Is nothing irreplaceable? A substitution theory of *de re*

Goal. We unite three problems for transparent evaluation (TE) theories of *de re*, previously treated in isolation from each other, and develop a single mechanism to account for them via replacement.

The problem(s). TE theories derive both wide- and narrow-scope *de re* readings of attitude reports by interpreting a world-dependent element in the attitude's propositional complement relative to the matrix world, while interpreting the rest of the complement in the worlds quantified over by the attitude verb. TE thus predicts (1) to have the readings in (1a-c). The literature presents several challenges to TE: (i) DPs whose restrictors have empty extensions in actuality can have *de re* readings (the Burj Dubai case, (2)). Given an appropriate context, even predicates can have *de re* readings (3) despite the well-documented fact that predicates do not generally give rise to transparent readings about their extensions (6). (ii) We can felicitously report that x believes p, even if x believes some other proposition q, such that q together with the common ground entails p ("revisionist" reporting, (4)); shifting the evaluation index of any element in the attitude's complement in such cases will not yield the desired readings. (iii) Finally, presuppositions can be evaluated transparently, even when the presupposition trigger has no world index to manipulate and the asserted content is interpreted *de dicto* (i.e., the trigger *also* in (5)). We argue that these examples should all be viewed as instances of the same problem; namely, of our ability to report $\lceil S \text{ ATTITUDE } p \rceil$ to convey that S holds the attitude (*de dicto*) not towards p but towards some related proposition q. In (2-5), the (c)-sentences provide the q that makes each (b)-sentence true given its context in (a).

Propositional substitution. Discussing cases like (4), Percus (2020) floats the idea that a replacement operator R attaches to an attitude's prejacent (7a) and replaces it with a contextually equivalent proposition (7b). We call the attitude's overt prejacent the *replaced* proposition (in (4), *Ann can learn tennis in ten lessons*), and the proposition used in interpreting the attitude report the *replacing* one (e.g., *if Ann is 6, she can learn tennis…*). In (4) the two are indeed contextually equivalent: given that throughout the context worlds Ann is 6, in every context world where the replacing proposition is true the replaced one is, too, and vice versa. However, this does not extend to cases like Burj Dubai (BD, (2)), where the prejacent is false in the context, and contextual equivalence licenses replacement of a contextually false prejacent with any other contextually false proposition.

Counterfactual-contextual equivalence (CCE). We thus depart from (7b), and construe contextual equivalence counterfactually (Schwager 2011). p, q are CCE given c if the p-worlds closest to c are q-worlds, and vice versa (i.e., $\forall w \in c$: $\{w' \mid p(w') \wedge w' \text{ is maximally similar to } w\} = \{w' \mid q(w') \wedge w' \text{ is maximally similar to } w\}$). When the propositions involved in replacement are not ruled out by c, counterfactuality is vacuous, and R requires contextual equivalence as in (7b). This is how replacement of the prejacent in the (b)-sentences with the one in the (c)-sentences is licensed in (2-5): In (2), that BD has 191 floors is a contextual tautology, so in the closest worlds where Mary buys a 192-storied building, she buys one with one floor more than BD, and vice versa. In (3), that John is Catholic is a contextual tautology, so in all context worlds Sue is Catholic if and only if she is of the same faith as John. Finally, in the discourse in (5) between A and B, the presupposition of *also* in B's utterance does not hold in the belief-worlds of B's parents. This amounts to a presupposition-failure if presupposition satisfaction is required in the attitude's scope. Yet in the given context someone other than B, namely A, is already in bed, so in all context-worlds where B is in bed, B is *also* in bed, and (trivially) whenever B is in bed in addition to someone else being in bed, B is in bed. Thus, we license replacement of the prejacent with its presupposition-less variant.

Compatibility. Consider a modification of the tennis case in (4a) in which tennis instructor Mary knows 6yo Ann, but mistakenly thinks she is 5, and has thus formed the (*de dicto*) belief that Ann

cannot learn tennis in ten lessons. We now judge (4b) as false, yet replacement wrongly predicts (4b) to be able to express the *de dicto* reading of (4c), as the replaced and the replacing propositions still comply with CCE (which does not take into account the attitude holder's belief worlds). This scenario illustrates, then, that we need to disallow replacement of a prejacent p when the attitude holder holds the attitude *de dicto* towards $\neg p$; i.e., given an attitude $\mathcal{B}$, only a prejacent that is compatible with an attitude holder's $\mathcal{B}$-worlds can be replaced. To formulate this condition, we need to depart from Percus's schema even further, and have R operate on the attitude itself, rather than on its prejacent (8-9), adding *compatibility* (9-ii) to CCE (9-i) as a definedness condition on R.

Non-vacuity. Given our proposal, (2-5) all use replacement to allow $\lceil S$ ATTITUDE $p\rceil$ to convey (*de dicto*) that $\lceil S$ ATTITUDE $q\rceil$, where q together with some contextual tautology entails p. Note that if q already logically entails p, replacement defeats its purpose. If the subject holds the attitude *de dicto* towards a proposition that entails p, then given Hintikka semantics for attitudes (which we adopt), they also hold the attitude *de dicto* towards p without applying replacement. To avoid vacuous applications of R, we disallow replacement by a logically stronger proposition (9-iii). This is still not enough, though. Blumberg & Lederman (B&L, 2021) note that in the tennis case (4), we cannot felicitously utter (4d). Yet given that Ann being 6 is a contextual tautology, we (wrongly) predict that it would be replaceable with *any* other contextual tautology. B&L suggest that we disallow replacement of contextual tautologies. But if we want a single mechanism to account for both "revisionist" reports and third readings, the constraint is far too strong, as third readings of attitude reports do not require the attitude's prejacent not to hold throughout the context set. We argue that what B&L's (4d) shows is that if p itself is a contextual tautology, then it cannot be the contextual tautology that enabled us to replace it with q in the first place; i.e., there must be another contextual tautology that together with q entails p. This is formalized in (9-iv). Together (9iii-iv) ensure that CCE between the replaced and the replacing proposition holds not because the replaced or the replacing proposition are contextual tautologies, but rather, thanks to both the replacing proposition and some other contextual tautology that together entail the proposition being replaced.

