

## Vivid Attitudes: Centered Situations in the Semantics of *Remember* and *Imagine* \*

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**Abstract** This paper deals with a subset of uses of propositional attitude predicates such as *remember* and *imagine*. I argue that these have a distinct **vivid** reading, which requires direct witnessing or sensory perception similar to that required in direct perception reports. To account for this use, I introduce a notion of **centered situations**, combining situations in the sense of Kratzer (1989) with centered worlds in the sense of Lewis (1979) and others. I propose that, on their vivid uses, these predicates make reference to a (real or possible) **centered situation**. This makes it possible in particular to account for attitude reports that are simultaneously vivid and obligatorily *de se*.

**Keywords:** *Imagine*, *Remember*, Propositional Attitudes, Direct Perception Reports, Centered Worlds, Situation Semantics

### 1 Vivid Attitudes

In this section, I will argue that *remember* and *imagine* have a distinct, **vivid** reading that gives rise to an interpretation somewhat akin to that of a direct perception report. This reading can be distinguished from non-vivid ones based on a few different tests, including intuitive truth conditions, the availability of certain modifiers, and, to some extent, the syntactic properties of the embedded clause.

#### 1.1 An Initial Contrast

Consider (1)-(2).

- (1) Mary remembered John feeding the cat.
- (2) Mary remembered that John fed the cat.

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(2) can be true in a situation where Mary was only told about the feeding. On the other hand, (1) requires her to have actually witnessed it. This is similar to familiar observations about direct perception reports (see, e.g., Barwise 1981; Barwise & Perry 1983; Kratzer 2009) – that is, (1) behaves something like (3), whereas (2) behaves something like (4).

(3) Mary saw John feed the cat.

(4) Mary saw that John fed the cat.

To see the point in another way, consider (5)-(6).

(5) # Mary remembered being born in L.A.

(6) Mary remembered that she was born in L.A.

For (5) to be true, Mary must have the extraordinary ability to remember back to her own birth, whereas (6) could be true under ordinary circumstances.

## 1.2 A Diagnostic

We can also distinguish these two uses of *remember* by the behavior of modifiers such as *vividly*. For example, inserting *vividly* in sentence (1) yields (7), which sounds acceptable. On the other hand, if we try to insert *vividly* in (2), as in (8), the result sounds a bit odd.

(7) Mary vividly remembered John feeding the cat.

(8) ?? Mary vividly remembered that John fed the cat.

A similar pattern holds for a modifying PP such as *in perfect detail*, as shown in (9)-(10b).

(9) Mary remembered John feeding the cat in perfect detail.

(10) (a) ??/\* Mary remembered in perfect detail that John fed the cat.

(b) ??/\* Mary remembered that John fed the cat in perfect detail.

(9) sounds perfectly fine, and has the intended meaning that Mary's memory is particularly detailed. On the other hand, (10a) sounds odd, and (10b) seems to suggest a nonsensical interpretation on which John's feeding of the cat was somehow especially detailed.

As a reflection of this diagnostic, I will call the two uses of *remember* the **vivid** use, which requires direct witnessing and permits modification with *vividly* or *in*

*perfect detail*, and the **non-vivid** use, which does not require direct witnessing and does not permit modification with *vividly* or *in perfect detail*.

### 1.3 More on Clause Type and the Vivid Use

Recall the initial examples of the two uses of *remember*, (1)-(2), repeated below:

(1) Mary remembered John feeding the cat.

(2) Mary remembered that John fed the cat.

These embed different clause types: (1) contains a gerundive small clause and no *that* complementizer, while (2) contains a normal finite *that*-clause. However, unlike the case of direct perception reports, the distinction between the vivid and non-vivid use is not tied tightly to clause type. In particular, while it does seem that gerundive small clauses as in (1) always trigger a vivid reading, finite *that*-clauses do not always trigger non-vivid readings. For example, a vivid reading seems to be possible for (11), as evidenced by the fact that (12) is acceptable.

(11) Mary remembered that John was busy feeding the cat.

(12) Mary vividly remembered that John was busy feeding the cat.

