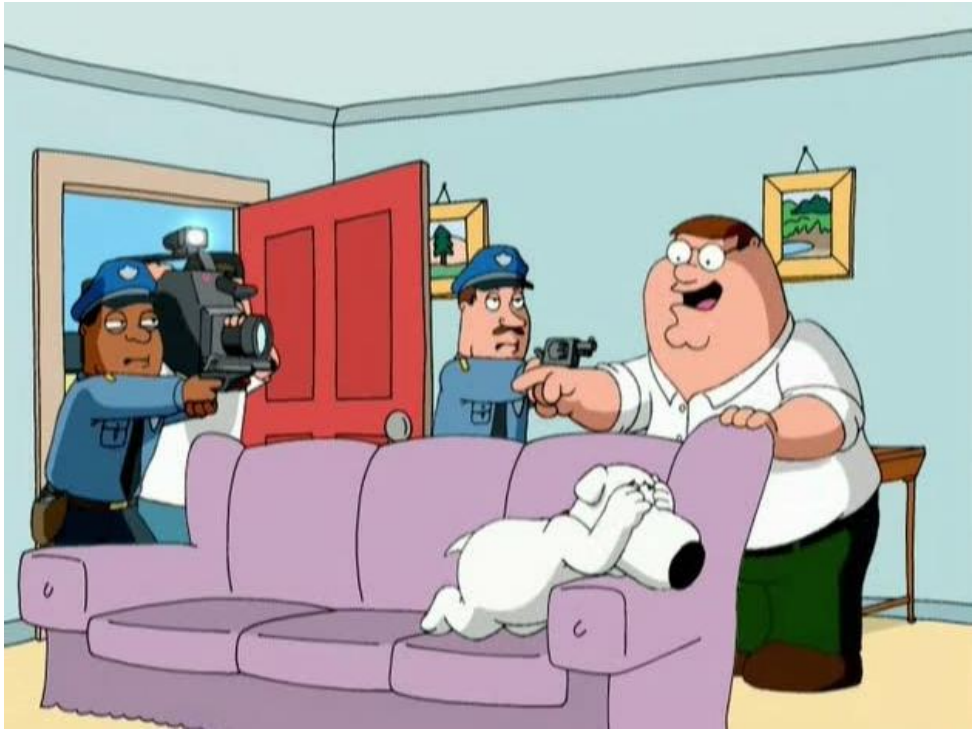
De re and *de se* in quantified belief reports

Emar Maier

Percus & Sauerland (2003) use quantified belief reports of the form *Only Peter*$_i$ *thinks he*$_i$*'s* ... to argue for dedicated *de se* LFs. The argument is targeted against any reductionist account that sees *de se* as merely a particular subtype of *de re*, viz. a *de re* belief about oneself from a first person perspective, requiring nothing but an account of *de re* attitudes. My *acquaintance resolution* framework is an attempt at just such a reduction and in this paper I extend that theory with a projection mechanism to allow local accommodation of acquaintance relations. With this extension we can account for their data, as well as for some related data involving quantified belief reports familiar from arguments in the *de se* literature.



Proceedings of ConSOLE XIII, 2005, 211-229
http://www.sole.leidenuniv.nl

1. *Introduction*

In case your PDF reader doesn't display movies[1] and you are unfamiliar with *Family Guy*[2] what happened in this scene was that a police squad breaks into Peter's house, accompanied by a camera crew filming live, so Peter was able to follow his own arrest live on TV, which he does, but without realizing it's him that's being arrested and filmed. Seeing himself and his wife Lois on the TV, he remarks: "Hey, fatty's wife's a babe". Although his statement is about himself and his own wife, this attitude does not directly contradict his usual reluctance to think of himself as fat, or of Lois as sexy. For the purpose of this paper we should add that Peter's best friend Cleveland is less prone to self-deception and would (rightly) describe himself as fat.

Peter's is a typical case of mistaken self-identity as introduced into the philosophy of language by Kaplan (1989) whose original example had him looking at himself in a mirror while pointing and shouting: "That guy's pants are on fire!". Such scenarios show the difference between *de se* and *de re* beliefs about oneself.[3] On the one hand, Cleveland's "I'm fat" and Peter's "Fatty's wife's a babe" both express (among other things) a similar belief that is in both cases about the utterer himself, viz. that he's fat. On the other hand the cognitive attitudes of these two expressed beliefs differs vastly, as is obvious from the fact that Peter would never express the proposition that he's fat with the words "I'm fat" that Cleveland chose.

On most accounts it follows that both men have *de re* beliefs about themselves, since they are both referring more or less directly to themselves with their statements about who's fat. There is nonetheless an obvious difference in the *way* they manage to refer to themselves: Cleveland's belief is "from a first person perspective" as evidenced by his use of the first person pronoun to refer to himself, while Peter's choice of an expressive with accompanying pointing shows a "third person perspective" on the belief that he's fat. Both beliefs have in common that there's a real and perceptual link between the believer and the object or *res* of his belief: Peter sees it on TV; Cleveland knows he himself is the *res* of his belief. The terminology I'll be using has it that both beliefs are *de re*, because of the perceptual links, but only Cleveland's is *de se*.

The above tentatively suggests a treatment of *de se* attitudes as a subclass of *de re*. In section 2 we will make this precise by giving a semantics of *de re* and *de se* belief. In section 3 we will switch to belief *reports*, and see what the aforementioned semantics predicts as a semantics of reports. Section 4 presents a problem for the reductionist account of *de se* reports sketched above. In section 5 I present my own reductionist attempt, which will be extended in section 6 to cover the problematic constructions of 4.[4]

---

[1]Supposed to work in Acrobat reader, versions ≥ 6. The clip can also be downloaded separately, in .mpg format.

[2]Season 3, episode 4 "One If By Clam, Two If By Sea" ©FOX 2001.

[3]I use the terms *de re* and *de se* a bit loosely, to conform to common longuistic practice. Under some definitions of these terms, beliefs like "That guy in the mirror's pants are on fire!" are also *de se* (because *that guy* is a complex demonstrative and, moreover, an *essential* indexical Perry 1977), but not *pure de se*.

[4]There's considerable overlap between sections 2, 3 and 5 of this paper and corresponding sections in its companion (Maier 2005). Both provide different extensions to Maier (2004), each addressing a different set of counterarguments to the *de se* reductionist proposal.

2. *The relational account of* de re *belief*

To carry out the reduction of *de se* to *de re* we must be precise about what *de re* belief is. For this purpose we use a combination of Kaplanian (1969) acquaintance relations and Lewisian (1979) self-ascription. To start with the Kaplanian ingredient, which relies on Quine's (1956) classic Ortcutt scenario as the motivating example:

> There is a certain man in a brown hat whom Ralph has glimpsed several times under questionable circumstances on which we need not enter here; suffice it to say that Ralph suspects he is a spy. Also there is a greyhaired man, vaguely known to Ralph as rather a pillar of the community, whom Ralph is not aware of having seen except once at the beach. Now Ralph does not know it but the men are one and the same [viz. Bernard J. Ortcutt]. (Quine 1956:179)

From the first half we conclude that Ralph in fact believes *de re* of Ortcutt that he is a spy, but from the pillar-of-the-community bit it follows that Ralph believes *de re* of Ortcutt that he is not a spy. How to account for these two facts, without dismissing Ralph as logically insane?

