account implicit arguments: (don't exchange e.g. *temperature of Cécile's refrigerator* for *temperature of Ede's refrigerator*, ...)
- Meaning Postulates are not unproblematic... (cf. Zimmermann 2000)

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  $\mathbf{the_r} \equiv$
  $\lambda \mathbf{P}_{\langle\langle s,e\rangle,t\rangle} \lambda \mathbf{Q}_{\langle\langle s,e\rangle,t\rangle}.\exists \mathbf{x}[\forall \mathbf{y}[\mathbf{P}(\mathbf{y}) \leftrightarrow \mathbf{y} = \mathbf{x}] \wedge \mathbf{Q}(\mathbf{x})]$
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  $\mathbf{the_r} \equiv$
  $\boldsymbol{\lambda P_{\langle\langle s,e\rangle,t\rangle}\lambda Q_{\langle\langle s,e\rangle,t\rangle}.\exists x[\forall y[P(y) \leftrightarrow y = x] \wedge Q(x)]}$
  (**Q** = **rise** requires an intensional argument, so, the restrictor has to be of that type, too)
- use: Fregean definite descriptions denote individuals e - their intensions are $\langle s, e\rangle$ (= individual concepts)

Deriving Individual Concepts (2)

- **temperature** as *actual temperature value(s)*: $\langle s, \langle e, t\rangle\rangle$
  function: the intension of *(the unique) temperature (value)* $\langle s, e\rangle$
- untouched: **rise**: $\langle s, \langle\langle s, e\rangle, t\rangle\rangle$
- Fregean (presuppositional) *the*:
  $\mathbf{the_f} \equiv \lambda \mathbf{P}_{\langle s,\langle e,t\rangle\rangle} \lambda \mathbf{Q}_{\langle\langle s,e\rangle,t\rangle}.\mathbf{Q}(\lambda(\mathbf{w},\mathbf{t}).\iota \mathbf{u}[\mathbf{P}_{(\mathbf{w},\mathbf{t})}(\mathbf{u})])$

(9) $[\![\iota \mathbf{u}\phi]\!]^g(w,t)$ is the unique object d
such that $[\![\phi]\!]^{g[\mathbf{u}/d]}(w,t) = 1$
if such an object d exists; undefined otherwise.

$\lambda(\mathbf{w},\mathbf{t}).\iota\mathbf{u}[\mathbf{temperature}_{(\mathbf{w},\mathbf{t})}(\mathbf{u})]$ denotes always the same function that picks out the temperature at each index

Applying Lasersohn's Approach

- value:

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❀: both readings
❀: simpler types
❀: removes unintuitive multiplicity

Other (true) quantifiers?

- *temperature* (of the salient location): inherently functional, singleton set
- implicit relational argument can vary (e.g. over cities):

(12)
a. Three temperatures are rising.
b. Many temperatures are rising.
c. All temperatures are rising.
d. A few temperatures are rising.
e. No temperature is rising.
f. Every temperature is rising.

$\Rightarrow$ Romero (2006): $\langle\langle s, e\rangle, t\rangle$-extensions for nouns after all (+ meaning postulate against OID over time within one world)

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Extending Lasersohn

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(13) Most temperatures are rising.
Most contextually given objects x are such that the intension of 'the unique temperature of x' is rising.

- proportion problem with non-injective functions?
  - in general: Don't quantify over implicit arguments!

(14) Most mothers love their children.
$\not\Leftrightarrow$ Most children x are such that x's mother loves x.

decide: if two cities have exactly the same temperature at all worlds and times, this analysis counts them twice (- wanted?)

Problem: 2 Types of Properly Relational Nouns

- Funktionenbündel (*bundle of functions*, Löbner 1979):

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  - (i) interested in one patient only, (ii) if the sentence is true, there is not unique critical value of that one patient
  - but: each critical value/minister has a unique connection to the implicit argument:
    Smith's (unique) *blood pressure*/*body temperature*/*concentration of cholesterol*;
    ministers - by departments, ...

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- sets without roles: simply a set of objects (connected to the relational argument)

(16) a. Most pictures on Jordan's wall have changed.
b. Three bodyguards have changed.

