Unspecific Objects (EGG Wroclaw 05)

0. Intro
0.1 Prehistory

I posit the case that for a good service you performed for me, I promised you a good horse. [. . .] And since I owe you this, until I have paid that concerning the payment of which I have obligated myself [. . .], you could rightly take action against me to bring about payment to you of a horse, which you could not do if I did not owe you. [. . .] But the opposite is argued in a difficult way.
[Buridanus (1966 [1350]: 137)]

Let us then have our horse-coper arguing again. "If I owe you a horse, then I owe you something. And if I owe you something, then there is something I owe you. And this can only be a thoroughbred of mine: you aren't going to say that in virtue of what I said there's something else I owe you. Very well, then: by your claim, there's one of my thoroughbreds I owe you. Please tell me which one it is." [Geach (1965: 430)]

The incorrectness of rendering 'Ctesias is huning unicorns' in the fashion:

($\exists x$) (x is a unicorn . Ctesias is hunting x)

is conventionally attested to the non-existence of unicorns, but is not due simply to that zoological lacuna. It would be equally incorrect to render 'Ernest is hunting lions' as:

(1) ($\exists x$) (x is a lion .Ernest is hunting x)

where Ernest is a sportsman in Africa. The force of (1) is rather that there is some individual lion (or several) which Ernest is hunting; stray circus property, for example.

The contrast recurs in 'I want a sloop'. The version:

(2) ($\exists x$) (x is a sloop . I want x)

is suitable insofar as there may be said to be a certain sloop that I want. If what I seek is mere relief from slooplessness, then (2) conveys the wrong idea.

The contrast is that between what may be called the *relational* sense of lion-hunting or sloop-wanting […] and the likelier or *notional* sense. [Quine (1956, 177)]

0.2 Failures of Transparency

Existential Impact
From *x Rs an N* infer: *There is at least one N*.

Extensionality
From *x Rs an N*, *Every N is an M*, and *Every M is an N* infer: *x Rs an M*.

Specificity
From *x Rs an N* infer: *Some (specific) individual is Red by x*.

[Zimmermann (2001: 516), 2 foonotes omitted]

0.3 Types of Opacity

[Forbes (ms.: 35f.)]

VERBS OF...	EXAMPLES
Absence	avoid, lack, omit
Anticipation	allow* (for), anticipate, expect, fear, foresee, plan
Calculation	calculate, compute, derive
Creation	assemble, bake, build, construct, fabricate, make (these verbs in progressive aspect only)
Depiction	caricature, draw, imagine, sculpt, visualize, write* (about)
Desire	hope* (for), hunger* (for), lust* (after), prefer, want
Evaluation	admire, disdain, fear, respect, scorn, worship (verbs whose corresponding noun can fill the gap in the evaluation 'worthy of _' or 'merits_')
Requirement	demand, need, require
Search	hunt* (for), look*, rummage about*, scan*, seek
Similarity	imitate, be reminiscent* (of), resemble, simulate
Transaction	buy, order, owe, own, reserve, sell, wager

+ [Moltmann (1997), 43–50]

epistemic verbs	see, recognize, count, $find_2$
resultative verbs	appoint, hire, elect, choose, $find_3$

(1) The committee lacks a mathematician. [cf. Forbes (ms.: 43)]
(2) I expected a bus before anything else. [Forbes (ms.: 56, fn. 6)]
(3) John counted 28 ships. [Moltmann (1997: 43)]
(4) Nigella was preparing a meal. [Forbes (ms.: 129)]
(5) Guercino painted a dog. [cf. Forbes (ms.: 47)]
(6) The referee wants no biting. [Forbes (ms.: 123)]
(7) Lex Luthor fears Superman. [Forbes (2000: 141)]
(8) John needs an assistant. [Moltmann (1997: 11)]
(9) Ernest is hunting lions. [Quine (1956: 177)]
(10) Tom's horse resembles a unicorn [Zimmermann (1993: 158)]
(11) Mats owns 75% of the ball bearings in the basement. [Rooth (p.c.), reported in Zimmermann (1993: 152)]
(12) John found a student who is able to solve the problem. [Moltmann (1997: 47)]
(13) John found a secretary. [Moltmann (1997: 47)]

0.4 Approaches to Opacity

- ***Clausal analysis*** [Quine (1956, 1960), den Dikken *et al.* (forthcoming)]

Idea:
An opaque verb must be decomposed into an attitude (a) and a relation (b) such that the individual x denoted by the subject is reported to bear the attitude (a) towards a proposition obtained by combining x with the relation (b) and the denotation of the object.

Schematically: $\text{ATT}_a(x,(\text{OBJ } y)\ \text{REL}_b(x,y))$

Example:
Jones seeeks a unicorn.
comes out as
Jones tries for it to be the case that there be a unicorn that he finds.