### 1.4 Vivid and Non-Vivid *Imagine*

Here I'll argue that *imagine* also has a distinctive vivid use. First consider (13)-(14).

(13) Mary imagined John feeding the cat.

(14) Mary imagined that John fed the cat.

The contrast is not quite as obvious as it was with *remember* in (1)-(2) (Section 1.1), since the situations involved with imagining aren't generally actual ones, and therefore can't be directly witnessed in the same way. However, a parallel contrast can still be found if we look carefully. For example, for (13) to be true, Mary needs to have some sort of mental image of a situation in which John is actually engaged in feeding the cat; whereas (14) could be true if Mary had a mental picture of the circumstances that would result from John feeding the cat (such as a satisfied cat licking its paws beside a dirty food dish).

As with *remember*, we can add *vividly* without oddness to (13), but not to (14), as shown in (15)-(16).

(15) Mary vividly imagined John feeding the cat.

(16) ?? Mary vividly imagined that John fed the cat.

And, also as with *imagine*, a vivid reading is available with progressive *that*-clauses as in (17).

(17) Mary vividly imagined that John was feeding the cat.

Note that the use of *imagine* that means something like ‘believe’ or ‘entertain’, as in (18) or (19), is non-vivid, as evidenced by the fact that adding *vividly* makes them odd (see 20-21).

(18) I imagine you must be tired.

(19) I never imagined that John would actually forget to feed the cat.

(20) ??/\* I vividly imagine (that) you must be tired.

(21) ??/\* I never vividly imagined that John would actually forget to feed the cat.

## 2 *De Se* Reports

*Imagine* and *remember* can also occur in control constructions, as in (22)-(23).

(22) John remembered feeding the cat.

(23) John imagined feeding the cat.

As is usual with control constructions (see, e.g., Morgan 1970; Chierchia 1989), these are obligatorily interpreted *de se*. For example, for (22) to be true, John must be aware that it is his own self that is doing the singing in his memory. But beyond being obligatorily *de se*, these are also obligatorily interpreted as involving imagining or remembering **from the inside** in the sense of Vendler (1979) (also see, e.g., Recanati 2007; Ninan 2008). That is, the mental image John builds up (or calls to memory) must be from the sensory perspective of the person doing the feeding; it is not sufficient that John be able identify this individual as his *de se* counterpart. This in turn means that for (22) to be true (for example), John has to have directly witnessed the relevant feeding event (since being the person doing the feeding is one way of directly perceiving it). Things work similarly for *imagine* in (23). As a result, control constructions with *imagine* and *remember* are essentially guaranteed to be vivid as well. Accordingly, it is not surprising that these are acceptable with modifiers like *vividly* as in (24)-(25).

(24) John vividly remembered feeding the cat.

(25) John vividly imagined feeding the cat.

The requirement for a “from the inside” interpretation seems to be specific to control clauses. Note that if a small clause with a reflexive is used instead, as in (26), the interpretation need not be either *de se* or “from the inside.” For example, John could be imagining a film of a person who looks like him feeding the cat, whether or not he is able to identify this person as his *de se* counterpart. This doesn’t change when *vividly* is added as in (27).

(26) John imagined himself feeding the cat.

(27) John vividly imagined himself feeding the cat.

Incidentally, this suggests one of two things about *de se* interpretations of reflexives. If we assume that (22)-(23) must be interpreted “from the inside” for the same reason that they are *de se* – if these two properties are closely connected – then this gives us reason to believe that a *de se* understanding of (26) or (27) does not arise from a distinct reading, but simply reflects a generality in the truth conditions. I won’t have any more to say about this issue here, however.

