De re in context

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This essay discusses a case of formal *de re* puzzle – a situation in which the believer holds a true belief about an individual that cannot be linguistically expressed. For example, when Ralph is unaware that Ortcutt is gender-fluid (experiencing their gender as varying over time), Ralph's true belief about Ortcutt cannot be expressed using gendered language. Both 'Ralph believes that Ortcutt is always enjoying herself' and 'Ralph believes that Ortcutt is always enjoying himself' are inappropriate to characterise Ralph's belief that Ortcutt derives joy from life. I show that formal *de re* is a case of presupposition failure that can be analysed using a contextualist strategy. This strategy, however, is not widely accepted in formal semantics, which currently lacks the apparatus to explain formal *de re*. Thus, formal *de re* is an argument for incorporating the contextualist view into formal semantics.

1 What is formal *de re*?

Discussions about *de re* belief often start with the story about Ralph who knows Ortcutt under two guises: as a man in the brown hat whom Ralph suspects to be a spy and as a man on the beach whom Ralph believes to be a pillar of the community (Quine, 1956). Describing the difficulty of ascribing to Ralph the belief that Ortcutt is a spy, we focus on the *content* of the belief. But we can construct parallel cases of *formal de re* puzzle. Suppose that Ortcutt is gender-fluid – that is Ortcutt experiences his or her gender as varying over time and behaves accordingly. Ralph is not aware of this fact. He knows Ortcutt under two guises: as a beautiful blonde woman whom he often sees on the beach and as a handsome blond man whom he sometimes sees in the bar. Suppose further that English is like French in that it has strict rules about adjectives in the predicative position agreeing with the gender of the individual they are predicated of. So, when Ralph sees Ortcutt during her female phase, he would say 'She is blonde' (with the '-e'). But Ralph would describe Ortcutt during his male phase by saying 'He is blond' (without the '-e'). Ralph's belief that Ortcutt has fair hair is a true belief, and its truth is independent of how Ortcutt is presented to Ralph. But how can we ascribe this belief to Ralph? It seems that both (1) and (2) are inappropriate.

(1) Ralph believes that Ortcutt is blonde.

(2) Ralph believes that Ortcutt is blond.

The ineffability of this belief ascription is not a problem with linguistic conventions. We have rules to resolve gender non-specificity. For example, in French, a default masculine gender is used in the cases of mixed gender groups (*Les étudiants sont intelligents* 'The students – of both sexes – are intelligent-masculine') and general subjects (*Quelqu'un est venu* 'Someone has come-masculine'). Using this convention, we can ascribe the true belief that Ortcutt has fair hair to Phoebe, who knows that Ortcutt is gender-fluid, by saying 'Phoebe believes that Ortcutt is blond' (meaning that she holds this belief about Ortcutt irrespectively of the gender phase). Ralph, as a competent language speaker, knows how to resolve gender non-specificity, but he cannot apply these rules in the case of Ortcutt because Ortcutt (for Ralph) has a specific (though context-dependent) gender. As a result, we also cannot use these rules to ascribe to Ralph the belief that Ortcutt has fair hair.

The context-dependent nature of Ralph's belief about Ortcutt's gender is evident from the following considerations: When standing on the beach next to Ralph, who follows with his gaze Ortcutt in

her feminine appearance, we can felicitously use (1). Similarly, there is no problem with using (2) to describe Ralph's belief when we are with him in the bar where Ortcutt is in his masculine manifestation.

The ineffability of the belief ascription in our version of the Ralph story is more apparent in languages with true adjectival agreement like French. But English speakers can use pronominal agreement to sharpen their intuition. Suppose that Ralph, after seeing Ortcutt on several occasions during both gender phases, correctly concludes that Ortcutt derives joy from any situation in life. Which of the following two sentences should we use to describe Ralph's true belief about Ortcutt:

(3) Ralph believes that Ortcutt is always enjoying herself.

(4) Ralph believes that Ortcutt is always enjoying himself.

It seems that, like in the case of Ortcutt's hair colour, neither (3) nor (4) is a good description. Again, this is not because we cannot resolve gender non-specificity. Phoebe, who knows that Ortcutt is gender-fluid and that Ortcutt is now at a party but does not know Ortcutt's current gender phase, can felicitously say 'I hope Ortcutt is enjoying himself or herself', resolving gender non-specificity by disjunction. But we cannot use disjunction to describe Ralph's belief about Ortcutt, because for Ralph, Ortcutt has a specific gender.