- ***Predicational analysis*** [Montagues (1969, 1970), Zimmermann (1993)]

Idea:
On its unspecific reading, an opaque verb expresses a relation between the individual denoted by the subjectand an abstract entity denoted by the object.

Schematically: VERB(x,OBJ)

Example:
Jones seeeks a unicorn.
comes out as
Jones stands in the relation of seeking to the generic unicorn.

- ***Adverbial analysis*** [Goodman (1969), Forbes (ms.)]

Idea:
On its unspecific reading, an opaque verb attributes a property further specified by the object to the individual denoted by the subject.

Schematically: OBJ-ly(VERB) (x)

Example:
Jones seeeks a unicorn.
comes out as
There is a unicorn-directd search that Jones is engaged in.

- ***Quantificational analysis*** [Zalta (1988), May (1985), Zimmermann (ms.)]

Idea:
On its unspecific reading, the opaque verb expresses a binary relation with an extended (quantificational) domain of its object.

Schematically: $(\text{OBJ}^+ y)$ VERB(x,y)

Example:
Jones seeeks a unicorn.
comes out as
There is an intentional unicorn to which Jones stands in the relation of seeking.

1. Clausal Analysis
1.0 Some motivation

• Failures of inference

Existential Impact

(0) Jones dreamt that a unicorn had attacked his pet weasel.

⇏ There exists at least one unicorn.

Extensionality

(1) Jones suspects that his wife dates a professor from the linguistics department.
All professors from the linguistics department are female

⇏ Jones suspects that his wife dates a female professor from the linguistics department.

(2) Lex Luthor fears that Superman is on his way.
Clark Kent is Superman.

⇏ Lex Luthor fears that Clark Kent is on his way.

Specificity

(3) Jones hopes that a communist has won a seat in parliament.

⇏ There is a (specific) communist that Jones hopes has won a seat in parliament.

• Specific/unspecific ambiguities

(4) Jones thinks that he lives next door to a movie star.
(a) There is a (specific) movie star that Jones thinks he lives next door to.
(b) Jones thinks that he lives next door to a morvie star but he has no idea who that ma ybe.

• *de re/de dicto* ambiguities

(5) Jones believes that the president of member of the department..
(a) Jones believes that whoever may be president is a member of the department.
(b) Jones believes of the (actual) president that he is a member of the department.

(6) Jones is looking for the president.
(a) Jones is looking for whoever may be president
(b) Jones is looking for the person who is actually president.

• Attachment ambiguities

(7) I expected that a bus would arrive before anything else.
(a) I expected that, before anything else would arrive, a bus would arrive.
(b) Before I expected anything else, I expected that a bus would arrive.

(8) I expected a bus before anything else.

• Ellipsis

(9) Do you want another sausage?
– I can't ~~have another sausage~~, I'm on a diet.

(10) Jonathan wants to have more toys than Benjamin.
⇔ Jonathan wants to have more toys than Benjamin ~~has~~.

• Propositional anaphors
Joe wants some horses but his mother won't allow it.
⇔ Joe wants some horses but his mother won't allow that he has some horses. .

1.1 Some details of analysis Larson *et al.* (fortchcoming)

• Syntax-semantics interface

(11) Mary wants a cracker.
Mary wants [FOR PRO TO HAVE a cracker]
Mary wants-FOR-HAVE PRO a cracker restructuring

(12) Mary wants to have a cracker.
Mary wants [FOR PRO to have a cracker] no restructuring

(13) Mary hopes for a cracker.
Mary hopes [for PRO TO HAVE a cracker]

(14) Mary seeks a cracker.
Mary seeks [FOR PRO TO FIND a cracker]
Mary seeks [FOR PRO TO HAVE a cracker Parsons (1997): 'Hemingway ellipsis'

(15) Mary seeks to find a cracker.
Mary seeks [FOR PRO find a cracker] no restructuring

(16) Max imagined a new car.
Max imagined [a new car P] small clause with 'hidden' stage level predicate *P*
Max imagined [a new car to be] Parsons (1997): 'Hamlet ellipsis'

(17) Mary seeks a cracker. specific reading
[a cracker]$_t$ Mary seeks [FOR PRO TO HAVE t]

• Possible wordls analysis of attitudes Hintikka (1969)

(18) Jones thinks that it's raining.
≡ $(\forall j)\,[i\ \boxed{\textbf{\textit{BEL}}}_{\textbf{Jones}}(i,j) \rightarrow \textbf{rain}_j]$
☞ believe ≡ $[\lambda p.\ \lambda x.\ (\forall j)\,[i\ \textbf{\textit{BEL}}_x(j) \rightarrow p_j]$

\+ two simplifications (for convenience):

