ORIGINAL RESEARCH

Experiential Attitudes are Propositional

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Abstract

Attitudinal propositionalism is the view that all mental attitude content is truth-evaluable. While attitudinal propositionalism is still silently assumed in large parts of analytic philosophy, recent work on objectual attitudes (i.e. attitudes like 'fearing Moriarty' and 'imagining a unicorn' that are reported through intensional transitive verbs with a direct object) has put attitudinal propositionalism under explanatory pressure. This paper defends propositionalism for a special subclass of objectual attitudes, viz. experiential attitudes. The latter are attitudes like seeing, remembering, and imagining whose grammatical objects intuitively denote (events or) scenes. I provide a propositional analysis of experiential attitudes that preserves the merits of propositionalism. This analysis uses the possibility of representing the target-scenes of experiential attitudes by the intersection of all propositions that are true in these scenes. I show that this analysis makes available the usual (Russellian) account of intensionality and the common (Boolean) logic for entailments.

1 Introduction

In the philosophy of language and mind, mental attitudes are typically taken to be propositional attitudes. The latter are attitudes like believing, claiming, and hoping that agents hold towards propositions (or towards proposition-like, or propositional content-bearing objects). The propositional nature of mental attitude contents is supported by the possibility of substituting the embedded *that*-clause CP in some (!)[1] attitude reports by a DP of the form 'the proposition [$_{CP}$]' [in (1)] (see e.g. King,

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[1] The observation that this substitution often fails (see Prior's (1971) substitution problem and Moltmann's (2003, 2013) objectivization effect) stands behind the above modification of 'propositions' to 'proposition-like objects' (including, among others, facts and possibilities).

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2002; Forbes, 2018), of evaluating attitude contents for their truth or falsity [in (2)] (see Hintikka, 1969; Moltmann, 2020), and of generating 'new' attitude contents through the application of logical inference rules [in (3): existential generalization] (see Montague, 2007; Sinhababu, 2015).

(1)   a. Bill believes that the Earth is round.

   $\equiv$ b. Bill believes *the proposition* that the Earth is round.

        [$\equiv$ Bill's belief has as its content (the proposition) that the Earth is round.]

(2)   What Bill believes (viz. that the Earth is round) *is true*.

(3)   a. Bill believes that the Earth is round.

   $\Rightarrow$ b. Bill believes that *something* is round.

The propositional nature of attitude content is captured by Hintikka's (1969) classical relational account of mental attitudes (see Stalnaker, 1988; von Fintel and Heim, 2021) . This account identifies attitude content [= a proposition] with the set of possible worlds in which this content is true. Attitudes are then analyzed through the inclusion of this set[2] [in (4): $\{w : \text{the Earth is round in } w\}$] in Bill's doxastic alternatives $\text{DOX}_{\text{Bill},@}$ [= the set of possible worlds that are compatible with Bill's beliefs in @; see (4b)]:

(4) $[\![\text{Bill believes that the Earth is round}]\!]^@$

     $\equiv [\![\text{believe}]\!]^@\big([\![\text{Bill}]\!], [\![\text{the Earth is round}]\!]\big)$

   $=$ a. $[\![\text{believe}]\!]^@\big(\text{Bill}, \{w : \text{the Earth is round in } w\}\big) = 1$

   $\Leftrightarrow$ b. $\text{DOX}_{\text{Bill},@} \subseteq \{w : \text{the Earth is round in } w\}$

The observation that a large number of attitudes displays the behavior in (2)–(3) and allows for (some variant of) Hintikka's account in (4) has recently given rise to *attitudinal propositionalism* (see e.g. Felappi, 2021; Forbes, 2006; Grzankowski, 2014; Grzankowski and Montague, 2018; Montague, 2007; Sinhababu, 2015; Zimmermann, 2016).[3] The latter is the view that all mental states have truth-evaluable propositions as their semantic (information) content. Attitudinal propositionalism is a general thesis about the truth-evaluability of attitude contents that is independent of any particular theoretical implementation. Thus, it is compatible with different relational accounts, including possible worlds-based accounts (e.g. Hintikka,

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[2] In this paper, I enclose natural language expressions in semantic brackets, $[\![\cdot]\!]$, to obtain their values (e.g. individuals, propositions, properties). Attendantly, $[\![\text{Bill}]\!]$ is the individual Bill; $[\![\text{it is raining}]\!]$ is the proposition 'it is raining'. A superscripted '@' indicates that the respective value is evaluated at the actual world, @. Thus, $[\![\text{it is raining}]\!]^@ = 1$ iff it is, in fact, raining in @.

[3] It is perhaps ironic that the large majority of contemporary philosophers who explicitly discuss propositionalism (including all of the above, with the exception of Sinhababu) criticize this view.

1969; von Fintel and Heim, 2021), situation semantic accounts (e.g. Kratzer, 2002; Elbourne, 2013), impossible worlds-accounts (e.g. Zalta, 1997; Jago, 2014), and 'primitive propositions'-accounts (e.g. Pollard, 2015). Since propositions still play a central role in some non-relational accounts (viz. as the contents of concrete, content-bearing objects), attitudinal propositionalism is also compatible with accounts that replace propositions with proposition-like objects (e.g. facts, possibilities; see Vendler, 1967; Parsons, 1993; Pryor, 2007) and with accounts that replace propositions with content individuals (e.g. beliefs, claims, or fears; see Kratzer, 2006; Moltmann, 2020; Moulton, 2015).

Attitudinal propositionalism is supported by the belief report in (1a) [see (4) and (5)]. It is even supported by a number of attitudes that *prima facie* do not have a propositional content. Such attitudes include desires, whose reports typically embed infinitives or direct objects[4] rather than *that*-clauses [e.g. (6a)] (see Larson, 2002) resp. [(6b)] (see Quine, 1956; Montague, 1973). Below, the semantic content of an expression X in a context c is abbreviated '$[\![X]\!]^c$'.

(5) a. Bill believes [that the Earth is round].
     b. $[\![(\text{that}) \text{ the Earth is round}]\!]^{(c)} = \{w : \text{the Earth is round in } w\}$

(6) a. i. Will wants [Bill to have a sloop]. ($\equiv$ Will wants [that Bill has a sloop])
        ii. $[\![\text{Bill to have a sloop}]\!]^{(c)} = \{w : \text{Bill has a sloop in } w\}$
     b. i. John seeks [a unicorn]. ($\equiv$ John tries [that he/John finds a unicorn])
        ii. $[\![\text{a unicorn}]\!]^c = [\![\text{John finds a unicorn}]\!]^c = \{w : \text{John finds a unicorn in } w\}$

Attitudinal propositionalism has been praised for its uniformity and ontological parsimony, and for its ability to capture natural language reasoning (more on this in Sect. 2). However, despite these merits, propositionalism has recently come under empirical pressure. This pressure stems from 'objectual' attitudes[5] (see Forbes,

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[4] Since *try* in the analysis of (6b) is a control verb, its correct account involves the silent pronoun PRO [see (†a)]. Since this pronoun is obligatorily interpreted *de se* [in (†b); see Chierchia, 1989], the content of the complement of *try* in (6b) is a *function* from individuals to propositions (or a set of ordered individual/world-pairs; i.e. a centered proposition; see Lewis, 1979; Ninan, 2010):

(†) a. John[1] tries [that PRO$_1$ finds a unicorn].
         ($\equiv$ John tries [that [λx_1. PRO$_1$ finds a unicorn]])

     b. $[\![\lambda x_1. \text{ PRO}_1 \text{ finds a unicorn}]\!] = \lambda x. [\![x \text{ finds a unicorn}]\!]$
         $= \lambda x. \{w : x \text{ finds a unicorn in } w\} = \{\langle x, w \rangle : x \text{ finds a unicorn in } w\}$

However, since this function is still truth-evaluable (w.r.t. ordered pairs of worlds and their individual centers), it does not pose a serious challenge for propositionalism. For a generalization of propositionalism to *de se* attitudes (as well as to inquisitive and parasitic attitudes), the reader is referred to (Liefke, 2022).