Kaplan (1969) has a simple answer: *de re* belief does not really involve so-called singular propositions, it's just *de dicto* belief with descriptive content provided by the way the believer is (perceptually) *acquainted* with the *res*. Applied to the Ortcutt example, the *res* is Ortcutt, and the relevant acquaintance relations involve Ralph seeing someone in a brown hat, and seeing some guy with gray hair at the beach. In Kaplan's own terminology: there are two *vivid names* of Ortcutt for Ralph: *the man in the brown hat* and *the gray-haired man at the beach*. The logical forms of the two seemingly contradictory beliefs then come out as *Ralph believes that the man in the brown hat is a spy* and *Ralph believes that the gray-haired man at the beach is not a spy*. The notion of belief needed then is simple *de dicto* belief, that is, belief as relating an individual to a general proposition, which we explicate as a set of possible worlds. The believed propositions for the example are given set-theoretically as $\{w \mid \text{in } w \text{ there is a (uniquely salient) man in a brown hat who is a spy in } w\}$ and $\{w \mid \text{in } w \text{ there is a gray-haired man at a beach who is not a spy in } w\}$. The classical *de re*/*de dicto* distinction has now faded somewhat, the only difference is that the content of a *de re* belief must involve a vivid acquaintance relation that actually relates believer and *res*. I will not here decide exactly what makes a relation vivid, but most forms of direct and indirect perception (e.g. on TV or in a mirror) standardly give rise to *de re* beliefs, whereas merely having picked up someone's name presumably doesn't. Equality is the relation that relates someone to the person that she *is*, perhaps the most intimate acquaintance relation of all.

To capture the *de re*/*de se* distinction, however, beliefs need more structure than just propositions construed as sets of possible worlds. This was the conclusion of Lewis's (1979) argumentation, based on examples where people are unaware or mistaken about who they are or are referring to. Take for instance the Family Guy scene discussed above, and imagine that Peter suddenly realizes what's happening, saying "Wait a minute, that's *me*...*I* am fat." What is the thing he has come to realize about himself? Of course, now he uses "I", as did Cleveland, so the belief has turned from merely *de re* to *de se*, but does that mean he has learned a new *proposition*? No, says Lewis, proposition-wise nothing has changed; whether he refers to himself

in the third person with a pointing at the TV, or with *I*, the expressed proposition constituting his belief is that Peter is fat, i.e. $\{w \mid \text{Peter is fat in } w\}$.[5]

Lewis' solution is that belief is *self-ascription of properties*: first, Peter self-ascribes the property of seeing someone on the TV who is fat, then he realizes his mistake and comes to self-ascribe a different (additional) property, viz. that of being fat. In possible worlds semantics, these properties are set-theoretically represented as sets of pairs of individuals+worlds rather than just sets of worlds, in our example: $\{\langle a, w\rangle \mid a \text{ sees a fat person on TV in } w\}$ and $\{\langle a, w\rangle \mid a \text{ is fat in } w\}$, respectively. Self-ascription is a new primitive notion that replaces the old propositional attitude operator. Formally we have shifted from a relation between believer and proposition to one between believer and property. My formalization in section 5 relies on an alternative but equivalent formulation of Lewis' insights which sticks to a kind of proposition, but switches from sets of *worlds* to sets of *centered worlds* or *contexts*. For present purposes a context is simply a world which in addition comes with a unique agent/center, so we can describe Peter's predicament by saying that, first, he believes himself to be the agent of a context in $\{c \mid \text{the center of } c \text{ sees a fat person on TV in the world of } c\}$ and then, after realizing his mistake he eliminates from his belief-set the contexts where the person seen by the agent differs from the agent himself, leaving him with only the contexts in $\{c \mid \text{the agent of } c \text{ is fat in the world of } c\}$.

We want to extend the broadly Kaplanian analysis of Ralph's predicament to cover Peter and Cleveland's case as well. The obvious idea here is that *de se* belief is just *de re* belief under an "egocentric" description/acquaintance relation. In order for such an analysis of *de re* and *de se* to work, we must obviously heed Lewis' arguments establishing the need for properties instead of just propositions. So, here's how we combine the two (Kaplan and Lewis) into a unified analysis of *de re* and *de se*. First, make the Kaplanian definition of *de re* belief sensitive to properties/contexts:

(1) x believes *de re* of y that it has P iff there is a two-place relation (or rather, a partial function)[6] R s.t.
   (i) R is a sufficiently vivid acquaintance relation
   (ii) R holds between x and y (in the actual world)
   (iii) x self-ascribes the property of bearing R to something P

Applied to Peter and Cleveland we get that both believe *de re* about themselves that they are fat, because for both men x there is an R that holds between x and x (ii) and satisfies the other two criteria: for Peter we can take R to be *seeing someone on TV*, for Cleveland we can just take the relation of equality, since unlike Peter, he believes to "bear equality to someone who is fat" (iii). Formally, the properties verifying clause (iii) are $\{\langle a, w\rangle \mid \text{there is a fat person } b \text{ seen by } a \text{ on TV in } w\}$ for Peter, and

[5] To really derive this properly we must assume standard Kripke/Kaplan-style direct referentiality of *I* and *Fatty*+pointing, which means that referential terms like those designate their referents (Peter, in this case) directly, without the mediation of a Fregean *Sinn*, i.e. independent of the world of evaluation (Kripke 1972, Kaplan 1989).

[6] As von Stechow (1982) (backed by the anonymous reviewer) points out, in order to be a proper acquaintance relation R has to be unique in its second argument, i.e. it should satisfy the requirement that for all x there is *at most one* y with $R(x, y)$. Formally, this requirement makes the relation into a partial function.

$\{\langle a, w\rangle \mid$ there is a fat person b in w and $a = b\}$ (=$\{\langle a, w\rangle \mid a$ is fat in $w\}$) for Cleveland.

Next, define *de se* as *de re* under the acquaintance relation of equality:

(2) x believes *de se* to be P iff x believes *de re* of x that he is P, with equality as the 2-place acquaintance relation R

It follows, correctly, that Cleveland's belief is *de se*, but Peter's is merely *de re*. This reduction of *de se* to *de re* can be traced back to Lewis:

> [*de se* belief] is ascription of properties to oneself under the relation of identity. Certainly identity is a relation of acquaintance par excellence. So belief *de se* falls under belief *de re*. (Lewis 1979:p.156)

However, Cresswell & von Stechow (1982) were the first to clearly separate belief and belief reports, and extend the above analysis of *de re* belief to a semantics of *belief reports*, with which the rest of the paper is concerned.

3. *Belief reports*

Belief reports are sentences typically used to convey that someone has some belief or other. As I said, the remainder of this paper provides a semantics for (a certain subclass of) belief reports, that is, a systematic way of deriving logical forms (representations of truth-conditions in a logical language) from surface structures of the form *NP believes that NP VP*. The obvious starting point being that a sentence of that form is true iff the referent of the first NP believes *de re* of the referent of the second NP that that last has the property denoted by the VP, for example:

(3) $[\![$Ralph believes that Ortcutt is a spy$]\!]_w = 1$
iff $[\![$Ralph$]\!]_w$ believes (in w) *de re* of $[\![$Ortcutt$]\!]_w$ that it is a spy
iff there is an R s.t.
(i) R is a sufficiently vivid acquaintance relation
(ii) $R([\![\text{Ralph}]\!]_w, [\![\text{Ortcutt}]\!]_w)$
(iii) $[\![$Ralph$]\!]_w$ self-ascribes the property of bearing R to a spy

We already saw that in Quine's example scenario these three clauses are verified by taking R to be the relation of seeing someone in a brown hat. An analogous derivation, with $R(x, y)$ is *x sees y at the beach*, shows the truth of the report *Ralph believes that Ortcutt is not a spy*.