The formal *de re* puzzle highlighted by the examples above is that Ralph's belief about Ortcutt appears to limit our use of linguistic conventions. We cannot use gendered language ('blonde', 'herself', and so on) because it only partially characterises Ralph's belief. Similarly, we cannot use strategies for resolving gender non-specificity, since Ralph assigns a specific gender to Ortcutt.

Intuitively, the ineffability of the belief ascriptions in (1)-(4) comes from different presuppositions about Ortcutt's gender held by conversational participants and Ralph. In the next section, I will show that formal *de re* can be analysed as a case of presupposition failure. In what follows, I will brief address why formal *de re* has not been integrated in broader discussions of *de re* phenomena.

To my knowledge, formal *de re* has not been systematically formulated or treated as a general phenomenon. The closest analogue discussed in formal semantics is Brigitte Bardot cases ('I dreamt I was Brigitte Bardot and I kissed me'). But these cases are more complex, as they involve *de se* interpretation, binding, and counterfactual attitude reports (e.g., Lakoff, 1972; Percus & Sauerland, 2003b; Anand, 2006).

The reason formal *de re* is excluded from general discussions of *de re* phenomena lies, I believe, in the restrictive formulation of *de re* puzzles in formal semantics. In his original paper, where Ralph suspects Ortcutt of espionage, Quine argues that Ralph has a *de re* belief about Ortcutt if we accept the conjunction in (5) as true. Note the use of a quotation in the first conjunct.

(5) Ralph sincerely denies 'Ortcutt is a spy' and Ralph believes that Ortcutt is a spy.

Quine's formulation of the problem is different from the formulation usually used in formal semantics, where both conjuncts contain a belief ascription:

(6) Ralph believes that Ortcutt is a spy and Ralph believes that Ortcutt is not a spy.

As we saw in (1)-(4), *de re* belief is problematic not only for truth-conditional content of belief but also for formal or presuppositional content of a sentence. The issue with presuppositional content can be captured using a Quine-style conjunction, as in (7), where to 'appropriately reject' an utterance is to have a reaction characteristic of presupposition failure, such as 'Hey! Wait a moment.'

(7) Ralph appropriately rejects 'Ortcutt is blond' and Ralph believes that Ortcutt is blond.

However, the same issue cannot be captured using a conjunction of two belief ascriptions parallel

to that in (6), where the content of the second belief is negated. This is because presuppositions normally project under negation (e.g., Frege 1892; Karttunen 1974).

2 Contextualist analysis

In linguistics, gender agreement (as well as agreement in person and number) is often analysed as involving presuppositional content (e.g., Cooper, 1983; Dowty & Jacobson, 1989; Pollard & Sag, 1994; Heim, 2008). This is usually illustrated with the help of pronominal agreement. For example, it is said that by using the deictic pronoun 'she' in (8), the speaker signals that it is presupposed in common ground that the person 'she' picks out is a female. Bound pronouns, including 'himself' and 'herself', are also analysed as presuppositional. So, the deviance of (9) (marked by the hash sign '#') is attributed to the fact that it is presupposed in common ground that Phoebe is a male contrary to the conventional interpretation of 'Phoebe' as referring to a female.

(8) She is married.

(9) #Phoebe is enjoying himself.

In the scope of an attitude report, presuppositions are normally present not as part of common ground but are accommodated into the beliefs of the attitude holder (e.g., Karttunen, 1974; Heim, 1992). So, in (10), it is Ralph, not the speaker and the listener, who incorrectly presupposes that Phoebe is a male.

(10) #Ralph believes that Phoebe is enjoying himself.

Against this background, the ineffability of the belief ascriptions in (1)-(4) can be explained as presupposition failure.