[5] In the term *objectual attitude*, the adjective 'objectual' is sometimes taken to specify the relatum of this attitude (see Forbes, 2000, p. 141). However, this conflicts with the widely accepted view that the direct object in reports of these attitudes cannot be interpreted as an individual (see e.g. Moltmann, 1997;

2000, 2006; Grzankowski, 2016; Montague, 2007). The latter are attitudes like liking, fearing, and worshipping that are reported through intensional transitive verbs with a direct object [e.g. (7a)]. Unlike the attitudes that are reported by (6a, b), objectual attitudes resist an analysis in terms of propositional attitudes. In particular, in contrast to (6b), (7a) is intuitively not equivalent to the result of supplementing its direct object, i.e. *Mary*, with a contextually given predicate (in (7b); see Zimmermann, 1993; Szabó, 2005; Grzankowski, 2016). This even holds for a supplementation with the lexically 'poor' predicate *be there* (or *exist*) [in (7c)] (see Forbes, 2006; Zimmermann, 2016; *pace* Parsons, 1997):

$$(7)\quad \text{a.}\quad \text{John likes [Mary].}$$
$$\not\equiv\quad \text{b.}\quad \text{John likes [that Mary is caring].}$$
$$\not\equiv\quad \text{c.}\quad \text{John likes [that Mary exists/is there].}$$

For example, John might not like Mary's exemplifying any particular property (including her existence), but only Mary *herself* (see Grzankowski, 2016, p. 829; Szabó, 2005). In this scenario, (7b) and (7c) are false and, hence, not equivalent to (7a).

The unavailability of a propositionalist analysis for cases like (7a) has often been taken to suggest that all objectual attitudes that defy a syntactic analysis [see (6a)] or lexical paraphrase into a clause-embedding structure [see (6b)] are non-propositional. The present paper argues that this conclusion is too rash. In particular, the paper shows that a special subclass of objectual attitudes, viz. *experiential attitudes* (e.g. seeing, remembering, imagining), allows for a systematic propositional treatment. Experiential attitudes differ from other objectual attitudes in being relations to events or scenes, rather than to individuals [unlike (7a)]. Their common classification as 'objectual' attitudes is due to the fact that – like vanilla objectual attitudes—experiential attitudes can[6] be ascribed through linguistic constructions with intensional transitive verbs and direct objects (compare (8) [experiential] with (7a) [non-experiential]):

$$(8)\quad \text{Mary imagined [a unicorn].}$$

Footnote 5 (continued)

Zimmermann, 1993; Grzankowski, 2016) and with the common inclusion of experiential attitudes (e.g. imagining a unicorn) in the class of objectual attitudes (see Forbes, 2000, p. 180; Forbes, 2006, pp. 37, 61–64; Montague, 2007, p. 514). Michelle Montague (2007, p. 514) even lists *remember* as "[a] candidate for being [an] irreducibly objectual intentional attitude". I thank an anonymous reviewer for pointing out this ambiguity of the term 'objectual'.

[6] I will show in Sect. 3.1 that, in contrast to reports of 'true' [= non-experiential] objectual attitudes, reports of experiential attitudes license many different grammatical complements, including event nominalizations and gerundive small clauses.

My propositionalist account of experiential attitudes will start from the scenes that serve as the target of the experiential attitude and that have been personally experienced by the holder of this attitude (see Stephenson, 2010). The propositional content of these scenes is then identified with the intersection of all propositions that are true in these scenes. My account is supported by early findings from situation semantics (see Barwise and Perry, 1983; Higginbotham, 2003; Umbach et al., 2022). It is in line with Tulving's (1972) notion of episodic memory (see e.g. Bernecker, 2010; Cheng et al., 2016), with the notion of experiential imagination (e.g. Dokic and Arcangeli, 2014; Peacocke, 1998), and with the observation from psychology that some cases of episodic memory cannot be distinguished from propositional memory on the basis of their information content alone (Tulving, 1985; Suddendorf and Busby, 2003; Klein, 2013; see my Sect. 6.2).

The paper is structured as follows: to support the propositionalist thesis about mental attitude content, I will first illustrate the merits of propositionalism (in Sect. 2). In Sect. 3, I then identify the defining property of experiential attitudes that is key to my propositionalist account, viz. their scene-directedness. I provide this account in Sect. 4 and illustrate its merits in Sect. 5. The paper closes with a conjecture about how the presented account could be generalized to non-singular scenes, and about the theoretical implications of this account (in Sect. 6).

2 Merits of Attitudinal Propositionalism

I have suggested above that the propositional nature of attitude contents has a number of merits. These include the availability of a uniform account of different intensionality phenomena and of a simple explanation of the multivaried behavior of natural language entailment. These merits of attitudinal propositionalism are generally acknowledged (see e.g. Felappi, 2021; Montague, 2007; Sinhababu, 2015). However, since they are typically accepted without formal argument—and since I will later need such argument to support my claim about the standardness and uniformity of my account –, I first present these merits:

2.1 Intensionality

Intensionality is a cluster of semantic properties comprising (i) referential opacity, (ii) non-specificity, and (iii) non-actuality (see Zimmermann, 2001, p. 516). Referential opacity is the ability of an expression (in a linguistic context) to resist the truth-preserving substitution by a co-referential or truth-conditionally equivalent expression (see Quine, 1956; cf. Frege, 1997). Non-specificity and non-actuality concern the ability of indefinite DPs [e.g. *a unicorn* in (9)] to allow for an unspecific reading (see Fodor, 1970) and to lack existential import (see Quine, 1956).

The above properties are all exemplified in (9). In particular, on its fully intensional [= *de dicto*-] reading, this sentence neither commits Bill to the existence of unicorns [i.e. (9) does not entail (9c); see (iii)], nor does it attribute to him the belief

that there is a *particular* unicorn which John is seeking [i.e. (9) does not entail (9b); see (ii)] or that John is seeking a griffin[7] [i.e. (9) does not entail (9a); see (i)]:

(9)   Bill believes [that John seeks a unicorn]$_{de\ dicto}$.

$\not\Rightarrow$ a. Bill believes [that John seeks a griffin].   (referential opacity)

$\not\Rightarrow$ b. There is [a unicorn]^1 of which Bill believes [that John seeks it$_1$]. (non-sp.)