### 3 Proposal

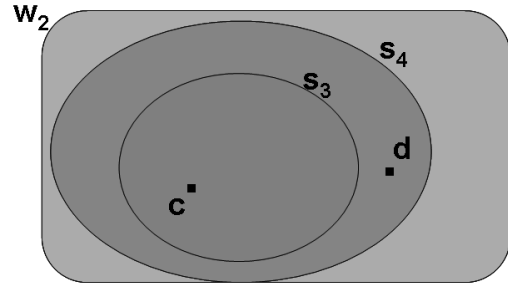
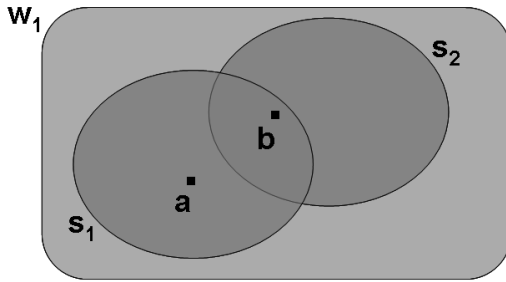
My proposal, in essence, is that vivid attitude predicates make reference to centered situations, where a centered situation is understood as a situation experienced from the perspective of one of the individuals in that situation. Roughly, a sentence of the form *x imagines p* is true if there is a centered situation at which *p* is true and to which *x* stands in the particular cognitive relation that corresponds to vivid imagining. I’ll begin by going through the view of centered situations that I’m assuming, and then turn to the specifics of the analysis.

#### 3.1 Centered Situations

The notion of a centered situation that I’m using here is intended to be simply a combination of a standard view of centered worlds (as understood, e.g., by Lewis 1979) with a notion of situations as parts of possible worlds, following Kratzer (1989). In particular, I take a centered situation to be a pair  $\langle s, x \rangle$  where *s* is a situation (part of a world) and *x* is an individual in *s*. Some examples are illustrated in (28).

(28)

**Centered Situations:**



**Centered Situations:**

$\langle s_1, a \rangle, \langle s_1, b \rangle, \langle s_2, b \rangle$

**Part-Whole Relation:**

$$s_1 \leq w_1, \\ s_2 \leq w_1$$

**Centered Situations:**

$\langle s_3, c \rangle, \langle s_4, c \rangle, \langle s_4, d \rangle$

**Part-Whole Relation:**

$$s_3 \leq s_4 \leq w_2$$

For example,  $\langle s_2, b \rangle$  counts as a centered situation since  $b$  is in  $s_2$ , but  $\langle s_2, a \rangle$  does not because  $a$  is not in  $s_2$ . Similarly,  $\langle s_3, d \rangle$  is not a centered situation because  $d$  is not in  $s_3$ . Note that technically  $\langle w_1, a \rangle, \langle w_1, b \rangle, \langle w_2, c \rangle$ , and  $\langle w_2, d \rangle$  are also centered situations, since worlds are just maximal situations.

Following [Kratzer](#), I assume that situations (and worlds) stand in part-whole relations. For example, in (28),  $s_1$  and  $s_2$  are each part of  $w_1$  ( $s_1 \leq w_1$  and  $s_2 \leq w_1$ ) but  $s_1 \not\leq s_2$  and  $s_2 \not\leq s_1$ . Although is this not noted in (28), situations count as parts of themselves, so  $s_1 \leq s_1, s_2 \leq s_2, w_1 \leq w_1$ , and so on. For every situation  $s$ , there is a unique maximal situation  $w$  that  $s$  is part of. Note that this part-whole relation is only over situations, not centered situations. There are various ways we could extend this idea to centered situations, but I won't need to do that here in any full-fledged way. I will, however, say that a centered situation  $\langle s, y \rangle$  is **in a world**  $w$  iff  $s \leq w$ .

### 3.2 Semantics for *Imagine* and *Remember*

As mentioned above, I'm proposing that vivid attitude reports make reference to specific centered situations. There are various ways this could be implemented, including simply requiring that a centered situation of the right kind exists, adding a position for a centered situation argument, or assuming that the complement clause itself actually refers to a particular centered situation. Partly for ease of exposition, I will assume that vivid attitudes have an additional argument position for a centered

situation, but little will depend on this choice in technical implementation.