Two Tasks Open

1. account for the quantificational data with functional but also properly relational nouns:

(17)
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1. account for the quantificational data with functional but also properly relational nouns:

   (17) a. Every temperature is rising right now.
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2. Nathan's puzzle (functional nouns/Funktionenbündel vs. sets without roles)

   (18) Three mayors changed. (*PC*)

   (19) Three bodyguards changed. (*only: SC*)

   set change (SC): overall set of bodyguards/mayors changes
   pointwise change (PC): three cities have a different mayor afterwards (set of mayors may stay the same)

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- Aloni (2000): quantification, belief attribution and questioning proceed w.r.t. methods of identification

Conceptual Cover

Given a set of indices $(W \times T)$ and a universe of individuals D, a conceptual cover CC based on $(W \times T, D)$ is a set of functions $(W \times T) \rightarrow D$ such that:
$(\forall(w,t) \in W \times T)(\forall d \in D)(\exists! c \in CC)[c(w,t) = d]$

= set of individual concepts, s.t. at all indices
(i) all individuals are picked out (existence)
(ii) each individual is picked out by only once (uniqueness)

Contextual Perspectives at Work

Which cover is salient depends on the contextual perspective:

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Contextual Perspectives at Work

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(20) Who was president of Mali in 2000?

a. Him! (*at a cocktail reception*)

b. Alpha Oumar Konaré. (*at a history exam*)

What is a legitimate answer? - Depends on salient cover!

Rigid Cover $= \{\lambda(w,t).d \mid d \in D\}$

Naming Cover $= \{\lambda(w,t).a.o.konaré_{(w,t)}, \lambda(w,t).g.w.bush_{(w,t)}, \lambda(w,t).a.merkel_{(w,t)}; \ldots\}$

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Quantification Under Cover

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- interpretation proceeds with respect to a set Π of most salient conceptual covers (usually, just one): $[\![\cdot]\!]^{\Pi}$
- D also contains the absurd individual ✪ (ignored by the cover condition *uniqueness*)
  $[\![\textbf{change}]\!]^{\Pi}(w,t)(f) = 1$ iff $f(w,t) =$ ✪, and
  $f(w,t^{-}) \neq f(w,t^{+})$, where $t^{-} <^{!} t <^{!} t^{+}$.
- denotation of common noun α changes at $(w,t) \rightarrow$ ✪ $\in [\![\alpha]\!]^{\Pi}$

Generalized Quantifiers under Cover

- pointwise application of a set of functions $F = \{f_1, \dots, f_n\}$:

(21) $F[w,t] := \{f_i(w,t) \mid f_i \in F\}$

- quantification:

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- quantification:
$[\![$**most/every/three/...**$]\!]^{\Pi}(w,t)(Q_{\langle s,\langle e,t\rangle\rangle})(P_{\langle\langle s,e\rangle,t\rangle}) = 1$ iff
for every $F \in \Pi$ and $F_1 = \{f_1, \ldots, f_n\} \subseteq F$ such that either
(i) for all $f_i \in F_1$: $f_i(w,t) \neq$ ✪ and $F_1[w,t] = Q(w,t)$, or
(ii) $F_1[w,t^-] = Q(w,t^-)$ and $F_1[w,t^+] = Q(w,t^+)$:
$\text{MOST/EVERY/THREE}\ldots(\lambda f.f \in F_1)(\lambda f.P(f))$

$[\![\textit{Three bodyguards/mayors changed.}]\!]^{\Pi}(w,t) = 1$ iff

for every $F \in \Pi$ and $F_1 = \{f_1, \ldots, f_n\} \subseteq F$ such that either

(i) for all $f_i \in F_1$: $f_i(w,t) \neq$ ✪ and

$F_1[w,t] = [\![\textbf{bodyguard/mayor}]\!]^{\Pi}(w,t)$, or

(ii) $F_1[w,t^-] = [\![\textbf{bodyguard/mayor}]\!]^{\Pi}(w,t^-)$ and

$F_1[w,t^+] = [\![\textbf{bodyguard/mayor}]\!]^{\Pi}(w,t^+)$:

$|\ \{f_i \in F_1 \mid f_i(w,t^-) \neq f_i(w,t^+)\}\ | \geq 3$

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$|\{f_i \in F_1 \mid f_i(w,t^-) \neq f_i(w,t^+)\}| \geq 3$

Co-operative Individuation:

If Π contains no cover that passes condition (i) or (ii), consider less salient or even arbitrary covers.