From now on we restrict attention to reports of beliefs about oneself. As Kaplan (1989) has pointed out, in mistaken identity scenarios such as the one where Peter doesn't recognize himself on the TV, the following reports, as uttered by an informed spectator, are both true:

(4) a. Cleveland thinks he's fat.
b. Peter thinks he's fat [though he doesn't realize it].

At least, such has been the received view of philosophers since Kaplan (1989) first put forth the judgment. Perhaps the bracketed continuation or an explicit mention of the scenario will help

to convince the reader of the truth of (4b), but there's no denying that (4b) is "not as good" as (4a), and it seems to really require a context in which the mistaken identity is saliently common ground among the speaker and her audience. My account comes with a *pragmatic* explanation of the difference between (4a) and (4b) in section 5, but for now let us just accept Kaplan's *semantic* judgment and see where it leads us.

Kaplan concluded that "purely indexical distinctions," such as the difference between Peter's *de re* and Cleveland's *de se* attitudes, cannot be conveyed by reports in natural language: there are no *de se* reports, only *de se* attitudes. In the reductionist framework discussed above, this boils down to saying that for a report to be true there has to be *some* acquaintance relation, and natural language has no way of specifying on the surface, *which* acquaintance relation. This is exactly what we automatically did in the straightforward report semantics exemplified in (3), which would indeed predict truth for both sentences in (4), in accordance with Kaplan's (1989) conjecture.

Such reductions of *de se* to *de re*, denying the existence of dedicated *de se* LFs for natural language reports have been proposed and defended by Boër & Lycan (1980), Cresswell & von Stechow (1982), and von Stechow (1982). The Lewis/Kaplan-inspired reductionist semantics worked out most explicitly by Cresswell & von Stechow (1982), has been adapted and applied to other linguistic phenomena by Reinhart (1990) (ellipsis in belief reports) and Abusch (1997) (sequence of tense, cf. also discussion on p.217). An equally reductionistic variant has been proposed in Kaplan's own slightly more complicated formalism of two-dimensional character theory, by Kaplan (1989), with significant refinements by Zimmermann (1991) and von Stechow & Zimmermann (2004).[7] Lately, however, there has been a surge in counterarguments, one of which is the topic for the remainder of the paper.

4. *Anti-reductionism*

There are two groups of counterarguments against the general reductionist setup, one appears in work on monsters and *de se* reports (Chierchia 1989, Schlenker 2003, von Stechow 2001; 2002), and the other involves quantified belief reports, most notably embedding under *only* (Percus & Sauerland 2003:=P&S). The first objection I discuss elsewhere, for now we'll focus on *only* and other issues that have arisen from embedding *de re*/*de se* reports under quantifiers.

The P&S argument is meant to give additional evidence to Chierchia's (1989) claim that, contrary to what Kaplan (1989) assumed, language can and does distinguish *de re* from *de se* reports, a case in point being *Mary hopes to win* which is false in a mistaken identity scenario where *Mary hopes that she will win, but she doesn't realize it* is true. Chierchia postulates distinct *de se* and *de re* LFs, so sentences as in (4) are ambiguous, whereas the corresponding infinitival report *believes to be fat*[8] would have only *de se* LF. To be a bit more specific: in

[7]von Stechow & Zimmermann (2004) do not argue for a reductionist account as such, in fact they compare the two reductionist frameworks, Kaplan (1989) vs. Cresswell & von Stechow (1982), and conclude that Kaplan's character theory is superior on grounds of its more obvious compositionality. The current paper will not address this particular criticism nor others related to (strictly Montagovian) compositionality. We focus here on the attack involving quantified belief reports.

[8]The English *believes to be* is pretty rare, so Chierchia resorts to Italian where *crede di essere* is the normal

Chierchia's theory a *de re* belief complement is of a sentential type, with a free variable bound by a *res* from the outside. Such complements become *de se* by fronting them with a λ at LF and binding the free variable, thereby type-shifting the propositional (*de re*) complement into a property (*de se*, Lewis-style). The variable binder has no discernible surface realization, so the ambiguity of (4) boils down to the appearance or non-appearance of this variable binder at LF.

P&S's argument in favor of Chierchia-inspired *de se* separatism starts off with a scenario like our Family Guy scene, i.e. a situation with different people having *de re* beliefs with the same contents, each about herself, but not all *de se*, in our case Peter's *being fat* belief is a mere *de re* and Cleveland's is *de se*. P&S then offer the sentence:

(5) Only Cleveland thinks he's fat.

Let's agree with their judgment that (5) is true, when uttered in the Family Guy context by an informed spectator. The *de se* reductionist semantics proposed in (3) is now in trouble, since it will assign (5) an LF with an existentially quantified acquaintance relation. P&S give reductionists only the narrow scope option, that is a logical form that treats *only Cleveland* as a quantifier and the rest as a simple co-referential belief report *x thinks he's fat* analysed as in (3). The resulting truth-conditions can be paraphrased as: Cleveland is the only x for which there is an R s.t. (i) R is vivid relation of acquaintance, (ii) $R(x, x)$, and (iii) x believes the person he bears R to is fat. This analysis would incorrectly predict falsity for (5) since Cleveland is not the only such x; for Peter there is an appropriate R as well, it's just not the same one. In other words, the reductionist proposal with narrow-scope acquaintance fails.

However, let's not be too hasty dismissing narrow-scope existential LFs, because there happens to be another argument—based also on quantified belief reports—*in favor* of this analysis, viz. Zimmermann's (p.c.) example of a universally quantified report of a mixed *de re*/*de se* situation:

(6) Both men think they're fat.

Zimmermann judges such a report true in our mixed situation,[9] meaning that an LF with narrow existential acquaintance (for both men x there is an appropriate R s.t.. . .) must be possible.

Returning to the P&S example, perhaps we can counter P&S with a wide-scope analysis, i.e. assign (5) an LF where the quantification over R is scoped outside the *only* operator: there is an acquaintance relation R such that only Cleveland has the property of believing himself to be fat *under that* R. This would seem to correctly predict truth for (5) by taking R to be the relation of equality. In fact, this is more or less Abusch's (1997) adaptation of the unified *de re* semantics of Cresswell & von Stechow (1982). Since her analysis comes quite close to the one I'll present myself in that it aims to let R be determined by the context, let me quote her in full:

> I understand the acquaintance relation as being given by the context or, more generally, as pragmatically constructed from discourse and contextual information. In

way to report *de se* belief. For English the point can be made with another attitude verb, e.g. *hopes to be*.

[9] Again, as with (4b), a continuation like 'but only one of them actually realizes it himself' may make the judgment much clearer, and moreover, the fact that such a continuation is well-formed, interpretable and felicitous already makes the point.

> contrast, Cresswell and von Stechow quantify the relation in the semantic rule for believe. The definition in footnote 9 of Cresswell and von Stechow (1982) begins as follows:
>
> (i) 'a believes ω of b in w iff there is a suitable relation ξ such that...'
>
> An advantage of leaving the relation unquantified is that one can say that the relation is kept constant through a sequence of belief descriptions where Ralph is understood as presenting the *res* to himself in a consistent way. Further, one can analyze [*Ralph believes that Ortcutt is a spy*] as true in one context but false in another. I feel that an analysis which simply characterizes [that sentence] and [*Ralph believes that Ortcutt is not a spy*] as both true does not do justice to my intuitions. (Abusch 1997:fn.9 on p.9)

What Abusch actually does in the rest of her paper is simply to leave the variable R free, which automatically puts her in the (ultra-)wide-scope camp.[10] Leaving a free variable in a logical form, of course, is the standard way of saying "The binding of this variable to a suitable contextually given individual is left to pragmatics. I, as a semanticist, have nothing to say about that." Indeed, I don't see how one could say more about it in a classical *static*[11] semantic framework like Abusch's. This is the reason my own account to be presented below is couched in a *dynamic* semantic framework that allows this kind of contextual resolution to be an integral part of the (pragmasemantic) formal analysis.

