Proceedings of SALT 34: 000–000, 2024

Non-*de dicto* construals as a unified phenomenon*

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Abstract The interpretation of expressions in the scope of intensional operators μ is not always relativized to the quantificational domain of μ. The literature has identified several such phenomena, subsumed here under '*non-de dicto* (NDD)'-construals. Based on novel data, we argue contra most existing accounts that (i) different kinds of NDD-construals (*der re* and transparent construals of predicates) must be derived by the same mechanism, (ii) this mechanism should involve replacement of meanings of the sub-constituents of the clause embedded by the intensional operator, (iii) replacement is constrained in that different replacements cannot lead to different answers to the QUD, and (iv) NDD-construals are not grammatically individuated, i.e., they do not 'live off' a structure distinct from the one that yields us meanings without NDD. We then sketch a proposal that captures these properties.

Keywords: *de re/de dicto*, transparent construals, replacement, ambiguity

1 Introduction

The distinctive property of intensional operators (like attitudes or modals/conditionals) is that they 'shift' the semantic evaluation of their scope argument away from the facts around us to whatever worlds they make accessible: (1a) can be true regardless of whether it is the case in our actual world that it is raining. This behavior is captured, for example, in the traditional lexical entry due to Hintikka (1969) for *believe* in (1b): the propositional argument of $[\![believe]\!]$ must be true in all of the doxastic alternatives of the attitude holder x, i.e., in all the worlds x considers candidates for the actual world (hereafter 'belief worlds').

(1) a. *Joe believes that it is raining*
b. $[\![believe]\!]^w = \lambda p_{\langle s,t\rangle}.\lambda x_e.\forall w' \in \text{DOX}_{x,w}(p(w'))$

However, it is also known that sometimes expressions in the scope of intensional operators are not evaluated relative to this intensional operator. For instance (2a)

* We thank Amir Anvari, Ido Benbaji, Amy Rose Deal, Nina Haslinger, Aron Hirsch, Petr Kusliy, Paul Meisenbichler, Orin Percus, Craige Roberts, Philippe Schlenker, Yael Sharvit, Dominique Sportiche, Ede Zimmermann, the audiences at SILT 2023, PhLiP 2023, SALT 33, Göttingen, ZAS and MIT.

is true in contexts where Joe told us that Eve is involved with the person she was dancing with, who we, but not he, know to be Ada (and he might even think this person is named Bea). Likewise, (2b) is true if Joe told us that Eve is involved with one of Ada, Bea and Carl, who we, but crucially not he, know to be linguists.

(2) a. *Joe believes that Eve is involved with Ada.*

b. *Joe believes that Eve is involved with a linguist*

This observation is clearly at odds with our general perspective on intensional operators and the semantic composition of sentences with such operators. Neither is (3a) – the proposition, all else being equal, taken to be denoted by the embedded clause in (2a) – true in Joe's belief worlds in the first context sketched, nor is (3b) – the proposition associated with the embedded clause in (2b) – in the second context.

(3) a. λw.Eve is involved with Ann in w

b. $\lambda w.\exists x[x$ is a linguist in w & Eve is involved with x in $w]$

The general strategy for dealing with (2a), an instance of the so-called *de re* phenomenon, is that *Ada* is replaced for interpretative reasons by an alternative concept so that the proposition resulting for the embedded clause is entailed by Joe's belief state (Quine 1956; Kaplan 1968; Lewis 1979 a.m.o.). We argue that (2b), an instance of the narrow-scope transparent (NT) construal – and like *de re* a 'non-*de dicto*' (NDD) phenomenon – also involves replacement (see also Percus (2021); Benbaji (t.a.)). First, we present new evidence that the notion of replacement is empirically real: both *de re* and NT construals are subject to the constraint that the proposition obtained without replacement and the proposition obtained with replacement must answer the Question Under Discussion (QUD) in the same way. Second, replacement is shown to not be special to *de re* and NT construals – which is to say there is no dedicated grammatical mechanism deriving them. This is motivated by the novel observation that quantifiers access the *de dicto* – i.e., the "standard" meanings of the embedded clauses in (2a) and (2b) in (3a) and (3b), respectively – and the *de re*/NT construal simultaneously. We call this 'parallelism', which would be unexpected under a view that assumes ambiguity. Third, we provide an analysis incorporating these observations. The underlying idea is that grammar allows us to freely generate 'alternatives' resulting in alternative propositions that the intensional operator can quantify over. For reasons of space, we implement this via standard concept generators affixed to the relevant expressions (Percus & Sauerland 2003; Anand 2006; Ninan 2012; Charlow & Sharvit 2014 a.m.o.). Because of parallelism these generators are present irrespective of the construal, yielding extremely liberal truth-conditions that are constrained by the QUD-condition.

2 Replacement in *de re*

2.1 Background: *de re* versus *de dicto* construals

(4b) is true in scenario 1. This is expected under the classic view of attitudes in (1b), where the first argument of **believe** must be entailed by the subject's belief state.[1] In (4b), **believe** is fed the standarad denotation of the embedded clause, $[\lambda w'$. Eve is involved with Ann in $w']$, which yields the truth-conditions in (5), assigning TRUE to (4b) in scenario 1. This is the *de dicto* construal of (4b).

(4) a. SCENARIO 1: Joe and Bob went to a party. Ann and Eve were among the guests. Bob knows Ann and Eve. He didn't see them together at the party, but is certain they are a couple. Joe recognizes Eve, but not Ann (and does not think Eve knows Ann). He saw them dancing with each other and thinks Eve and the person she danced with are lovers. There was debate about Eve's relationship status. No one else has an opinion about it.

b. *Bill thinks that Eve is involved with Ann.* ✓

(5) $[\![(4b)]\!]^w = \forall w' \in \text{DOX}_{\text{Bill},w}(\text{Eve is involved with Ann in } w')$

(6) is also true in scenario 1, but crucially, given what we know about Joe's belief state, the proposition $[\lambda w'$. Eve is involved with Ann in $w']$ is not true in his belief worlds. The proposition $[\lambda w'$. Eve is involved in w' with the person Eve danced with in $w']$, however, *is* true in his belief worlds. So, if we replaced **Ann** with **the person dancing with Eve**, (6) would be true in scenario 1. This is the *de re* construal.