(cf Aloni (2005) for more general pragmatic principles in bi-directional OT on what covers are considered)

Nathan's Puzzle in Terms of Types of Covers: Bodyguards

- $[\![\textbf{bodyguard}]\!]^{\Pi}(w, t^{-}) = \{john,\ peter,\ mary,\ sally\}$
  $[\![\textbf{bodyguard}]\!]^{\Pi}(w, t) = \{sally,$ ✪$\}$
  $[\![\textbf{bodyguard}]\!]^{\Pi}(w, t^{+}) = \{simon,\ susi,\ sandro,\ sally\}$

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- salient cover: naming NC (most likely)
  but: (i) is not applicable: ✪ $\in [\![\textbf{bodyguard}]\!]^{\Pi}(w, t)$
  and (ii) no subset of NC describes exactly the bodyguards at both (w, t^{-}) and (w, t^{+})
  per Cooperative Identification: try all covers that meet (ii)

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	f_1	f_2	f_3	f_4
(w, t^{-})	*john*	*peter*	*mary*	*sally*
(w, t)	*sally*	✪	✪	✪
(w, t^{+})	*simon*	*susi*	*sandro*	*sally*

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(w, t^{+})	*sandro*	*sally*	*simon*	*susi*

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(w, t^{-})	*john*	*peter*	*mary*	*sally*
(w, t)	*sally*	✪	✪	✪
(w, t^{+})	...	...	...	...

Nathan's Puzzle in Terms of Types of Covers: Bodyguards

- $[\![\textbf{bodyguard}]\!]^{\Pi}(w, t^{-}) = \{john,\ peter,\ mary,\ sally\}$
  $[\![\textbf{bodyguard}]\!]^{\Pi}(w, t) = \{sally,\ ✪\}$
  $[\![\textbf{bodyguard}]\!]^{\Pi}(w, t^{+}) = \{simon,\ susi,\ sandro,\ sally\}$
- <u>salient cover:</u> naming NC (most likely)
  <u>but:</u> (i) is not applicable: ✪ $\in [\![\textbf{bodyguard}]\!]^{\Pi}(w, t)$
  and (ii) no subset of NC describes exactly the bodyguards at both (w, t^{-}) and (w, t^{+})
  <u>per Cooperative Identification:</u> try all covers that meet (ii)

	f_1	f_2	f_3	f_4
(w, t^{-})	*john*	*peter*	*mary*	*sally*
(w, t)	*sally*	✪	✪	✪
(w, t^{+})				

- unless the two sets differ on three elements, there will be an F_i s.t. for less than three $f \in F_i$: $f(w, t^{-}) \neq f(w, t^{+})$.
  $\Rightarrow$ *Set Change*

Nathan's Puzzle in Terms of Types of Covers: Mayors

- mayors render salient: naming NC or job-cover JC
  $NC = \{\{\lambda(w,t).wolfgang(w,t), \lambda.petra(w,t)\}\}$
  $JC = \{\lambda(w,t).\iota u[\textit{mayor-of-frankfurt}_{(w,t)}(u)],$
  $\lambda(w,t).\iota u[\textit{mayor-of-stuttgart}_{(w,t)}(u)]\}$

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- Wolfgang and Petra exchange their cities at (w,t):

(22) $[\![$Two mayors changed.$]\!]^{\Pi}(w,t)$ is
true if $\Pi = \{\text{JC}\}$ (PC), false if $\Pi = \{\text{NC}\}$ (SC)

two of the individual concepts needed to cover the mayors at (w,t^-) and (w,t^+) *change at* (w,t).

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	NC		JC	
	Wolfgang	*Petra*	$mayor_{Frankfurt}$	$mayor_{Stuttgart}$
(w,t^-)	w	p	p	w
(w,t)	(w)	(p)	✪	✪
(w,t^+)	w	p	w	p

In Favour of the Pragmatic Solution

- context dependence of change interpretation (Nathan 2006):

(23) Three pictures on Jordan's wall have changed.

a. *pictures by who is on them* → SC-interpretation

b. *the picture on the left wall, the picture closest to the window,...* → PC-interpretation

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- intensional readings for name-like DPs:

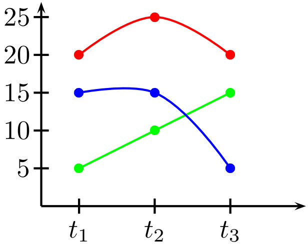
(24) The temperature in my office is 36 degrees and I think *(the) 36 degrees will certainly increase.