(19) Jones is trying to wake up.
≡ $(\forall j)\,[i\ \boxed{\textbf{\textit{TRY}}}_{\textbf{Jones}}(j) \rightarrow \textbf{awake}_j(\textbf{Jones})]$
☞ try ≡ $[\lambda P.\ \lambda x.\ (\forall j)\,[i\ \boxed{\textbf{\textit{TRY}}}_x(j) \rightarrow P_j(x)]$ no *de se* [cf. Lewis (1979)]

(20) Jones is trying to read a book. specific reading
≡ $(\exists y)\,[\textbf{book}_i(y) \wedge (\forall j)\,[i\ \boxed{\textbf{\textit{TRY}}}_{\textbf{Jones}}(j) \rightarrow \textbf{read}_j(\textbf{Jones},y)]]$
no *de re* [cf. Kaplan (1969), Lewis (1981)]

(21) Jones is looking for a book.
(a) $(\forall j)\,[i\ \boxed{\textbf{\textit{SEEK}}}_{\textbf{Jones}}(j) \rightarrow (\exists y)\,[\textbf{book}_j(y) \wedge \textbf{\textit{HAVE}}_j(\textbf{Jones},y)]]$ unspecificity as dependence
(b) $(\exists y)\,[\textbf{book}_i(y) \wedge (\forall j)\,[i\ \boxed{\textbf{\textit{SEEK}}}_{\textbf{Jones}}(j) \rightarrow \textbf{\textit{HAVE}}_j(\textbf{Jones},y)]]$

1.3 Some problems

• Irreducible attiudes

(22) Jones worships a Greek godess. Kamp (p.c.) reported in Montague (1969)
(23) Arnim resembles a fox. Zimmermann (1993)
(24) Mary drew a unicorn. Forbes (ms.)

• Lack of ambiguity

Attachment Forbes (ms.), citing Partee (1974)

(25a) Walter will look for a bigger boat by dawn.
(b) Walter will look to find a bigger boat by dawn.
(26) Walter is seeking/sought a mermaid by noon

Ellipsis Resolution

(26) Do you need your glasses?
(a) – Actually, I don't ~~need my glasses~~. ✓
(b) – I don't ~~have my glasses~~ #

(27) Are you looking for your glasses?
(a) – I can't ~~look for my glasses~~, my eyes are too bad. ✓
(b) – Yes, but I can't ~~find my glasses~~ #

Propositional anaphora

(28) Joe is looking for some horses but his mother won't allow it.
$\overset{?}{\Leftrightarrow}$ Joe is looking some horses but his mother won't allow that he finds/has some horses..

• Inexactness of Paraphrases

(29a) Mary is looking for a tall Norwegian.
(b) Mary seeks to marry a tall Norwegian.
(c) Mary seeks to arrest a tall Norwegian.

(30a) Max visualized a unicorn. Larson *et al.* (forthcoming)
(b) Max visualized a unicorn in front of him.

(31a) Max didn't visualize a unicorn. Forbes (ms.)
(b) Max didn't visualize a unicorn in front of him..
(c) Max didn't visualize a unicorn spatially related to him.

(32) The clerk must give me 100 Euros. Artstein (p.c., 2000)
$\overset{?}{\Leftrightarrow}$ The clerk owes me 100 Euros.

2. Predicational Analysis
2.0 Some motivation

• Uniform (surface-oriented) analysis

(1) John is seeking a unicorn.
Jones stands in the relation of seeking to the generic unicorn.
$<\not\Rightarrow>$ *There is a (specific) unicorn that Jones stands in the relation of seeking to..*

(2) John is kicking a unicorn. transparency as lexical property
Jones stands in the relation of kicking to the generic unicorn.
$<\not\Rightarrow>$ *There is a (specific) unicorn that Jones stands in the relation of kicking to..*

• Irreducible opacity

(3) Mary painted a unicorn.
$<\not\Rightarrow$ Mary painted to have a unicorn.
... $<\not\Rightarrow$ Mary quainted to gave a unicorn.

2.1 Some details

• Starting point: clausal analysis

(4) Jones is seeking a unicorn.

⇐> Jones is trying to find a unicorn.