(6) *Joe thinks that Eve is involved with Ann.* ✓ in scenario 1

2.2 Replacement

Simplifying somewhat, standard accounts of *de re* hold that in (6) in scenario 1, Joe has a particular belief about Ann, the so-called res. The crucial point for us is that he does so in virtue of a particular individual concept (Quine 1956; Kaplan 1968; Lewis 1979 a.m.o.), $[\lambda w$.the person dancing with Eve in $w]$ for instance. This concept yields Ann in the actual world and in all of Joe's belief worlds its value is involved with Eve. Assume for now that f contextually resolves to this concept. Replacing $[\lambda w$.Ann$]$ with f, the truth-conditions of (6) in (7) yield true in scenario 1.

(7) $[\![(6)]\!]^w = 1$ iff $\forall w' \in \text{DOX}_{\text{Joe},w}(\text{Eve is involved with } f(w') \text{ in } w')$

For what follows we can think of the concept $[\lambda w$.the person dancing with Eve in $w]$ as being an alternative or replacement for the concept $[\lambda w$.Ann$]$.

1 Unless it could lead to confusion, expressions in boldface stand for the meanings of these expressions.

3 Two individuating properties of replacement, based on *de re*

The first novel piece of evidence reported here suggests that genuine replacement is involved in *de re*. The second one tells us something about how it is encoded.

3.1 Property 1: The QUD-constraint

We just saw that (6) is fine in scenario 1. Let us now supplement the scenario by (8a) (we will call the overall scenario SCENARIO 1'). The sentence in (8b) is degraded here. But why does (8b) differ from (6)? After all, the alternative concept [λw.the person dancing with Eve in w] is equally salient in scenario 1'.

(8) a. SCENARIO 1' [...] We are discussing who Joe thinks was at the party.

b. *Joe believes that Ann was at the party.* ✗

There is a natural constraint, appealed to in the explanation of other phenomena[2], which does not feature in traditional discussions on *de re* but accounts for the observed asymmetry: Replacement seems to be possible only if the resulting interpretation for the sentence as a whole resolves the QUD in the same way that the sentence without replacement would.

We treat QUDs as partitions of the logical space, (Groenendijk & Stokhof 1984), i.e., a set of equivalence classes of worlds ('cells'), (9a). Two propositions resolve a QUD in the same way in case they single out (= entail) the same unique cell, (9b).

(9) a. A QUD is a partition P of the logical space W such that for each $w \in W$ there is a cell $c \in P$ such that $w \in c$ and there is no $c' \neq c$ such that $w \in c'$.

b. p and q resolve P in the same way iff for some $c \in P$, $p \subseteq c$ and $q \subseteq c$.

The QUD-constraint in (10) permits f to be a possible replacement for b just in case the resulting meaning for the whole sentence ϕ addresses the QUD in the same as ϕ would without replacement of b.[3]

(10) **QUD constraint on replacement:** Assume $[_\phi\ \alpha\ \mu\ [_\psi \ldots \beta \ldots]]$ where μ is an attitude predicate, α its subject, and ψ the embedded clause with β embedded in it. Then for any world w and context c an interpretation $\exists f.[\![\mu]\!]^w(\lambda w'.[\![\psi]\!]^{w',[\beta \to f]})([\![\alpha]\!]^w)$ is possible iff

a. f is salient in c, and

b. $[\![\phi]\!]^{w,[\beta \to f]}$ resolves a QUD in c in the same way as $[\![\phi]\!]^w$ would.

2 Cf. non-maximal uses of definite plurals (Krifka 1996; Lasersohn 1999; Malamud 2012; Križ 2016).

3 This condition is tailored to attitude reports but can be easily adapted to other modal constructions.

We moreover assume that answer options to the QUD must be relativized to what is available in the context (the common ground or an intensional state introduced by a higher operator). It should be clear that the context can, but does not have to contain information about a subject's belief state that is considered relevant[4]; likewise, there is more than one type of question which an attitude report can address (see Benbaji t.a. for the same point wrt similar phenomena)[5]: questions about the subject's internal state (**a thinks that p**, relativized to c, addresses a question about a, i.e., **whether a Ps?**) and questions about the embedded content (**a thinks that p** relativized to c addresses a general question not about a, i.e., **whether p?**).

Let us return to the contrast between (6) and (8b). The question *Does Joe think Eve is single?* is salient in scenario 1 and can function as the QUD, as stated in (11a). The *de dicto* construal of (6) in (11b) would resolve this QUD negatively, if it were true. The *de re* version based on the salient replacement concept **the person dancing with Eve** does so too, as (11c) shows, and is thus licensed by (10).

(11) a. QUD in scenario 1: *Does Joe think that Eve is single?*

b. $\forall w' \in \text{DOX}_{\text{Joe},w}$(Eve is involved with Ann in w') QUD no

c. $\forall w' \in \text{DOX}_{\text{Joe},w}$(Eve is involved in w' with the person dancing with Eve in w') QUD no

A salient QUD in scenario 1' is as in (12a). The *de dicto* construal of (8b) would resolve this positively, as stated in (12b). But the *de re* construal based on the replacement **the person dancing with Eve** does not address that QUD at all, as (12c) shows. Given (10) replacement is thus correctly ruled out.