$\not\Rightarrow$ c. There are (actual/real-world) unicorns.   (non-actuality)

To capture the referential opacity of attitude reports, contemporary semantics and the philosophy of language interpret attitude verbs as relations to (characteristic functions of) sets of possible worlds (Montague, 1970; Hintikka, 1979) [see (4)–(6)]. *De dicto* attitude reports then have the form in (10), where set abstraction over possible worlds (here: λw) is highlighted in grey.[8] The non-validity of the entailment from (9) to (9a) is then due to the existence of a world in which the set of unicorns and the set of griffins do not coincide (in the sense that, in this world, there is a unicorn that is not a griffin, or *vice versa*).

(10) $[\![$Bill believes [that John seeks a unicorn]$_{de\ dicto}]\!]^{@}$

$\equiv$ a. $[\![$Bill believes-in-@ $[\ \lambda w.$ John seeks-in-w a unicorn- in-$w\ ]]\!]$

$=$ b. $believe_{@}(bill,\ \lambda w\ \exists x.\,unicorn_{w}(x) \wedge seek_{w}(john,x)) = 1$

$\Leftrightarrow$ $(\forall w)\,[\mathrm{DOX}_{bill,@}(w) \rightarrow (\exists x.\,unicorn_{w}(x) \wedge seek_{w}(john,x))]$

To emphasize the interpretation of *a unicorn* at the members of the set of worlds that serves as the semantic complement in (9), I use abstractors, λ, over world variables in syntax [along the lines of Percus, 2000; see (10a)]. In interpretations like (10b), the evaluation of *a unicorn* at the abstracted world variable w (i.e. *unicorn*$_w$; see the grey-marked parts of the formula) captures this expression's lack of existential import [see (iii)].

The non-specific interpretation of the DP *a unicorn* in (9) [see (ii)] is captured by giving the existential quantifier that is introduced by this DP narrow scope w.r.t. *believe* [see '*believe*$_{@}(\ldots \exists x.\ \ldots)$' in (10b)]. This scoping relation effects that (10) is already true in a scenario where John seeks a different unicorn in Bill's different doxastic alternatives. Since (9b) is false in this scenario, the inference from (9) to (9b) is invalid.

The propositional interpretation of the infinitival and the DP complement in (6a-i) respectively in (6b-i) enables an account of the intensionality of (6a-i) and (6b-i)

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[7] This last possibility relies on the non-existence of unicorns and griffins in the actual/real world, such that the set of unicorns and the set of griffins are the same set (i.e. $\emptyset$).

[8] In (10b), the interpretation of *seeks a unicorn* is, in fact, incorrect: the set of worlds that serves as the argument of *believe* would need to be $\lambda w.try_{w}(john, \exists x.find_{w}(john, x))$ [see (11b)]. I intermittently adopt the incorrect interpretation for reasons of simplicity.

that is completely analogous to the account of the intensionality from (10). The propositional interpretation of (6b-i) is given in (11b), where $\text{BUL}_{x,@}$ is the set of x's buletic [= desire-]alternatives in @:

(11) $[\![\text{John seeks [a unicorn]}_{de\ dicto}]\!]^{@}$ (see (6b-i))
     $\equiv [\![\text{John tries [that he finds a unicorn]}_{de\ dicto}]\!]^{@}$

  $\equiv$ a. $[\![\text{John tries-in-@ } [\ \lambda w.\ \text{John finds-in-}w\ \text{a unicorn- in-}w\ ]]\!]$

  $=$ b. $try_{@}(john,\ \lambda w\ \exists x.\ unicorn_{w}(x) \wedge find_{w}(john, x)) = 1$

  $\Leftrightarrow (\forall w)\ [\text{BUL}_{john,@}(w) \rightarrow (\exists x.\ unicorn_{w}(x) \wedge find_{w}(john, x))]$

The above interpretation straightforwardly captures the referential opacity [see (12a)], non-actuality [see (12c)], and unspecificity of *a unicorn* in (6b-i) [see (12b)]:

(12) John seeks [a unicorn]$_{de\ dicto}$.

  $\not\Rightarrow$ a. John seeks [a griffin].   (referential opacity)
  $\not\Rightarrow$ b. There is [a unicorn] which John seeks.   (non-specificity)
  $\not\Rightarrow$ c. There are (actual/real-world) unicorns.   (non-actuality)

Arguably, the intensional behavior of *a unicorn* in (6b-i) could also be modelled by interpreting this DP as an object of some other type, so long as this object is still intensional (see Percus, 2000) and can take scope below the attitude verb (see Russell, 1905). For example, the semantics from (Montague, 1970) [see (13)] (cf. Moltmann, 1997)—which interprets the direct objects of attitude verbs as intensional generalized quantifiers [= as functions from worlds to the set of properties P that are jointly exemplified at these worlds]—can likewise account for the intensional behavior of the direct object *a unicorn* in (6b-i):

(13) $[\![\text{John seeks [a unicorn]}_{de\ dicto}]\!]^{@}$ (see (6b-i))

  $\equiv$ a. $[\![\text{John seeks-in-@ } [\ \lambda w.\ \text{a unicorn- in-}w\ ]]\!]$
  $=$ b. $seek_{@}(john,\ \lambda w\ \lambda P\ \exists x.\ unicorn_{w}(x) \wedge P_{w}(x))$

However, since this interpretation does not treat the direct object as a proposition (s.t. this object cannot be a subset of John's buletic alternatives in @), it blocks a Hintikka-style analysis along the lines of (4b) and (10b).

2.2 Entailment

The propositional interpretation of attitude complements [along the lines of (11)] is further preferred for reasons having to do with the modelling of natural

language entailment (see Montague, 2007; Liefke and Werning, 2018; Theiler et al., 2018). In formal semantics, entailment is commonly modelled as (the functional counterpart of) set-theoretic inclusion. For two linguistic expressions X and Y, it thus holds that $X \Rightarrow Y$ iff $[\![X]\!] \subseteq [\![Y]\!]$ (see Keenan and Faltz, 1985; Kac, 1992). By the conditions on set-theoretic inclusion, entailment is restricted to pairs of expressions that denote objects of <u>the same</u> type. These include the designators of propositions and the designators of intensional generalized quantifiers. Admissible pairs of expressions then include the pairs in (14) to (16). They *prima facie* exclude the pair in (17):

(14)   a. The Earth is round. $\Rightarrow$ b. Something is round.

(15)   a. Bill believes [that the Earth is round].
   $\Rightarrow$ b. Bill believes [that something is round].

(16)   a. A unicorn! $\Rightarrow$ b. A mythical creature!

(17)   a. John seeks [a unicorn].   (see (6b))
   $\Rightarrow$ b. John tries [that he/John finds a mythical creature].

In particular, since (14a) and (14b) each denote a set of possible worlds [viz. (18a) resp. (18b)], they are in the domain of this inclusion relation. The validity of (14) is then due to the set-theoretic inclusion of the set in (18a) in the set in (18b):

(18)   a. $\{w : \text{the Earth is round in } w\}$ $\subseteq$ b. $\{w : \exists x.\ x \text{ is round in } w\}$

Assuming that 'believe' is upward monotonic in its complement position, an analogous observation holds for (15).

