

## Three puzzles about de se

### 1. Introduction

We know since Grice's work on conversational maxims that the choices that speakers make in conversation are in part guided by considerations of relevance (Grice 1975). A feature of a scenario may be relevant in one conversational context but irrelevant in another, so that a cooperative speaker would be expected to mention that feature in the former context, but may ignore it in the latter one. Consider the following scenario, for example:

1. Scenario: Sam, Josh and Toby are participating in a baking competition. Both Sam and Josh feel that they deserve the prize, but Sam, who is rather shy, expresses this in the form of a whisper, whereas Josh, the more extrovert of the two, shouts it. Claudia wanted to know who felt that they deserved the prize, so she asked Leo.

Claudia:       Who said that they deserve the prize?  
Leo:            Sam and Josh said that they deserve the prize.

In this context, the difference in the manner of Sam's and Josh's speech acts is irrelevant, and hence rather than using the verbs *whisper* or *shout* Leo uses the weaker term *say*, which is compatible with both. That the dynamics of conversation permit a speaker to ignore irrelevant features of a situation when formulating her contribution is unsurprising; communication would be a great deal more cumbersome if this were not possible. In this paper, we want to argue for a more surprising result: under certain circumstances, and subject to constraints, it is possible for *addressees* to ignore irrelevant features of a situation when evaluating a speaker's contribution for truth. We shall call this second aspect of linguistic communication – which has received relatively little attention in the semantic and pragmatic literature – *backgrounding*. Our case study is attitude reports involving the distinction between so-called de se and de re construals of pronouns and anaphora; we illustrate these construals in the next section. Along the way, we develop a new way of probing intuitions about such cases, involving judgments of incompatibility of pairs of attitude reports, where existing theories predict that it should be possible to resolve the incompatibility by construing one report de se and the other de re.

The paper is structured as follows. In Section 2, we set out some background on the de se/de re distinction, describing the landscape of construals for pronouns and obligatorily controlled PRO as it is currently understood. Section 3 adds a new observation to the mix: certain verbs, such as *boast*, introduce a de se entailment as a matter of their lexical semantics; we call this 'lexical de se'. Sections 3-5 describe three puzzles concerning de se construal with respect to PRO vs. *boast*; the observations in Sections 3 and 4 are based on introspective judgments, while Section 5 presents data collected through experimental means. Section 7 sketches the beginnings of a solution to these puzzles, couched within a Kratzerian approach to attitude reports. Section 8 concludes.

## 2. Background

Consider the following scenario.

2. Bake sale scenario 1: At a bake sale, Mary eats a cookie, not realizing that it is one that she herself baked. She says, ‘This cookie is delicious! Whoever baked it is a wonderful baker.’

- a. ‘Mary claimed PRO to be a wonderful baker.’
- b. ‘Mary<sub>i</sub> claimed that she<sub>i</sub> was a wonderful baker.’

The received wisdom in the formal semantics literature is that (a), which has the covert element PRO in the understood subject position of the infinitive, is false in the scenario in (2), but its counterpart with an overt pronoun in (b) is true. The falsity of (a), the story goes, is due to the fact that when Mary says ‘Whoever baked this cookie is a wonderful baker’, she is unaware that she is talking about herself (Morgan 1970, Chierchia 1990). By contrast, although *Mary* and *she* are coreferential in (2b), the sentence does not entail that Mary knows that she is talking about herself (at least on one reading). This contrast between PRO and overt pronouns forms the core of our paper.

In general, it seems that communicative acts and mental attitudes that are in some intuitive sense ‘about’ the attitude holder fall into two classes: (i) attitudes that the attitude holder is *aware* are about herself, and (ii) attitudes that the attitude holder is not aware are about herself. Call the former class of attitude an attitude ‘de se’, and the latter class an attitude ‘de re’.

### 3. *Attitude de se*

A de se attitude (a mental state or speech act) is an attitude that

- (i) is in an intuitive sense *about* the attitude holder; and
- (ii) the attitude holder is *aware* is about herself

*Aboutness condition*

*Awareness condition*

[cf. Pearson (2013)]

Intuitively, a de se attitude is one that the attitude holder would be likely to express by using the first person pronoun; for this reason, this class of attitudes is often characterized as involving a first personal perspective. In bake sale scenario 1, Mary refers to herself with the description *whoever baked it (the cookie)*; had she been aware that she was talking about herself, she would instead have used *I*. Her utterance thus expresses a de re attitude about herself, rather than a de se attitude.

Based on introspection, linguists have followed Morgan (1970) and Chierchia (1990) in assuming that obligatory control sentences formed with an attitude predicate as the matrix verb can only be used to report attitudes de se, whereas their counterparts with an overt pronoun are ambiguous between a reading on which they report an attitude de se, and a reading on which they report an attitude de re. For brevity, we will say that PRO is unambiguously construed de se, and overt pronouns are ambiguous between a de se and a de re reading. The claim that the resources of natural language include pronominal and anaphoric expressions such as PRO that are unambiguously construed de se has traditionally been taken as a key piece of evidence that the grammar is sensitive to the distinction

between first personal and third personal ways of thinking about oneself (eg Chierchia 1990, Schlenker 1999, Anand 2006, Pearson 2013, 2018). What has to our knowledge received little attention until now, however, is the capacity of certain verbs, nouns and adjectives to impose a requirement of de se interpretation upon the reports in which they occur – what we shall call *lexical de se*. In this squib, we shall discuss examples motivating the notion of lexical de se, and present a series of puzzling cases where lexical de se behaves differently from the de se requirement that has in the literature been associated with obligatorily controlled PRO. We contend that the source of the differences between PRO and lexical de se is that the former, but not the latter, is amenable to ‘backgrounding’ of the de se requirement. That is, under appropriate linguistic and contextual conditions, the de se requirement can be treated as though it is pragmatically irrelevant to the truth value of a control sentence; we shall see that this interpretive latitude is not available for sentences formed with lexically de se predicates such as *boast*, however.