(12) a. QUD in scenario 1': *Does Joe know that Ann was at the party?*

b. $\forall w' \in \text{DOX}_{\text{Joe},w}$(Ann was at the party in w') QUD yes

c. $\forall w' \in \text{DOX}_{\text{Joe},w}$(the person dancing with Eve in w' was at the party in w') QUD unaddressed

To the extent that another replacement concept, or another QUD, could be found in the scenario 1', the *de re* construal of (8b) might improve according to this view. However, our context does not make any other replacement concept or QUD salient. In particular, a QUD about the embedded content (*Was Ann at the party?*) won't arise since its answer is already entailed by the context.

Notice that the QUD sensitivity of *de re* can be seen to provide substance to the claim that there is replacement in the first place: otherwise a constraint like (10) relating the original concept with its replacements, should not be observable at all.

4 Heim 1992 a.o.

5 Simons, Tonhauser, Beaver & Roberts 2010; Simons, Beaver, Roberts & Tonhauser 2016; Beaver, Roberts, Simons & Tonhauser 2017 a.o. cf. also Lyons 1977

3.2 Property 2: Parallelism

The second property of replacement that we will discuss relates – on a quite general level – to how replacements are made available. We start by noting that the sentences in (13b) are judged true in scenario 2.

(13) a. SCENARIO 2: Joe went to a party. Ann and Eve were among the guests. Joe recognizes Eve, but does not recognize Ann (and does not think Eve knows Ann). He saw them dancing with each other and thinks Eve and the person he saw her dancing with are lovers. There was discussion about Eve's relationship status. No other guest has an opinion about it.

b. i. *Exactly one guest thinks that Eve is involved with Ann.* ✓

ii. *Only one guest thinks that Eve is involved with Ann.* ✓

iii. *Only Joe thinks that Eve is involved with Ann.* ✓

The meanings of the sentences in (13b) have an upward monotonic and a downward monotonic component, introduced by *exactly* and *only*. The positive components of the sentences are true in scenario 2 on a *de re* construal of *Ann* with **the person dancing with Eve** being the replacement concept. Scenario 2 is compatible with the negative components of the sentences entailing only that this *de re* construal of the embedded clause is false for any guest other than Joe. Yet it is also compatible with the negative components entailing that both the *de re* and the *de dicto* construals are false, as none of the guests other than Joe has any belief about Eve's relationship. Hence (13) is compatible with the possibility that the truth-conditions of the positive component amount to the disjunction of the *de re* and the *de dicto* construal.

Reconsider now scenario 1, repeated in (14a): in addition to Joe having a *de re* belief about Ann regarding Eve's relationship status, Bill has the relevant *de dicto* belief. The sentences from (13b) repeated in (14b) are very odd here, even though their positive components are true in scenario 1 for the same reason they were true in scenario 2. If the negative components only entailed that the *de re* construal of the embedded clause is false for any guest other than Joe, the sentences should be acceptable – contrary to fact. Thus, the negative components of all the sentences in (14b) must negate both construals.

(14) a. SCENARIO 1: Joe and Bill went to a party. Ann and Eve were among the guests. Bill knows both Ann and Eve well. He didn't see them together at the party. Still, he is convinced Eve and Ann are a couple. Joe recognizes Eve, but does not recognize Ann (and does not think Eve knows Ann). He saw them dancing with each other and thinks Eve and the person he saw her dancing with are lovers. There was discussion about Eve's relationship status. No other guest has an opinion about it.

b. i. *Exactly one guest thinks that Eve is involved with Ann.* ✗
ii. *Only one guest thinks that Eve is involved with Ann.* ✗
iii. *Only Joe thinks that Eve is involved with Ann.* ✗

Crucially, we also find the reverse situation. The positive component of (15) is true in scenario 1 given Bill's *de dicto* belief there. In order to explain its unacceptability, its negative component must, again, include both construals.

(15) *Only Bill thinks that Eve is involved with Ann.* ✗ in scenario 1

We can thus conclude that the *de re* and the *de dicto* construal must be available simultaneously. The positive components, in particular, should be their disjunction. This conclusion is supported by the fact that the upward monotonic (16) is true in scenario 1. Given that Joe has a *de re* and Bill a *de dicto* belief with regards to Ann and her relationship status there, and no one else has either of the two, for the sentence to come out true, both construals must be available at the same time.

(16) *Two guests think that Eve is involved with Ann.* ✓in scenario 1

This parallelism property suggests that, descriptively, the replacement concept f used in the truth-conditions in (7) is existentially quantified over (following Lewis (1979); Percus & Sauerland (2003) a.o., but cf. Heim 1994; Deal 2018). That is, the truth-conditions for (6) and (4b) are more accurately represented as in (17).

(17) $[\![\textit{(6)/(4b)}]\!]^w = \exists f_{\langle s,e\rangle} \forall w' \in \text{DOX}_{\text{Joe/Bill},w}(f(w') \text{ is involved with Eve in } w')$

This suffices to capture the data descriptively. Assume that the subject quantifiers *exactly one guest* and *two guests* in the matrix clauses in (14b-i) and (16) have denotations as in (18), with the *only* cases working in parallel to (14b-i):

(18) a. $[\![\textit{exactly one guest}]\!]$
$= \lambda f_{et}.\exists X[\text{guest}(X) \wedge |X| = 1 \wedge f(X)] \wedge \neg\exists X[\text{guest}(X) \wedge |X| > 1 \wedge f(X)]$
b. $[\![\textit{two guests}]\!] = \lambda f_{et}.\exists X[\text{guest}(X) \wedge |X| \geq 2 \wedge f(X)]$

(19a) gives the denotation for the matrix VP for our examples.[6] Leaving distributivity implicit for the sake of simplicity, the resulting truth-conditions for (14b-i) in (19b) yield falsity in scenario 1. These are incompatible with there being a concept f such that in all of Bill's doxastic alternatives w' Eve is involved with $f(w')$ in w', but there is one: $[\lambda w.\text{Ann}]$. (16) on the other hand receives the truth-conditions in (19c), which are true in scenario 1 for exactly the reason why (14b-i) is false there.