A higher-type analogue of the above holds for the generalized quantifier-interpretation of the DPs in (16):

(19)   a. $\lambda w. \{P : \text{a unicorn has (the property) } P \text{ in } w\}$
       $\subseteq$ b. $\lambda w. \{P : \text{a mythical creature has } P \text{ in } w\}$

Since DPs are typically interpreted in a *different* semantic type from embedded clause-CPs (viz. as generalized quantifiers *vis-à-vis* as propositions; see Montague, 1970; Moltmann, 1997), the complements of *seek* and *try* in (17) *prima facie* do <u>not</u> stand in a semantic inclusion relation. The propositional analysis of the complement in (17a) [see (11); based on (6b)] remedies the problematic type-difference. This analysis captures the entailment in (17) through the semantic inclusion of the set of worlds in which John finds a unicorn in the set of worlds in which John finds a mythical creature [in (20)]:

(20)   a. $\{w : \text{John finds a unicorn in } w\}$ $(= \{w : \text{John finds-in-}w \text{ a unicorn-in-}w\})$
   $\subseteq$ b. $\{w : \text{John finds a mythical creature in } w\}$

Admittedly, by itself, the modelling of natural language entailment is not yet unequivocal support for the propositional nature of mental attitude content: the entailments from (14) to (17) could also be modelled by assuming that attitude content takes the form of intensional generalized quantifiers. This assumption would straightforwardly capture the entailment relation in (16). The remaining relations could then be captured by interpreting linguistic expressions at face-value [as in (13)] and by lifting propositions to intensional quantifiers through a suitable type-shifter. However – apart from failing to account for the relation in (17) –,[9] such a move would violate Partee's principle of trying simplest types first (given that sets of worlds are simpler [= have a lower-rank type] than generalized quantifiers) and of only using type-shifting as a last resort (see Partee and Hendriks, 1997).

3 Experiential Attitudes

I have suggested above that experiential attitudes[10] differ from 'true' [= non-experiential] objectual attitudes in being relations to events or scenes (viz. a scene that saliently features some individual; e.g. a scene involving a [possibly non-specific] unicorn), rather than to individuals (e.g. the unicorn). To prepare my propositionalist account of experiential attitudes, I first provide support for the scene-directedness of experiential attitudes (in Sect. 3.1) and contrast 'experiential' with 'propositional' occurrences of experiential attitude verbs (in Sect. 3.2).

3.1 The Scene-Directedness of Experiential Attitudes

Like reports of 'true' objectual attitudes [see e.g. (7a)], experiential attitude reports [e.g. (21a), (22a)] resist a syntactic analysis or lexical paraphrase as a clause-embedding structure. However, they are <u>equivalent</u> to the result of supplementing their direct object with a contextually determined predicate (including the context-universal predicate *exists*; see (21b/c) and (22b/c), where '$\overset{c}{=}$' indicates a contextual equivalence in the described scenario).[11] The examples below are inspired by (Forbes, 2006, ex. (14a)) and (Zimmermann, 2016, ex. (3)), respectively:

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[9] This holds since such account would also need to consider information structure (e.g. the fact that, in (17b) 'a mythical creature' is attributed the predicate 'being found by John'—rather than 'John' being attributed 'finding a mythical creature'). But this is difficult to capture through a type-shifter.

[10] The term *experiential attitude* is well-established in philosophy and psychology (see e.g. Siegel, 2006; Bernecker, 2010 [*experiential memory*]; Peacocke, 1998 [*experiential imagination*]). Anand (2011) uses the term *experiential attitude* for *de se*-versions of what I call 'experiential attitudes'. In (Anand, 2011), the latter are called *imagistic attitudes*.

[11] For simplicity of exposition, I will hereafter often neglect verbal tense and aspect.

(21) *Scenario:* Mary imagined that a unicorn was cantering.

  a. Mary imagined [a unicorn]$_{de\ dicto}$.

$\equiv$ b. Mary imagined-in-@ [λw. a unicorn-in-w exists-in-w]

$\overset{c}{\equiv}$ c. Mary imagined-in-@ [λw. a unicorn-in-w canters-in-w]

(22) *Scenario:* Penny painted a penguin diving into the sea.

  a. Penny painted [a penguin]$_{de\ dicto}$.

$\equiv$ b. Penny painted-in-@ [λw. a penguin-in-w exists-in-w]

$\overset{c}{\equiv}$ c. Penny painted-in-@ [λw. a penguin-in-w dives-into-the-sea-in-w]

Assume that Mary imagined a unicorn which is/was cantering [see the scenario in (21)]. This attitudinal event can then be reported by (21a) as well as by (21b) or, in the described scenario, by (21c).[12]

The equivalences in (21) and (22) are reminiscent of the equivalence of objectual and scene-directed perception reports (see Barwise and Perry, 1983; van der Does, 1991; Falkenberg, 1989 [for German]):

(23) *Scenario:* James saw Samuel eating a fish.

  a. James saw [Samuel].   (van der Does, 1991, ex. (1))

$\equiv$ b. James saw-in-@ [λw. Samuel exists-in-w]

$\overset{c}{\equiv}$ c. James saw-in-@ [λw. Samuel eats-a-fish-in-w]   (van der Does, 1991)

As has been extensively discussed in situation semantics, (23a–c) are all adequately paraphrased by (24) in the described context:

(24) James perceived [*a visual scene* in which Samuel was eating a fish].

Analogous paraphrases can be provided for (2s1a–c) [in (25)] and for (22a–c)[13] [in (26)]:

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[12] Since the complement in (21c) provides a more specific description of the imagined content than (21a) [or (21b)], (21c) does not stand in a context-general equivalence relation to (21a).

[13] The possibility of depicting scenes from perception or imagination suggests that *paint* can be referentially dependent (or 'parasitic') on other attitudes. For an account of this behavior, the reader is referred to (Liefke and Werning, 2021; see Blumberg, 2019, Sect. 5.2).

(25)   Mary imagined [*a counterfactual scene* in which there was a unicorn (a, b) /
                                                    in which a unicorn was cantering (c)].

(26)   Penny depicted [*a (perceived or counterfactual) scene* in which there was a
                            penguin (a,b) / in which a penguin was diving into the sea (c)].

The possibility of paraphrasing experiential imagination and depiction reports
through explicit reference to scenes suggests that—like *see*—*imagine* and *paint*
(and, as I will show below, *remember*) denote relations to events or scenes.[14] The
'scene-directedness'[15] of these attitudes is further evidenced by the possibility of
modifying the matrix verbs in reports of these attitudes by an experiential modifier
like *vividly* or *in vivid/perfect/lifelike detail* [in (27), (28); see Stephenson, 2010]:

> (27)   Mary *vividly* imagined [a unicorn].
>
> (28)   Penny painted [a penguin] *in vivid/lifelike detail*.

The scene-directedness of *imagine-* and *paint*-reports like (21a) and (22a) is fur-
ther apparent from the possibility of replacing the direct object DPs in these reports
by a scene- or event-denoting *how*-phrase [in (29), (31)] (see Umbach et al., 2022)
and from these reports' entailment to the truth of sentences that relate the agent's
personal (perceptual or mental) experience of the scene described by the comple-
ment [in (30), (32)] (see Stephenson, 2010).

(29)   a. Mary imagined [a unicorn cantering].
   ≡   b. Mary imagined [i. *how* / ii. *a scene in which* a unicorn was cantering].

(30)   a. Mary imagined [a unicorn].
   ⇒   b. Mary mentally experienced (seeing/visualizing) a unicorn.

(31)   a. Penny painted [a penguin diving into the sea].
   ≡   b. Penny painted [i. *how* / ii. *an event in which* a penguin was diving into the
           sea].