### 3. Lexical de se

Here’s a further data point to add to the mix. When we replace *claim* with *boast* as the embedding predicate, the sentence can only be judged false in bake sale scenario 1.

4. Bake sale scenario 1: At a bake sale, Mary eats a cookie, not realizing that it is one that she herself baked. She says, ‘This cookie is delicious! Whoever baked it is a wonderful baker.’

- a. Mary<sub>i</sub> boasted that she<sub>i</sub> was a wonderful baker. False
- b. A: Did Mary<sub>i</sub> boast that she<sub>i</sub> was a wonderful baker?  
B: No/#Yes.

The falsity of (4a) and the infelicity of answering A’s question in the affirmative in (4b) is due to the fact that Mary does not know that she is talking about herself. This can be shown by comparison with a scenario where the ‘awareness’ condition associated with de se reports is fulfilled:

5. Bake sale scenario 2: At a bake sale, Mary eats one of her own cookies. She says, ‘My cookie is delicious! I am a wonderful baker.’

Mary<sub>i</sub> boasted that she<sub>i</sub> was a wonderful baker. True

Notice that this sensitivity of *boast*-sentences to the awareness condition is despite the fact that *boast* embeds a finite clause rather than a control complement, and hence the subject of the embedded clause is an overt pronoun rather than PRO. Even though overt pronouns generally allow de re readings, the sentence as a whole in (4) does not. Thus it seems that *boast* itself imposes a de se requirement: since Mary wasn’t aware that she was talking about herself, her ascription of the property of being a wonderful baker to herself does not – on any reading - count as boasting.

Furthermore, we can check that the de se requirement imposed by *boast* isn’t merely an instance of a more general inability to substitute co-referring terms *salva veritate* in the scope of this verb. In the following scenario, a de re construal of *Chomsky* is available in the scope of *boast*.

6. Chomsky scenario 1: Sally reads a paper by Chomsky, but doesn't realize that he is the author. She says, 'I'm smarter than whoever wrote this paper'.

Sally boasted that she was smarter than Chomsky.

True

Yet the same sentence is judged false in a scenario where the author of the paper is Sally herself, and she doesn't realize it:

7. Chomsky scenario 2: Sally reads a paper that she herself wrote a long time ago, but doesn't realize that she is the author. She says, 'Whoever wrote this paper is smarter than Chomsky'.

Sally boasted that she was smarter than Chomsky.

False

Thus it seems that *boast* imposes a de se requirement, and this requirement cannot be reduced to a mere instance of a Frege puzzle. This observation holds quite generally across syntactic categories for lexical items formed from the root *boast*: Mary's speech act counts as a *boast* or *boasting* in bake sale scenario 2 but not in bake sale scenario 1. Likewise the event in bake sale scenario 2 could be held up as evidence that Mary is *boastful*, but that in bake sale scenario 1 could not.<sup>1</sup>

A small class of lexical items displays this sensitivity to whether or not the bearer of the attitude is aware that she is thinking about herself. For example, in bake sale scenario 2 Mary is *proud* of her cookie, but not in bake sale scenario 1. Or suppose that Tom gets sick after eating one of Mary's cookies. If Mary doesn't know that the cookie Tom ate was one of hers she might feel bad about what happened, but she won't feel *embarrassed* or *ashamed* or even *guilty* or *remorseful* unless she knows that it was *her* baking that made him sick.<sup>2</sup>

The lesson of this section then is that there is such a thing as *lexical de se*: unambiguous de se construal that is not associated with a pronoun or anaphor such as PRO, but rather is imposed by the lexical semantics of the predicate in question. In the next three sections we highlight some differences between lexical de se and the de se inference associated with PRO.

#### 4. First puzzle: hedges

So far, we have presented a standard picture – endorsed by both philosophers of language and linguists – and simply added to it the observation that not only pronominal or anaphoric elements but also certain predicates can be a source of obligatory de se interpretation. In what follows, we shall present a series of challenges to the standard picture.

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<sup>1</sup> Note also that *boast* cannot take a control complement in English:

(i) \*Mary boasted to be a wonderful baker.

We leave it to future work to investigate whether this fact holds across languages, or whether it is a more idiosyncratic property of English.

<sup>2</sup> Emotions such as pride, embarrassment, shame and guilt that characterize feelings about oneself are known in psychology as *self-conscious emotions* (eg Tracy and Robins 2004). It is perhaps not surprising that words describing this class of emotions should be the place to look for lexical items that carry with them a de se requirement.

As a general tendency, it seems that even with ordinary pronouns, there is a preference for the *de se* reading: many speakers are more inclined to judge the relevant sentences false than true in mistaken identity scenarios, or report that they find the reading on which the sentence is true difficult to detect. Nonetheless, it is generally assumed in the literature that there is a contrast between (2a) and (2b) (repeated below), and that a grammar of attitude reports ought to capture this contrast.

8. Bake sale scenario 1: At a bake sale, Mary eats a cookie, not realizing that it is one that she herself baked. She says, ‘This cookie is delicious! Whoever baked it is a wonderful baker.’

- a. ‘Mary claimed PRO to be a wonderful baker.’ False
- b. ‘Mary<sub>i</sub> claimed that she<sub>i</sub> was a wonderful baker.’ True

One strategy for bringing out the *de re* reading of the ordinary pronoun is by adding some additional linguistic material signaling that Mary didn’t realize that she was talking about herself, as in the following examples.<sup>3</sup>

- 9a. Mary **unwittingly** claimed that she was a wonderful baker.
- 9b. Mary **unintentionally** claimed that she was a wonderful baker.
- 9c. **In effect**, Mary claimed that she was a wonderful baker.
- 9d. **In a sense**, Mary claimed that she was a wonderful baker.
- 9e. **Without realizing it**, Mary claimed that she was a wonderful baker.

In these cases, it seems easy enough to see that the sentences are true in bake sale scenario 1. In fact, the additional material need not be a modifier within the same sentence, but can appear in a separate clause:

- 10. **Mary doesn’t realize it**, but she just claimed that she was a wonderful baker.