6 We postpone a compositional derivation of the VP to section 5.

(19) a. $[\![\textit{thought that Eve is involved with Ann}]\!]^w$
$= \lambda x_e.\exists f_{\langle s,e\rangle}.\forall w' \in \text{DOX}_{x,w}(\text{Eve is involved with } f(w'))$

b. $[\![(14b\text{-}i)]\!]^w =$
$\exists X[\text{guest}(X) \wedge |X| = 1 \wedge \exists f_{\langle s,e\rangle}.\forall w' \in \text{DOX}_{X,w}(\text{Eve is involved with } f(w'))] \wedge$
$\neg\exists X[\text{guest}(X) \wedge |X| > 1 \wedge \exists f_{\langle s,e\rangle}.\forall w' \in \text{DOX}_{X,w}(\text{Eve is involved with } f(w'))]$

c. $[\![(16)]\!]^w =$
$\exists X[\text{guest}(X) \wedge |X| \geq 2 \wedge \exists f_{\langle s,e\rangle}.\forall w' \in \text{DOX}_{X,w}(\text{Eve is involved with } f(w'))]$

In summary, the parallelism property supports the view that there is existential quantification over alternative concepts used for replacement in *de re* construals. That is, the value of the concept variable f should not be left up to the context. Moreover, such existential quantification over alternative concepts must always be available in principle, even when we are dealing with *de dicto* construals. This means that there should be no dedicated grammatical structures for *de re* construals via which replacements and existential quantification over the latter is introduced.[7]

4 Replacement in narrow-scope, transparent construals

We can now use these two symptoms of *de re* – the QUD-constraint and parallelism – to probe for replacement in other kinds of NDD-construals; i.e., NDD-construals where constituents other than individual concept denoting ones seem to be affected and which have been kept separate from *de re* in most of the previous literature.[8] More precisely, we will employ the following rationale: If an NDD-phenomenon X exhibits QUD dependence and parallelism, then X should involve replacement.

In the following we will use this rationale to address NT construals.

4.1 Background: narrow-scope, transparent construals

The sentence in (20b) is true in scenario 3. This is expected: the embedded clause is standardly taken to denote the proposition **Eve is involved with some linguist**; this proposition in turn is true in all of Bill's doxastic alternatives. Hence, (20b) is true on the *de dicto* construal of the embedded clause. In order to differentiate the construal of (20b) in scenario 3 from the NT construal below, we will refer to this specific *de dicto* construal as a narrow-scope opaque (NO) construal with regards to the indefinite *a linguist*: the indefinite takes narrow scope relative to the attitude predicate, and *linguist* is evaluated in the doxastic alternatives contributed by it.

7 This can be seen as support for the conjecture that there are no genuine *de dicto* construals. On the present view, *de dicto* construals involve trivial replacement, as it were, and would qualify as *de re* in a sense. We will still continue to speak of *de dicto* and de re construals for descriptive purposes.

8 Tancredi & Sharvit 2022 is an exception, but their general perspective is very different from ours.

(20) a. SCENARIO 3: Joe and Bill went to a party. Bill has no idea if there were linguists at the party, but is convinced that Eve is in a relationship with a linguist. Joe thought all guests were biologists. Except for three linguists, Ann, Bea, and Cate, this was the case. Joe doesn't know them or their names. He saw each of them dancing with Eve, who he knows. So he thinks Eve and one of them are lovers but is unsure which of them. Eve's relationship status was discussed. No other guest has an opinion about it.

b. *Bill thinks Eve is involved with a linguist.* ✓

The sentence in (21), however, is also true in scenario 3.

(21) *Joe thinks Eve is involved with a linguist.* ✓ in scenario 3

In contrast to the NO-case, this judgement does not follow directly from standard assumptions: in scenario 3 **Eve is involved with some linguist** is not true in all Joe's belief worlds. In fact, if Joe were asked *Is a linguist involved with Eve?* he might well answer *No*: the description *linguist* is not Joe's, but comes from 'outside' of his perspective – it holds in the utterance world. This is the NT construal (Fodor 1970; Bäuerle 1983 a.m.o.). While the predicate *linguist* is not evaluated relative to Joe's belief state, the indefinite must be construed in the scope of the intensional operator: there is no linguist x in the actual world such that Joe believes x is involved with Eve. As Joe is undecided with regard to which of Ann, Bea and Cate is involved with Eve, the indefinite must vary with the doxastic alternatives considered.[9]

4.2 A replacement account of NT

Our semantics must thus derive both the NO construal in (22a) and the NT construal in (22b).

(22) a. $\lambda w.\forall w' \in \text{DOX}_{\text{Bill},w}(\exists x\,(x \text{ is a linguist in } w' \,\&\, \text{Eve is involved with } x \text{ in } w'))$

b. $\lambda w.\forall w' \in \text{DOX}_{\text{Joe},w}(\exists x\,(x \text{ is a linguist in } w \,\&\, \text{Eve is involved with } x \text{ in } w'))$

The replacement approach from sections 2 and 3 can be extended to do so – the only difference being that replacement now yields a property. For example, in scenario 3, the property $[\lambda w.\lambda x.\text{person } x \text{ dancing with Eve in } w]$ is salient. (21) yields the truth-conditions in (23). These make the sentence true in scenario 3, qua the fact that in all of Joe's doxastic alternatives w' the proposition that there is an individual x such that x is dancing with Eve in w' is involved with Eve in w' hold. That is, we exploit the fact that the value $[\lambda w.\lambda x.$ person x dancing with Eve at the party in $w]$ for f yields a true proposition in the scenario.

