



# Experiential Imagination and the Inside/Outside-Distinction

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**Abstract.** Gerundive imagination reports with an embedded reflexive subject (e.g. *Zeno imagines himself swimming*) are ambiguous between an ‘inside’ and an ‘outside’ reading: the inside reading captures the imaginer’s directly making the described experience (here: swimming); the outside reading captures the imaginer’s having an experience of an event, involving his own counterpart, from an out-of-body point of view (watching one’s counterpart swim). Our paper explains the inside/outside-ambiguity through the observation (i) that imagining can referentially target different phenomenal experiences – esp. proprioception (i.e. bodily feeling) and visual perception (seeing, watching) – and (ii) that imagining and its associated experience can both be *de se*. Inside/outside readings then arise from intuitive constraints in the lexical semantics of verbs like *feel*, *see*.

**Keywords:** Inside/outside readings · Imagistic perspective · Experiential imagining · Self-imagining · Counterfactual parasitism

## 1 Introduction

Imagination reports like (1) are generally taken to have two different kinds of *de se*-reading (see e.g. [2, 39–41]): an *inside* (*subjective*, or *experiential*) reading,<sup>1</sup> which captures what it would be like for the imaginer to undergo the described

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<sup>1</sup> In philosophy and psychology, the inside and the outside reading are commonly associated with a first-person *field perspective* on the experienced event, respectively with a third-person *observer perspective* on this event (see e.g. [2, 17, 18, 22, 29, 30, 35]).

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experience; and an *outside* (*objective*, or *imagistic*) reading, which captures what it would be like for the imaginer to witness an event, that involves his own counterpart, from an out-of-body point of view. The inside reading of (1), i.e. (1a), reports a relation towards the bodily experiences of Zeno’s swimming counterpart (e.g. the salty taste of the water, the tug of the current, the feeling of cold). The outside reading, (1b), reports a relation towards the target of Zeno’s (counterfactual) visual perception that has Zeno’s swimming counterpart as its object (e.g. an observer view of Zeno being tossed about, his body bobbing up and down in the foamy waste; [39, p. 161]).

- (1) Zeno imagines himself swimming in the rough ocean
- a. Zeno imagines *what it would feel like* to swim in the rough ocean
  - b. Zeno imagines *seeing/watching himself* swimming in the rough ocean

Recent work on self-imagination reports (esp. Anand [2] and Ninan [24]) explains the ambiguity in (1) through the *de dicto/de se*-distinction [24] (see [13]) or through the particular way in which we set up imaginative projects [2] (see [46]). However, this work either fails to capture the experiential character of imagining (in Anand’s case) or the perceptual nature of the outside reading (in Ninan’s case). Specifically, Ninan’s account (dubbed the *Simple View* in [24]) counterintuitively treats the outside reading of (1) as equivalent to (2):

- (2) Zeno imagines *that* he is (doing/experiencing a) swimming in the ocean

Our paper seeks to compensate for the above shortcoming. To do so, it uses a variant of Blumberg’s [5] observation (see also [25, 34, 40]) that imagining can be referentially dependent – or *parasitic* – on experiences. Our variant involves the inverse of Blumberg’s referential dependency relation, viz. the dependency of some counterfactual experiences (e.g. counterfactual proprioception or visual perception) on imagining. The ambiguity in (1) can then be explained through the fact that imagining and its dependent experience(s) can both be ascribed *de se*. It arises from the existence of intuitive constraints in the lexical semantics of proprioception and perception verbs.

The paper is structured as follows: we start (in Sect. 2.2, 3.1) by describing two properties of imagining that are particularly relevant for the inside/outside-ambiguity, viz. experiential parasitism and *de se*-ness, and argue that these properties can be co-instantiated in a single imagination report. We then show that the formal-semantic tools that are commonly used to capture these properties, viz. world-variables in syntax (see [27]) and centered worlds [13], can be straightforwardly combined into a single formalism (Sect. 3.2). Section 4 uses the content- and act-specific properties of proprioception and perception to reduce the many possible LFs of (1) that our formalism predicts to the inside- and the outside reading. Section 5 identifies the grounds for Vendler and Walton’s disagreement about outside readings of gerundive imagination reports with a PRO subject and explains the non-availability of an outside reading of Williams’ [46] *imagining being Napoleon*. The paper closes by pointing out that the linguistic

inside/outside-distinction may reflect a real psychological and neurobiological difference.