Here’s the surprising part: the same strategy changes our judgments concerning the counterpart of the attitude report with PRO. To our ears, the examples in (11) and (12) also sound true in the same scenario.<sup>4</sup>

- 11a. Mary **unwittingly** claimed PRO to be a wonderful baker.
- 11b. Mary **unintentionally** claimed PRO to be a wonderful baker.
- 11c. **In effect**, Mary claimed PRO to be a wonderful baker.
- 11d. **In a sense**, Mary claimed PRO to be a wonderful baker.
- 11e. **Without realizing it**, Mary claimed PRO to be a wonderful baker.

- 12. **Mary doesn’t realize it**, but she just claimed PRO to be a wonderful baker.

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<sup>3</sup> Another strategy is to set up the mistaken identity scenario in such a way that the mistaken identity is incidental to the goals of the protagonist. This is the strategy that we employed in the experiment discussed in section 5.

<sup>4</sup> That adverbs like *unwittingly* and *unintentionally* apparently remove the *de se* requirement for PRO was pointed out to us by Tom McFadden (p.c.), while Wataru Uegaki made a similar observation regarding *in effect* in a Facebook post.

Yet if it is hard-wired into the grammar that PRO cannot receive a de re reading, the addition of this material ought not to change the truth value judgment that the sentence receives; rather, the sentences should still be judged false, or perhaps even infelicitous or contradictory. The point is particularly striking in the case of (12), where the additional material is not even in the same clause, and therefore cannot be analyzed as an operator manipulating the semantic content of the sentence in which PRO occurs; rather the first clause in (10) seems to perform a manipulation of the *context*. This suggests that the picture regarding the interpretation of PRO vs. pronouns in attitude reports is more complex than has until now been appreciated, and that the availability of de re readings is susceptible to contextual influence in a manner that is not captured by current theories.

Do the modifiers discussed above simply permit a relaxation of the de se requirement across the board? Not in the case of lexical de se. The examples discussed above can be compared with the following:

- 13a. Mary **unwittingly** boasted that she was a wonderful baker.
- 13b. Mary **unintentionally** boasted that she was a wonderful baker.
- 13c. **In effect**, Mary boasted that she was a wonderful baker.
- 13d. **In a sense**, Mary boasted that she was a wonderful baker.
- 13e. **Without realizing it**, Mary boasted that she was a wonderful baker.

14. **Mary doesn't realize it**, but she just boasted that she was a wonderful baker.

Here, the addition of the bolded material does not help: if Mary didn't know that she was talking about a cookie that she herself made, then what she said simply doesn't count as boasting, and no further modifiers or hedges can change that.<sup>5</sup>

Indeed, the examples in (13) and (14) are not merely false, but somewhat infelicitous (at least out of the blue). Yet it is not true across the board that these modifiers fail to combine with *boast* to yield a felicitous sentence, nor that they can never be recruited to signal that some sort of mistaken identity has taken place. When the mistaken identity concerns someone other than the subject of *boast*, the resulting sentences are judged felicitous and true, as can be seen by returning to Chomsky scenario 1:

15. Chomsky scenario 1: Sally reads a paper by Chomsky, but doesn't realize that he is the author. She says, 'I'm smarter than whoever wrote this paper'.

- a. Sally **unwittingly** boasted that she was smarter than Chomsky. True
- b. Sally **unintentionally** boasted that she was smarter than Chomsky. True
- c. **In effect**, Sally boasted that she was smarter than Chomsky. True
- d. **In a sense**, Sally boasted that she was smarter than Chomsky. True
- e. **Without realizing it**, Sally boasted that she was smarter than Chomsky. True
- f. **Sally doesn't realize it**, but she just boasted that she was smarter than Chomsky. True

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<sup>5</sup> Note that our claim is not that it is *in general* impossible to boast without realizing it, but rather that being unaware that one is talking about oneself is not among the routes to unwitting boasting.

So our first puzzle has two pieces: (i) the putative *de se* requirement imposed by PRO can be relaxed by the addition of hedging material; (ii) the same hedging material *cannot* relax the lexical *de se* requirement imposed by items such as *boast*.

## 5. Second puzzle: (non-)contradictions

Suppose we present our Semantics 1 students with the following apparent paradox:

16. ‘Imagine I tell you that yesterday, Mary didn’t *boast* that she was a wonderful baker, but she did *claim* that she was a wonderful baker. How can that possibly be?’

Of course, one possible answer is that sincerely claiming to be a wonderful baker doesn’t count as boasting – it’s just a statement of fact (or at least, sincerely held opinion). But let’s close off that route by stipulating that if you go around saying ‘I’m a wonderful baker’ – no matter your grounds for that assertion – you are indeed boasting. Still a second route is available: by appealing to a situation like bake sale scenario 1. Our students will agree that in that situation, Mary didn’t *boast* that she was a wonderful baker (because she didn’t know that she was talking about herself), but she did *claim* that she was a wonderful baker (even though she didn’t know that she was talking about herself).

In this case, what permits ‘x boasted that she VP’ to be judged false and ‘x claimed that she VP’ to be judged true at one and the same time is the appeal to a scenario where the awareness condition is not met – since this factor is always relevant to the truth of *boast*-sentences, but it need not be relevant to the truth of *claim*-sentences with overt embedded pronouns (at least on one reading of such sentences), it is possible for their truth value to differ.

The task of our students in the above case is to explain how ‘Mary didn’t boast that she was a wonderful baker’ and ‘Mary claimed that she was a wonderful baker’ could express compatible propositions, by thinking up a scenario where the two sentences are true; because of the *de se* requirement imposed by *boast*, a mistaken identity scenario fits the bill perfectly. So given the standard picture of *de se* and *de re* construals of pronouns and anaphora, the same thing ought to hold for sentences of form ‘x claimed PRO to VP’ and ‘x claimed that she VP’. Let’s see if the prediction is borne out:

17. ‘Imagine I tell you that yesterday, Mary didn’t claim to be a wonderful baker, but she did claim that she was a wonderful baker. How can that possibly be?’