A potential strength of the substitution theory. If replacement is available, then together with a movement operation like QR, we can generate the three attested readings of DPs in intensional contexts (1a-c) within the confines of the *scope theory of intensionality* (STI). STI has a DP's syntactic position relative to an intensional operator determine its intensional and quantificational scope. It thus wrongly predicts a biconditional dependence between wide quantificational scope and transparent interpretation, ruling out narrow-scope *de re*, or "third", readings (1c). When supplemented with replacement (7), however, STI can generate third readings as *de dicto* attitude reports with a different prejacent, introduced via replacement, while deriving wide-scope *de re* via QR of the DP above the intensional operator. We can thus adopt STI+replacement, and avoid world-pronouns or split intensionality without losing empirical coverage (Percus 2000, Keshet 2008).

Remaining issues. Though the conditions in (9-i-iv) are necessary conditions for replacement, we cannot claim they are sufficient. This paper further discusses conditions which, unlike (9-i-iv) do not restrict the logical relations between the prejacent, its replacing proposition, and the context set, but rather the relation the former two bear to the question under discussion (i.e., conditions on their "at-issue-ness"). If we introduce replacement in order to resurrect STI, an issue left open here is whether replacement can circumvent arguments from syntactic islands against STI; i.e., if narrow-scope *de re* of a DP inside an island can also be accounted for using R. Finally, construing R as an operation on the intensional verb itself, opens the road to a broader empirical study of whether R is selective in the intensional operators with which it can combine.

(1) Mary wants to buy a hat like Sue's. (Fodor 1970)

a. *De dicto*: $\lambda w.\forall w' \in \text{DESIRE}_{M,w} : \exists x\ s.t.\ hat\text{-}like\text{-}Sue's_{w'}(x) \wedge buy_{w'}(M,x)$

b. Wide-scope *de re*: $\lambda w.\exists x\ s.t.\ hat\text{-}like\text{-}Sue's_{w}(x) \wedge \forall w' \in \text{DESIRE}_{M,w} : buy_{w'}(M,x)$

c. Narrow-scope *de re*: $\lambda w.\forall w' \in \text{DESIRE}_{M,w} : \exists x\ s.t.\ hat\text{-}like\text{-}Sue's_{w}(x) \wedge buy_{w'}(M,x)$

(2) a. Context: Mary is looking at the Burj Dubai. Not knowing that it has 191 floors and is the world's highest building, she thinks, 'I want to buy a building that's a floor higher!'

b. Mary wants to buy a building with 192 floors. (Schwager 2011)

c. Intended: Mary wants *to buy a building one floor higher than the Burj Dubai.*

(3) a. Context: Mary hears that her religious friend John is dating Sue, and thinks Sue must belong to John's faith, but does not know which faith it is. We know it is Catholicism.

b. Mary thinks that Sue is Catholic. (Sudo 2014)

c. Intended: Mary thinks that *Sue is of the same faith as John.*

(4) a. Context: Ann is a *6yo* who Mary, a tennis instructor, does not know. Mary believes every *6yo* can learn tennis in ten lessons. Having heard Mary's views, Ann's dad says:

b. Mary thinks Ann can learn tennis in ten lessons. (Blumberg & Lederman 2021)

c. Intended: Mary thinks that *if Ann is 6, she can learn tennis in ten lessons.*

d. #Mary thinks that Ann is six years old.

(5) a. Context: A and B are texting. B's parents think B (and possibly B alone) is in bed.

b. A: *I'm already in bed.* B: *My parents think I'm also in bed.* (Heim 1992)

c. B's intended utterance: My parents think *I'm in bed.*

(6) a. Context: Mary thinks Pierre, a Canadian, is my brother and that is actually American.

b. #Mary thinks that my brother is Canadian. (Percus 2000)

(7) a. Mary thinks [[$R\ q_7$] [Ann can learn tennis in ten lessons.]]

b. $[\![R]\!]^{w,g,c} = \lambda q \lambda p : p, q$ are equivalent given c. q (where c is the discourse's context set)

(8) Mary [[[$R\ q_7$] [thinks]] [Ann can learn tennis in ten lessons.]]

(9) $[\![R]\!]^{w,g,c}(q_{\langle s,t\rangle})(\mathcal{B}_{\langle st,\langle e,t\rangle\rangle})(p_{\langle st\rangle})(x_e)$ is defined only if:

i. CCE: p, q are couterfactually-contextually equivalent given c.

ii. Compatibility: $\neg\mathcal{B}_w(\neg p)(x)$

iii. Non-vacuity: $q \not\rightarrow p$

iv. Non-redundancy: $c \subseteq p \rightarrow [\exists r \supseteq c : (r \not\rightarrow p)\ \wedge ((r \wedge q) \rightarrow p)\ \wedge\ (p \not\rightarrow r)]$

If defined, returns 1 iff $\mathcal{B}_w(q)(x)$

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