## 2 Experiential and Parasitic Imagining

Before we discuss the properties of imagining that are relevant for the inside/outside-distinction, it is important to identify the particular kind of imagining that this paper is about:

### 2.1 Experientiality

We have suggested above that our considerations in this paper focus on *experiential* imagining (esp. imagining feeling/seeing). The latter is an event-directed attitude – similar to experiential [= episodic] remembering (see [36, 37, 43]) – that requires the attitudinal agent’s personal (counterfactual) experience of the target event or scene (see [8, 34]). For the memory report in (3a) and a variant, (4a), of the imagination report in (1), the satisfaction of this requirement is evidenced by the validity of the inferences in (3) and (4):

- (3) a. Anna remembers [a woman being chased by a squirrel]  
 ⇒ b. Anna has veridically (visually) experienced [a woman being chased. . .]
- (4) a. Zeno imagines [Ken swimming in the ocean]  
 (≡ Zeno imagines seeing [Ken swimming in the ocean]) (Sect. 2.2)  
 ⇒ b. Zeno counterfactually experiences (= has a visual/experiential simulation of) [Ken swimming in the ocean]

As is suggested by our use of the verb *experience* in (4b), we assume that *experience* does not entail or presuppose the truth of its complement (i.e. *experience* is neither veridical nor factive; see [9]). To still explain the factivity of *remember* in (3a) (attested, e.g., in [12, 45]), we observe that *remember* is derivative on the particular mode of the remembered experience (e.g. visual [see (3b)], proprioceptive, agentive, emotional; see Sect. 2.2). The relevant occurrence of *remember* then inherits the veridicality and factivity properties of this mode.

Importantly, in contrast to episodic remembering, experiential imagining can also be reported through *that*-clause complements (see [15, 23]; *pace* [34]).<sup>2</sup> This is reflected in the fact that *that*-clause-taking *imagine* allows modification with event-modifiers like *vividly* (see (5b) and the data in [38]). It has been argued that such modification is not possible for *that*-clause memory reports (see (6b)) and that those are associated with propositional, i.e. semantic, memory (see [34]).

- (5) a. ✓ Zeno vividly imagines [Ken swimming in the ocean]  
 b. ✓ Zeno vividly imagines [that Ken is swimming in the ocean]

<sup>2</sup> This is not to argue against the possibility of propositional imagining. For an intuitive example, see *Bill imagined [that 4 was a prime number]*.

- (6) a. ✓ Anna vividly remembers [a woman being chased by a squirrel]  
 b. # Anna vividly remembers [that a woman was chased by a squirrel]

The above suggests that the inadequacy of Ninan’s paraphrase in (2) (which uses a *that*-clause) is not due to the syntactic form of its complement, but to the particular inserted predicate (i.e. *doing/experiencing*). We will return to this point in Sect. 4.

## 2.2 Counterfactual Parasitism

Recently, Blumberg [5] and Ninan [25] have argued that experiential imagining can be *parasitic* [= referentially dependent] on experiences, in the sense that the ‘correct’ analysis of experiential imagining requires some imagination contents to take their referents from worlds other than the actual/evaluation world or the agent’s imagination alternatives.<sup>3</sup> This analysis is prompted either by the presence of experience predicates (in (7) and (8): *see* resp. *dream*) or by the lack of adequate truth-conditions in the absence of these predicates (thus, (9a) requires the insertion of a *dream*-PP; in (9b)). Examples (7) and (8) are due to Ninan [25, ex. (18)] and Blumberg [5, ex. (102)], respectively. Example (9) is inspired by Blumberg’s [4] ‘burgled Bill’-case. In what follows, we mark the matrix [= ‘parasite’] attitude (here: imagining) with a grey frame. The experience [= ‘host’] (i.e. seeing resp. dreaming) is highlighted in grey:

- (7) Ralph is imagining that the man [whom he sees sneaking around on the waterfront] is flying a kite in an alpine meadow
- (8) John is imagining that the woman [who threatened him in his dream last night ] is swimming in the sea
- (9) Context: Ira has been dreaming of a tattooed woman (no particular one that he has come across in real life)
- a. Now, he is imagining her having clear, untattooed skin  
 ≠ i. *de re*: There exists a tattooed woman whom Ira is imagining

<sup>3</sup> This is in line with Vendler [39, p. 164] who analyzes ‘*B imagines A’s V’ing*’ as ‘*B imagines seeing (or hearing) A’s V’ing*’:

[...] imagining being in some situation or other involves not merely fancying tactual, muscular or kinesthetic sensations, but auditory and visual ones as well. Consequently imagining myself swimming in that water, or imagining you running on the field, can be understood in terms of imagining seeing myself swimming in that water, and imagining seeing you running on the field. And what about imagining you (or myself) whistling in the dark? Obviously, what this means is imagining hearing you (or myself) whistling in the dark. If this is true, then [*Imagine yourself swimming in that water*] is nothing but an elliptical product of *Imagine seeing yourself swimming in that water*.

- having clear, untattooed skin
- ≠ ii. *de dicto*: Ira is imagining an inconsistent scene in which a woman simultaneously does and does not have tattoos
- ≡ b. Ira is imagining [the tattooed woman from his dream] having clear, untattooed skin

The parasitic interpretation of *imagine* in (9a) is triggered by the observation that – given the context in (9) – (9a) is false on its *de re*-reading (which gives the DP *her* [= *a tattooed woman*] a specific interpretation; see (9a-i), (10a)) and that (9a) is contradictory on its *de dicto*-reading (see (9a-ii), (10b)). The parasitic interpretation is then prompted by the observation that (9a) has plausible truth-conditions on a reading that evaluates *her* at some other world (different from the actual world and from Ira’s imagination alternatives; see (9b), (10c)). Our name for this reading, i.e. *de hospite*, is motivated by the observation that this world is associated with the host experience, on which the matrix attitude (here: Ira’s imagining) is parasitic. In (10c), the ‘host’ world is denoted by  $\mathbf{X}$ :<sup>4</sup>