It seems to us to be less obvious that in bake sale scenario 1, Mary didn’t claim to be a wonderful baker, but she did claim that she was a wonderful baker; even in this scenario, one cannot help but hear the sentence as a contradiction.<sup>6</sup> Likewise, whereas (18) is a sensible alternative question to ask with respect to bake sale scenario 1, with (19) one has the

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<sup>6</sup> We leave it to the reader to verify that the perceived contradiction persists regardless of intonational contour. It is there regardless of whether stress is placed on *that*, *she* or *was* in the second conjunct.

intuition that one is being asked to decide between two options that actually amount to the same thing:<sup>7</sup>

18. Did Mary *boast* that she was a wonderful baker, or did she (merely) *claim* that she was?

19. #Did Mary claim to be a wonderful baker, or did she claim that she was?

As with the effects of hedges that we saw in the previous section, the *de se* requirement associated with PRO behaves differently from that associated with lexical items like *boast*. This is puzzling if both are taken to share the core semantic property of imposing a *de se* semantics. In the case of the riddle, one might be tempted to reply that the *de se* requirement is for some reason more *salient* with *boast* than it is with PRO, so that the difference in judgments is due not to a semantic difference between the two, but rather to a difference in meta-linguistic awareness of that semantics. But if this were the explanation, then we should expect that researchers who have studied the connection between PRO and *de se* should be sufficiently attuned to the admittedly subtle factors at work in (18) and (19) to be able to make sense of these sentences. Yet we too share the intuition that in bake sale scenario 1, (16) and (18) sound coherent but (17) and (19) do not.

The point can be illustrated further by examining intuitions of (non-) contradictoriness in other cases. For example, (20) sounds contradictory, which is as expected if the first sentence carries an entailment that the awareness condition was satisfied and hence that the subject knew that she was talking about herself.

20. #Mary boasted that she was a wonderful baker, although she didn't know that she was talking about herself.

By the same reasoning, a counterpart of (18) with *claim* + PRO instead of *boast* ought to sound contradictory. Yet it does not strike us as particularly bad, and we clearly perceive a contrast between the two examples.

21. (?)Mary claimed to be a wonderful baker, although she didn't know that she was talking about herself.

In this section we have employed a novel diagnostic involving judgments of (in)compatibility of attitude reports, in order to identify a second puzzle that again has two pieces. The diagnostic involves conjoining two sentences *not p* and *q*, where the putative meaning of *p* and *q* differs only insofar as *p* entails a *de se* interpretation but *q* does not: this difference should render a judgment that the resulting conjunction is not a contradiction, because it can be true in a mistaken identity scenario. Application of this diagnostic revealed that (i) the putative *de se* requirement imposed by PRO makes incorrect predictions regarding perceived (non-)contradictions; (ii) these same predictions are borne out for the lexical *de se* requirement imposed by items such as *boast*. The general picture is this: both with cases

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<sup>7</sup> The apparent impossibility of hearing (19) as a coherent question is all the more striking when one considers the linguistic gymnastics that hearers perform in order to make sense of cases such *Did she order a salad, or did she order a SALAD salad?*



involving hedges and judgments of contradiction, lexically de se predicates behave as expected, but PRO does not.

## 6. Third puzzle: experimental evidence

### 6.1 Overview

So far, we have been relying only on our own introspective judgments about the cases of interest; indeed up until now, there has to our knowledge been almost no investigation of de se and de re construals using experimental means.<sup>8</sup> One challenge in this undertaking is that as mentioned in section 3 there appears to be a strong bias for construing a pronoun with respect to the de se reading. Indeed, in a pilot study we found that participants almost always judged attitude reports false in ‘mistaken identity’ scenarios where the awareness condition was not met. This judgment held regardless of whether the subject position of the embedded clause was occupied by PRO or an overt pronoun.

This bias for de se readings presents two related challenges for an investigation of the interpretation of PRO. First, participants’ reluctance to interpret either PRO or overt pronouns with respect to the de re reading led to a ceiling effect, where it was not possible to detect a significant interpretive difference between a critical experimental item with PRO and a control item with an overt pronoun. A further issue is the general difficulty of demonstrating the absence of a reading. For instance, there are in principle two possible conclusions to draw from a judgment that a given attitude report is false in a mistaken scenario: one is that the sentence lacks a de re reading, and another is that the sentence has a de re reading, but the speaker evaluated the truth of the sentence with respect to the de se reading. In the latter case, the inference from a judgment of falsity to the conclusion that some expression such as PRO lacks a de re reading would be unwarranted.

We designed experimental items with the goal of overcoming these difficulties. Participants read stories such as the one described in the introduction, repeated here:

22. Mary, Bob and John all like baking. Their teacher, Mr. Smith, wanted to know which of them baked the best cookies. He had an idea. Each of them would bake a batch of cookies, and then one of them would taste them and decide which one he or she thought was the best. Mr. Smith would give a prize to whoever's cookie was judged the best. Mr. Smith picked Mary to be the judge, and decided that she should wear a blindfold for the tasting so she wouldn't know whose cookie was whose. When Mary tasted her own cookie, she couldn't tell that it was hers. She said, 'This is the best cookie. Whoever baked this cookie deserves the prize.' Sam had been keeping track of who made which cookie, so that he could go and tell the results to Mr. Smith. He went to Mr. Smith and said:

- (i) 'Mary claimed to deserve the prize.'
- (ii) 'Mary<sub>i</sub> claimed that she<sub>i</sub> deserved the prize.'

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<sup>8</sup> Two exceptions, with a somewhat different emphasis, are Pearson and Dery (2014) and Dery and Pearson (2016).

A feature of this scenario is that it introduces a protagonist who has a goal for which the de se/de re distinction is irrelevant. We are told that Mr. Smith wants to determine who to award a prize to. If he is told, ‘Mary claimed to deserve the prize’ or ‘Mary claimed that she deserved the prize’, then if the sentence is true on the de re reading but false on the de se reading, this nonetheless constitutes sufficient grounds for Mr. Smith to give the prize to Mary. Moreover, since Mr. Smith determined that Mary should be blindfolded so as not to know who made which cookie, then he is likely to interpret the target sentence with respect to the de re reading, not the de se one.