Under these assumptions, we can give *remember* (on its vivid reading) the lexical entry in (29). Note that  $\langle s, y \rangle$  is intended to be a variable over centered situations, and  $p$  is a variable over a proposition, which I'll say more about in Section 3.3.

$$(29) \quad \llbracket \text{remember} \rrbracket^{w,t} = [\lambda p . [\lambda \langle s, y \rangle : p(\langle s, y \rangle) = 1 . [\lambda x_e . x \text{ has the cognitive relation of remembering vividly towards } \langle s, y \rangle \text{ in } w \text{ at } t] ] ]$$

This says that a sentence of the form  $x$  *imagines*  $p$ , making reference to a particular centered situation  $\langle s, y \rangle$ , is true at world  $w$  and time  $t$  iff  $x$  holds the appropriate vivid cognitive relation towards  $\langle s, y \rangle$ , provided that  $p$  is true in  $\langle s, y \rangle$ . Of course, a fair amount of work is being done by the placeholder “cognitive relation of remembering vividly,” but intuitively this is intended to be whatever relation a person needs to have to some event or happening to count as remembering it. (30) gives some more specific requirements for this relation to hold.

- (30) For  $x$  to **vidently remember**  $\langle s, y \rangle$  (in  $w$  at  $t$ ), it must be the case that:
- i.  $x$  formed a memory of  $s$  by directly witnessing it
  - ii.  $x$ 's experience of  $s$  is from the perspective of  $y$
  - iii. the time of  $s$  is prior to  $t$
  - iv.  $s \leq w$  (for true memories)

Condition (iv) ensures that the remembered situation actually exists. This might need to be changed to allow for cases of false memory, but that is independent of the issues at hand and I will not be addressing it here.

Similarly, vivid *imagine* can be given the lexical entry in (31). Some requirements for the relation of imagining vividly are given in (32).

$$(31) \quad \llbracket \text{imagine} \rrbracket^{w,t} = [\lambda p . [\lambda \langle s, y \rangle : p(\langle s, y \rangle) = 1 . [\lambda x_e . x \text{ has the cognitive relation of imagining vividly towards } \langle s, y \rangle \text{ in } w \text{ at } t] ] ]$$

- (32) For  $x$  to **vidently imagine**  $\langle s, y \rangle$ , it must be the case that:
- i.  $x$  forms a mental image of  $s$  as if by directly witnessing it
  - ii.  $x$ 's imagined experience of  $s$  is from the perspective of  $y$

In the case of imagining, there is no requirement that  $s$  be part of  $w$ , since imagined events are generally not actual, and the time of  $s$  doesn't have to bear any particular relation to the time of imagining.

### 3.3 Semantics for Embedded Clauses

Finally, we need to make some assumptions about the semantics of the clauses embedded under *remember* and *imagine*. The meanings for *remember* and *imagine* above contain the presuppositional restriction that the propositional argument  $p$  be true at the centered situation  $\langle s, y \rangle$ , which means that we need to allow propositional (sentential) items to be true or false at centered situations. In typical cases, we can just assume that  $p$  is true at a centered situation  $\langle s, y \rangle$  iff  $p$  is true at  $s$ . For example, then, the meaning of *John feeding the cat* is given in (33).

$$(33) \quad \llbracket \text{John feeding the cat} \rrbracket^{w,t} = [\lambda \langle s, y \rangle . \text{John feeds the cat in } s]$$

In this case, the center  $y$  is an idle wheel, but this will not be the case in *de se* reports. In these cases, the center is the *de se* counterpart of the attitude holder. For example, in a sentence like (22), *John remembered feeding the cat*, the constituent *feeding the cat* is true at a centered situation if the center feeds the cat, as illustrated in (34).

$$(34) \quad \llbracket \text{feeding the cat} \rrbracket^{w,t} = [\lambda \langle s, y \rangle . y \text{ feeds the cat in } s]$$

For a more detailed implementation of this idea, see Stephenson (2010), based on Chierchia (1989) and others.

### 3.4 Examples

Now let me turn to giving a few illustrative examples of the analysis laid out in Sections 3.2-3.3. Let's start with (1), repeated below, which is predicted to have the meaning in (35). (I am assuming that a silent centered world argument  $\langle s_1, z \rangle$  is present, and I'm disregarding the role of the past tense.)