- (10) a. [a woman in @][ $\lambda t$ . Ira imagines in @ [ $\lambda w$ . *t* has clear skin in *w*]]
- b. Ira imagines in @ [ $\lambda w$ . a woman in  $\mathbf{w}$  has clear skin in *w*]
- c. Ira imagines in @ [ $\lambda w$ . a woman-in- $\mathbf{X}$  has clear skin in *w*]

To specify the particular world(s) at which the different constituents of the complement in (9a) are evaluated, (10) uses Percus’ [27] *Index Variables-approach*. This approach posits possible world-variables in the representation of syntactic structures, and allows intensional (here: attitude/experience) operators to bind these variables. In particular, Percus’ approach assumes that all predicates contain an unpronounced variable that saturates their world-argument. It further assumes that intensional operators are associated with a lambda abstractor that can bind a world variable. The ability of the same world variable in a syntactic structure to be bound by different lambdas then accounts for different readings.

The LFs in (10) only assume a single world-variable, *w*, next to our variable for the actual world, @. To capture our observation that the constituents of the complement in (9a) are dependent on different worlds/alternatives, we follow Blumberg [4] in positing *distinct* variables for the alternatives that are introduced by the parasite attitude [here: imagining] ( $w_2$ ) and for the alternatives that are introduced by the host experience [here: dreaming] ( $w_1$ ). The different readings of the imagination report in (9a) (see (10)) are then associated with the LFs in (11). The relevant LF – on which (9a) is true – is given in (11c).

<sup>4</sup> Below, the hyphens in ‘woman-in- $\mathbf{X}$ ’ indicate that the DP *a woman* is evaluated at the world  $\mathbf{X}$ . The thus-obtained individual is then imported in the interpretation of the complement (at *w*, where interpretation is indicated without hyphens). This import can proceed through a rigidifying operator, analogous to Kaplan’s [11] *dthat*.

- (11) a. [a woman in @] [ $\lambda t$ . Ira imagines in @  
[ $\lambda w_1$  [ $\lambda w_2$ . t has clear skin in  $w_2$ ]]] ]  
 b. I. imagines in @ [ $\lambda w_1$  [ $\lambda w_2$ . a woman in  $w_2$  has clear skin in  $w_2$ ]] ]  
 c. I. imagines in @ [ $\lambda w_1$  [ $\lambda w_2$ . a woman-in- $w_1$  has clear skin in  $w_2$ ]] ]

We have suggested above that, in (11c), the matrix attitude [= imagining] depends for its reference on the underlying experience [= dreaming]. The direction of this dependence motivates the ‘parasite’/‘host’-terminology in [5] (see [4], due to [16]). The situation is different for imagination reports like (1): arguably, in such reports, the embedded subject DP (in (1): *himself*) is still interpreted at the imaginer’s experience alternatives (viz. at Zeno’s proprioception- or perception alternatives). However, in these reports, the referential dependency is the other way around, i.e. the implicit experience is *dependent on the imagining*.<sup>5</sup> In particular – unlike (9) –, (1) does not assume that the imaginer’s experience [there: Zeno’s feeling or seeing] happens in the same world as his imagining (viz. at @). Rather, it only happens *in his imagination*. To capture the inverse dependency relation of reports like (1) w.r.t. *de hospite*-reports, we describe reports like (1) as *de parasito*. The inverse dependency of the matrix attitude and the experience in (1) validates the equivalence in (12) (see [40]), where ‘V’ stands proxy for the experience (i.e.  $V \in \{feel, see\}$ ):

- (12) a. Zeno imagines [himself in V swimming in the ocean]  
 ≡ b. Zeno imagines [V’ing himself swimming in the ocean]

The above suggests that (1) should not be analyzed as an analogue of (11c) (i.e. as (13)), but rather as (14a). This LF inverts the order of the lambda abstractors over imagination- and experience alternatives (in comparison to the order of the lambda abstractors over imagination- and dream alternatives in (11c)).

- (13) [Zeno] [ $\lambda t$ . t imagines in @ [ $\lambda w_1$  [ $\lambda w_2$ .  
t’s counterpart-in- $w_1$  swims in  $w_2$ ]]]] ] ]  
 (14) a. [Zeno] [ $\lambda t$ . t imagines in @ [ $\lambda w_2$ . [ $\lambda w_1$ .  
t’s counterpart-in- $w_1$  swims in  $w_1$ ]]]] ] ]  
 b. [Zeno] [ $\lambda t$ . t imagines in @ [ $\lambda w_2$ . ( $\lambda w_1$ .  
t’s counterpart-in- $w_1$  swims in  $w_1$ ]]]] ] ]

<sup>5</sup> The bi-directional dependence of imagination contents is due to the fact that imagining stands in a *synchronic* relation to its associated experience (see [19]). This differs from the (*diachronic*) referential dependence of episodic memory contents, which is only uni-directional (in the direction of (9a)).