(32)   a. Penny painted [a penguin].
   ⇒   b. Penny experienced (mentally visualizing) a penguin.

The above behavior is displayed by all representational counterfactual atti-
tude verbs (see Blumberg, 2019). These are verbs that "convey a mental picture"

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[14] For *imagine*, this view is defended in Stephenson (2010) (following observations by Higginbotham,
2003).

[15] For simplicity, I hereafter use 'scene' as a cover term for events and scenes.

(see White et al., 2018) [representationality] and whose DP complements denote objects that may not exist at @ [counterfactuality]. They include—next to verbs of intentional physical and mental depiction (e.g. *paint*, *imagine*, *visualize*; see above)—verbs of non-intentional depiction (e.g. *dream (of)*, *hallucinate*) [see (33a)]. The behavior from (24) to (32) is also observed for reports with direct object-taking occurrences of memory and attention verbs (e.g. *remember*, *notice*, *observe*) [see (34a)].

(33)   a.   Jacob was dreaming of [an angel].   (see Zimmermann, 2016, p. 435)
    ≡ b.   Jacob was oneirically experiencing [*a scene* in which there was an angel].

(34)   *Scenario:* Last week, Ron saw a spider hanging from the ceiling in his office.
        a.   (Now,) Ron remembers [a/the spider].
    ≡ b.   Ron remembers [*a particular scene* that featured a spider (doing sth.)].

The remainder of this paper will defend propositionalism about the content of experiential attitudes. This defense will use the possibility of representing the target-scenes of experiential attitudes through sets of possible situations (see Sect. 4). To avoid wrong conclusions about the information content of the direct objects in experiential attitude reports, I precede my analysis with a distinction between *experiential* [= scene-directed] and *propositional* [= proposition- or fact-directed] occurrences of experiential attitude verbs (in Sect. 3.2). In contrast to the objects of experiential occurrences of these verbs, the objects of propositional occurrences have a straightforward—and widely acknowledged – propositional analysis.

3.2 Scene-Directed *vis-à-vis* Proposition-Directed Experiential Attitudes

Remarkably, many experiential attitude verbs also license finite *that*-clause complements. For the matrix verbs in (21a), (33a), (23a), and (34a), examples of such constructions are given below:

    (35)   Mary imagined [that a unicorn was cantering].
    (36)   Jacob was dreaming [that an angel was climbing the ladder to heaven].
    (37)   James saw [that Samuel was eating a fish].
    (38)   Ron remembers [that a spider was hanging from the ceiling].

In contrast to their experiential counterparts, the *that*-clause reports in (35) to (38) intuitively do not describe an agent's relation to a scene. Rather, they express the agent's relation to a proposition that is true of this scene, or to a fact about this scene (see Barwise and Perry, 1983; Higginbotham, 2003; Stephenson, 2010). The propositional nature of (35) to (38) is evidenced by the observation that these reports

resist a paraphrase in terms of scenes [for (38), this is shown in (39)]. In particular—
in contrast to (34a) –, (38) is already true in a scenario in which Ron has only been
told that a spider was hanging from the ceiling, but has not seen (or otherwise expe-
rienced) the spider.

(39) a. Ron remembers [that a spider was hanging from the ceiling].   (see (38))
   ≡ b. Ron remembers [*the fact* that a spider was hanging from the ceiling].
   ≢ c. Ron remembers [*a specific (perceptual) scene* in which a spider was hang-
      ing from the ceiling].

The propositional nature of *that*-clause variants of experiential attitude reports is
further supported by the observation that these reports fail the diagnostic tests for
experiential attitude reports from Sect. 3.1.

The difference between experiential and propositional attitude reports reflects
established distinctions in the philosophy of mind, psychology, and cognitive sci-
ence. These include Dretske's (1969) distinction between 'non-epistemic' [≈ expe-
riential] and 'epistemic' [≈ propositional] perception, Tulving's (1972) distinction
between 'episodic' [≈ experiential] and 'semantic' [≈ propositional] memory, and
Peacocke's (1998) distinction between 'experiential' and 'suppositional' [≈ propo-
sitional] imagining.

Following Hintikka's relational account [see (4), (10)], the information content of
the *that*-clause in (38) is identified with the set of worlds in which a spider is hang-
ing from the ceiling (in (40a); see Ciardelli et al., 2018; Abusch, 2020):

(40) a. ⟦that a spider was hanging from the ceiling⟧^{c}
         $= \{w : $ a spider was hanging from the ceiling in $w\}$
   ≠ b. ⟦*a scene* in which a spider was hanging from the ceiling⟧^{c}

Since the object that is denoted by the DP *a spider* in (34a) (viz. an event/a scene)
has a different type from the object that is denoted by the *that*-clause in (38) (viz. a
proposition/a fact), these objects are seemingly unable to stand in a semantic inclu-
sion relation. I will show below that this is not the case.

4 'Propositionalizing' the Content of Experiential Attitudes

To extract the propositional information content from the scenes that serve as the
objects of experiential attitudes, I represent these scenes by sets of situations. The
members of these sets are informationally incomplete parts of possible worlds that
encode exactly the same qualitative [= non-spatio-temporal and -worldly] semantic
information. The propositional representation of scenes uses the possibility of cod-
ing objects of a certain type (here: the general type for situations, events, and scenes)
by sets of objects of this type (see e.g. Quine, 1946). My representation deviates

from standard uses of this possibility in coding scenes by sets of (partial) <u>situations</u>, rather than by sets of (maximal, total) worlds. This deviation is motivated by the informational incompleteness of imagined and remembered scenes. The representation of informationally incomplete scenes by their maximally extending worlds would destroy this partiality (see Fine, 2017; Yablo, 2014).[16]

My strategy for the propositional representation of scenes is given in (41). This strategy identifies the propositional content of a scene s with a subset of the set, Σ, of situations whose members exactly verify (in the sense of truthmaker semantics, to be specified below) the conjunction, S, of all sentences that are true in s [see condition (i)] and—if applicable—whose members are located at the same spatio-temporal and world-coordinate, l_s (for *location* of s), t_s (for *time* of s), and w_s (for *world* of s), as s [see condition (ii)]. In (41), $\Vdash$ is the truthmaker-semantic relation of exact verification (see Fine, 2017).[17] $s \Vdash S$ asserts that s is "wholly relevant for the truth of S", such that s "does not include anything that fails to bear on the truth of S" (Moltmann, 2020, p. 167).

$$(41) \quad \lambda s. \left\{ s' \mid s' \in \Sigma \ \& \ \underbrace{(\exists S : s \Vdash S \wedge s' \Vdash S)}_{\text{Condition (i)}} \& \ \underbrace{(l_{s'} = l_s \ \& \ t_{s'} = t_s \ \& \ w_{s'} = w_s)}_{\text{Condition (ii)}} \right\}$$

Condition (i) ensures that the propositional representation of the target scene is a set of isomorphic [= qualitatively identical] situations (in the sense of Kratzer, 2002, p. 667; see Fine, 1977, p. 136). In combination with this condition, Condition (ii) ensures that *specific* scenes, i.e. scenes that are located (or 'anchored') in a particular spatio-temporal and world-coordinate (e.g. Ron's remembered scene from (34), in which a spider is hanging from the ceiling)[18] are represented by a <u>singleton</u> sets of situations. *Non-specific* scenes, i.e. scenes without a particular spatio-temporal and/or world-coordinate (e.g. Mary's imagined scene from (21a), in which some (!) unicorn is cantering), are represented by a (typically non-singleton) <u>set</u> of situations.