9 This last point means that the NT construal is not reducible to a wide-scope transparent construal where the entire indefinite would be construed outside of the scope of the intensional operator.

(23) $[\![(21)]\!]^w = \exists f_{\langle s,et\rangle}.\forall w' \in \text{DOX}_{\text{Joe},w}(\exists x[\text{Eve is involved with } f(w')(x) \text{ in } w'])$

4.3 The two properties of replacement in NT construals

If this analysis were to be developed for NT examples, the two properties of replacement discussed in section 3 should hold of NT construals as well.

4.3.1 The QUD-constraint in NT construals

Just as with *de re*, we find QUD sensitivity for NT construals. To see why, recall that example (21) is fine in scenario 3, i.e., it permits an NT construal. We now supplement the scenario slightly as in (24a). The sentence in (24b) is degraded here, hence it seems to lack an NT construal parallel to the one of (21) in scenario 3.

(24) a. SCENARIO 3' [...] We are discussing who Joe thinks was at the party.
b. *Joe thinks/knows that a linguist was at the party.* ✗

The problem regarding (24b) is analogous to the *de re* case: In scenario 3', the property **person dancing with Eve** is a possible replacement for **linguist**. So why do judgments for (21) and (24b) differ?

We submit it is the effect of the QUD-constraint in (10). A QUD in scenario 3 is as in (25a). The NO construal of (21) resolves this question negatively, (25b), as does the NT construal in (25c). Hence, (21) meets the QUD-constraint on replacement in scenario 3 and the NT-construal is correctly expected to be available.

(25) a. QUD in scenario 3: *Does Joe think that Eve is single?*
b. $\forall w' \in \text{DOX}_{\text{Joe},w}$(Eve is involved in w' with a linguist in w') QUD no
c. $\forall w' \in \text{DOX}_{\text{Joe},w}$(Eve is involved in w' with a person dancing with Eve in w') QUD no

In scenario 3' a salient QUD is (26a). This is resolved positively by the NO construal of (24b) in (26b). The NT construal in (26c), however, does not address this QUD. The QUD-constraint is thus violated in (24b) with the replacement property **person dancing with Eve**, correctly predicting the NT-construal to be unavailable.[10]

(26) a. QUD in scenario 3': *Does Joe know a linguist was at the party?*
b. $\forall w' \in \text{DOX}_{\text{Joe},w}$(a linguist in w' was at the party in w') QUD yes
c. $\forall w' \in \text{DOX}_{\text{Joe},w}$(a person dancing with Eve in w' was at the party in w') QUD unaddressed

10 Notice that just as in the unacceptable *de re* case in (8a) the question whether a linguist was at the party is already resolved in the context. That is, this is not an available QUD.

4.3.2 Parallelism in NT-construals

Parallelism, too, extends to NT- and NO-construals. To set the stage again, we observe that the sentences in (27b) are all true in scenario 4. Crucially, their positive components are true on the NT construal of *a linguist*. Moreover, the sentences overall would be true both if their negative components only entailed that the NT construal of the embedded clause is false for any guest other than Joe, and if they entailed that both the NT and NO construals are false for any such individual.

(27) a. SCENARIO 4: Joe went to a party. He thought all guests were biologists. Except for three linguists called Ann, Bea, and Cate, this was the case. Joe doesn't know them or their names. He saw each of them dancing with Eve, who he knows. So he thinks Eve and one of them are lovers but is not sure which of them. There was discussion about Eve's relationship status. No other guest has an opinion about it.

b. i. *Exactly one guest thought that Eve is involved with a linguist.* ✓

ii. *Only one guest thought that Eve is involved with a linguist.* ✓

iii. *Only Joe thought that Eve is involved with a linguist.* ✓

In scenario 3, repeated in (28a), Bill's belief state entails the NO construal of the embedded clauses in (28b). Since the sentences are degraded here, they must entail the falsity of both the NT and the NO construal for any individual other than Joe.

(28) a. SCENARIO 3: Joe and Bill went to a party. Bill has no idea if there were linguists at the party, but is convinced that Eve is in a relationship with a linguist. Joe thought all guests were biologists. Except for three linguists, Ann, Bea, and Cate, this was the case. Joe doesn't know them or their names. He saw each of them dance with Eve, who he knows. He thinks Eve and one of them are lovers but is unsure which of them. Eve's relationship status was discussed. No other guest has an opinion about it.

b. i. *Exactly one guest thought that Eve is involved with a linguist.* ✗

ii. *Only one guest thought that Eve is involved with a linguist.* ✗

iii. *Only Joe thought that Eve is involved with a linguist.* ✗

Again, we also find the reverse: The positive component of (29) is true scenario 3 given Bill's NO belief. For the sentence to come out false, Joe's NT belief must thus be taken into account in the negative component. (28b) and (29) tell us that there is no difference between the input for NO and NT construals: the NT construal must also make the NO construal available and, importantly, *vice versa*.

(29) *Only Bill thought that Eve is involved with a linguist.* ✗ in scenario 3

Finally the acceptability of (30) in scenario 3 corroborates the simultaneous accessibility of the NT and the NO construals: the former must be available when considering Joe as a value for guests, and the latter when considering Bill.

(30) *Two guests thought that Eve is involved with a linguist.* ✓ in scenario 3

The pattern is thus completely parallel to the one found with *de re* and *de dicto*. The truth-conditions entertained in (23) immediately explain this pattern. Given the existential quantification over replacements f and the particular scenario, both the property **linguist** and **person dancing with Eve** are possible values for f here.