(≡ Zeno imagines V'ing his counterpart in an imaginary V'ed scene swim in this scene)

Notably, in contrast to (11c), the LF in (14a) interprets the embedded predicate *swim* at the same world as the embedded subject DP *himself*, viz. at the imaginer's experience alternatives,  $w_1$ . This is required by the assumption that the described event (here: a swimming) takes place in the same counterfactual world at which the agent of this event (here: the referent of the embedded subject DP; i.e. Zeno's counterpart) is determined. To capture the equivalence in (12), (14b) makes explicit reference to the dependent experience (see the clause '*t* Vs in  $w_2$ '). Since this reference also requires identifying the subject of this experience (here: Zeno[*'s* counterpart], or – as we will see later – the semantic value of the silent pronoun PRO), it facilitates the formal implementation of first person-perspective (see Sect. 3.2). In (14b), the LF-referents of the 'imaginer' and the 'experiencer' are circled in grey (imaginer) resp. in black (experiencer).

We close this subsection with a remark on the compatibility of (14) with Percus' *Generalization X*. The latter is a constraint on admissible readings of a sentence which demands that the world variable that a verb selects for must be coindexed with the nearest lambda above it [27, p. 201]. This constraint excludes (15a) as an admissible reading of (1). This LF gives a reading that describes Zeno's experience-counterpart as swimming in the actual world, @:

- (15) a. [Zeno] [ $\lambda t$ .  $t$  imagines in @ [ $\lambda w_2$ .  $t$  Vs in  $w_2$  [ $\lambda w_1$ .  $t$ -in- $w_1$  swims in @] ] ] ]
- b. [Zeno] [ $\lambda t$ .  $t$  imagines in @ [ $\lambda w_2$ .  $t$  Vs in  $w_2$  [ $\lambda w_1$ .  $t$ -in- $w_1$  swims in  $w_2$  ] ] ] ]

Since the mere inversion of the order of the lambdas in (13) (see (15b)) evaluates *swim* at the 'middle' world,  $w_2$ , *Generalization X* also excludes the reading in (15b). By interpreting the embedded predicate at the same world as the embedded subject DP (along the lines proposed in (14)), we avoid this exclusion. In (14), *swim* is evaluated at the 'lowest' world,  $w_1$ , as *Generalization X* demands.

### 3 Self-Imagination and Experiential Parasitism

With the referential dependence between imagination and experience(s) in place, we turn to the second property of imagining that is relevant for the inside/outside-distinction, viz. *de se*-ness:

#### 3.1 Imagining *de se*

*De se*- (or self-locating) attitudes are first-personal attitudes that the holders of these attitudes self-ascribe, to the effect that these attitudes "crucially involve the attitude holder's access to [his/her] own 'self'" ([33, p. 411]; see also [13,

34]). In English, *de se*-attitudes are commonly denoted by reports with subject-controlled infinitives or gerundives (e.g. (16b), (17); see [6]) and can be denoted by infinitives and gerundive small clauses with a reflexive subject (e.g. (16); see [28]):

- (16) John wants himself to be famous  
 a. John<sub>*i*</sub> wants John<sub>*i*</sub> to be famous ( $\equiv$  [J.][ $\lambda t$ . *t* wants *t* to be famous])  
 b. John<sub>*i*</sub> wants PRO<sub>*i*</sub> to be famous
- (17) Alda<sub>*i*</sub> avoids PRO<sub>*i*</sub> getting a parking ticket

Following Lewis [13] and Chierchia [6], the contents of *de se*-attitudes are standardly modelled as sets of centered worlds. Centered worlds are worlds that are experienced from the perspective of one of the individuals in these worlds (i.e. from the perspective of the *center* of these worlds). Formally, centered worlds are coded as world/individual-pairs  $\langle w, y \rangle$ , where *y* is the center of *w* (see [13, 33]).

In attitude reports like (16b) and (17), Chierchia’s analysis associates the subject of the control clause, i.e. PRO, with the individual center of the world that is introduced by the matrix attitude verb (above: *want* resp. *avoid*; see [6]). Analogously to the treatment of world-variables in syntax (see Sect. 2.2), variables over individual centers can be bound by a lambda abstractor. To emphasize the ‘unity’ of centered worlds, we allow abstraction over ordered pairs of world- and individual-variables, resulting in abstracts of the form  $\lambda\langle w, y \rangle$ . Using such abstracts, the reports in (16b) and (17) are then analyzed as (18) and (19), respectively:

- (18) John wants in @  $\lambda\langle w, y \rangle$ . *y* is famous in *w*  
 ( $\equiv$  John stands in a wanting relation to worlds whose center is famous)
- (19) Alda avoids in @  $\lambda\langle w, y \rangle$ . *y* gets a parking ticket in *w*

Unsurprisingly, the above analysis is often also applied to imagination reports with subject-controlled gerundive small clauses (e.g. (20a); see [10, 34]). On this analysis, the ‘non-parasitic’ reading of (20a) (which neglects the dependent experience) is taken to report Zeno as standing in the imagining relation to worlds whose center is swimming (see (20b)):

- (20) a. Zeno<sub>*i*</sub> imagines PRO<sub>*i*</sub> swimming in the ocean  
 b. Zeno imagines in @  $\lambda\langle w, y \rangle$ . *y* is swimming in the ocean in *w*