It seems then that wide-scope analyses, especially those taking context-dependence into account, may have some advantages for unembedded belief reports, and can correctly predict truth for P&S's (5). However, as we noted before, the Zimmermann judgment (6) will remain problematic, and more seriously, consider (7):

(7) #Only Peter thinks he's fat.[12]

In our context Cleveland is known to say "I am fat", so (7) should definitely count as false, but the wide-scope analysis sketched above would predict truth again, by taking R to be the relation *seeing someone on TV*; only Peter is so related to himself while believing the person he bears that R to is fat. So, the simple wide-scope acquaintance version of the reductionist semantics exemplified by (3) fails too.

---

[10] Besides Abusch, this "wide-scope camp" perhaps contains Aloni (2000), who considers a pragmatic analysis where:

> The sentence 'a believes b to be φ' uttered in context C is true iff there is a description α *suitable in* C such that α is actually b and a believes that α is φ. (Aloni 2000:p.61)

Additionally, Aloni cites some other logicians/philosophers with supposedly similar ideas (Aloni 2000:fn.34 p.57). I could also count myself in, but with reservations, because the account to be proposed here crucially allows occasional narrow scopings as well.

[11] Static semantic frameworks (like e.g. modal predicate logic) take truth and truth-conditions of sentences as the basic semantic units. In *dynamic* theories, the way an utterance changes its context is the primary focus of semantics, as will become clear in section 5.

[12] This sentence as counter argument to the simple wide-scope analysis was brought to my attention by Henk Zeevat at Szklarska Poreba 2004

The alternative proposed by P&S is simple: just assume separate "dedicated *de se*" and "general *de re*" LFs, as did Chierchia. On its *de se* reading, (5) gets an LF which reports Cleveland as having a first person belief of the form *I am fat*, which is true, so P&S correctly predict a true reading of (5) (in addition to any *de re* LF it might have). They would also get the right result for (7), since its *de se* reading is false, since Peter doesn't have a *de se* belief, and the *de re* reading is also false, since both men have a *de re* belief, be it under different perspectives. Note that this *de re* reading must thus cover both mere or strict *de re* and *de se*, so the syntactic ambiguity posited by P&S in effect must distinguish *de se* from *de re*-or-*de se*, which seems a bit redundant, from a theoretical perspective. Speculatively note that with this "redundant" ambiguity their theory may be able to deal with Zimmerman's (6) by saying that the embedded sentence there has the general *de re* LF, yielding something like the narrow scope existential acquaintance truth-conditions, though then the LF difference between the superficially similar complements of (5) and (6) would be totally *ad hoc*. P&S can give no explanation of why in the Zimmermann sentence we do not get the *de se* LF which should be something like a default, as was in fact also conjectured for universally quantified reports by Chierchia, who remarks, about his analogous sentence (30):

(30) a. Everyone in that room thinks that he is Hume.

The most plausible interpretation of (30a) claims that each person in the relevant room has a certain de se attitude (perhaps due to schizophreny). (Chierchia 1989:p.10)

My goal will be to get rid of the P&S ambiguity and have the syntax generate only underspecified *de-re*-or-*de-se* LFs, shifting the job of disambiguation onto pragmasemantics. This is the crucial difference setting apart my analysis from its modern (separatist) rivals, who all put the burden on morphology/syntax (cf.Schlenker's 1999, 2003 *agreement* mechanism and Von Stechow's 2001, 2002 *feature deletion*).

In the next sections I propose a way to implement these ideas formally in order to show that we can capture all the above data in a reductionist framework based on a presupposition-like contextual resolution of acquaintance relations.

5. *Acquaintance Resolution*

My proposal, *Acquaintance Resolution*, is formulated in a dynamic semantics framework, viz. Kamp & Reyle's (1993) Discourse Representation Theory with van der Sandt's (1992) presuppositions-as-anaphora. I will here simplify a bit with respect to the formal semantics, focusing more on mapping sentences to representations and deriving correct (representations of) truth-conditions from sentences in their context.[13]

Just *representing* adequate *de re* and *de se* truth-conditions in DRT already necessitates some additions. A DRS consists of a set of discourse referents (think: existentially quantified variables) paired with a set of DRS-conditions, which may be predicates or other DRSs pre- or

[13]In Maier (2004) the interested reader will find the tedious formal semantic details, i.e. a 2-layered fragment of LDRT to account properly for direct reference and indexicality. For simplicity, we now proceed with a 1-dimensional toy version, keeping in mind that certain uniqueness and rigidity facts are left unaccounted for.

infixed by operators, like negation or quantifiers. We add to a standard DRS language an operator "believe(x)" interpreted as in (8), which involves a function $\mathcal{B}el \in [\mathcal{D} \times \mathcal{W} \rightarrow \wp\mathcal{W}]$ that assigns each individual a set of belief alternatives (=worlds she cannot distinguish from the real world), and that is given by the model:

(8) $[\![\text{believe(x):}\varphi]\!]^f = \left\{ w \in \mathcal{W} \middle| [\![\varphi]\!]^f \supseteq \mathcal{B}el(f(\text{x}), w) \right\}$.

Now we can represent things like:

(9) a. Peter thinks there's a spy at the beach.

b. $\left[\text{x} \;\middle|\; \text{Peter(x), believe(x):} \left[\text{y} \mid \text{spy(y), at\_the\_beach(y)} \right] \right]$

c. $[\![\text{(9b)}]\!]_w = 1$ iff there is an individual a, called "Peter", in w, all of whose belief worlds $w' \in \mathcal{B}el(a, w)$ feature some spy who is at the beach (at w')

A second addition to vanilla DRT is the "center" predicate, a generalization of a "speaker" predicate that picks out the speaker of the current utterance. I use "center" to represent first person pronouns, (10a-b), but also to represent the agent/first person of a thought or other attitude, which is useful for capturing *de se* truth-conditions, (10c-d):

(10) a. $\left[\text{y} \mid \text{center(y), fat(y)} \right]$

b. $[\![\text{(10a)}]\!]_w = 1$ iff w has a center (speaker) who is fat in w

c. $\left[\text{x} \;\middle|\; \text{Cleveland(x), believe(x):} \left[\text{y} \mid \text{center(y), fat(y)} \right] \right]$

d. $[\![\text{(10c)}]\!]_w = 1$ iff a certain Cleveland in w has a belief set in which each world has a center (experiencer) who is fat

Due to the abovementioned simplifications (cf. footnote 13) we must now simply assume that "$w$orlds" here are actually more like *centered worlds* or *contexts* (in accordance with the discussion of Lewis on p.214), and we see that (10c) correctly represents the *de se* truth-conditions. But we have not said how to systematically get at such a representation, given a sentence like (4a). This process is often described as a two-stage procedure: first the sentence is parsed and compositionally transformed into a *preliminary DRS*, then (presupposition) resolution merges the preliminary DRS with the context (input) DRS and takes care of context-dependencies by binding or accommodating presuppositions, yielding the final (output) DRS representing the new context. My aim is to give an analysis of belief reports that assigns them all a single uniform preliminary *de re* DRS and in that sense unifying *de re* and *de se* reports. Note that my analysis is thus only weakly reductionistic because although the preliminary sentence representations of say (4a) and (4b) are uniform, after resolution the final representations (the *output contexts* in dynamic semantics jargon) differ, which is as it should be given the observed divergence in truth-conditions for *de re* and *de se* (readings of) reports.