4.4 Immediate consequences

Existing accounts of NT-construals uniformly assume some form of syntactic or referential ambiguity between NO and NT construals: all such accounts posit dedicated structures for NT construals to the exclusion of NO construals.[11] More specifically, these analyses can be divided into intensional ones with evaluation worlds contributed as interpretation parameters and extensional ones with world pronouns present in the syntactic structure. Among intensional approaches, there are those based on movement of the transparently interpreted DP with subsequent semantic reconstruction for NT (von Fintel & Heim 2011), those based on the optional presence of an *ACTUAL* operator for NT (Kamp 1971; Cresswell 1990), and approaches based on abstraction over the world parameter by a special operator Λ with movement across that operator for NT (Keshet 2011). Extensional approaches, on the other hand, have evaluation world pronouns present in the syntax and vary them accordingly for NO and NT construals (Percus 2000, 2020; Schwarz 2012).

Our parallelism data in section 4.3.2 suggest that these accounts are untenable: if NT and NO construals had different underlying structures, the negation of a sentence seemingly construed as NT should not entail the falsity of the NO construal or *vice versa*.[12]

Moreover, the parallelism data indicate that the interpretative system must be intensional, i.e., that world variables are not contributed by pronouns. Otherwise, while the parallels between *de re* and NT construals could be implemented along the lines sketched below, there would also be an additional route to NT through the variation of world pronouns and one would over-generate NT construals.

11 As referential ambiguity will be one between locally bound and locally free variables, it also correlates with a syntactic ambiguity.

12 The ambiguity accounts sketched above do not use replacement. This is another disadvantage, as the QUD sensitivity of NT and *de re* construals is straightforwardly captured with replacement.

5 Generalized replacement

The discussion so far motivated the following points: (i) different kinds of NDD-construals (*de re* and NT) should be derived by the same mechanism, namely, one involving replacements. (ii) This mechanism cannot be such that it introduces and ambiguity between NDD- and DD-construals (both must be available at the same time). (iii) Whether a replacement is available is subject to the QUD-constraint; i.e., non-trivial replacement cannot 'change' the answer to the QUD.

5.1 An account in terms of concept generators

Modulo the additional suitability conditions on concepts which we have not addressed so far (see section 5.3 below) the truth-conditions given above for *de re* construals correspond to those derived with concept generators (cf. Percus & Sauerland 2003; Anand 2006; Ninan 2012; Charlow & Sharvit 2014; Pearson 2015; Deal 2018 a.o.). A concept generator is a function from individuals to individual concepts, i.e., it generates a concept from an individual. The idea we probe here is that such concept generators are responsible for the replacement intuition we have been working with so far. In particular, we will briefly spell-out a compositional implementation of a *de re* example in these terms. The extension to NT construals will then be seen to be straightforward. Unlike what is found in the literature, the system assumed here is intensional, for the reason mentioned in section 4.4. The world argument for the concept generator – which will be bound – must thus be introduced by a dedicated expression, which we refer to as the world supplier.

Our rendering of the *de re* construal of (31) (= (6)) in scenario 1 was (32).

(31) *Joe thinks that Eve is involved with Ann.* ✓scenario 1

(32) $[\![(31)]\!]^w = \exists f_{\langle s,e\rangle}.\forall w' \in \textsc{dox}_{\text{Joe},w}(\text{Eve is involved in } w' \text{ with } f(w'))$

Something very close to (32) can be derived from an LF like (33) and the lexical entries for *G* and *think* in (34a) and (34b), respectively. *G* – the world supplier for the concept generator f – takes f and an individual x and returns the value f yields for x in the world of evaluation w. That is, the index *2* is the actual concept generator in (33). The combination of *G* and *2* yields what we termed replacement. *Think* takes the intension of a function from concept generators to truth-values and an individual as arguments and contributes existential quantification over concept generators.

(33) *[Joe [thinks [λ_2 [that Eve is involved with [[G 2] Ann]]]]]*

(34) a. $[\![G]\!]^{w,g} = \lambda f_{\langle e,se\rangle}.\lambda x_e.f(x)(w)$

b. $[\![think]\!]^{w,g} = \lambda f_{\langle s,\langle\langle e,se\rangle,t\rangle\rangle}.\lambda x_e.\exists g_{\langle e,se\rangle}.\forall w' \in \textsc{dox}_{x,w}(f(w')(g) = 1)$

The crucial steps in the composition are as in (35). In (35a) the world supplier is combined with the concept generator and *Ann*. (35b) shows the extension of the embedded clause derived via predicate abstraction (PA, Heim & Kratzer 1998), a function from concept generators to truth-values. Since *think* requires the intension of such a function, it must combine with the embedded clause via intensional function application (IFA, Heim & Kratzer 1998). The result in (35c) shows that the replacement concepts are obtained by applying a concept generator to Ann. Existential quantification is over such generators rather than over replacement concepts directly. But if there is a concept generator mapping Ann to a replacement function, then it follows that there is a replacement function. In other words, (35c) entails the truth-conditions in (32) by anchoring the replacement function to the res.

(35) a. $[\![\textit{[G 2] Ann}]\!]^{w,g} = [\lambda f_{\langle e,se\rangle}.\lambda x_e.f(x)(w)](g(2))(\text{Ann})$
$= g(2)(\text{Ann})(w)$

b. $[\![\lambda_2 \textit{ [that Eve is involved with [[G 2] Ann]]}]\!]^{w,g}$
$= \lambda f_{\langle e,se\rangle}.$Eve is involved with $f(\text{Ann})(w)$ in w

c. $[\![\textit{Joe [thinks [} \lambda_2 \textit{ [that Eve is involved with [[G 2] Ann]]]]}]\!]^{w,g}$
$= [\![\textit{thinks}]\!]^{w,g}(\lambda w'.[\![\lambda_2 \textit{ [that Eve is involved with [[G 2] Ann]]}]\!]^{w',g})(\text{Joe})$
$= \exists f.\forall w' \in \text{DOX}_{\text{Joe},w}(\text{Eve is involved with } f(\text{Ann})(w') \text{ in } w')$