≡ $\mathbf{try}_i(\mathbf{Jones},\lambda j\ (\exists y)\ [\mathbf{unicorn}_j(y) \wedge \mathbf{find}_j(\mathbf{Jones},y)])$ unspecific reading*)

≡ $\mathbf{try}_i(\mathbf{Jones},\lambda j\ [\lambda P_{et}.\ (\exists y)\ [\mathbf{unicorn}_j(y) \wedge P(y)]]\ (\lambda y.\ \mathbf{find}_j(\mathbf{Jones},y)))$ transparent object

≡ $\mathbf{try}_i(\mathbf{Jones},\lambda i\ [\lambda P_{et}.\ (\exists y)\ [\mathbf{unicorn}_i(y) \wedge P(y)]]\ (\lambda y.\ \mathbf{find}_i(\mathbf{Jones},y)))$ renaming

≠ $[\lambda \wp_{(et)t}.\ \mathbf{try}_i(\mathbf{Jones},\lambda i\ \wp(\lambda y.\ \mathbf{find}_i(\mathbf{Jones},y)))]\ (\lambda P_{et}.\ (\exists y)\ [\mathbf{unicorn}_i(y) \wedge P(y)])$ confusion

BUT:

…≡ $[\lambda \boldsymbol{Q}_{s((et)t)}.\ \mathbf{try}_i(\mathbf{Jones},\lambda i\ .\boldsymbol{Q}_i\ (\lambda y.\ \mathbf{find}_i(\mathbf{Jones},y)))]\ (\lambda i\ .\ \lambda P_{et}.\ (\exists y)\ [\mathbf{unicorn}_i(y) \wedge P(y)])$ 'cap'

≡ $[\lambda \boldsymbol{Q}_{s((et)t)}.\ \mathbf{try}_i(\mathbf{Jones},\lambda j\ (\boldsymbol{Q}_j y).\ \mathbf{find}_j(\mathbf{Jones},y)))]\ (\lambda j.\ \lambda P_{et}.\ (\exists y)\ [\mathbf{unicorn}_j(y) \wedge P(y)])$

quantifier notation + renaming

*) $\mathbf{try} \equiv [\lambda i.\ \lambda p_{st}.\ \lambda x_e.\ (\forall j)\ [i\ \boldsymbol{TRY}_x(j) \rightarrow p_j]]$ *propositional* attitude, Hintikka style

• Deriving analyses (and types) of opaque verbs Montague (1969, 1970, 1973)

seek ≡ $[\lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e.\ \mathbf{try}_i(x,\lambda j.\ (\boldsymbol{Q}_j y).\ \mathbf{find}_j(x,y))]$

type $(s((et)t))(et)$

appear ≡ $[\ \lambda z_e\ \lambda P_{s(et)}.\lambda \boldsymbol{Q}_{s((et)t)}\ \mathbf{appear}_i(z,\lambda j.\ (\boldsymbol{Q}_j y).\ P_j(y))]$

type $e((s(et))((s((et)t))t))$

owe ≡ $[\lambda z_e\ \lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e\ \mathbf{obliged}_i(x,\lambda j.\ (\boldsymbol{Q}_j y).\ \mathbf{give}_j(x,y,z)))]$

type $e((s((et)t))(et))$

[… or maybe:

owe ≡ $[\lambda \boldsymbol{P}_{s((et)t)}\ \lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e\ \mathbf{obliged}_i(x,\lambda j.\ (\boldsymbol{Q}_j y)\ (\boldsymbol{P}_j z).\ \mathbf{give}_j(x,y,z)))]$

type $(s((et)t))((s((et)t))(et))$

… depending on readings of:

(5) I owe a student a beer. unspecificity possible?

(6) I am obliged to buy a student a beer. unspecificity possible!]

• Irreducible opacity Montague (1969)

worship ≡ **worship**

[≡ $[\lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e.\ \mathbf{worship}_i(x,\boldsymbol{Q})]$]

type $(s((et)t))(et)$

• Reducibility without opacity

kill ≡ $[\lambda y_e.\ \lambda x_e.\ \mathbf{cause}_i(x,\lambda j,\mathbf{die}_j(y))]$ Dowty (1979)?

type $e(et)$

• Generalizing to the worst case Montague (1970, 1973)

love ≡ $[\lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e.\ (\boldsymbol{Q}_i y).\mathbf{love}_i(x,y)]$