Participants gave truth value judgments for three types of sentences: attitude reports with *claim* and PRO (eg (23a)), attitude reports with *claim* and an overt pronoun (eg (23b)), and attitude reports with *boast* and an overt pronoun (23c).

23a. Mary claimed to deserve the prize.

23b. Mary claimed that she deserved the prize.

23c. Mary boasted that she deserved the prize.

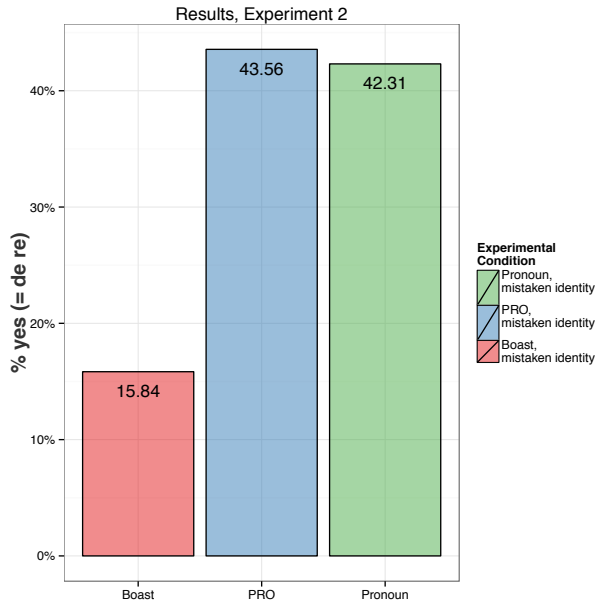
Additionally, stories fell into two different types, giving a 3 x 2 design. In the ‘mistaken identity’ type of story, the speaker was unaware that she was talking about herself. In the ‘no mistaken identity’ story type, the awareness condition was met, and the speaker referred to herself using the first person pronoun. Sentence type was a within subjects factor, and story type a between subjects factor.

The experiment was conducted on Amazon Mechanical Turk. 60 participants were tested with 4 items per condition and 12 fillers. After each story they were asked ‘Is what x said to y true?’, and ‘Why/why not?’ In the mistaken identity condition, an affirmative answer to the first question was coded as a de re response, and a negative answer was coded as a de se response.

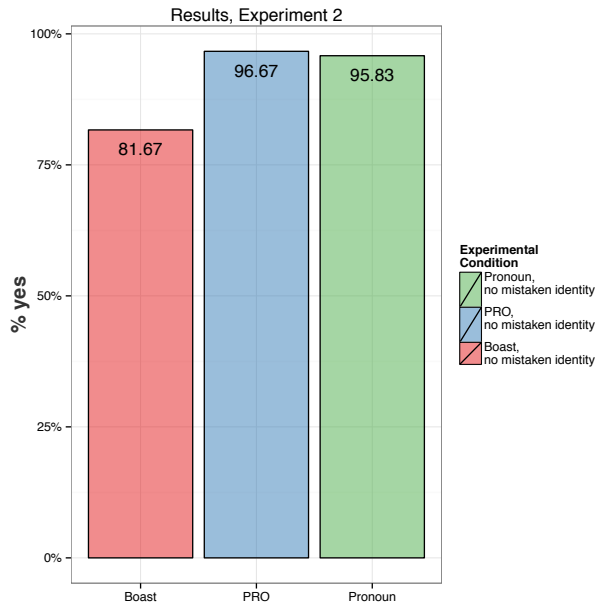
Given the standard characterization of the facts in the formal semantics literature, we predicted that the pronoun/mistaken identity condition would elicit a high rate of de re responses, and that the PRO/mistaken identity condition would elicit a low rate of such responses. Furthermore, we noticed based on our own introspection that sentences with *boast* are unambiguously false in mistaken identity situations. For example, ‘Mary boasted that she deserves the prize’ seemed to be false in the baking competition scenario. *Boast* type sentences therefore served as a control condition against which to compare the rate of de re responses for PRO sentences; if PRO is indeed unambiguously de se, then PRO-sentences and *boast* sentences should both elicit low rates of de re responses in the mistaken identity condition.

## 6.2 Results

Our scenario was fairly successful in overcoming the de se bias and thereby avoiding a ceiling effect: de re responses were recorded for 42.31% of answers in the pronoun/mistaken identity condition. Surprisingly, PRO elicited de re responses at roughly the same rate: participants judged these sentences true 43.56% of the time. By contrast, sentences in the *boast* type elicited few de re responses (15.84%). These results are summarized below.



As expected, sentences in both the PRO and the pronoun sentence types were almost always judged true in the ‘no mistaken identity’ condition (96.67% and 95.83% respectively). *Boast* sentences also yield a high rate of affirmative answers (81.67%).



Inspection of the reasons that participants gave for their answers verified that they read the stories carefully and reasoned about them in the expected way, paying attention to whether or not the speaker whose utterance is reported in the target sentence was aware that she was talking about herself. Participants who gave *de re* responses in the mistaken identity condition understood that in the story, a character had said something about herself without realizing that she was talking about herself. They deemed the fact that the awareness condition was not met irrelevant to the truth value of the target sentence, saying things like

‘She picked her cookie as the best, not knowing it was hers, and claimed whoever (being her) deserved the prize’, or ‘She picked her own cookies, knowingly or not’.

### 6.3 Discussion

Our results are surprising in that they show that participants give roughly the same rate of de re responses regardless of whether the sentence is formed with a control infinitive or a finite clause with an overt pronoun; the putative contrast observed in the theoretical literature is not attested in our data. The justifications given for participants’ answers confirm that they understood the scenarios and reasoned about them in an appropriate way; in particular, in the mistaken identity condition they understood that the relevant protagonist said something about herself without realizing that she was talking about herself. Furthermore, the responses in the *boast*/mistaken identity condition show that this cannot be due to participants failing to use the awareness condition as a basis on which to determine a truth value judgment: participants judged sentences in this condition false, citing the fact that the speaker did not know that she was talking about her own cookie. This is further supported by comparison with the *boast*/no mistaken identity condition trials, where we found a high rate of ‘yes’ response. This confirms that the crucial factor in participants’ rejection of *boast* sentences in the mistaken identity condition was indeed the awareness condition, as opposed to some other factor (say a general reluctance to describe a certain utterance as ‘boasting’, given the negative connotations of the word).