### 3.2 Experientially Parasitic *de se*-Imagining

The analysis of the subject-controlled imagination report in (20b) can be straightforwardly transferred to the *de parasito*-version of (20a), i.e. (21a). In the resulting LF (see (21b)), the *de se*-center is doubly circled. To avoid overly long LFs, we replace ‘*t*’s counterpart-in- $w_1$ ’ by ‘*t*-in- $w_1$ ’:

- (21) a. Zeno<sub>*i*</sub> imagines **PRO**<sub>*i*</sub> V’ing himself swimming in the ocean



- b. [Zeno]<sub>i</sub> [λt. t imagines in @ ([λ⟨w<sub>2</sub>, y⟩. y Vs in w<sub>2</sub> [λw<sub>1</sub>. t-in-w<sub>1</sub> swims in w<sub>1</sub> ] ] ] ]

Note that the LFs in (20b) and (21b) identify different centered contents. In particular, while (20b) interprets the complement in (20a) as the set of centered worlds whose center is swimming, (21b) interprets this complement (analyzed as the *imagine*-complement in (21a)) as the set of worlds whose center is V'ing (e.g. visually perceiving) Zeno's counterpart from the imagined scene swimming. We will return to this difference below.

Work on self-imagining (e.g. the kind of imagining reported by (1)) typically follows the above in identifying the *de se*-attitude with the matrix attitude (see e.g. [34, 40]). What has escaped researchers' attention – but what is at work in (1a) *vis-à-vis* (1b) – is that the experience can also be *de se*. This is suggested by our discussion of parasitic imagining in Section 2.2 and is evidenced by (22) (note the silent pronoun PRO in the complement of V):

- (22) Zeno<sub>i</sub> imagines PRO<sub>i</sub> V'ing **PRO**<sub>i</sub> swimming in the rough ocean

The possible *de se*-ness of the matrix attitude [= imagining] and the experience [= V'ing] then predicts four combinatorially possible parametrized LFs for (1) (in (23), where (23a) copies (14b) and where V = {*feel*, *see*}). Since we assume that names are rigid designators (s.t. evaluating *Zeno* yields the same individual at all worlds), we suppress counterpart relations (writing 't' instead of 't-in-w<sub>1</sub>').

- (23) a. [Zeno]<sub>i</sub> [λt. t imagines in @ [λw<sub>2</sub>. t Vs in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] ] ]  
 b. [Z]<sub>i</sub> [λt. t imagines in @ [λw<sub>2</sub>. t Vs in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] ] ]  
 c. [Z]<sub>i</sub> [λt. t imagines in @ [λ⟨w<sub>2</sub>, y⟩. y Vs in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] ] ]  
 d. Z. imagines in @ [λ⟨w<sub>2</sub>, y⟩. y Vs in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] ] ]

In what follows, we call the above LFs 'non-*de se*' (i.e. (23a)), 'experience *de se*' (i.e. (23b)), 'matrix *de se*' (i.e. (23c)), and 'doubly *de se*' (i.e. (23d)), respectively. The LFs in (23) roughly correspond to the English sentences in (24):

- (24) a. Zeno<sub>i</sub> imagines [that he<sub>i</sub> Vs [that he<sub>i</sub> is swimming in the ocean]]  
 b. Zeno<sub>i</sub> imagines [that he<sub>i</sub> Vs [PRO<sub>i</sub> swimming in the ocean]]  
 c. Zeno<sub>i</sub> imagines [PRO<sub>i</sub> V'ing [that he<sub>i</sub> is swimming in the ocean]]  
 d. Zeno<sub>i</sub> imagines [PRO<sub>i</sub> V'ing [PRO<sub>i</sub> swimming in the ocean]]

## 4 Multiply Parasitic Imagining and Constraints on *de se*-Ascription

We have suggested above that imagining can determine *different* counterfactual experiences – saliently, proprioception [bodily feeling] (see (1a)) and visual perception [seeing/watching] (see (1b)). Given the possible realization of V by *feel* respectively by *see*, the parametrized LFs in (23) then have the (many !) possible readings in (25):

- (25) Zeno imagines himself swimming (see (1))  
 (≡ Zeno imagines [himself V'ing [himself swimming]])
- a. ~~{Zeno}[λt. t imagines in @ [λw<sub>2</sub>. t feels in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] }~~
  - b. [Zeno][λt. t imagines in @ [λw<sub>2</sub>. t sees in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] ]
  - c. ~~{Z.}[λt. t imagines in @ [λ⟨w<sub>2</sub>, y⟩. y feels in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] }~~
  - d. [Z.][λt. t imagines in @ [λ⟨w<sub>2</sub>, y⟩. y sees in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] ]
  - e. [Z.][λt. t imagines in @ [λw<sub>2</sub>. t feels in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] ]
  - f. ~~{Z.}[λt. t imagines in @ [λw<sub>2</sub>. t sees in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] }~~
  - g. Zeno imagines in @ [λ⟨w<sub>2</sub>, y⟩. y feels in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ]
  - h. Zeno imagines in @ [λ⟨w<sub>2</sub>, y⟩. y sees in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ]