To sketch the workings of acquaintance resolution, consider the 3rd person reports about Cleveland (4a), and Peter (4b), in the mistaken identity context. In our dynamic framework we must first represent this input context, in which it is common ground (among the reporter and her audience, that is, Peter of course is clueless) that there are two men, called Peter and

Cleveland, the first of whom is watching TV but not recognizing himself. This is represented as:

(11) $\left[\text{x y} \mid \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)}\right]$

Now, the preliminary DRS of (4a) is:

(12) $$\left[\begin{array}{l} \partial\left[\text{z} \mid \text{Cleveland(z)}\right] \\ \text{R(z,w)}\doteq? \\ \text{believe(z):}\left[\text{u v} \left| \begin{array}{l} \text{center(u), R(u,v), fat(v)} \\ \partial\left[\text{w} \mid \text{masc.3.sg.(w)}\right] \end{array}\right.\right] \end{array}\right]$$

This represents a sort of LF based on the relational analysis of *de re* sketched in section 2. The proper name *Cleveland* and the pronoun *he* have triggered presuppositions, denoted by the ∂DRS, but there is also another kind of underspecification in (12), viz. R, a 2nd order free variable (ranging over 2-place relations), which is supposed to hold of z and w in the main DRS (corresponding to the real world). This R further serves as the descriptive content under which Cleveland has the *de re* belief, as represented in the complement DRS which says "there is a v that the belief center is R-acquainted with, and that v is fat" in accordance with the *de re* analysis of (1), p.214.

After merging (12) and (11), we resolve the regular presuppositions, that is, we try to bind the ∂ referents to *appropriate* ($\approx$predicated content matches pragmasemantically) and *accessible* (van der Sandt 1992) antecedents, in this case binding z (*Cleveland*) and w (*he*) to x (the contextually given Cleveland), and get:

(13) $$\left[\text{x y} \left| \begin{array}{l} \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ \text{R(x,x)}\doteq? \\ \text{believe(x):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right] \end{array}\right.\right]$$

The resolution algorithm must perform what we might call a "second order binding" to determine R, given that must be a two-place relation that holds in the context between x and x. This 2nd order binding is done by means of 2nd order matching, a (very simple) special case of *higher order unification*, a powerful technique fruitfully applied in e.g. the semantic analysis of ellipsis phenomena by Dalrymple et al. (1991). Here, it means we look for a substitution for R that verifies the equation R(x,x)$\doteq$?, where the $\doteq$ represents $\alpha\beta\eta$-interconvertability of lambda terms (roughly: the left-hand term can be transformed into the right-hand term by executing a finite number of functional applications (β-reductions) and renamings of bound variables), after the "?" has been replaced by a contextually salient relation relating x to x. By default we take x=x for the ?-slot, which is not explicitly written in the context DRS, but can be thought of as always implicitly there, since it adds nothing to the truth-conditions. This gets us (14a). Then there are 4 possible unifying substitutions for R, of which (14b) is the one we want, the non-trivial

one that resolves R to the relation of equality.[14] Applying it to the whole gives (14c), which is equivalent to (14d-e):

(14) a. $\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \text{R(x,x)}\doteq\text{x=x} \\ & \text{believe(x):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right] \end{array}\right]$

b. R$\mapsto\lambda$sλt.s=t

c. $\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & (\lambda\text{s}\lambda\text{t.s=t)(x,x)}\doteq\text{x=x} \\ & \text{believe(x):}\left[\text{u v} \mid \text{center(u), }(\lambda\text{s}\lambda\text{t.s=t)(u,v), fat(v)}\right] \end{array}\right]$

d. $\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \text{x=x}\doteq\text{x=x} \\ & \text{believe(x):}\left[\text{u v} \mid \text{center(u), u=v, fat(v)}\right] \end{array}\right]$

e. $\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \text{believe(x):}\left[\text{u} \mid \text{center(u), fat(u)}\right] \end{array}\right]$

We have succeeded in assigning a *de se* output DRS, equivalent to our earlier (10c), to an underspecified input.

As for Peter, (4b), a *de se* output would be false, contradicting our judgments, so let's see what happens if we add the same preliminary structure (12), except for the proper name, to the same context (11). After merging and resolving presuppositions, we're at (15a). If now we were to choose the default resolution, y=y for the question mark position and to consequently bind R to equality, we'd get *de se* which the context falsifies. But we can choose a different route, since now there is a salient contextual relation between y and himself: the seeing someone on TV, the derivation of the *de re* reading we get from that is shown in (15). One of the main selling points of this kind of analysis is that we can view the deviation from the default equality acquaintance, and the associated pragmatic backtracking described above, as an explanation of the awkwardness many people feel with (4b)'s way of reporting the situation.

(15) a. $\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \text{R(y,y)}\doteq? \\ & \text{believe(y):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right] \end{array}\right]$

b. R$\mapsto\lambda$sλt.see_on_tv(s,t)

c. $\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \text{believe(y):}\left[\text{u v} \mid \text{center(u), see\_on\_tv(u,v), fat(v)}\right] \end{array}\right]$

d. $[\![(15c)]\!]^f_w = 1$ iff ... [context] ... and all of Cleveland's belief alternatives have a center who sees someone fat on TV

[14] A trivial one is for instance R$\mapsto\lambda$sλt.s=x

Note in conclusion that the third person feature of the syntactically embedded *he* is straightforwardly interpreted as a semantic condition in the presupposition. This means that in the resolution *he*'s presupposition floats up to the main DRS, which places this account firmly in the reductionist camp championed by Cresswell & von Stechow (1982), opposite the separatists (Chierchia 1989, Schlenker 2003, von Stechow 2002) who all have to somehow semantically ignore the morphological 3rd person of the embedded pronoun to account for the *de se* reading. It remains to be seen if we can do better with respect to the quantified examples.

6. *Quantified belief reports*

We now turn to the more challenging judgments alluded to in 4 above, starting with (6). The quantifier *both* is treated as a generalized quantifier, very much like *all* in that it is interpreted as relating a restrictor set (the men) and a nuclear scope (believe they're fat) by the condition that all members of the restrictor have the property corresponding to the scope with an additional requirement that the restrictor set has exactly two members.[15] In DRT we represent generalized quantifiers as [restrictor]⟨quantifier⟩[nuclear scope], the ⟨quantifier⟩ specifying the variable that is being quantified. In our example the nuclear scope is a belief report like (4a) and the restrictor consists of a presupposed set of men, which we can easily bind to the set formed by Peter and Cleveland, so after the first trivial pronoun and proper name resolutions (to the quantified variable z) the preliminary DRS in context is:

(16)
$$\left[\begin{array}{l|l} \text{x y X} & \begin{array}{l}\text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ \left[\text{z} \mid \text{z}\in\text{X}\right]\left\langle\begin{array}{c}\text{both}\\ \text{z}\end{array}\right\rangle\left[\begin{array}{l|l} & \text{R(z,z)}\doteq\text{?} \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right]\end{array}\right]\end{array}\end{array}\right]$$

This has Cleveland and Peter and asserts that each of these two has the property of bearing R to himself and believing that he's R-acquainted with someone fat. What could R be? Well, no relations are given between z and z, so the default must apply; resolve to equality so that following (14) we get:

(17) a.
$$\left[\begin{array}{l|l} \text{x y X} & \begin{array}{l}\text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ \left[\text{z} \mid \text{z}\in\text{X}\right]\left\langle\begin{array}{c}\text{both}\\ \text{z}\end{array}\right\rangle\left[\begin{array}{l|l} & \text{R(z,z)}\doteq\text{z=z} \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right]\end{array}\right]\end{array}\end{array}\right]$$

b. $\text{R}\mapsto\lambda\text{s}\lambda\text{t.s=t}$

c.
$$\left[\begin{array}{l|l} \text{x y X} & \begin{array}{l}\text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ \left[\text{z} \mid \text{z}\in\text{X}\right]\left\langle\begin{array}{c}\text{both}\\ \text{z}\end{array}\right\rangle\left[\begin{array}{l|l} & \text{believe(z):}\left[\text{u} \mid \text{center(u), fat(u)}\right]\end{array}\right]\end{array}\end{array}\right]$$

[15] The cardinality of the restrictor condition is perhaps best analysed as a presupposition, but we don't have time to go into that here.