To see how this works, let us assume a contextualist approach to *de re* belief (Stalnaker, 1988, 2009). According to this approach, the role of a propositional expression (a sentence or sentential clause) is to exclude the worlds that are incompatible with the content of the propositional expression from the relevant context set. In case of belief ascription, there are two relevant contexts: a *basic* context – a set of possible worlds compatible with what conversational participants commonly believe, and a *derived* context – a set of possible worlds compatible with what the attitude holder beliefs in every world in the basic context. Let C be our basic context for 'Ralph believes that p'. Then, if R_R is a Hintikka-style accessibility relation for Ralph, $\bigcup_{x \in C}\{y : R_R(x, y)\}$ is the derived context where 'that p' is assessed. A *de re* belief ascription is determined as a function of an individual the belief is about. To be determined, both the basic and the derived context for the ascription must satisfy the presuppositional constraints necessary for a successful reference to the individual the belief is about. For example, in the original Ralph story where Bernard J. Ortcutt is suspected of espionage, both the basic and the derived context must entail that Ortcutt is a male (i.e., $C \subseteq \{z : \text{Ortcutt is a male in } z\}$ and $\bigcup_{x \in C}\{y : R_R(x, y)\} \subseteq \{z : \text{Ortcutt is a male in } z\}$). In the contextualist account, the acquaintance relation is substituted with a causal relation between the believer and the individual his belief is about. The causal relation is formulated as a series of nested counterfactuals: "if conditions were normal, then if Ortcutt were different in this or that way, then Ralph's mental state would be different in corresponding ways" (Stalnaker, 1988, 164). The context-dependence of *de re* belief is explained by the fact that when both the basic and the derived context entail, say, that Ortcutt is presented as a man in the brown hat, the proposition 'Ortcutt is a spy' can be used to describe Ralph's mental state in a determinate way. However, in a neutral context, this is not possible. Suppose Ralph does not have any belief about Ortcutt's involvement in espionage under either of his guises. Then, we have four possibilities in the derived context: α where neither the man on the beach nor the man in the brown hat is a spy, β where both men are spies, γ where only the man from the beach is a

spy, and δ where only the man in the brown hat is a spy. In this context, neither 'Ralph believes that Ortcutt is a spy' nor 'Ralph believes that Ortcutt is not a spy' is suitable to reduce our context in a determinate way. This explains the difficulty of attributing to Ralph the *de re* belief that Ortcutt is a spy in the original Ralph story.

In our version of the Ralph story where Ortcutt is gender-fluid, the basic context entails that Ortcutt does not have a specific gender. This is the reason why Ortcutt can be referred to using a masculine or a feminine pronoun (or agreement) and why we can use the strategies for resolving gender non-specificity when we do not know Ortcutt's gender phase. For Ralph, however, the situation is different. Ralph does not know that Ortcutt is gender-fluid; therefore, some derived contexts for 'Ralph believes that p' entail that Ortcutt is a male, while others entail that Ortcutt is a female. That is, depending on the context, $\bigcup_{x \in C}\{y : R_R(x, y)\} \subseteq \{z :$ Ortcutt is male in $z\}$ or $\bigcup_{x \in C}\{y : R_R(x, y)\} \subseteq \{z :$ Ortcutt is female in $z\}$. The ineffability of the belief ascriptions in (1)-(4) is due to the impossibility of using either feminine or masculine agreement in all derived contexts: the feminine agreement fails in the derived contexts where Ortcutt is a male, while the masculine agreement fails in the derived contexts where Ortcutt is a female. Moreover, the rules for resolving gender non-specificity cannot be used in any of these derived contexts because to apply these rules, the context should be compatible with Ortcutt having a non-specific gender.

Formal *de re* is not restricted to gender agreement and can be replicated with other presuppositions. Here is an example with a change-of-state predicate. The sentence 'x stopped taking drugs' is usually analysed as asserting that the agent is not taking drugs and presupposing that the agent used to take drugs (e.g., Dowty 1979; Rappaport Hovav & Levin 1998; Tonhauser et al. 2013; Roberts & Simons 2024). Suppose that Ralph knows Ortcutt as a respectable man, a pillar of the community, whom he sometimes sees on the beach, and also as a homeless drug addict to whom he sometimes gives a penny after attending Sunday mass. One day, Ralph sees his Sunday beggar (our Ortcutt) in a sober state and correctly concludes that Ortcutt is not taking drugs. The sentence 'Ralph believes that Ortcutt stopped taking drugs' is not a good way to describe Ralph's true belief about Ortcutt in the above situation. This is because it presupposes that Ortcutt used to take drugs, which is not the case when Ralph thinks of Ortcutt as a pillar of the community. The case with a change-of-state predicate can be explained the same way as the case with gender agreement we looked at earlier.

3 Semantic alternatives

Existing semantic accounts of *de re* belief are not well-suited to explaining formal *de re*. To see this, let us consider the concept generator analysis as a representative successful compositional account of the *de re* puzzle (e.g., Percus & Sauerland, 2003a; Charlow & Sharvit, 2014; Mayr & Schmitt, 2024). According to this analysis, different guises of Ortcutt are obtained using a syntactically present pronominal element G (a concept generator) which is abstracted over in the scope of the attitude report, resulting in the Logical Form shown in (11). The definition of a concept generator is given in (12) and the denotation of 'believe' in (13). The formulations in (12) and (13) are simplified, omitting conditions not directly relevant here.