The possibility of representing non-specific scenes by sets of situations allows us to propositionally model the contents of representational counterfactual attitudes like imagining. To see how this works, consider the scenario in Fig. 1.[19] In this scenario, Mary is imagining a white unicorn with a peach belly and a rainbow-colored mane and tail that is cantering. However—as is often the case in counterfactual attitudes –, the featured unicorn is not a specific individual that inhabits a particular possible world.

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[16] This holds for information 'gaps' that have the same completion in all possible worlds.

[17] To keep the presentation as simple as possible, I here neglect falsification.

[18] Since scenes need not be part of a particular world at a particular place and time (see e.g. Mary's imagined scene in (25)), they are distinct from (truthmaker-style) situations.

[19] The stick figure in Fig. 1 is taken from xkcd.com and is used under the Creative Commons License. The unicorn and the callouts are taken from FlyClipart [https://l.rub.de/b8ff77f5] respectively from FreePik [https://l.rub.de/33d27254].

Following the strategy from (41), we represent Mary's imagined scene by the set of situations that serve as exact truthmakers for the conjunctive sentence in (42) [see (43)]. The members of this set encode exactly the same qualitative information. They differ in being parts of <u>different</u> possible worlds. Since, in some worlds, there may be multiple unicorns that each exemplify the properties in (42), this set may even contain situations with different spatial and/or temporal coordinates that are part of the <u>same</u> world.

(42) A white unicorn with a peach belly and a rainbow-colored mane and tail is cantering.

(43) $\llbracket$a unicorn$\rrbracket^{c\,[=\,\text{Fig. 1}]}$

  $=\ \llbracket$*a (non-specific) counterfactual scene* in which there is a unicorn$\rrbracket^c$

  $=\ \{s : s \Vdash (42)\}$

  $=\ \{s : \exists x.\ x$ is a white unicorn in s, x has a peach belly in s, x has a rainbow-colored mane/tail in s, x is cantering s, <u>and nothing else is the case in s</u>$\}$

To illustrate the propositional information content of Mary's imagined scene in Fig. 1, consider the representation of this scene in the universe from Fig. 2: this universe consists of three worlds, viz. @, w_1, and w_2. These worlds each contain three situations with distinct[20] spatio-temporal coordinates that may, however, overlap (see the informational inclusion of σ_1^{ii} in σ_1^{iii}). The semantic information that is true in these situations is abbreviated as follows:

A: a white unicorn with a peach belly and a rainbow-colored mane and tail is cantering
B: a white unicorn with a peach belly and a silver mane is basking in the sun
C: a spider is hanging from the ceiling
D: Samuel is eating a fish

The information from (42) is exactly true in the 'white' situations, viz. in σ_1^i, σ_1^{ii}, and σ_2^{iii}. As a result, in the context from Fig. 1, the information content of *a unicorn* in (21a) can be represented by the set $\{\sigma_1^i, \sigma_1^{ii}, \sigma_2^{iii}\}$.

Note that, because of the non-specificity of Mary's imagined scene, (21a) [copied in (44a)] is intuitively equivalent to the *that*-clause report from (44b) in the described context:

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[20] In virtue of this assumption, the unicorns that make A true in σ_1^i and σ_1^{ii} cannot be the same.

(44)   a. Mary imagined [a unicorn].   (see (21a))
$\overset{c}{\equiv}$ b. Mary imagined [*that* a white unicorn with a peach belly and a rainbow-colored mane and tail was cantering].

By replacing the familiar semantic values of sentences and clauses (viz. sets of possible worlds in which the clause is true; see Sect. 1) by sets of their exact veri-fiers/situations,[21] we can straightforwardly capture the above equivalence.

(45)   ⟦that a white unicorn with a peach belly and a rainbow-colored mane and tail is cantering⟧^{c}

$= \{s : s \Vdash$ a white unicorn with a peach belly and a rainbow-colored mane and tail is cantering$\}$

Notably, contextual equivalences like (44) do not hold for perception and mem-ory reports. In particular, the DP *a spider* in (34a) does not, in any context, have the same propositional information content as the CP *that a spider was hanging from the ceiling* [see (46)]. This non-identity even holds if the fact that a spider was hanging from the ceiling was the only thing that Ron saw in the remembered scene.[22] This is so since the semantic complement in (34a) (i.e. Ron's formerly perceived – and now remembered—scene that features a particular spider) is a *specific* spatio-temporal part of the <u>actual</u> world. This differs from the semantic complement in (38), which is a spatially *un*specific part of <u>some</u> world.

To capture the specificity of the remembered scene/situation in (34a) (hereafter called 'σ'), I represent this scene by a singleton that only contains this scene [see (46a)]. Since the information content of the *that*-clause in (38) contains <u>all</u> past situ-ations that exactly verify the sentence *A spider was hanging from the ceiling* [see (46b)], it includes the propositional information content of *a spider* in (34a). To cap-ture the pastness of the relevant situations (see the past tense in '<u>was</u> hanging …'), I restrict the set in (46b) by demanding that *s* is located at an earlier point in time than @ (formally: '$t_s < t_@$').

(46)   a. $[\![\text{a spider}]\!]^c$
$= [\![\text{a } \textit{specific scene} \text{ in which a spider was hanging from the ceiling}]\!]^c$
$= \{s : (t_s \prec t_@ \ \& \ s \Vdash \text{a spider is hanging from the ceiling}) \ \underline{\& \ s = \sigma}\}$
$= \{s : (s \Vdash \text{a spider is hanging from the ceiling}) \ \underline{\& \ s = \sigma}\} \ = \ \{\sigma\}$

   $\sqsubseteq$ b. $\{s : t_s \prec t_@ \ \& \ s \Vdash \text{a spider is hanging from the ceiling}\}$
$= [\![\textit{that} \text{ a spider was hanging from the ceiling}]\!]^c$

Arguably, the replacement of sets of (total) worlds by sets of exact truthmakers [= of (partial) situations] effects that we can no longer capture semantic inclusion through set-theoretic inclusion (*contra* Sect. 2.2). To answer this challenge, I replace set-theoretic inclusion with a relation, $\sqsubseteq$, of *pointwise informational inclusion* in (46). I assume that a set of situations, Σ, informationally includes another set Σ', i.e. $\Sigma \sqsubseteq \Sigma'$, iff $\forall s' \in \Sigma' : (\exists s \in \Sigma : s' \leq s)$, where $\leq$ is Moltmann's (2020, pp. 167–168) partial ordering on situations (see Liefke and Werning, 2018, p. 659 for a description of this ordering). On this ordering, a situation s includes a situation s', i.e. $s' \leq s$, if s contains all information that is contained in s'. This condition requires that the location l_s and time t_s of the world-part about which s contains information includes the location $l_{s'}$ and time $t_{s'}$ of the world-part about which s' contains information (s.t. l_s maintains or expands the perimeters of $l_{s'}$ and t_s starts before or simultaneously with $t_{s'}$ and ends after or simultaneously with $t_{s'}$).