In general, this is what we predict: a universally quantified report like (6) is true iff all individuals in the domain have a *de se* belief. This is exactly what Chierchia (1989:p.10) assumed, as witness the quote on page 219 here, and it also corresponds to the *de se* LF that P&S argue exists. In the context under discussion, this means the sentence is false, because Peter's belief is not *de se*.

Perhaps this is a plausible reading, but I agree with Zimmermann who says that *given a mixed context* the sentence is still true. How can we account for that? My proposal is to slightly generalize the acquaintance resolution framework, by positing a full presupposition-like projection mechanism for the second-order resolution of R. The idea is that R really is a presupposed variable, to be represented in the preliminary DRS as a ∂DRS with presupposed content given by the "R(...)$\doteq$?"-condition:

(18)
$$\left[\begin{array}{l|l} \text{x y X} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ & \left[\text{z} \mid \text{z}\in\text{X}\right]\left\langle\begin{array}{c}\text{both}\\ \text{z}\end{array}\right\rangle\left[\begin{array}{l|l} & \partial\left[\text{R} \mid \text{R(z,z)}\right] \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right]\end{array}\right]\end{array}\right]$$

The effect will be that in resolution R can now be projected outside of an embedded position and furthermore it can be *accommodated* as well as bound. Recall that in presuppositions-as-anaphora, there's a resolution repair strategy called accommodation, which can be applied if binding fails (e.g. if all possible bindings lead to a false or incoherent output). What accommodation does is to fix the context so that the presupposition is in fact trivially resolved, and in DRT this amounts to just dropping the presupposition's referent and content at a suitable place in the DRS. Uncontroversial are *local* (drop it where it's triggered) and *global* accommodation (drop it at the main DRS), and with these extra resolution options offered by standard treatments of presupposition I will show that if we assume that the context-dependence of acquaintance relations is of a presuppositional nature we can tackle all the problematic examples of section 4. Note that the extension to full presuppositionality is conservative in that all results derived in the DRT framework sofar, can be seen as cases where R is just bound.

Returning to the analysis of the Zimmermann-Chierchia sentence (6): given that, as we saw above, the binding option leads to a false reading, we shall try accommodation. Local accommodation that is; global is not an option here because the presupposition's content contains two z's, which would become unbound if the presupposition were merged in with the main DRS. So, we merge the ∂DRS with it's originating DRS and we're done:

(19)
$$\left[\begin{array}{l|l} \text{x y X} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ & \left[\text{z} \mid \text{z}\in\text{X}\right]\left\langle\begin{array}{c}\text{both}\\ \text{z}\end{array}\right\rangle\left[\text{R}\left|\begin{array}{l}\text{R(z,z)} \\ \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right]\end{array}\right.\right]\end{array}\right]$$

We now have a nuclear scope with a non-empty universe, and according to DRT semantics that means we have in fact derived what I termed the narrow-scope existential reading in section 4, i.e. each of the men has the property that there is an R holding between that man and himself and such that that man believes the person he is R-acquainted with is fat. And this is certainly

true, as we had already seen.

So far, so good, so let's move on to the P&S and Zeevat examples, (5) and (7). We shall basically analyze *only* as a generalized quantifier that says that *only NP VP* is true iff $[\![\text{NP}]\!] \cap [\![\text{VP}]\!] = [\![\text{VP}]\!]$. In DRT, generalized quantifiers are represented as duplex conditions, so I propose the following semantics of *only* conditions:[16]

(20) a. Only NP VP

b. $$\left[\!\!\left[\left[\text{x} \mid \text{NP(x)} \right] \left\langle \begin{matrix}\text{only}\\ \text{x}\end{matrix} \right\rangle \left[\;\mid \text{VP(x)} \right] \right]\!\!\right]^{f} = 1 \text{ iff there is a } d \text{ s.t. } [\![\text{NP(x)}]\!]^{f \cup \{\langle \text{x},d\rangle\}} = [\![\text{VP(x)}]\!]^{f \cup \{\langle \text{x},d\rangle\}} = 1 \text{ and for all } d' \neq d\text{: } [\![\text{VP(x)}]\!]^{f \cup \{\langle \text{x},d'\rangle\}} = 0$$

Now we turn to P&S's (5), *only Cleveland thinks he's fat*. Note that the restrictor NP *Cleveland* is a proper name and such needs to be identified with the contextually given Cleveland, but at the same time it has to serve its role as quantified variable, a rather peculiar but harmless situation, represented in (21a). In (21a) we also see that R should hold between the quantified variable z and itself, because of course we're dealing with a sloppy/bound variable reading of the pronoun under *only*, i.e. not the reading *only Cleveland thinks Cleveland is fat [so Peter doesn't think Cleveland is fat]*. Resolution proceeds by trying to bind R: since the presupposition contains z's, again it cannot reach the main context and we're stuck with the default, equality, as the only option in (21b), which then leads to the strong *de se* LF (21c):

(21) a. $$\left[\begin{array}{l|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ & \left[\text{z} \mid \text{z=x} \right] \left\langle \begin{matrix}\text{only}\\ \text{z}\end{matrix} \right\rangle \left[\begin{array}{l|l} & \partial\left[\text{R} \mid \text{R(z,z)} \right] \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)} \right] \end{array} \right] \end{array} \right]$$

b. $$\left[\begin{array}{l|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ & \left[\text{z} \mid \text{z=x} \right] \left\langle \begin{matrix}\text{only}\\ \text{z}\end{matrix} \right\rangle \left[\begin{array}{l|l} & \text{R(z,z)}\doteq? \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)} \right] \end{array} \right] \end{array} \right]$$ [17]

c. $$\left[\begin{array}{l|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y), X=x}\oplus\text{y} \\ & \left[\text{z} \mid \text{z=x} \right] \left\langle \begin{matrix}\text{only}\\ \text{z}\end{matrix} \right\rangle \left[\;\mid \text{believe(z):}\left[\text{u} \mid \text{center(u), fat(u)} \right] \right] \end{array} \right]$$

This output corresponds to the *de se* LF that P&S argue for, and which is true: among the two men, Cleveland is indeed the only one with a *de se* belief.

[16] I am well aware of the difficulties of this simple semantics for *only*, but I choose it because of its intuitive appeal and because it's the straightforward analysis implicit in e.g. P&S and explicit in Schlenker (2003:89), of the already cited works. As a result, I ignore all issues related to *only*'s interaction with focus, intonation and presupposition. Note further that this semantics doesn't work for plural NPs. In footnote 19 I will briefly consider what happens on the one existing (slightly different) analysis of *only* in DRT, viz. Geurts & van der Sandt (2004).