A first restriction on the readings in (25) comes from natural constraints on the content of proprioception resp. of visual perception. These constraints include the obligatory *de se*-nature of proprioceptive content (i.e. the inherently first-personal perspective – or self-directedness – of bodily feeling) and the typically non-*de se* nature of visual perception content (i.e. the observation that our vision is typically directed towards the outside). The first constraint excludes all LFs with non-centered ‘feeling’-content, viz. (25a) and (25c) (indicated by a double strikethrough). The second constraint marks as non-salient all LFs with centered visual perception content, viz. (25f) and (25h). Vendler attributes this non-salience to the external perspectivity of visual perception, which “put[s] the perceiver in a spatial relation to the object” [39, p.165]. In (25), LFs with centered visual perception content are indicated by a single strikethrough.

From the remaining LFs (copied in (26)), the intuitive readings of (1), i.e. (26d) [= (1a)] and (26b) [= (1b)], are then obtained by considering intuitive lexical-semantic constraints on acts of proprioception respectively of (visual) perception. These constraints include the inherently *de se*-nature of bodily feeling and of seeing. This nature excludes non-self-locating feeling and seeing, as is assumed in (26c) and in (26a) (indicated by a single strikethrough):

- (26) a. ~~{Zeno}[λt. t imagines in @ [λw<sub>2</sub>. t sees in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] }~~
- b. [Z.][λt. t imagines in @ [λ⟨w<sub>2</sub>, y⟩. y sees in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] ]  
 ≡ [Zeno<sub>i</sub>][λt. t imagines [PRO<sub>i</sub> seeing [t swimming ...]]]  
 ≡ Zeno imagines seeing/watching himself swimming ... ≡ (1b)
  - c. ~~{Z}[λt. t imagines in @ [λw<sub>2</sub>. t feels in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] }~~
  - d. Z. imagines in @ [λ⟨w<sub>2</sub>, y⟩. y feels in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] ]  
 ≡ Zeno<sub>i</sub> imagines [PRO<sub>i</sub> experiencing [PRO<sub>i</sub> swimming ...]]  
 ≡ Zeno imagines what it would feel like to swim ... ≡ (1a)

The combination of ‘V = *feel*’ with centered matrix and experience content – and the attendant identification of the ‘experiencer’- with the ‘swimmer’-perspective

in (26d) – then identifies (26d) with the inside reading of (1). The combination of ‘V = see’ only with centered matrix content – and the attendant separation of the (centered) ‘perceiver’- and the ‘swimmer’-perspective – identifies (26b) with the outside reading.

## 5 Applications

We finish our paper by using the proposed analysis to account for some well-known puzzles and debates involving the inside/outside-distinction. These include Vendler and Walton’s disagreement about outside readings of gerundive imagination reports with PRO-subjects (see Sect. 5.1), the salience of inside readings of subject-controlled gerundive memory reports, and the non-availability of an outside reading of Williams’ [46] *imagine being Napoleon* (both Sect. 5.2):

### 5.1 Vendler and Walton’s Disagreement

Our previous considerations have focused on imagination reports with reflexive complements (i.e. complements that are headed by reflexive pronouns like *himself*). While most researchers agree that such reports are ambiguous along the lines described in Sect. 1, they disagree whether imagination reports with subject-controlled gerundive complements (e.g. (20a), copied in (27)) display an analogous ambiguity: in line with Vendler [39, pp.162–163], many researchers assume that subject-controlled gerundive imagination reports only allow for an *inside* reading (see e.g. [26,34]), making (27) equivalent with (27a). Following Walton [41, pp.28–35], researchers in the opposing camp assume that (27) can also be used to report an outside perspective (see e.g. [2,44]), making (27) ambiguous between (27a) and (27b) (with a slight preference for (27a)):

- (27) Zeno<sub>i</sub> imagines [PRO<sub>i</sub> swimming in the ocean]
- a. Zeno imagines *what it would feel like* to swim in the ocean (≡ (1a))
  - b. ??Zeno imagines *watching himself* swimming in the ocean (≡ (1b))

The acceptance of outside readings like (27b) is typically fuddled by examples like (28), which include the perspective of the spectator (in (28a), due to Walton [41, p.31]) or which remove the possibility of inside consciousness (in (28b); due to Anand [2, p.4]; see [39, p.166]):

- (28) a. Gregory imagines hitting the home run [in a major league baseball game] from the perspective of a spectator in the stands. [...] his imagination of the field includes Gregory as he slams the ball over the center field fence and rounds the bases
- b. Mary imagined being buried, unconscious, under a pile of snow inches away from the rescue team

However, upon closer inspection, the examples in (28) do not support the availability of (27b) as an admissible reading for (27). This is due to the fact that,

in the scenes that are described by these examples, the familiar interpretation of subject-controlled gerundive complements (= ‘inside’) is not available. The outside reading of (28a) and (28b) can then be explained through a pragmatic reinterpretation of the complement in these reports. Since (27) – by admission of defenders of Walton’s ambiguity – has an inside reading, an analogous explanation of the outside reading is not available for (27).