## **7. Comparing the semantics of lexically de se predicates and obligatory control**

We have discovered a series of differences in the behaviour of lexically de se predicates such as *boast* and obligatorily controlled PRO both in terms of introspective judgments and through data collected by experimental means. These constitute a puzzle that we will not be able to provide a definitive solution to in this short paper; however, a first step is set out a few assumptions about the semantics of *boast* versus control sentences formed with *claim*.

### 7.1 The semantics of *boast*

Suppose we adopt a Kratzerian approach to the semantics of attitude reports (eg Kratzer 2006, Moulton 2009, Kratzer 2013, Bogal-Allbritten 2016, Elliott 2017), according to which the clause introduced by an attitude verb is in fact a modifier (a predicate of eventualities, type  $\langle v, t \rangle$ )<sup>9</sup>. Then a sentence containing *boast* such as (24a) will have the truth conditions in (24b).<sup>10</sup>

24a. Mary boasted that she deserved the prize.

24b.  $\exists e$  [boast(e) & AG(e) = Mary & CON(e) =  $\lambda w$ . Mary deserves the prize in w]

Where CON(e) is that function from attitudinal eventualities e to propositions p such that p is the content of e.

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<sup>9</sup> We use the term ‘eventualities’ here to cover both states and events. Their type is v. Attitudinal eventualities are eventualities that have content – beliefs, desires, speech acts of various kinds, etc.

<sup>10</sup> We adopt the slightly unorthodox assumption that the content of the attitude (CON(e)) is identical to the set of worlds denoted by the embedded clause, rather than being a subset of that set; see Elliott (2017) for motivation of this idea. Nothing hinges on this choice for us; we adopt it simply for expository purposes.

‘There is an eventuality  $e$  such that (i)  $e$  is a boasting eventuality, (ii) the Agent of  $e$  is Mary and (iii) the content of  $e$  is the proposition that Mary deserves the prize in  $w$ .

Note additionally that *boast* does not have to combine with a *that*-clause:

- 25a. Yesterday Mary was boasting.  
25b.  $\exists e$  [boast( $e$ ) & AG( $e$ ) = Mary]

What does it mean for an event to count as a boasting event? It seems that  $x$  *boasted* is true just in case (i)  $x$  uttered some sentence  $S$  and (ii)  $x$ 's intention in uttering  $S$  was to cause her addressee to be impressed with herself. Crucially, the condition in (ii) should be understood on a *de se* reading of the reflexive. If instead  $x$ 's intention was to cause her addressee to be impressed with some individual whom *she does not realize* is herself – as when Mary unwittingly praises her own baking skills – then her speech act does not count as boasting. This is why, intuitively, Mary cannot be said to have boasted in this scenario.

In order to capture this intuition in the semantics of *boast* we will adopt the orthodox assumption that the contents of *de se* attitudes are sets of world-individual pairs  $\langle w', y \rangle$ , where  $y$  is a candidate of the attitude holder's for herself – an individual that for all she believes (wants, says, intends, etc.), she might be (eg Lewis 1979, Chierchia 1990). The dependence of the meaning of *boast* on intentions *qua* eventualities with centred content can then be captured as follows:

26. ‘ $x$  boasts’ is true in  $w$  iff  
(i) there is some  $p$  such that  $x$  utters  $p$ ; and  
(ii) for every  $\langle w', y \rangle$  such that it is compatible with the fulfilment of  $x$ 's intentions in uttering  $p$  in  $w$  for  $x$  to be  $y$  in  $w'$ , (a)  $x$ 's addressees believe in  $w'$  that  $p$ , and (b)  $x$ 's addressees' belief that  $p$  causes them to be impressed with  $y$  in  $w'$ .<sup>11</sup>

So the semantics of *boast* seems to be roughly the following:

27.  $\llbracket \text{boast} \rrbracket = \lambda e. \text{boast}(e) =$   
 $\lambda e. \text{say}(e) \ \& \ \text{there is some proposition } p \text{ such that } \text{CON}(e) = p \ \& \ \text{for every } \langle w', y \rangle \text{ such}$   
 $\text{that it is compatible with the fulfilment of } \text{AG}(e)\text{'s intentions in uttering } p \text{ in } w \text{ for } \text{AG}(e) \text{ to}$   
 $\text{be } y \text{ in } w', \text{ (a) } \text{AG}(e)\text{'s addressees believe in } w' \text{ that } p, \text{ and (b) } \text{AG}(e)\text{'s addressees' belief that}$   
 $p \text{ causes them to be impressed with } y.$

So a boasting event is (roughly) a speech act event where the agent is motivated by an intention to impress her audience (that is, to cause her audience to have a favourable impression of herself (*de se*)).<sup>12</sup> It is this latter part that introduces a *de se* component: the person speaking has an intention that can be paraphrased roughly as, ‘My addressee should

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<sup>11</sup> Throughout this paper, we leave open the possibility that mental attitudes such as beliefs and intentions may be unconscious; our semantics is compatible with such states of affairs.

<sup>12</sup> This semantics presupposes that all boasting events involve an addressee; we leave it to future work to interrogate how (im)plausible this assumption is. In any case, the notion of addressee should be sufficiently abstract to include such cases as a diarist writing ‘dear Diary’, or even a speaker who is talking to herself.

be impressed by *me* as a result of what I am saying'. Moreover, this meaning component is part of the semantics of the verb itself.

Given this semantics, the de se requirement of *boast* is an entailment introduced by the verb itself in just the same way as it is entailed that a speech act took place; the former should be no more amenable to being pragmatically ignored than the latter is. In contrast, certain prototypical properties of boasting events seem not to be required; a prototypical boast probably involves speaking loudly, for instance - why bother if your audience aren't going to hear you? - yet it is not completely out to say *Toby boasted quietly*. Since the proposed semantics is silent on properties of the reported speech act such as volume, this seems just as it should be.