[17] The presupposition may also move to the restrictor and be bound there, but that would make no difference since equality is still the only option.

But there's also Zeevat's observation: if the report were about Peter it would be false. Starting from his (7) we get a preliminary DRS resembling the previous one except for the quantifier. Resolution will of course proceed exactly the same but now the result is false: of the two, the only one with a *de se* fat-belief is certainly not Peter. That's good. But in order to do justice to the Zimmermann intuition we had expanded the system to allow accommodation of R in cases where binding fails, and this is such a case. So we must check that even by accommodation we cannot get a true output.

As we have remarked before, global accommodation and binding are not available given the R-presupposition's content, so we cannot bind R to the globally available relation of seeing someone on TV, which would be one way to make the report true. Local accommodation is the only possibility[18] and that gives:

(22)
$$\left[\begin{array}{l|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \left[\text{z} \mid \text{z=y}\right] \left\langle \begin{array}{c}\text{only}\\ \text{z}\end{array} \right\rangle \left[\begin{array}{l|l} \text{R} & \text{R(z,z)} \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right] \end{array}\right] \end{array}\right]$$

Or, in other words, the narrow-scope existential reading, which is false because now both have the property expressed in the quantifiers scope, viz. there is some acquaintance relation R under which .... So, indeed, accommodation does provide an alternative, but fortunately it too is false, so we have done justice to Zeevat's judgment.[19]

[18]How about intermediate accommodation, if such exists? There's no need to choose sides in that debate since an intermediate "trapping" reading here happens to make very little sense anyway; would an R in the restrictor force quantification over ⟨R,z⟩-pairs? Then we'd need an extra argument for the only operator as well. And if not, there's still no sensible, let alone plausible, reading that I can attach to the intermediately accommodated output.

[19]It has been suggested that a different DRT analysis of *only*, viz. the one proposed by Geurts & van der Sandt (2004), might make the argument even simpler. Let's see. This alternative *only* analysis assigns the following structure (after resolution of the proper name) to the Zeevat example (7) in context.

(i)
$$\left[\begin{array}{l|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \neg\left[\begin{array}{l|l} \text{z} & \neg\left[\ \mid \text{z=y}\right] \\ & \partial\left[\text{R} \mid \text{R(z,z)}\right] \\ & \text{believe(z):}\left[\text{u v} \mid \text{center(u), R(u,v), fat(v)}\right] \end{array}\right] \end{array}\right]$$

Paraphrase: There is no z s.t. z is not Peter (y) and z believes that he is fat under acquaintance R. Because of the sentence's focus structure, this gets strengthened by Geurts & van der Sandt's (2004) "Background Presupposition Rule" which adds an existential presupposition to the effect that someone believes to be fat under R. Together with the assertion that no z unequal to Peter believes that, this yields the correct implication that Peter believes it. However, the question is here, do we apply BPR before or after the acquaintance resolution? G&S don't consider any sentences where presuppositions and the BPR interact in this way, but the easiest thing would be to first resolve R. If we do this, we can't bind R in the main context, because of the z's, but we can always bind R(z,z) to z=z and R to equality.

(ii)
$$\left[\begin{array}{l|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \neg\left[\begin{array}{l|l} \text{z} & \neg\left[\ \mid \text{z=y}\right] \\ & \text{believe(z):}\left[\text{u} \mid \text{center(u), fat(u)}\right] \end{array}\right] \end{array}\right]$$

To sum up, let's follow the idea of context-dependence of acquaintance to a logical conclusion: the acquaintance relation is presupposed, because that is enough to account for the problematic examples of Chierchia, Zimmermann, P&S and Zeevat. Moreover, merely a static formalization of context-dependence (or wide-scope) of acquaintance (e.g. by leaving the R free Abusch

This coincides with the false reading that only Peter has a *de se* belief that he is fat, which is false (a correct prediction). So we try accommodation, which in this case can only be local, because global is blocked by the z's and there is no intermediate level. Local accommodation gives

(iii) $$\left[\begin{array}{c|l} \text{x y} & \text{Cleveland(x), Peter(y), see\_on\_tv(y,y)} \\ & \neg\left[\begin{array}{c|l} \text{z R} & \neg\left[\ \middle|\ \text{z=y}\right] \\ & \text{R(z,z)} \\ & \text{believe(z):}\left[\text{u v}\ \middle|\ \text{center(u), R(u,v), fat(v)}\right] \end{array}\right] \end{array}\right]$$

I.e. the narrow scope existential reading, which is false (because there *are* z and R, viz. Cleveland and equality, verifying the embedded DRS).

We see that both resolution outputs, (ii) and (iii), are false, even before applying the BPR (which would make it even more false), so we have done justice to the Zeevat judgment. Furthermore, it's easily seen that the P&S example can be assigned a true output by binding to equality. So, the G&S analysis of *only* works at least as well as the one I proposed earlier. Moreover, the fact that the question about intermediate accommodation does not even arise here (cf. footnote 18), seems an argument in favor of this analysis.

There are however still some problems that make me opt for the duplex condition analysis of (20) eventually. They have to do with the interaction between presuppositions (including anaphoric pronouns) and *only*. The main point is that on the G&S account the surface arguments of *only NP VP*, restrictor (NP) and scope (VP) are reversed in terms of accessibility in the preliminary DRS, and this may wreak havoc, for example with presuppositions triggered in the VP. In G&S, the construction algorithm presumably puts the NP material under the second negation, so that any presupposition triggered there will have access to material provided by the VP, but not the other way around. For example, the *his* in *Only a man loves his computer* will end up in a position from which the *man* is inaccessible so it cannot bind *his*. Note that this problem does not arise so strongly for definite NPs in the restrictor (e.g. proper names as in G&S's and my examples) because they will float up to the accessible global level anyway. But even so, I find it strange that resolution of *her* should depend on resolution of *Lois* in *Only Lois likes her husband*, which moreover then only seem to get a strict reading implying that nobody else likes Lois' husband. This problem is brought out even more clearly by Heim's (classnotes, discussed e.g. in Kratzer) famous *Only I did my homework* which would be assigned the preliminary DRS in (iva), or equivalently, the universal version in (ivb) (*Everybody who did "my" homework is equal to me*), which may help to bring out the same issues of accessibility without the double negation.

(iv) a. $$\left[\begin{array}{c|l} \text{x} & \text{center(x)} \\ & \neg\left[\begin{array}{c|l} \text{z} & \neg\left[\ \middle|\ \text{z=x}\right] \\ & \text{did\_homework\_of(z,y)} \\ & \partial\left[\text{y}\ \middle|\ \text{center(y)}\right] \end{array}\right] \end{array}\right]$$

b. $$\left[\begin{array}{c|l} \text{x} & \text{center(x)} \\ & \left[\begin{array}{c|l} \text{z} & \text{did\_homework\_of(z,y)} \\ & \partial\left[\text{y}\ \middle|\ \text{center(y)}\right] \end{array}\right]\left\langle\begin{array}{c}\text{every}\\ \text{z}\end{array}\right\rangle\left[\ \middle|\ \text{z=x}\right] \end{array}\right]$$

In the subDRS it is given that z is unequal to x, the speaker, so we can't bind the presupposition, y, triggered by *my* to z. The only remaining option is binding to the global speaker x, but this gives us only the marginal strict reading where it's implied that nobody else did my homework. The account I provided in (20) keeps the accessibility from VP to NP intact and is therefore arguably better suited to handle such cases as discussed here. Note that this whole discussion is related to the belief report business, because the supposed advantage of G&S, the avoidance of intermediate accommodation possibilities, is a direct consequence of their swapping restrictor and scope.