In Fig. 3, $\leq$ holds e.g. between σ_0^{ii} (in which a spider is hanging from the ceiling and Samuel is eating a fish) and its spatio(-temporal) part σ_0^i (in which a spider is hanging from the ceiling, and nothing else), s.t. $\sigma_0^i \leq \sigma_0^{ii}$. Since Moltmann's ordering is not a proper ordering (unlike $<$), this ordering can even hold between a situation and itself (s.t. $\sigma_0^i \leq \sigma_0^i$). The propositional content of the direct object, *a spider*, from (34a) is given in (46a).

Assuming that $\sigma = \sigma_0^{iii}$, the propositional information contents from (46a) and (46b) are identified with $\{\sigma_0^{iii}\}$ ($= [\![\text{a spider}]\!]^c$) respectively with $\{\sigma_0^i, \sigma_0^{iii}, \sigma_2^{ii}\}$ ($= [\![\textit{that} \text{ a spider is hanging from the ceiling}]\!]^c$). In Fig. 3, the members of these sets are marked in white (for $[\![\text{a spider}]\!]^c$), respectively are circled by a dashed line (for $[\![\textit{that}\text{ a spider} \ldots]\!]^c$). Since each member of $\{\sigma_0^{iii}\}$ is an informational part of some member (here: σ_0^{iii}) of $\{\sigma_0^i, \sigma_0^{iii}, \sigma_2^{ii}\}$ (see the above definition of pointwise informational inclusion), the propositional content of the *that*-clause in (38) is semantically included in the content of the direct object DP in (34a) [see (46)].

5 Preserving the Merits of Propositionalism

With the propositional representation of the objects of experiential attitudes in place, I am now ready to show how my account preserves the merits of attitudinal propositionalism. I start with the modelling of natural language entailment (see Sect. 2.2).

Fig. 1 Mary imagining a unicorn
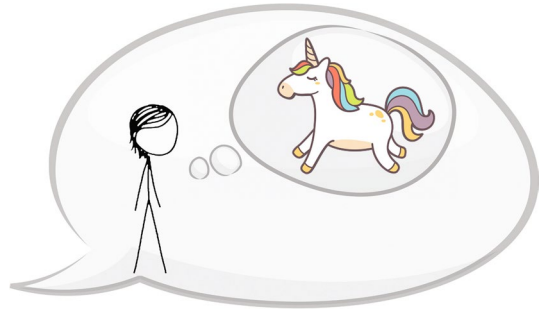
5.1 Entailment

I have already observed that, on my proposed account, the direct object DPs in experiential imagination reports have the same information content as the conjunction of all sentences that are exactly true in the scene denoted by these DPs [see (43), (45)]. This identity straightforwardly accounts for the entailment in (47), whose second report, i.e. (47b), only uses a small fragment (viz. *a unicorn was cantering*) of the informationally much richer sentence (42) in its complement [see (48)].

> (47) a. Mary imagined [a unicorn (cantering)].
> $\not\Leftarrow\overset{c}{\Rightarrow}$ b. Mary imagined [that a unicorn was cantering].

(48) a. $[\![\text{a unicorn}]\!]^{c\,[=\text{Fig. 1}]}$ (i.e. (43))
         $= \{s : s \Vdash \text{a white unicorn with a peach belly and a rainbow-colored mane}$
                                 $\text{and tail is cantering}\}$
 $\sqsubseteq$ b. $[\![\text{that a unicorn is cantering}]\!]^{c} = \{s : s \Vdash \text{a unicorn is cantering}\}$

A similar account to the one above can be provided for intuitive entailments between 'direct object' and '*that*-clause' perception and memory reports [e.g. (34a), (38); see (49)]:

> (49) a. Ron remembers [a spider (hanging from the ceiling)].
> $\not\Leftarrow\Rightarrow$ b. Ron remembers [that a spider was hanging from the ceiling].

The only difference between my account of (47) and my account of (49) lies in the spatial and worldly restriction on the members of the sets of situations that serve as the information content of the DPs in (47a) and (49a): since the direct object *a spider* in (49a) refers to a specific scene, its information content is represented by a singleton set—unlike the information content of *a unicorn* in (47a).
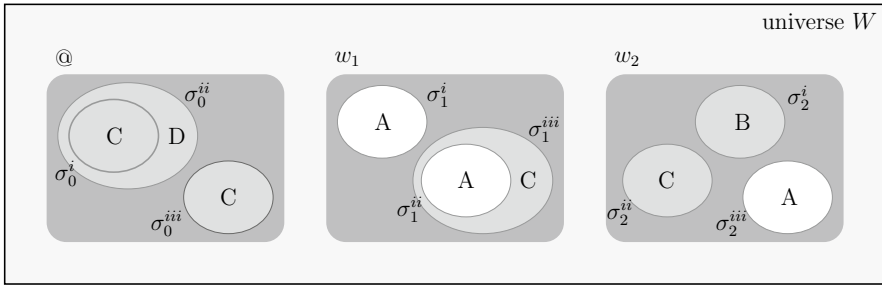
Fig. 2 The propositional representation of Mary's imagined scene from Fig. 1 [= the set of 'white' situations]

5.2 Intensionality

As one may expect, the propositional information content of experiential attitudes also preserves the intensional behavior of reports of these attitudes [see (12)] (Sect. 2.1). This is so since the representation of the target scene by a set of situations preserves the possibility of interpreting the direct object DP inside the scope of the attitude verb, and of evaluating this DP at a non-@ situation. In particular, since the sets of unicorns and of griffins need not be the same in all situations in which a white unicorn with a peach belly and a rainbow-colored mane and tail is cantering [see (43)], my account ensures the referential opacity of *imagine* [see (50a)]. The same holds for embedded indefinites' lack of existential import [see (50c)]: since the existential quantifiers that are introduced by embedded DPs still enter into scope relations with the matrix attitude verb (in (50): *imagine*), my propositionalist account also allows these DPs to receive a non-specific interpretation [see (50b)].

To avoid spelling out the details[23] of a formal semantics for experiential attitude verbs, I interpret *a unicorn* in (50) against the specific context from Fig. 1:

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[23] Formally, the context-dependence of experiential attitude contents can be captured through a subset selection function that is parametrized by the attitudinal event (see Blumberg, 2019, Sect. 5.2; using the function from von Fintel, 1999). In (Liefke, 2020, 2022), this function is hardcoded into the semantics of DP-taking occurrences of experiential attitude verbs. However, this is only one option.

(50) $[\![$Mary imagined [a unicorn]$_{de\ dicto}]\!]^{@,c}$
        $\equiv [\![$Mary imagined-in-@ $[\ \lambda s.\ s \Vdash$ a white unicorn with ... is cantering$]]\!]$
$$\underbrace{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$$
                    (a propositional representation of) Mary's imagined scene

$\not\Rightarrow$ a. $[\![$Mary imagined [a griffin]$_{de\ dicto}]\!]^{@,c}$ (referential opacity)
        $\equiv [\![$Mary imagined-in-@ $[\ \lambda s.\ s \Vdash$ a $\underline{griffin}$ is performing certain actions/
            has particular properties (specified w.r.t. Mary's imagined scene)$]]\!]$

$\not\Rightarrow$ b. $[\![$There is [a unicorn] which Mary imagined$]\!]^{@,c}$ (non-specificity)
        $\equiv [\![$[a unicorn]^1 [Mary imagined-in-@ $[\ \lambda s.\ s \Vdash x_1$ is performing certain
            actions/has particular properties (specified w.r.t. M's imagined scene)$]]]\!]$

$\not\Rightarrow$ c. $[\![$There are (actual) unicorns$]\!]^{@,c} = [\![$unicorns exist-in-@$]\!]^c$ (non-actuality)

The referential opacity of *imagine* is further due to the fact that different things may be the case in the scenes denoted by *a unicorn* in (50) and by *a griffin* in (50a) (see the phrasing 'is performing certain actions ...').