What our data seem to teach us is that in attitude reports, a component of meaning that is introduced by the attitude verb itself cannot be backgrounded, although a component of meaning introduced by the complement clause can (within certain limits). For instances, the same thing goes for manner speech act predicates:

28a. Mary whispered (that she deserved the prize).

28b. Mary shouted (that she deserved the prize).

It is not enough to judge these true if Mary simply said that she deserved the prize; she must have done so in the specified manner.

## 7.2 Formal treatment of de se

So far, we have been assuming that the content of an attitude is of propositional type – that is, that it is a function from worlds to truth values, type  $\langle s,t \rangle$ . But this is known to be too *coarse-grained* a notion of content; in order to capture de se, the content of attitudes needs to have the type of a property, not a proposition ( $\langle e, \langle s,t \rangle \rangle$ ) (Lewis 1979, Chierchia, et alia). The idea, roughly, is that if Sandy believes (de se) that she is the best skateboarder, then she self-ascribes the property of being the best skateboarder. So it seems that our function CON needs to be reconsidered not as a function from attitudinal eventualities to propositions, but as a function from attitudinal eventualities to properties:

29. CON: type  $\langle v, \langle e, \langle s,t \rangle \rangle \rangle$

Intuitively, for any attitude  $e$ , CON( $e$ ) is that property  $P$  such that Holder( $e$ ) (the attitude holder) self-ascribes  $P$ .

Thus if Mary believes (de se) that she deserves the prize, then she self-ascribes (in the form of a belief) the property of deserving the prize. If she says (de se) that she deserves the prize, then she self-ascribes (in the form of a speech act) the property of deserving the prize, and so on.

30. Mary believes that she deserves the prize. (De se reading)

$\exists e$  [belief( $e$ ) & Holder( $e$ ) = Mary & CON( $e$ ) =  $\lambda x \lambda w. x$  deserves the prize in  $w$ ]

But this move from a more coarse-grained notion of content (propositions) to a more fine-grained one (properties) raises a question: how do we handle the areas where it seems that a more coarse-grained notion is in fact useful?

For example, intuitively, beliefs may be either true or false; Mary may be right that she deserves the prize, or she may be wrong. (Of course, whether she is right or wrong may be a matter of opinion, or difficult to settle, but that is a different matter.) When we judge that Mary's belief is true or false, we seem to be saying that the *content* of her belief is true or false. But properties are not the kinds of things that are true or false, propositions are.

A property is simply a proposition with an unsaturated individual argument. So to obtain a truth-evaluable object from a property we can simply apply the property to the attitude holder, yielding a proposition. It seems then that we need two notions of content: a fine-grained one (properties), and a coarse-grained one (propositions).

31a.  $CON_{fg}$ : function from attitudinal eventualities to properties (type  $\langle v, \langle e, \langle s, t \rangle \rangle \rangle$ )

31b.  $CON_{cg}$ : function from attitudinal eventualities to propositions (type  $\langle v, \langle s, t \rangle \rangle$ )

This looks like extra machinery but it needn't weigh too heavily once we notice that there is a straightforward mapping between the two: for any attitudinal eventuality  $e$ , the coarse-grained content of  $e$  is obtained by applying the fine-grained content of  $e$  (a property  $P$ ) to the attitude holder ( $Holder(e)$ ).

32. For any attitudinal eventuality  $e$  with *fine-grained* content  $P$ ,  $CON_{cg}(e) = P(Holder(e))$

This notion of coarse-grained content has a number of uses. For example, we can use it to capture our intuitions about the circumstances under which Mary's belief (de se) that she deserves the prize is true or false.

33. For any attitudinal eventuality  $e$ ,  $e$  is TRUE iff  $CON_{cg}(e)(world(e)) = 1$

(‘An attitude is true if and only if the coarse-grained content of the attitude is true in the world in which the attitude is held.’)

34. Mary believes that she deserves the prize. (De se reading)

‘Mary's belief is true iff the proposition that Mary deserves the prize is true in the world in which Mary holds that belief.’

Another place where the coarse-grained notion of content is useful is with attitudes that carry a presupposition. Take factives such as *know*. ‘Trump knows that he is President of the USA’ seems to presuppose that Trump is President of the USA. But if the content of Trump's knowledge were simply the property of being President of the USA, then we could not capture this; properties are not the kinds of things that are true or false. Again, the notion of *coarse-grained* content helps us. The coarse-grained content of Trump's knowledge is the property obtained by applying the property of being President to Trump – ie, the proposition that Trump is President. So we can say that *know* presupposes that its *coarse-grained* content is true.

It seems then that we need a method for switching between (at least) two notions of content – one that is more fine-grained, and one that is less fine-grained. It turns out that Kratzer’s system is particularly well-suited to this task.

On the old view, due to Hintikka, the complements of attitude verbs are *arguments* of such verbs. With a *de se* attitude, the meaning of the complement is of property type, and the attitude predicate must have a suitable lexical entry for being fed an argument of this type. With other attitude reports – eg ‘John believes that it’s raining’, where the question of *de se/de re* doesn’t arise, the argument is of propositional type, and the verb must have an appropriate type for taking a type  $\langle s,t \rangle$  argument. Thus multiple lexical entries are needed for every attitude verb, in order to avoid type mismatch.

On Kratzer’s view, attitude verbs simply denote predicates of eventualities, and ‘complement’ clauses are modifiers of such eventualities. The *same* attitudinal eventuality  $e$  may have a more fine-grained content  $CON_{fg}(e)$ , and a more coarse-grained content  $CON_{cg}(e)$ . Either way, it is the *same* eventuality, with the same lexical entry and the same semantic type.