type $(s((et)t))(et)$

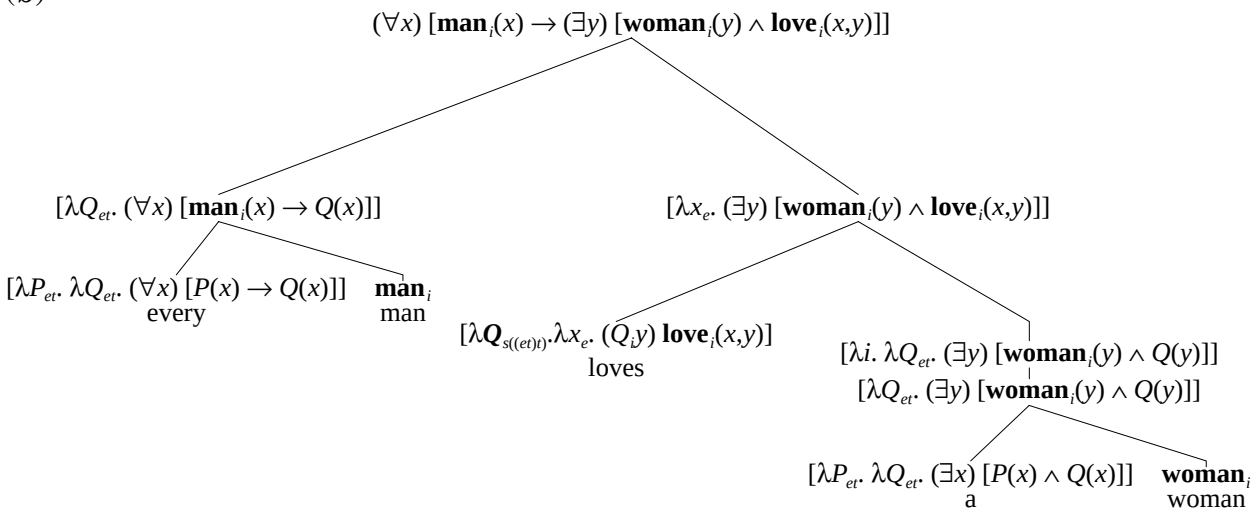
be ≡ $[\lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e.\ (\boldsymbol{Q}_i y).\ x = y]$ Montague (1970), quoting Quine (1960)

type $(s((et)t))(et)$

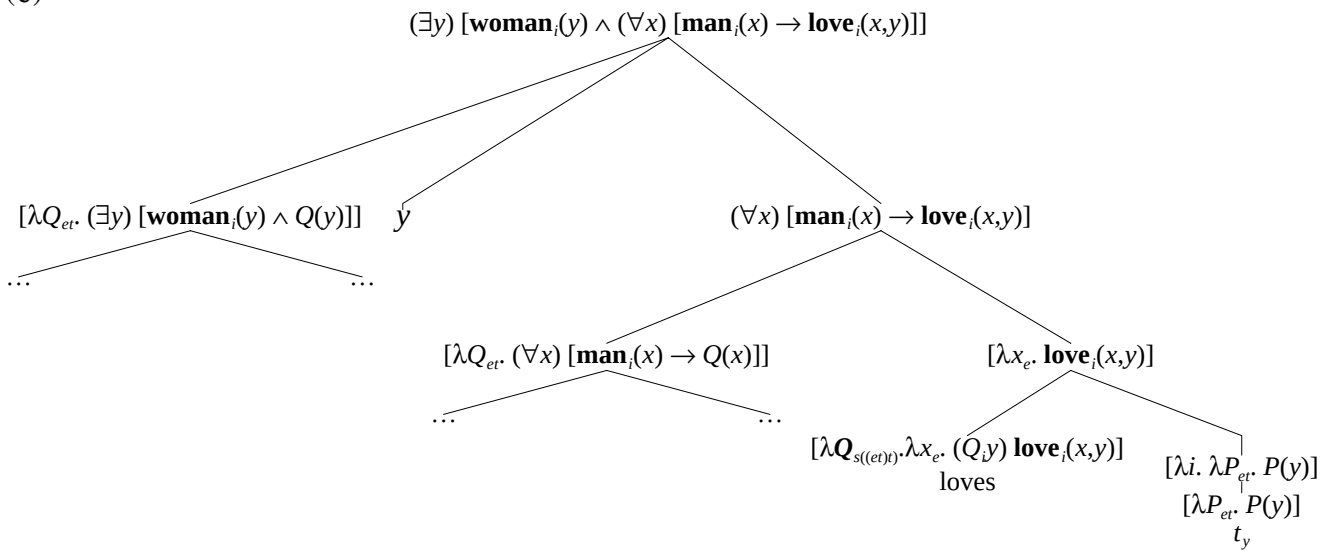
• Specific reading: scoping mechanism — Montague (1973)

(7a) Every man loves a woman.

(b)



(c)



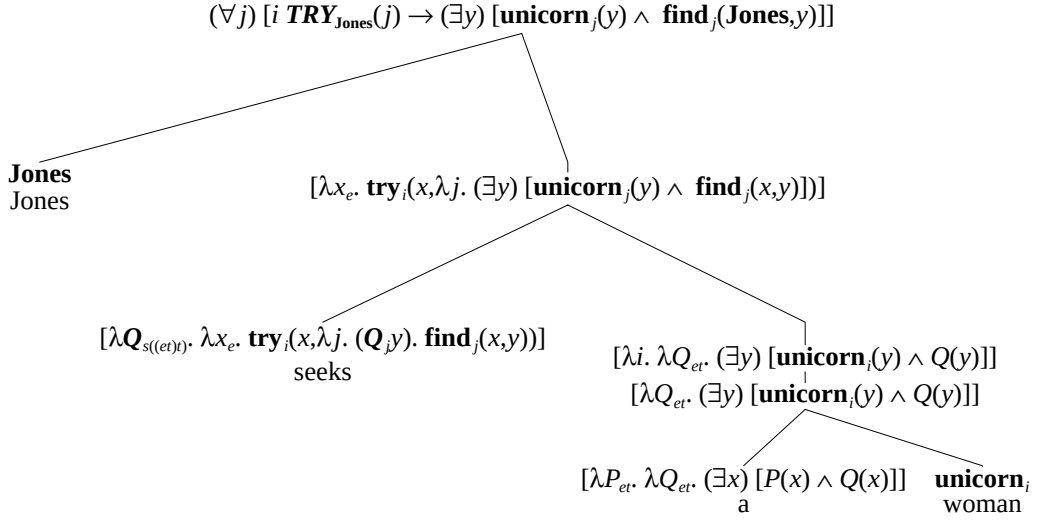
(8a) Jones seeks a unicorn.