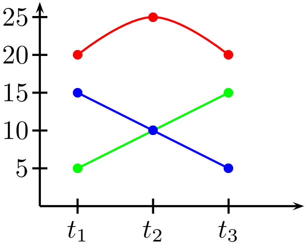
the requires individuation by individual concept; the abstract degree individual has been introduced as *the temperature in my office*

Cover Temperatures & Prices as Abstract Individuals?

scenario: at t_1, t_2, t_3, we take the temperatures of Frankfurt, Amsterdam and New York

(25) The lowest temperature is rising.





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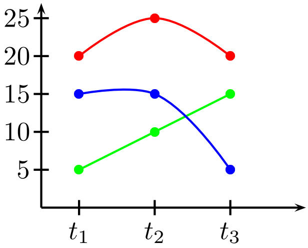

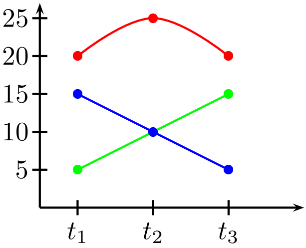

R_{city}: *right now, the temperature in NY is lowest, and the temperature in NY is rising*

CityCover = {*the temp. in F*, *the temp. in A*, *the temp. in NY* }

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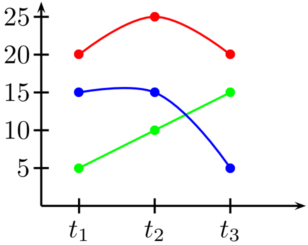

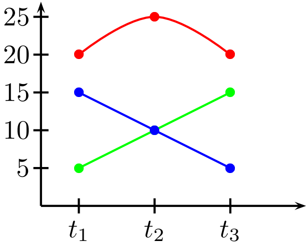

$R_{ranking}$: *lower boundary of the values recorded is going up*

RankingCover = {*the lowest temperature, the second lowest temperature,... the highest temperature* }

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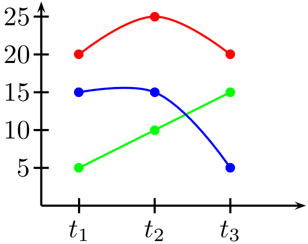

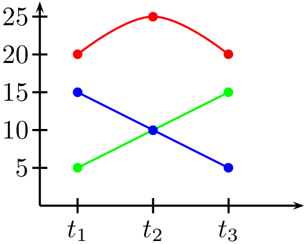

problem: right side - the two readings take into account different sets of individuals: R_{city} counts all occurrences of a value (presupposition failure!), $R_{ranking}$ counts just the values that occur

Conclusions

- nouns that can appear in subject position of intensional verbs need to have function readings in addition to value readings
- where does it come from? - avoid double index dependence
- *mayors*, *bodyguards*,. . . : quantification is sensitive to how they are picked out (cover) - individual concepts needed for the intensional verbs
- accounts for two different change interpretations
- accounts for context dependence
- nouns with abstract (one-dimensional) values (*temperature*, *price*) can be understood as values or occurrences of values

References

Aloni (2000) *Quantification under Conceptual Covers*. Amsterdam: ILLC.

Dowty, Wall, Peters (1981) *Introduction to Montague Semantics*. Reidel.

Lasersohn (2005) 'The Temperature Paradox as Evidence for a Presuppositional Analysis of Definite Descriptions' *Linguistic Inquiry* 36.

Löbner (1979) *Intensionale Verben und Funktionalbegriffe*. Narr.

Montague (1974) 'The Proper Treatment of Quantification in English'. In: Thomason (ed.) *Formal Philosophy*. Yale UP.

Nathan (2006) ' '. Ms., MIT.

Romero (2005) 'Concealed Questions'. *Linguistics & Philosophy* 28.

Romero (2006) 'Some Paradoxes about Individual Concepts'. Invited Talk at *Sinn und Bedeutung*, Barcelona.