The above suggests that Walton’s predicted ambiguity is due to a flip-flop between a syntactically suggested inside reading and a pragmatically coerced outside reading. Our results from Sects. 2, 3 and 4 suggest an alternative explanation of Vendler and Walton’s disagreement about the ambiguity of (27) that does not assume pragmatic coercion. This explanation is based on the existence of two possible referents of PRO in (27), viz. the individual center of the alternatives that are introduced by the matrix verb (s.t. (27) is analyzed as ‘matrix *de se*’; see (29a)) or the individual center of the alternatives that are introduced by the silent experience verb V (s.t. (27) is analyzed as ‘experience *de se*’; see (29b)):

- (29) Zeno<sub>i</sub> imagines PRO<sub>i</sub> swimming in the ocean
  - a. Zeno<sub>i</sub> imagines [PRO<sub>i</sub> V’ing [himself swimming in the ocean]]
  - b. Zeno<sub>i</sub> imagines [himself V’ing [PRO<sub>i</sub> swimming in the ocean]]

The readings in (29a) and (29b) differ with regard to which LFs they allow for (29): while the matrix *de se*-reading in (29a) – which we associate with Walton – is compatible with both of the LFs in (30) (see (23c), (23d)), the experience *de se*-reading in (29b) – which we associate with Vendler – is only compatible with the LF in (30b) (see (23d)). The unavailability of this LF for ‘V = *see*’ (see our argument for the exclusion of (25h) in Sect. 4) then explains Vendler’s exclusion of an outside reading of (27). The availability of (30a) for ‘V = *see*’ explains Walton’s inclusion of this reading.

- (30) a. [Z.] [λt. t imagines in @ [λ⟨w<sub>2</sub>, y⟩. y Vs in w<sub>2</sub> [λw<sub>1</sub>. t swims in w<sub>1</sub> ] ] ]
  - (≡ [Zeno] [λt. t imagines [PRO<sub>i</sub> V’ing [t swimming ... ]]])
- b. Z. imagines in @ [λ⟨w<sub>2</sub>, y⟩. y Vs in w<sub>2</sub> [λ⟨w<sub>1</sub>, x⟩. x swims in w<sub>1</sub> ] ] ]
  - (≡ Zeno<sub>i</sub> imagines [PRO<sub>i</sub> V’ing [PRO<sub>i</sub> swimming ... ]])

Arguably, the above observations still leave open the question of which one – matrix or experience *de se* – is the ‘correct’ reading of PRO in (27), i.e. who was right: Vendler or Walton. Since the syntax of iterated attitude reports is still understudied (s.t. we cannot draw any conclusions about matrix or experience *de se* based on the movement and ellipsis behavior of (24)), we try to answer this question by considering a closely related domain, viz. gerundive *remember*-reports:

### 5.2 Remembering ‘From the Outside’

In contrast to gerundive imagination reports (e.g. (20a), (1)), gerundive memory reports are generally taken to have a salient inside reading (see (32a)):

- (31) John<sub>i</sub> remembers [PRO<sub>i</sub> feeding the cat] (see [34, ex. (22)])
- (32) John remembers [himself feeding the cat]
- a. John remembers [what is felt/was like to feed the cat]
  - b. ??John remembers [seeing/watching himself feeding the cat]

The salience of the reading in (32a) is supported by the observation – reflected in corpus data – that memory reports with subject-controlled gerundive complements (e.g. (31)) are strongly preferred<sup>6</sup> over memory reports with reflexive subject-complements (e.g. (32)) in most contexts. This observation is striking since the pronoun *himself* is typically ambiguous between a control and a non-control interpretation (see [28]). As a result, one would expect that the admissible readings of (32) include<sup>7</sup> the reading(s) of (31). Given speakers’ general dispreference for (32), this suggests that *remember* semantically marks (as deviant, or ‘noteworthy’) non-centered alternatives in either matrix or experience position.

We will see below that our constraints on the content and act of the experience (i.e.  $V \in \{feel, see\}$ ; see Sect. 4) attribute this marking to non-centered alternatives in experience position. We have already found that these constraints only leave the *imagine*-counterparts of (33a) (see (26d)) and (33b) (see (26b)):

- (33) a. John remembers in @ [ $\lambda\langle w_2, y \rangle$ . *y* feels in  $w_2$  [ $\lambda\langle w_1, x \rangle$ .  
x feeds the cat in  $w_1$ ]]]]
- $\equiv$  John<sub>i</sub> remembers [PRO<sub>i</sub> experiencing [PRO<sub>i</sub> feeding the cat]]
- b. [John] [ $\lambda t$ . *t* remembers in @ [ $\lambda\langle w_2, y \rangle$ . *y* sees in  $w_2$  [ $\lambda w_1$ .  
*t* feeds the cat in  $w_1$ ]]]]]
- $\equiv$  [John<sub>i</sub>] [ $\lambda t$ . *t* remembers [PRO<sub>i</sub> seeing [*t* feeding the cat]]]]

Since, in (33), the only LF that is not doubly *de se* (i.e. (33b)) has its non-centered alternative in experience position, we conclude that *remember* marks non-centered alternatives in this position. This suggests that the explicit PRO in (31) is interpreted in experience position. This is in line with Vendler [40] and with the intuition of most researchers on the inside/outside-distinction (see Sect. 5.1).