$$\mathbf{try}_i(\mathbf{Jones}, \lambda j.\,(\exists y)\,[\mathbf{unicorn}_j(y) \wedge\ \mathbf{find}_j(\mathbf{Jones}, y)])$$

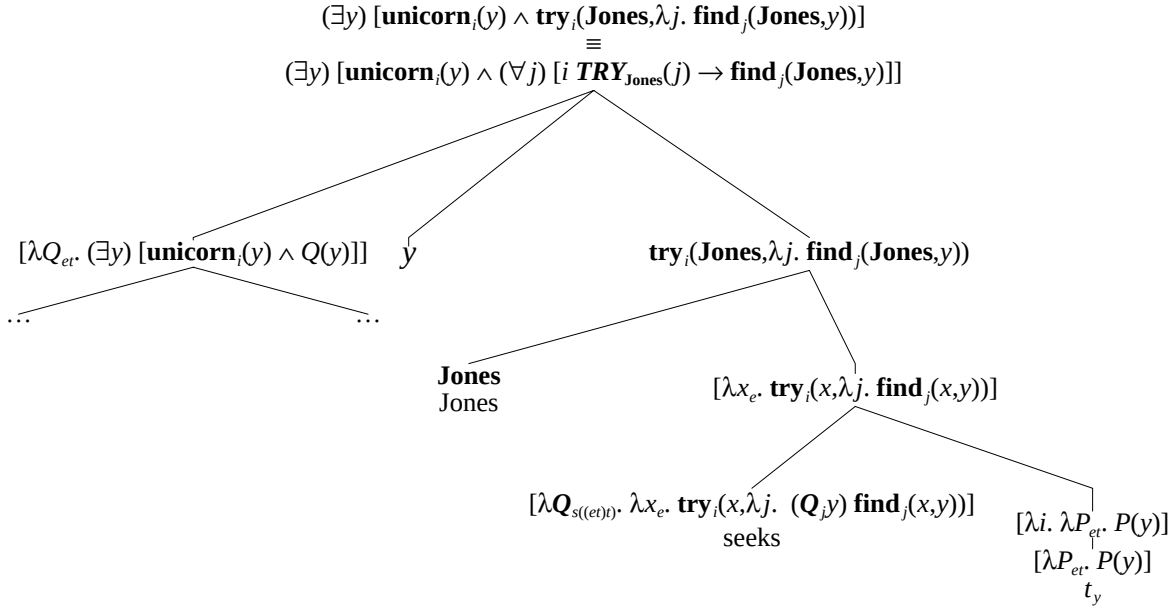
$$\equiv$$

$$(\forall j)\,[i\ \boldsymbol{TRY}_{\mathbf{Jones}}(j) \rightarrow (\exists y)\,[\mathbf{unicorn}_j(y) \wedge\ \mathbf{find}_j(\mathbf{Jones}, y)]]$$

(b)



(b)



- Property analysis — Zimmermann (1993)

Assumption:
Unspecific readings only arise when the object is an existential quantifier:

(9) Arnim compares himself to every pig.
(10) Arnim compares himself to most pigs.

[NB: Russellian descriptions and Montagovian names are existential quantifiers!]

Observation: Partee (1987)
Existential quantifiers stand in a 1-1 relation to (their restricting) properties:
$[\lambda P_{s(et)}.(\exists x_e)\ [\boldsymbol{Q}_i(y) \wedge P_i(y)]] \mathrel{\widehat{=}} \boldsymbol{Q}_i$

Conclusion
Opaque object positions are of type $e(et)$:
seek ≡ $[\lambda P_{s(et)}.\lambda x_e.\ \mathbf{try}_i(x,\lambda j.\ (\exists y)\ [P_i(y) \wedge \mathbf{find}_j(x,y)])]$
owe ≡ $[\lambda Q_{s(et)}\ \lambda P_{s(et)}.\lambda x_e.\ \mathbf{obliged}_i(x,\lambda j.\ (\exists y)\ (\exists z).\ [P_j(y) \wedge P_j(z) \wedge \mathbf{give}_j(x,y,z)])]$ double opacity
etc. – but also:
resemble ≡ $[\lambda P_{s(et)}.\lambda x_e.\ \mathbf{resemble}_i(x,P)]$ if irreducible
kiss ≡ $[\lambda P_{s(et)}.\lambda x_e.\ (\exists y_e)\ [P_i(y) \wedge \mathbf{kiss}_i(x,y)]]$ cf. McNally & van Geenhoven (2005)

Addition:
Obtain specific readings by scoping mechanism.