(1) Mary remembered John feeding the cat.

$$(35) \quad \begin{aligned} \llbracket \text{Mary remembered John feeding the cat} \rrbracket^{w,t} &= \llbracket \text{remember} \rrbracket^{w,t} (\llbracket \text{John feeding the cat} \rrbracket^{w,t}) (\langle s_1, z \rangle) (\llbracket \text{Mary} \rrbracket^{w,t}) \\ &= [\lambda p . [\lambda \langle s, y \rangle : p(\langle s, y \rangle) = 1 . [\lambda x_e . x \text{ has the cognitive relation of remembering vividly towards } \langle s, y \rangle \text{ in } w \text{ at } t ] ] ] ([\lambda \langle s, y \rangle . \text{John feeds the cat in } s]) (\langle s_1, z \rangle) (\text{Mary}) \\ &= 1 \text{ iff Mary has the cognitive relation of remembering vividly towards } \langle s_1, z \rangle \text{ in } w \text{ at } t, \text{ provided that John feeds the cat in } s_1 \end{aligned}$$

Next consider (22), repeated below. This is predicted to have the meaning in (36).

(22) John remembered feeding the cat.

- (36)  $\llbracket \text{John remembered feeding the cat} \rrbracket^{w,t} = \llbracket \text{remember} \rrbracket^{w,t} (\llbracket \text{feeding the cat} \rrbracket^{w,t}) (\langle s_1, z \rangle) (\llbracket \text{John} \rrbracket^{w,t})$   
 $= [\lambda p . [\lambda \langle s, y \rangle : p(\langle s, y \rangle) = 1 . [\lambda x_e . x \text{ has the cognitive relation of remembering vividly towards } \langle s, y \rangle \text{ in } w \text{ at } t ] ] ] (\llbracket \lambda \langle s, y \rangle . y \text{ feeds the cat in } s \rrbracket) (\langle s_1, z \rangle) (\text{John})$   
 $= 1 \text{ iff John has the cognitive relation of remembering vividly towards } \langle s_1, z \rangle \text{ in } w \text{ at } t, \text{ provided that } z \text{ feeds the cat in } s_1$

#### 4 Further Applications and Issues

In this section I'll discuss a few more ways in which the account can be applied and generalized, and bring up some issues for further study.

##### 4.1 Dual Perspectives

The account in Section 3 provides a straightforward explanation for sentences like (37)-(38).<sup>1</sup>

- (37) Mary imagined having a bright light shining in her eyes and not being able to see it.  
 (38) Mary remembered being in a room with Beethoven's *Ninth* playing but not being able to hear it.

In (37), Mary must have simultaneously imagined what it would be like to *not* see a bright light, and for a bright light to in fact be shining in her eyes – as would happen, for example, if she were temporarily blinded. Similarly, in (38), Mary must remember what it was like to *not* hear a symphony playing when in fact it was, as might happen if the music were drowned out by louder noises.

Let's illustrate these with (37). Following the proposal for controlled clauses in Section 3.3, I assume that the embedded clause has the meaning in (39). Then (37) will be predicted to have the meaning in (40).

- (39)  $\llbracket \text{having a bright light shining in her eyes and not being able to see it} \rrbracket^{w,t} = [\lambda \langle s, y \rangle . y \text{ has a bright light shining in her eyes in } s \text{ and } y \text{ can't see the light in } s]$   
 (40)  $\llbracket \text{Mary imagined having a bright light shining in her eyes and not being able to see it} \rrbracket^{w,t} = \llbracket \text{imagine} \rrbracket^{w,t} (\llbracket \text{having a bright light shining in her eyes and not being able to see it} \rrbracket^{w,t}) (\langle s_1, z \rangle) (\llbracket \text{Mary} \rrbracket^{w,t})$

<sup>1</sup> These were brought to my attention in a somewhat different context by Irene Heim (p.c.).