With this implementation straightforwardly account for the parallelism between *de re* and *de dicto*. The account of the judgments of the sentences in (36), repeated from above, in scenario 1 is essentially the same as in the simplified suggestion above. Consider (36c) for example. On the account just sketched its negative component entails that there is no concept generator f such that in all of Bill's doxastic alternatives w', Eve is involved with $f(\text{Ann})(w')$ in w'. But this is false in scenario 1. Any concept generator yielding the concept $[\lambda w'.\text{Ann}]$ for Ann falsifies this. (36c) is therefore unacceptable in scenario 1. (36d) entails the same for Joe, which is again falsified by the availability of the concept $[\lambda w.$the person dancing with Eve in $w]$, making it unacceptable. These two considerations immediately explain why (36a) and (36b) are unacceptable and (36e) is fine in scenario 1.

(36) a. *Exactly one guest thinks that Eve is involved with Ann.* ✗ in scenario 1
b. *Only one guest thinks that Eve is involved with Ann.* ✗ in scenario 1
c. *Only Joe thinks that Eve is involved with Ann.* ✗ in scenario 1
d. *Only Bill thinks that Eve is involved with Ann.* ✗ in scenario 1
e. *Two guests think that Eve is involved with Ann.* ✓ in scenario 1

In order to account for the unacceptability of (8b), repeated here, in scenario 1' in (8a) a QUD component must be added to this implementation.

(37) *Joe thinks/knows that Ann was at the party.* ✗ in scenario 1'

Remember that we want the value of the overall sentence obtained via replacement to resolve the QUD in the same way that the value without replacement would. We implement this as a presupposition of *think*, as in (38): the Q-parameter contributes a QUD that is salient in the context for evaluation. Hence, Q is itself dependent on the context parameter, which is suppressed here, for simplicity.

(38) $[\![think]\!]^{w,g,Q} =$
$\lambda f_{\langle s,\langle\langle e,se\rangle,t\rangle\rangle}.\lambda x_e : \exists p \in Q(\lambda w.\exists g_{\langle e,se\rangle}.\forall w' \in \text{DOX}_{x,w}(f(w')(g)=1) \subseteq p \wedge$
$\underline{\lambda w.\forall w' \in \text{DOX}_{x,w}(f(w')(\lambda y_e.\lambda w''.y)=1) \subseteq p)}\ .$
$\exists g_{\langle e,se\rangle}.\forall w' \in \text{DOX}_{x,w}(f(w')(g)=1)$

In (38) a value for the sentence equivalent to the one without replacement is gotten by replacing the existentially quantified concept generator g with the function that maps any individual and world to that same individual. This function maps Ann in (31) and (37) to herself regardless of the world. That is, it has the consequence that while technically replacement does take place the semantic effect is the same as with no replacement happening at all, i.e., as if the res were used directly.[13]

As shown in section 3 the value obtained via the replacement **the person dancing with Eve** addresses the QUD in scenario 1 whether Eve is single for (31) in the same way as the value obtained with **Ann** would. (31) thus is defined given (38). As also shown, this does not hold for (37) in scenario 1': with the QUD whether Ann was at the party and the assumed salient concept, (37) is undefined given (38).

This treatment can be extended to NT construals by making the entry for the world supplier and *think* type-neutral as in (39) (we omit the QUD-constraint). Of course, having to adjust the type of *think* with the choice of G is not ideal.

(39) a. $[\![G]\!]^{w,g} = \lambda f_{\langle\tau,s\tau\rangle}.\lambda x_\tau.f(x)(w)$
b. $[\![think]\!]^{w,g} = \lambda f_{\langle s,\langle\langle\tau,s\tau\rangle,t\rangle\rangle}.\lambda x_e.\exists g_{\langle\tau,s\tau\rangle}.\forall w' \in \text{DOX}_{x,w}(f(w')(g)=1)$

5.2 NDD-construals are not distinguished in the grammar

Since the *de dicto* and NO construals include the *de re* and NT construals, respectively, it is crucial to assume that even the former two construals involve concept

13 This function could also be implicated in *de re* construals under factive predicates like *know*; here the res should also figure directly in the factive presupposition as 1 (ignoring the QUD-constraint):

(i) $[\![know]\!]^{w,g} = \lambda f_{\langle s,\langle\langle e,se\rangle,t\rangle\rangle} : f(w)(\lambda y_e.\lambda w''.y)=1\ .\ \lambda x_e.\exists g_{\langle e,se\rangle}.\forall w' \in \text{DOX}_{x,w}(f(w')(g)=1)$

generators in the right positions. For example, in order to predict the unacceptability of (36d) in scenario 1, there must be a generator next to *Ann*. In other words, the representations for (36c) and (36d) must be parallel in all relevant respects, as in (40a). Similarly, the examples showing parallelism between NT and NO in (28b-iii) and (29) must have such parallel representations, as in (40b).

(40) a. *only [Joe/Bill thinks [λ_2 Eve is involved with [[G 2] Ann]]]*

b. *only [Joe/Bill thinks [λ_2 Eve is involved with [a [[G 2] linguist]]]]*

The conclusion regarding parallelism generalizes to sentences with an arbitrary number of (N)DD-construed expressions. Thus the number of concept generators over which we can abstract is thus not fixed, the semantics of embedding predicates must be type-polymorphous in the sense that it permits variation in the number (and, as stated above, types) of its arguments (see Sauerland 2014; Cable 2018). This issue would be avoided if we replaced propositions 'as a whole', as proposed by Percus (2021); Benbaji (t.a.).[14] Our choice is motivated by examples like (41) (cf. Cresswell 1990; Blumberg & Lederman 2021 a.o.): the embedded clause in (41b) is contradictory, but the sentence can be true in scenario 5. As this must be an NT-construal, Joe believes a proposition with replacement, e.g. [λw.one of Ada, Bea and Carl lost the race in w]. If replacements were only introduced at the propositional level, such a replacement would be unavailable, as we would have to replace alternatives to the empty proposition. In fact, we would get the absurd prediction that for any contradictory embedded clause, irrespective of its linguistic material, we should get the same replacements.[15]