2.2 Some problems

• Conceptual issues (quantifier analysis)

☞ Almost nobody likes this approach, though it is not at all easy to say in detail specifically what is wrong with it. Parsons (1997)

(11) Perseus seeks every gorgon.

☞ [The Montagovian analysis of (11a)] has a term for a property of properties as input to **seek**. It is hard to know what to make of this. Where NP is singular, we understand '*x* seeks NP' to mean that *x* is in the seeking relation to the individual to whom NP refers. We cannot understand '$\mathbf{seek}_i(x,\boldsymbol{P})$ in any different way, given that 'seek' is univocal with singular and quantified NP-complements. But to understand 'x seeks QNP' in this way is to have *x* seeking the meaning of a quantifier (perhaps by looking it up in the dictionary.*) Forbes (ms.)

*) Note that I am not objecting that the object-language sentence '*x* seeks every gorgon' is synonymous with the object-language sentence '*x* seeks the property of being a property of every gorgon'. These two [object-language] sentences have distinct Montagovian truthconditions. The issue is rather about the conception of truthmaker in play for the first sentence.

(CD) $\text{seek} \equiv [\lambda \boldsymbol{Q}_{s((et)t)}.\lambda x_e.\ \mathbf{try}_i(x,\lambda j.\ (\boldsymbol{Q}_j y).\ \mathbf{find}_j(x,y))]$ Zimmermann (1993)

[…] given the classical decomposition (CD) of 'seek' involving 'try', it is possible to define the latter's intension in terms of the former's. Thus, it would appear that one could learn the notion of attempt by logically deriving it from the notion of search, or that knowledge of the entire extension of *seek* implies knowledge of the entire extension of *try*: if you know who is seeking what, i.e. which quantifier, you know who is trying what, i.e., to make which proposition true. The reason for this rather surprising consequence of the classical theory lies in its unlimited use of intensional quantifiers. Here is a complete characterization of the attitude [**try**] appearing in (CD):**)

[(12) $\mathbf{try} = [\lambda i.\ \lambda p_{st}.\ \lambda x_e.\ \mathbf{seek}_i(\ x,\lambda j\ \lambda \boldsymbol{Q}_{s((et)t)}\ p_j)]$]

) [(12)] is easily proved by replacing **seek by its paraphrase given in (CD) and then applying the familiar reductions of λ-calculus. – Incidentally, German morphology seems to confirm the classical analysis: 'seek' translates as 'suchen', whereas 'try' is 'versuchen', so that the meaning of the prefix 'ver-' could be defined by $[\lambda \Re_{s(s((et)t)(et))}\ \lambda p_{st}\ \Re_i(\ x,\lambda j\ \lambda \boldsymbol{Q}_{s((et)t)}\ p_j)]$!

• Undergeneration (property analysis)

(13) I have looked for every typo in the manuscript.

Zimmermann (1993), crediting D. Dowty

• Overgeneration (quantifier analysis)

(14) I have looked for most typos in the manuscript.

• Unexpected Failure of Existential Impact Zimmermann (1983, 1993, 2001)

(15) The committee lacks a mathematician. *see above*
The mathematicians are precisely the grant holders.
∴? The committee lacks a grant holder.

(16) This book lacks a cover.
All covers are green.
⤫ This book lacks a green cover.

(17) Mats owns 75% of the ball bearings in the basement. *see above*

Excerpt from *An Unexpected Birthday Present* Zimmermann (2001)
Franzis enters a wine store. She is looking for a bottle of decent Riesling-Sylvaner. 'Of the twenty customers before you today, every single one bought a bottle of Cacter's Champers to celebrate don't-ask-me-what,' says the wine merchant. 'I guess the wine is for yourself. You know what? I'll give you two bottles for the price of one – one is for you and one is for your husband.' Now Franzis and Arnim each own a bottle of excellent white wine – to be consumed as soon as an appropriate occasion arises.

On her way home from the wine store, Franzis meets her friend Christiane, who wants to know where she bought the two bottles. 'I only bought one of them and got the other one for free,' Franzis explains. 'One is for Wladimir, though.' 'Which one?' asks Christiane, whereupon Franzis replies: 'Which-ever I choose; his is the bottle that is not mine.'