= 1 iff Mary has the cognitive relation of imagining vividly towards  $\langle s_1, z \rangle$  in  $w$  at  $t$ , provided that  $z$  has a bright light shining in her eyes in  $s_1$  and  $z$  can't see the light in  $s_1$

This requires that Mary mentally build up a centered situation  $\langle s_1, z \rangle$  in which  $z$  has certain properties (being in a particular spatial configuration with a bright light and being in a particular perceptual state), and at the same time build up an image of what it would be like to experience the situation  $s_1$  from the perspective of  $z$ . This seems correct, and highlights the importance of having both the “situation” part and the “center” part of a centered situation in the analysis. Similar observations apply to (38).

## 4.2 DP Complements

Note that *remember* and *imagine* can also take nominal complements as in (41)-(42).

(41) Mary remembered the cat.

(42) Mary imagined a cat.

I suggest that this is a vivid use of *imagine* and *remember*, for two reasons. First, the modifier *vivid* is possible as shown in (43)-(44).

(43) Mary vividly remembered the cat.

(44) Mary vividly imagined a cat.

Second, a requirement similar to direct witnessing seems to apply. For example, for (41) to be true, Mary has to have directly perceived the cat – it not sufficient that she simply be told that the cat exists, for example. Similar considerations apply to (42), though here the truth conditional effect is a bit more subtle since it involves an imagined cat rather than an actual one.

To extend the account to examples like (41)-(42), we only need to allow for the nominal expressions *a cat* and *the cat* to have meanings along the lines of (45) and (46), respectively.

(45)  $\llbracket \text{a cat} \rrbracket^{w,t} = [\lambda \langle s, y \rangle . \text{there is a cat in } s]$

(46)  $\llbracket \text{the cat} \rrbracket^{w,t} = [\lambda \langle s, y \rangle . \text{the (unique contextually salient) cat is in } s]$

### 4.3 Lawlike Generalizations

Vivid readings seem to be ruled out when the embedded proposition is something lawlike, which holds true in general rather than being made true by more specific, accidental facts about particular situations. One clear case of this is a mathematical truth such as the fact that pi is an irrational number. For example, (47 a), which contains a gerundive small clause and thus only allows a vivid reading, sounds odd, whereas (47 b) is acceptable. If we force a vivid reading of (47 b) by adding the modifier *vividly* as in (47 c), then it too sounds odd.<sup>2</sup>

- (47) [Context: People are discussing what they remember from math classes in school.]
- (a) ?? I remember pi being irrational.
  - (b) I remember that pi was irrational.
  - (c) ?? I vividly remember that pi was irrational.

This is also true for lawlike physical facts, as illustrated in (48), and biological ones, as illustrated in (49).

- (48) [Context: People are discussing what they remember from physics classes in school.]
- (a) ?? I remember gravity being inversely proportional to distance squared.
  - (b) I remember that gravity was inversely proportional to distance squared.
  - (c) ?? I vividly remember that gravity was inversely proportional to distance squared.
- (49) [Context: People are discussing what they remember from biology classes in school.]
- (a) ?? I remember bats being mammals.
  - (b) I remember that bats were mammals.
  - (c) ?? I vividly remember that bats were mammals.

On the face of it, these pose a problem for my analysis. My proposal predicts, for example, that (47 a) should be true provided that the speaker vividly remembers some situation in which it's true that pi is irrational. If we assume that mathematical truths hold in all situations, this amounts to making the sentence true if the speaker has any vivid memories at all.

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<sup>2</sup> Thanks to Meagan Louie for helpful discussion of these cases.

There are a number of ways to approach this. One possibility is to say that lawlike facts do not actually hold in all situations (even though they do hold in the worlds containing these situations); instead, they only hold in situations that contain the relevant abstract objects, such as  $\pi$  or the force of gravity. In this case, we might be able to say that ordinary people can't have sufficiently vivid cognitive relations towards things like  $\pi$  or gravity (or bats as a natural kind, as opposed to individual bats), and therefore can't have sufficiently vivid cognitive relations to situations containing these objects. Note that this would go against the claim of [Kratzer \(1989\)](#) that lawlike propositions have the property of being either true or false in all the situations of any given world.