1997) is not enough because it gets rid of the narrow-scope possibility that the presuppositional framework provides as accommodation, and that is needed to account for the truth of Zimmermann's (6).

Conclusion

In this paper I argued for a reductionist account of *de se* reports, based on the relational analysis of *de re* belief, according to which *de se* belief is *de re* belief about oneself, under the acquaintance relation of equality (or under the description *the person I am*, if you will). Reductionists typically claim there's no dedicated *de se* LFs for reports, only general *de re* reports, subsuming *de se* and mere *de re* truth-conditions.

My own framework is reductionist in the sense that it assigns a uniform preliminary structure to all reports of the form *NP believes that NP VP*, in which definite NPs are all interpreted as presuppositions, and in which the acquaintance relation is left underspecified. A mechanism is provided by which the presuppositions and acquaintance relation are resolved in context, so it's really pragmatics that disambiguates between *de re* and *de se*, not syntax. As a bonus we get a pragmatic explanation for the fact that non-linguist/philosophers often find it hard to accept a co-referential third person report like (4b) in a mistaken self-identity scenario.

The final part of the paper slightly generalizes the resolution machinery in order to get a correct account of belief reports embedded under quantifiers. This was done mainly because quantified belief reports have been a source of counterexamples to reductionist attempts and of discussion about the nature of *de se* reports. I have shown how we can follow through the idea of context-dependence of acquaintance to a logical conclusion, the acquaintance relation is presupposed. Resolving this presupposition in a standard way is then shown to be enough to account for the problematic examples of Chierchia, Zimmermann, P&S and Zeevat.

Acknowledgements

I thank the audiences of Szklarska Poreba 2004 *Workshop on the Roots of Pragmasemantics*, among whom especially Henk Zeevat for providing me with (7) as a counterexample to my first stab at analysing *only*-reports (cf. the wide-scope attempt on p. 218); the DiP colloquium Amsterdam; and of course this ConSOLE in Tromsø. Further thanks to Bart Geurts and Rob van der Sandt for discussing the semantics of *only* with me.

Emar Maier
Radboud University Nijmegen
e.maier@phil.ru.nl
http://www.ru.nl/phil/tfl/~emar

A second but probably related problem is the interaction between presuppositions and the BPR noted above. It is unclear which resolution should go first, and if it's the BPR, what happens with unresolved presuppositions in the background? Do they get copied? And are they then resolved independently?

References

Abusch, D. (1997). Sequence of tense and temporal *De Re*. *Linguistics and Philosophy* 20:1, pp. 1–50.

Aloni, M. (2000). *Quantification under Conceptual Covers*. Ph.D. thesis, University of Amsterdam. http://staff.science.uva.nl/~maloni/tesi.html.

Boër, S. & W. Lycan (1980). Who, me? *The Philosophical Review* 89, pp. 427–466.

Chierchia, G. (1989). Anaphora and attitudes *de se*. Bartsch, R., J. van Benthem & P. van Emde Boas (eds.), *Semantics and Contextual Expression*, Foris, vol. 11 of *Groningen-Amsterdam Studies in Semantics*.

Cresswell, M. & A. von Stechow (1982). *De Re* belief generalized. *Linguistics and Philosophy* 5:4, pp. 503–535.

Dalrymple, M., S. M. Shieber & F. C. N. Pereira (1991). Ellipsis and higher-order unification. *Linguistics and Philosophy* 14:4, pp. 399–452, URL citeseer.nj.nec.com/dalrymple91ellipsis.html.

Geurts, B. & R. van der Sandt (2004). Interpreting focus. *Theoretical Linguistics* 30:1, pp. 1–44. http://www.ru.nl/phil/tfl/bart/papers/focus.pdf.

Kamp, H. & U. Reyle (1993). *From Discourse to Logic, Vol. 1*. Kluwer Academic Publishers, Dordrecht.

Kaplan, D. (1969). Quantifying in. Davidson, D. & J. Hintikka (eds.), *Words and Objections*, D. Reidel Publishing Company.

Kaplan, D. (1989). Demonstratives. Almog, J., J. Perry & H. Wettstein (eds.), *Themes from Kaplan*, Oxford University Press, New York, pp. 481–614. [Versions of this paper began circulating in 1971, page references to the 1989 publication].

Kratzer, A. (1998). More structural analogies between pronouns and tenses. Strolovich, D. & A. Lawson (eds.), *Proceedings of SALT VIII*, CLC Publications, Ithaca, NY, pp. 36–54, URL http://semanticsarchive.net/Archive/WY1NDFkM/.

Kripke, S. (1972). Naming and necessity. Harman, G. & D. Davidson (eds.), *Semantics of Natural Language*, D. Reidel Publishing Co., Dordrecht, pp. 253–355.

Lewis, D. (1979). Attitudes *de dicto* and *de se*. *The Philosophical Review* 88, pp. 513–543.

Maier, E. (2004). Acquaintance resolution and belief *de re*. Alonso i Alemany, L. & P. Égré (eds.), *Proceedings of the 9th ESSLLI Student Session*. http://lingua.fil.ub.es/~lalonso/stusESSLLI04/programme.

Maier, E. (2005). De se reductionism takes on monsters. Maier, E., C. Bary & J. Huitink (eds.), *Proceedings of SuB9*, pp. 197–211. www.ru.nl/ncs/sub9.

Percus, O. & U. Sauerland (2003). On the LFs of attitude reports. Weisgerber, M. (ed.), *Proceedings of SUB 7*, Konstanz. http://ling.uni-konstanz.de/pages/conferences/sub7/proceedings/download/sub7_percusSauerland.pdf.

Perry, J. (1977). Frege on demonstratives. *The Philosophical Review* 86:4, pp. 474–497.

Quine, W. V. O. (1956). Quantifiers and propositional attitudes. *Journal of Philosophy* 53, pp. 101–111.

Reinhart, T. (1990). Self-representation. Lecture delivered at Princeton conference on anaphora, October 1990. Ms. http://www.let.uu.nl/~tanya.reinhart/personal/Papers/De_se_91.wp.pdf.

van der Sandt, R. (1992). Presupposition projection as anaphora resolution. *Journal of Semantics* 9, pp. 333–377.

Schlenker, P. (1999). *Propositional attitudes and indexicality*. Ph.D. thesis, MIT.

Schlenker, P. (2003). A plea for monsters. *Linguistics and Philosophy* 26, pp. 29–120.

von Stechow, A. (1982). Structured propositions. Tech. rep., Universität Konstanz, Konstanz. http://vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Aufsaetze/Structured%20Prop%201.pdf.

von Stechow, A. (2001). Schlenker's monsters. Handout http://vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Handouts/Schlenkers.Monster.pdf.

von Stechow, A. (2002). Binding by verbs: Tense, person and mood under attitudes. Kadowaki, M. & S. Kawahara (eds.), *Proceedings of NELS 33*, GLSA, Amherst, MA, pp. 379–403. http://vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/.

von Stechow, A. & E. Zimmermann (2004). A problem for a compositional account of *de re* attitudes. Draft vivaldi.sfs.nphil.uni-tuebingen.de/~arnim10/Lehre/Japan2004/VortraegeJapan/Attitudes/Stechow-Zimmermann.pdf.

Zimmermann, E. (1991). Kontextabhängigkeit. von Stechow, A. & D. Wunderlich (eds.), *Semantik/Semantics: Ein internationales Handbuch der zeitgenössischen Forschung*, Walter de Gruyter, Berlin/New York, pp. 156–229.