(18) Arnim owns the bottle that Franzis does not own.

(+) $(\iota x_e\ [\mathbf{bottle}_i(x) \wedge\neg\ \mathbf{own}_i(\mathbf{Franzis},x^*)])\ \mathbf{own}_i(\mathbf{Arnim},x^*)$ $x^* = [\lambda j.\ \lambda P_{et}.\ P(x)]$

=> $(\exists^{\leq 1} x_e)\ [\mathbf{bottle}_i(x) \wedge\neg\ \mathbf{own}_i(\mathbf{Franzis},x^*)])$ $\perp$

(–) $\mathbf{own}_i(\mathbf{Arnim},\lambda j.\ (\iota x_e\ [\mathbf{bottle}_j(x) \wedge\neg\ \mathbf{own}_j(\mathbf{Franzis},x^*)])))$
$(\iota x_e\ [\mathbf{bottle}_i(x) \wedge\neg\ \mathbf{own}_i(\mathbf{Franzis},x^*)])) = (\exists x_e\ \mathbf{unicorn}_i(x))$ $= \emptyset$!

=> $\mathbf{own}_i(\mathbf{Arnim},\lambda j.\ (\exists x_e\ \mathbf{unicorn}_j(x)))$ 💣 – by extensionality

3. Adverbial Analysis
3.0 Some motivation

• Occam's Razor
Entites non sunt multiplicanda prater necessitatem. apocryphal

Any account of the truth conditions of

(1) John painted (a picture of) a unicorn.

in terms of persons and pictures (plus acts of painting) alone is better than one that employs additional *abstracta* [e.g., contents] or *possibilia* [e.g., non-existent animals].

3.1 Some details
• Two major problems
If 'seek a unicorn' means 'seek unicorn-ly', then
(a) How is possible that 'a unicorn' contributes the content of its restrictor only?
compositionality problem; cf. Montague (1969)
(b) What does '-ly' mean?
… or the hyphen in Goodman's (1969) 'unicorn-picture'; cf. Forbes (ms.)

ad (a): Easily solvable if EITHER:
– opaque readings require existential objects see above
OR:
– any quantifier contributes only its restrictor
… and determiners are always conservative: Johnsen (1987)

(2) Perseus seeks every gorgon.
Forbes (ms.): not existential and contributing more than its restrictor

• Solution Forbes (ms.)
… by taking cases:

$$\boldsymbol{Q}\textbf{-ly}\left(\left\{\begin{array}{c}\textbf{seek}\\ \textbf{need}\\ \textbf{owe}\\ \ldots\end{array}\right\}\right) =$$

$$[\lambda e.\ \left\{\begin{array}{c}\textbf{seek}\\ \textbf{need}\\ \textbf{owe}\\ \ldots\end{array}\right\}(e) \wedge (\forall j)\,[\left\{\begin{array}{c}\textbf{success}\\ \textbf{meet}\\ \textbf{discharge}\\ \ldots\end{array}\right\}(e,e') \rightarrow (\boldsymbol{Q}_j y)\,(\exists e'' \subseteq e')\left\{\begin{array}{c}\textbf{find}\\ \textbf{get}\\ \textbf{surrender}\\ \ldots\end{array}\right\}(e'') \wedge \text{Theme}(y,e'')]$$

• Double opacity of depiction verbs Forbes (ms.)
(3) Jones is painting a picture.
$(\exists e \leq \textbf{now})\ [\textbf{-ly}(\lambda j.\ \exists y_e\ \textbf{picture}_j(y))\ (\lambda e.\ [\textbf{paint}(e) \wedge \textbf{progressive}(e)]) \wedge \textbf{agent}(\textbf{Jones},e)]$
(4) Jones is painting a dog.
$(\exists e \leq \textbf{now})\ [\textbf{of}(\lambda j.\ \exists y_e\ \textbf{dog}_j(y))\ (\textbf{paint}) \wedge \textbf{progressive}(e) \wedge \textbf{agent}(\textbf{Jones},e)]$

4. Qantificational Analysis
4.0 Some motivation
• Monotonicity Problem Zimmermann (2005, ms.)

(1) Jones is looking for something. 3 LFs
(2) Jones is looking for something Smith is looking for. 3 readings

(3) Jones is looking for a green sweater. upward monotonicity
∴ Jones is looking for a sweater.

(4) Smith is looking for a car
Jones is looking for a sweater.
∴ Jones is looking for something Smith is looking for.

4.1 Deatils Zimmermann (ms.)
(5) $(\exists P_{s(et)})\ [P \sqsubseteq \textbf{sweater} \wedge \textbf{seek}_i(\textbf{Jones},P)]$

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