6 Challenges and Prospectives

6.1 A Challenge: Non-singular Scenes

Above, I have defended propositionalism for experiential attitudes by showing that the scenes that serve as the objects of these attitudes allow for a straightforward representation in terms of propositions [= sets of truthmakers/situations]. My defense has been based on the assumption that agents hold experiential attitudes towards (specific or unspecific) <u>singular</u> scenes. However, this assumption does not hold in general, as is shown by (51):

(51)   *Scenario:* Over many years now, Oscar has occasionally spotted the same cat in different locations: in his garden, on his neighbor's front porch, and in the fields nearby. Since the time when he first spotted it as a kitten, it has changed in every perceivable way. In particular, it has almost tripled in size and its fur has turned grey, but it has become a lot more trusting.

        a.   Oscar remembers [a/the cat].
$\equiv$ b.   Oscar remembers [*different* scenes that all feature the same cat (doing different things/having different properties)].
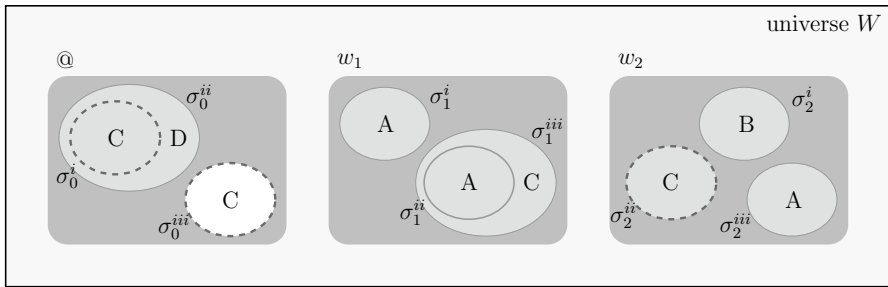$\not\equiv$ c.   Oscar remembers [a *particular* scene/event that featured the cat (doing sth.)].

Fig. 3 The propositional representation of Ron's remembered scene in (34) (white) vs. of Ron's remembered fact in (38) (dashed)

In contrast to (34a), the direct object DP in (51a) is intuitively <u>not</u> equivalent to the result of supplementing it with some contextually salient predicate. This is so since the remembered cat has different properties at Oscar's different 'cat seeing'-events, and since Oscar's remembering the cat may also involve him thinking of the cat when it was not around. The former excludes the DP's supplementation with a contextually determined predicate [along the lines of (7b)]. The latter excludes the DP's supplementation with an existence predicate [along the lines of (7c)].

The above notwithstanding, my propositionalist account can still be adapted to capture cases like (51a). This adaptation involves replacing a propositionally represented *single* scene by the propositionalist representation of a <u>set</u> of scenes (for (51a): the set of Oscar's [perceptually or counterfactually] experienced scenes that feature said cat). My strategy for the propositionalist representation of this set [in (52)] follows the strategy for the representation of single scenes [in (41); copied below]:

(41) $\lambda s. \left\{ s' : s' \in \Sigma \; \& \; \underbrace{(\exists S : s \Vdash S \rightarrow s' \Vdash S)}_{\text{Condition (i)}} \& \; \underbrace{(l_{s'} = l_s \; \& \; t_{s'} = t_s \; \& \; w_{s'} = w_s)}_{\text{Condition (ii)}} \right\}$

(52) $\lambda q. \bigcup_{s \in q} \left\{ s' : s' \in \Sigma \; \& \; \overbrace{(\exists S : s \Vdash S \rightarrow s' \Vdash S)} \& \; \overbrace{(l_{s'} = l_s \; \& \; t_{s'} = t_s \; \& \; w_{s'} = w_s)} \right\}$

The strategy from (52) differs from the 'single scene'-strategy in taking as input <u>sets</u> of scenes [see the 'λp' in (52)], rather than individual scenes. The need to still 'convert' these sets into sets of situations is due to the fact that some scenes in the input set are non-specific and are, hence, not situations. The conversion is further required by the wish to capture intuitive entailments between experiential attitude reports with event- and with concrete object-denoting DPs[24] [e.g. (53)]:

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[24] In virtue of this conversion, the obtained information content is *propositionalist*, not just *propositional*.

(53)   a. Oscar remembers [a (specific) event in which a cat was eating tuna out of
           a can in his garden].
       b. Oscar remembers [a/the cat].

   Following (52), the set of Oscar's experienced 'cat'-scenes is represented by the
union of the propositional [= singleton] representation of specific scenes (e.g. a par-
ticular visual scene of Oscar's in which the cat was eating tuna out of a can in his
garden) and the propositional [= non-singleton] representation of unspecific scenes
(e.g. Oscar's counterfactual buletic scene in which the cat is curling up on his sofa).
   It is an open question whether the proposed generalization can be extended to
'true' objectual attitudes (e.g. fearing Superman). However, the proposed account
is a first, and important, step in the 'divide and conquer'-defense of attitudinal
propositionalism.

6.2 Outlook: Just Propositional Attitudes?

The possibility of providing a propositional characterization of experiential attitude
content is an old hat in psychology and cognitive science that goes back (at least) to
Tulving (1985). In the attempt to provide a uniquely identifying feature of experi-
ential remembering, Tulving noticed that his earlier *what-where-when*-criterion for
episodic memory (that identified experiential remembering through its information
content and the latter's spatio-temporal 'anchoring'; see Tulving, 1972) fell short
of this purpose. This is so since propositional remembering can be equally detailed
(see the complex conjunctive sentence in (42); copied below) and spatio-temporally
specific [see the *de re*-reading, (54), of (38)] as experiential remembering (see also
Suddendorf and Busby, 2003; Klein, 2013; Sant'Anna, 2018).

(42)   A white unicorn with a peach belly and a rainbow-colored mane and tail is
       cantering.
(54)   [a spider][1] $[\lambda_1$ [Ron remembers that x_1 was hanging from the southmost corner
       of his office ceiling on April 1, 2022 at 1:37 p.m.]]

   To still distinguish experiential from propositional remembering, later work has
identified several special phenomenological features of episodic recall. The latter
include an experiencer perspective and a sense of self in episodic memory (see e.g.
Klein and Nichols, 2012; Tulving, 2005), a perspective on the experienced scene
(Nigro and Neisser, 1983; Rice and Rubin, 2009), the presence of mental imagery
(Mahr, 2020; Michaelian, 2016), and a degree of phenomenal transparency that
gives rise to experience-likeness (Cheng et al., 2016; Harman, 1990). I expect that a
fully-fledged theory of experiential attitudes will need to provide a careful account
of these different properties. While recent work in semantics and the philosophy of
language has started to, e.g., provide more realistic accounts of visual perspective

(beyond centered propositions; see Lücking et al., 2015), it has only taken the first few steps in this direction.

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