(11) Ralph believes [λ_7 [λ_1 [w_1 [[G_7 Ortcutt] w_1] is a spy]]]

(12) G is a concept generator for individual x in w iff (a) G is a function from individuals to individual concept and (b) $\mathrm{Dom}(G) = \{ z : x$ is uniquely acquainted with z in $w \}$

(13) $[\![$ believe $]\!]^{c,g}(w)(p)(x) = 1$ iff there is a (relevant) concept generator G suitable for x in w such that $Dox_{x,w} \subseteq \{w' \in D_s : p(G)(w') = 1\}$ $\quad (p \in D_{\langle\langle e,\langle s,e\rangle\rangle,\langle s,t\rangle\rangle})$

According to the concept generator analysis, the sentence 'Ralph believes that Ortcutt is a spy' is true in w only if there is a concept generator G suitable for Ralph in w such that at each of Ralph's

doxastic alternatives w' accessible from w, Ortcutt is such that $G(Ortcutt)(w')$ is a spy in w'. Because *de re* belief now contains an existential quantifier, the conjunction 'Ralph believes that Ortcutt is a spy and Ralph believes that Ortcutt is not a spy' is unproblematic: it says roughly that there is a concept generator G such that Ralph believes that $G(Ortcutt)(w)$ is a spy and there is a (possibly different) concept generator G' such that Ralph believes that $G'(Ortcutt)(w)$ is not a spy.

A natural way to extend the concept generator analysis to formal *de re* is to put a definiteness condition on 'believe', requiring that the believed proposition $p(G)$ be defined with the given concept generator G. The difficulty, however, is that neither existential (14) nor universal (15) quantification on the concept generator is appropriate.

(14) For any x, w, p, $[\![\text{ believe }]\!]^{c,g}(w)(p)(x)$ is defined iff there is a (relevant) concept generator G suitable for x in w such that $Dox_{x,w} \subseteq \{w' \in D_s : p(G) \text{ is defined in } w'\}$

(15) For any x, w, p, $[\![\text{ believe }]\!]^{c,g}(w)(p)(x)$ is defined iff for any (relevant) concept generator G suitable for x in w, $Dox_{x,w} \subseteq \{w' \in D_s : p(G) \text{ is defined in } w'\}$

The existential quantification in (14) is obviously too weak: it does not rule out that 'Ralph believes that Ortcutt is blonde' is defined when we report Ralph's belief about Ortcutt in his masculine manifestation (because there is a feminine guise under which the proposition is defined). Moreover, the existential quantification is insufficient for *de re* belief with quantifiers in the scope of the attitude report (e.g., Charlow & Sharvit, 2014). The universal quantification in (15) is too strong: it predicts that both 'Ralph believes that Ortcutt is blonde' and 'Ralph believes that Ortcutt is blond' are undefined even in their respective contexts. Thus, the conjunction 'Ralph appropriately rejects 'Ortcutt is blond' and Ralph believes that Ortcutt is blond' cannot be explained.

An intermediate solution would be to use universal quantification in the definiteness condition of 'believe' but require that concept generators be contextually relevant, or make the definiteness condition itself contextual. (A variation of the second strategy has recently been proposed by Mayr & Schmitt 2024 for a different purpose using the notion of question under discussion.) The following is a sketch of the intermediate solution:

(16) For any x, w, p, $[\![\text{ believe }]\!]^{c,g}(w)(p)(x)$ is defined **in context c** iff for any (relevant) concept generator G suitable for x in c, $Dox_{x,c} \subseteq \{w' \in D_s : p(G) \text{ is defined in } w'\}$

According to (16), there are contexts in which 'Ralph believes that Ortcutt is blonde' is defined (e.g., when Ralph is looking at a beautiful blonde woman on the beach), and there are contexts in which 'Ralph believes that Ortcutt is blond' is defined (e.g., when Ralph is looking at a handsome blond man in the bar). Using the intermediate solution, we can explain the context-dependence of *de re* belief and also the conjunction, assuming that the two conjuncts can be assessed in different contexts. We can also account for the ineffability of *de re* belief with different presuppositions in a neutral context as the impossibility to use either sentence in a determinate way. However, the intermediate solution undermines the main idea of the semantic analysis that resolves the conjunction by introducing and existentially quantifying over concept generators. If we have to relativise 'believe' to context to explain formal *de re*, why couldn't we apply the same approach to explain the initial *de re* puzzle about the content of belief, as the contextualist analysis suggests?

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