(41) a. SCENARIO 5: The winners of the race are super-athletes Abe, Bea, and Cate. Joe thinks that one of these three came last but is not sure who. Me:

b. *Joe thinks that one of the winners lost.* ✓

5.3 Overgeneration?

Our system allows replacement as long as a suitable concept is salient and the QUD-constraint is obeyed. Consider the continuation of scenario 1 in (42a). Here another individual – namely Bea, who is tangential to Joe's beliefs – is introduced. (42b) is still expected to be true in this scenario, but, problematically, (42c) is too.[16]

14 The account by Blumberg & Lederman 2021 also involves a version of propositional replacement, but is tied to a revised semantics for *believe* and other attitude predicates.

15 Our QUD-constraint predicts that non-trivial replacements should yield the same answer as the case where Joe believes the empty proposition. This seems on the right track, as examples like (41) often seem to answer questions like *Does Joe believe something absurd?*

16 We thank Nina Haslinger and Mitya Privoznov (pc) for raising this issue.

(42) a. SCENARIO 1": [...] Bea was also at the party. Joe does not know her. He saw her briefly talking with the host.

b. *Joe thinks Eve loves Ann.* ✓

c. *Joe thinks Eve loves Bea.* ✗

Descriptively, *Ann* in (42b can serve as the res for Joe's beliefs but *Bea* in (42c) cannot. But why? On our view the relevant *de re* and *de dicto* construals of (42b) and (42c) resolve the QUD if Joe thinks Eve is single in the same way. The immediate reaction to this issue is that the source of this overgeneration must be that we did not implement a requirement on co-extensionality between the res and its replacement in the world of evaluation (Quine 1956; Kaplan 1968; Lewis 1979 a.m.o.).

On our view, we expect this issue to also occur with NT construals. Consider scenario 6. It differs from scenario 3 in that Joe thinks the guests are all biologists or physicists, instead of just biologists, but is not sure who has which profession. (43b) is true on the NT construal, as before, but (43c) is not.[17] Again, the QUD is resolved in the same way by the NT construals of (43b) and (43c) and their NO construals.

(43) a. SCENARIO 6: Joe went to a party. He thought the guests were made up of biologists and physicists but could not tell who were the former and who the latter. Except for three linguists called Ann, Bea, and Cate, everyone was indeed either a biologist or a physicist. Joe doesn't know the three linguists or their names. He saw each of them dancing with Eve, who he knows. So he thinks Eve and one of them are lovers but is not sure which of them. There was discussion about Eve's relationship status. No other guest has an opinion about it.

b. *Joe thinks Eve is involved with a linguist.* ✓

c. *Joe thinks Eve is involved with a physicist.* ✗

We cannot require the property to be replaced and its replacement to be co-extensional in the world of evaluation – the set of linguists is not identical to the set of people dancing with Eve. In order capture both cases, we require not strict co-extensionality but overlap between the expression to be replaced and its replacement:[18] for f to be a replacement for g, f and g must overlap in the world of evaluation, as stated in (44). For individual concepts this amounts to co-extensionality. In the case of properties, overlap reduces to a non-empty intersection.

(44) **Salient-replacement-for:** For any context c, f is a salient replacement in c for g, $f \sim_c g$ iff f is salient in c and $f(w_c)$ and $g(w_c)$ overlap.

17 (43c) is not true on a *de dicto* construal either as does not believe that all guests are physicists.

18 For reasons of space, we omit discussion of cases with empty extensions, (Schwager 2011).

With this **person dancing with Eve** is a salient replacement for **linguist** in (43b) in scenario 6, but it is not for **physicist** in (43c) in the same scenario.

6 Conclusion and outlook

We motivated a number of claims that depart from previous work on NDD-phenomena. (i) As different 'types' of NDD-construals – *de re* and NT-construals – show the same empirical behavior, they should receive a unified analysis. (ii) This analysis should appeal to replacements of the denotations of material in the embedded clause; replacements are constrained by the condition that replacing the denotation of α with some f cannot change the answer to the salient QUD. (iii) NDD- and *de dicto*-construals result from the same structure; the contrast involves underspecification and not ambiguity. We then provided an implementation which used (type-generalized) concept generators underlying both NDD- and *de dicto*-construals.

Note that this implementation, although it does not introduce ambiguity between *de re*/NT construals on the one hand and *de dicto* on the other, still uses a special device for replacement, i.e., concept generators. If one assumed, following most of the literature, that NDD-construals are constrained in terms of which syntactic constituents they can target, this would have some plausibility – the syntactic constraints might then reflect c-selectional constraints of the concept generators. However, it is unclear whether we indeed find categorial constraints on replacement. While Percus (2000) argues that verbal predicates prohibit NDD-construals,[19] Schwager (2011); Sudo (2014) and Mayr & Schmitt (2023) provide arguments against this.

We omit a more detailed discussion of such data, but if replacement is more generally available having a particular syntactic mechanism for replacement would be less attractive than rooting it more deeply in the grammar. This would mean making it part of the basic meaning of expressions *per se*, e.g., by having all expressions associate with a set of replacement alternatives directly. This might make NDD-construals potentially more akin to other instances of underspecification that interact with the QUD and, via this parallel, might also give us a more principled handle on the constraints on replacement addressed in section 5.3.

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19 Also cf. Schwarz 2012 and see Keshet 2011, Romoli & Sudo 2009 for other potential restrictions

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Non-*de dicto* unified

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