We finish this section by suggesting an explanation for the non-availability of an outside reading of Williams’ *imagine being Napoleon*: in [46, p. 43], Bernard Williams observes that, while he can imagine from the inside being Napoleon (s.t. he can hold the attitude that is reported by the reading of (34) in (34a)),

<sup>6</sup> This preference disappears in self-reflection contexts, in which the mnemonic subject considers herself as a perceived object (see e.g. [18]).

<sup>7</sup> Whether this inclusion is proper depends on whether PRO denotes the matrix or the experiential center.

he is unable to imagine from the outside that he is Napoleon (s.t. he cannot hold the attitude that is reported by the reading in (34b)). Williams backs his observation by referring to the intuitive absence of a self – distinct from (himself *qua*) Napoleon – that could perceive this identity.<sup>8</sup>

- (34) Bernard imagines [PRO<sub>i</sub> being Napoleon]
- a. Bernard imagines [what it would be like if he were Napoleon]
  - b. #Bernard<sub>i</sub> imagines [PRO<sub>i</sub> seeing [that he<sub>i</sub> is Napoleon]]
- ≡ [Bernard] [ $\lambda t. t$  imagines in @  $\lambda \langle w_2, y \rangle. y$  sees in  $w_2$   $\lambda w_1. t$  is Napoleon in  $w_1$ ]]]

Our framework captures Williams’ intuition through another familiar constraint on visual perception: the restriction to what can be visually perceived. Specifically, this constraint includes that perception cannot serve to establish the personal identity of a perceived object (e.g. Napoleon) with the perceiver. However, exactly this would be required for the outside reading of (34). The insufficiency of perception for the establishment of personal identity is reflected in the semantic deviance of (34b).

The above notwithstanding, our identification of PRO in (34) with experience *de se* (see above) even allows for a yet simpler exclusion of (34b). The latter is based on the fact that (34b) involves experience non-*de se* (see the overt [= non-controlled] occurrence of *he* in the complement of *see*). Since this is incompatible with the use of PRO in (34) – as we have argued for (31) –, (34b) is not an admissible reading of (34).

## 6 Outlook

Our considerations in this paper have focused on the linguistic realization of the inside/outside-distinction. The cross-linguistic robustness<sup>9</sup> of this distinction suggests that there is a real psychological difference between the first-personal (*field*) and the third-personal (*observer*) perspective on a personally experienced event. For imagination, this difference is already suggested in Vendler [39], and has been corroborated by behavioral and imaging studies (see e.g. [7, 14]). In particular, in [7], Christian et al. have shown that first-person imagining of painful scenarios elicits greater activity in brain areas associated with interoceptive and emotional awareness, with visual imagery, and with sense of body ownership.

<sup>8</sup> see Williams’ “images of myself being Napoleon can scarcely merely be images of the physical figure of Napoleon, for they will not in themselves have enough of me in them – an external view would lose the essence of what makes such imaginings so much more compelling about myself than they are about another” [46, p. 43].

<sup>9</sup> The inside/outside-ambiguity is also attested in languages (e.g. German) that do not allow for subject-controlled *imagine*-complements (see (†)):

- (†) Zeno<sub>i</sub> stellt sich vor, wie er<sub>i</sub> (selbst) im Ozean schwimmt (translation of (29))
- a. Zeno stellt sich vor, wie es sich anfühlt, im Ozean zu schwimmen (s. (1a))
  - b. Zeno<sub>i</sub> stellt sich vor, wie er<sub>i</sub> sich (selbst) im Ozean schwimmen sieht (s. (1b)).

In their groundbreaking work, Addis et al. [1] and St. Jacques et al. [32] have observed a remarkable overlap in the neural and cognitive mechanisms that underlie episodic memory and imagination. Michaelian [21] even goes so far as to claim that remembering is just a special form of imagining that results from a reliable episodic construction mechanism and is directed towards one's personal past. Pointing out the close connection between the reliability of remembering and its causal dependence on the event remembering, Werning [42] contradicts this view and argues that remembering is distinct in kind from imagining.

Regardless of this controversy, the overlap between neural and cognitive processes underlying remembering and imagining might suggest that the difference between first- and third-person perspective on the experienced event in imagination is equally present in episodic remembering. This suggestion is further supported by the fact that the verbs *remember* and *imagine* have a very similar selection behavior. However, at least for recent events, observer perspective has been found to be less common in episodic remembering [20, 31] (see [29, 30]). This may be due to the particular importance of self-performed actions for episodic memory, and to the inherently first-personal perspective on such actions. Exceptions to this rule are PTSD patients' memories of traumatic events [3] and memories that involve intense emotional components or high self-awareness [22, 30].

Recently, McCarroll [17, 18] has claimed that agents can also take a third-personal mnemonic perspective on non-traumatic and emotionally less intense events. McCarroll supports his claim with reference to the epistemic generativity of episodic memory and to the observation that observer memories can be epistemically and emotionally beneficial. We leave the exploration of this claim as a topic for future work.

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