Another possibility is to put a stricter requirement on the centered situation argument of vivid attitudes. Recall that the meanings for *remember* and *imagine* in [Section 3.2](#) take three arguments: a proposition  $p$  (construed as something that's true or false at a centered situation), a centered situation  $\langle s, y \rangle$ , and an individual  $x$ , with the added requirement that the proposition  $p$  be true at the centered situation  $\langle s, y \rangle$ . We could refine this (using another idea of [Kratzer's](#)) by requiring that  $p$  not merely be true in  $\langle s, y \rangle$ , but be **exemplified** by it. On [Kratzer's](#) view (informally speaking), a situation  $s$  exemplifies a proposition  $p$  if  $p$  is true in  $s$  and nothing in  $s$  is extraneous to the truth of  $p$ . So, for example, a situation containing two apples and nothing else exemplifies the proposition 'there are apples', and so does a situation containing ten apples and nothing else; but a situation containing three apples and a pear does not. (See, e.g., [Kratzer 2002, 2009](#) for further discussion and definitions.) We can extend this notion to centered situations by saying (again informally) that a centered situation  $\langle s, y \rangle$  exemplifies a proposition  $p$  if  $p$  is true in  $\langle s, y \rangle$  and the situation part  $s$  contains nothing extraneous to making  $p$  true.<sup>3</sup> Note the minor sleight of hand here: the center  $y$  could potentially be extraneous, though it need not be – I assume that the center will be crucial to the propositions involved in *de se* attitudes, for example. Now we can ask what a (centered) situation would look like that exemplified a lawlike proposition. If we again assume that lawlike propositions are true in all of the situations of a world, then the only situations exemplifying a lawlike proposition would be ones that are so minimal as to have nothing concrete in them other than the individual center (since any additional objects would be extraneous to the truth of the proposition). We can then claim that it is not possible to stand in an appropriately vivid cognitive relation to this kind of completely minimal situation.

I've only given a sketch of these approaches, of course, and will have to leave a more detailed discussion of lawlike generalizations under *imagine* and *remember* for some other occasion, but I think I have shown at least that there is an important role

<sup>3</sup> Here is a somewhat more formal definition based on the one in ([Kratzer 2002](#): p. 660):  $\langle s, y \rangle$  exemplifies  $p$  iff  $p$  is true in  $\langle s, y \rangle$  and whenever  $s' \leq s$  and  $p$  is not true in  $\langle s', y \rangle$ ,  $s'$  can be extended to a **minimal situation**  $s''$  such that  $p$  is true in  $\langle s'', y \rangle$ . I leave further details for future work.

to be played by situation semantics and centered situations.

## 5 Conclusions and Outlook

In this paper, I've argued that *remember* and *imagine* have a distinct vivid reading, which makes crucial reference to centered situations. I've shown that vivid readings of attitudes can be distinguished from non-vivid ones by a number of diagnostics, including a requirement for direct witnessing, licensing of modifiers such as *vivid* and *in perfect detail*, and (in a limited way) the morphosyntax of the embedded clause. Using partial worlds (situations) rather than whole worlds makes it possible to pick out specific events or states which an individual could grasp in relevant cognitive ways. Adding individual centers makes it possible to give a unified analysis of vivid attitude reports containing gerundive small clauses (*x imagined y singing*), *that*-clauses (*x imagined that y was singing*) and control constructions (*y imagined singing*). The notion of a situation is also versatile enough to extend the same approach to cases with nominal complements (*x imagined a cat*).

Of course, in many places this paper has only scratched the surface of the issues involved, and several avenues for continued work suggest themselves. First of all, it's very likely that more will ultimately need to be said about what it means to stand in cognitive relations of remembering, imagining, etc. to situations or centered situations. It would also be useful to look for additional attitude predicates with vivid readings (in English and/or other languages). For example, it seems likely that the literal understanding of *dream* is inherently vivid, since in order for a person to dream that *p*, they have to have some particular dream in which *p* occurs. And just to name one more area, it could be important to look more carefully at how my assumptions about situations and centered situations interact with other aspects of situation semantics, particularly in light of the issues related to genericity and exemplification touched on in Section 4.3.

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