As we have defined them, the difference between a fine-grained notion of content and a coarse-grained one is that when an attitude is about the attitude holder herself, then whether or not the attitude holder is *aware* that her attitude is about herself (that is, whether the attitude is *de se* or *de re*) is distinguished at the level of fine-grained content, but not at the level of coarse-grained content. We should then expect that in a context where the *de se/de re* distinction is *irrelevant* to the truth of the attitude report, it should be sufficient to judge the truth of the sentence on the basis of the coarse-grained content alone.

One way to implement this idea is by appealing to Lasnik’s notion of pragmatic haloes (Lasnik 1999). Lasnik observed that if a sentence  $S$  is ‘close enough to the truth’ in a context  $c$ , then  $S$  may be judged true in  $c$ . For example, in many contexts we are inclined to judge ‘Lisa arrived at 3pm’ true if in fact Lisa arrived 47 seconds after the hour. Suppose we are in a context  $c$  where it’s good enough for our purposes if Lisa arrived under one minute to the hour or if she arrived up to one minute after; in such a context, any more fine-grained distinctions are pragmatically ignorable. We can say that the pragmatic halo for ‘Lisa arrived at 3pm’ in  $c$  is a set consisting not also of the proposition that Lisa arrived at exactly 3pm, but also that she arrived at 3pm and one second, 3pm and two seconds, and so on, up to 3.01pm (and the same for every interval stretching back to 2.59pm). In general, a sentence  $S$  is considered true in a context  $c$  if one of the elements of the halo of  $S$  in  $c$  is true. In the case at hand, since the proposition that Lisa arrived at 3pm and 47 seconds is a member of the halo and furthermore true, the sentence counts as true.

Returning to the case of attitude reports, it seems that the complement clause of an attitude verb is associated with a pragmatic halo that makes available a more coarse-grained content, even when such a content is not made *directly* available by the LF or compositional semantics:

35. [Mary claimed [PRO to deserve the prize]]

36. Pragmatic halo of the infinitive:



$\{\lambda e. \text{CON}_{\text{fg}}(e) = \lambda x \lambda w. x \text{ deserves the prize in } w, \lambda e. \text{CON}_{\text{cg}}(e) = \lambda w. \text{Holder}(e) \text{ deserves the prize in } w\}$

The pragmatic halo consists of (i) the predicate of eventualities generated by the LF of the report, given standard compositional semantic assumptions, and (ii) the predicate of eventualities generated by calculating the *coarse-grained* content, given our procedure for mapping fine-grained to coarse-grained content.

Lasnik argues that in a context where some truth condition of a sentence predicted by the compositional semantics is pragmatically ignorable (eg because it is not relevant to the task at hand), that truth condition may be ignored for the purposes of evaluating the truth or falsity of the sentence, providing that there is an element of the pragmatic halo that, when it enters the semantic composition, yields the weaker truth conditions. This seems to be precisely the situation that we are in in the baking competition scenario. There, we set up a case where it is irrelevant to the task at hand (determining who should be given the prize) whether Mary is or is not aware that she is talking about her own cookie. So it is permitted to pick from the pragmatic halo the weaker element, which is constructed on the basis of a notion of coarse-grained content. Thus a truth value judgment is given on the basis of the following truth conditions:

37. Mary claimed PRO to deserve the prize.

$\exists e [\text{claim}(e) \ \& \ \text{Holder}(e) = \text{Mary} \ \& \ \text{CON}_{\text{fg}}(e) = \lambda w. \text{Holder}(e) \text{ deserves the prize in } w]$

Why is the same option not available for *boast*? Actually, it might be, in the sense that the null hypothesis should be that complement clauses of *all* attitude verbs are associated with a pragmatic halo encoding the different options for granularity of content. But in this case, picking the predicate of eventualities that is based on the more coarse-grained notion won't help us: the source of the de se interpretation lies in the predicate itself. As we have seen above, it is part of what it is for something to count as a boast or boasting that it must involve an intention that is itself inherently de se. No pragmatic context for a *boast* sentence will ever render the de se/de re distinction irrelevant, because the mere *use* of the word *boast* renders that distinction relevant, just as the use of the word *whisper* renders the volume of the utterance relevant.

## 8. Conclusion

We have made three observations about obligatorily controlled PRO that are puzzling in light of the widely held assumption that PRO is obligatorily read de se. Firstly, the addition of hedges such as *unwittingly* and *in effect* has the effect of relaxing the de se requirement in control contexts. Secondly, questions conforming to the schema 'Did x claim PRO to VP or did x<sub>i</sub> claim that she<sub>i</sub> VP' are perceived as contradictory, even though it ought to be possible to avoid a contradiction by interpreting PRO de se and the overt pronoun de re. Finally, in an experimental set up where the relevance of 'mistaken identity' was lowered, sentences with PRO were judged true at comparable rates to their counterparts with an overt pronoun. It seems tempting to consider these findings merely as evidence of a general interpretive latitude; perhaps the participants in our experiment were simply 'charitable', or perhaps modifiers such as *in effect* signal that the speaker diverges from the literal meaning of what

she says. But such interpretive latitude has clear limits: the baseline case of *boast* is simply impervious to the effect that we have dubbed ‘backgrounding’ of the de se requirement. Backgrounding occurs when features of a context that are judged pragmatically irrelevant are ignored for the purposes of evaluating the truth of a sentence.

We have tentatively suggested that the mechanism underpinning this effect is Lasersohn’s ‘pragmatic halo’ – a set consisting of the denotation of the offending expression (the complement clause in the case of de se reports), along with further elements that differ from it in ways that are pragmatically ignorable. In the cases at hand, the pragmatic halo is a set consisting of (i) the denotation of the complement clause (a set of attitudinal eventualities with fine-grained content) and (ii) a set of attitudinal eventualities whose content is just like the content of the eventualities in (i), except that their content is coarse- rather than fine-grained. Such a halo makes no difference in the case of *boast* sentences: the source of the de se requirement associated with these sentences is the verb itself, rather than the complement clause. Much work remains to be done in order to understand these phenomena better, but for now we hope that we have managed to give an indication of how a Kratzerian approach to attitude reports can begin to shed some light upon a rather surprising trio of puzzles.

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