Standard and non-standard theories of attitudes and NPIs[1]

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Abstract. Some clause-taking verbs (e.g., *believe*) can also take DPs, some (e.g., *surmise*) cannot, and some (e.g., *groan*) can appear without a complement. The standard theory of complementation is forced to appeal to lexical ambiguity to explain this. An alternative theory says that "complements" of clause-taking predicates are not arguments, thereby offering a way to explain this variation without appealing to lexical ambiguity. This paper argues that the alternative theory is not more explanatory than the standard theory.

Keywords: complements, modifiers, attitudes, NPIs, Strawson entailment.

1. Introduction

As illustrated in (1), *Mia greeted Ted* may appear with or without a clause-level modifier, and *Mia groaned* may appear with or without a complement.

(1) a. Mia greeted Ted (passionately).
b. Mia groaned (that she was unhappy).

Event Semantics offers the following explanation for the fact that there is "room" for *passionately* in (1a). *Mia greeted Ted* denotes a property of eventualities rather than a truth value; the modifier *passionately* also denotes a property of eventualities.[2] When the two co-occur, they may combine by the same modification rule that combines *boy* and *who likes me* in *Ted is a boy who likes me*. Some versions of Event Semantics offer a similar explanation for the optionality of the complement in (1b) by rejecting the traditional distinction between complements and modifiers, and assuming that *groaned*, *Mia groaned* and *that she was unhappy* all denote properties of eventualities. This avoids treating *groaned* as lexically ambiguous. Based on examples with NPIs (negative polarity items), we argue that versions of Event Semantics that treat all clause-taking verbs as properties of eventualities do not have an advantage over theories that stipulate that some clause-taking verbs are lexically ambiguous.

2. Two variants of Event Semantics

We assume that the definition of the interpretation function ⟦ ⟧ subsumes presupposition-sensitive versions of Functional Application (FA) and Predicate Modification (PM) (see, for example, Heim & Kratzer, 1998; von Fintel & Heim, 2011), as in (2)-(3), where w is a possible

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[2] We use the term *eventuality* to refer to any event-like entity; this includes events, states, situations, etc.

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world and g is a variable assignment. FA combines a predicate with its arguments; PM combines a predicate with another predicate of the same type.

(2) FA. If α is a branching node and $\{\beta, \gamma\}$ is the set of α's daughters, then α is in Dom($[\![\ ]\!]^{w,g}$) if: (i) $[\![\beta]\!]^{w,g}$ is a function, and (ii) $[\![\gamma]\!]^{w,g}$ is in Dom($[\![\beta]\!]^{w,g}$) or $[\![\gamma]\!]^{g}_{¢}$ is in Dom($[\![\beta]\!]^{w,g}$), where $[\![\gamma]\!]^{g}_{¢} = [\lambda w: [\![\gamma]\!]^{w,g}$ is defined. $[\![\gamma]\!]^{w,g}]$.[3]
In this case, $[\![\alpha]\!]^{w,g} = [\![\beta]\!]^{w,g}([\![\gamma]\!]^{w,g})$ or $[\![\alpha]\!]^{w,g} = [\![\beta]\!]^{w,g}([\![\gamma]\!]^{g}_{¢})$, whichever is applicable.

(3) PM. If α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]^{w,g}$ and $[\![\gamma]\!]^{w,g}$ are functions from eventualities to truth values or from "normal" individuals to truth values, then $[\![\alpha]\!]^{w,g} = [\lambda o: [\![\beta]\!]^{w,g}(o)$ and $[\![\gamma]\!]^{w,g}(o)$ are defined. $[\![\beta]\!]^{w,g}(o) = [\![\gamma]\!]^{w,g}(o) = 1]$.[4]

What we refer to below as Variant I of Event Semantics says, with Davidson, 1967, that verbs take eventuality arguments, often in addition to non-eventuality arguments. Thus, for example, the surface verb pronounced *greeted* in *Mia greeted Ted* is – underlyingly – the verb *greet*^{e} in (4a), rather than the verb *greet*$^{non\text{-}e}$ in (4b) (from now on, the assignment function parameter – g – is often omitted when idle). We use the convention that e is an eventuality variable, and x and y are "normal" individual variables.

(4) a. $[\![greet^{e}]\!]^{w} = [\lambda x.\ \lambda y.\ \lambda e: GRT_{w}(e, y, x)$ is defined. $GRT_{w}(e, y, x)]$
b. $[\![greet^{non\text{-}e}]\!]^{w} = [\lambda x.\ \lambda y: Grt_{w}(y, x)$ is defined. $Grt_{w}(y, x)]$

FA combines *greet*^{e} with its non-eventuality arguments, yielding a function from eventualities to truth values. A clause-level modifier such as *passionately* denotes a function from eventualities to truth values; *passionately* combines with *Mia greet*^{e} *Ted* by PM.

(5) a. $[\![$*Mia greet*^{e} *Ted*$]\!]^{w} = [\lambda e: GRT_{w}(e, Mia, Ted)$ is defined. $GRT_{w}(e, Mia, Ted)]$
b. $[\![$*passionately*$]\!]^{w} = [\lambda e.$ e is a passionate eventuality in w$]$
c. $[\![$ [*Mia greet*^{e} *Ted*] *passionately*$]\!]^{w} = [\lambda e: GRT_{w}(e, Mia, Ted)$ is defined. $GRT_{w}(e, Mia, Ted) = [\![$*passionately*$]\!]^{w}(e) = 1]$

What we refer to below as Variant II of Event Semantics is itself a variant of Parsons, 1990, and Altshuler, Parsons & Schwarzschild, 2019. It says that verbs – like clause-level modifiers – take only eventuality-arguments. Thus, the verb pronounced *greeted* underlyingly decomposes into the verb *greet*$^{\theta}$ in (6) and the thematic predicates *Ag* and *Th* in (7), which introduce thematic role bearers. By assumption, the uniqueness principle in (8) is in effect.

(6) $[\![greet^{\theta}]\!]^{w} = [\lambda e:$ e has an agent and a theme in w. e is a greeting eventuality in w$]$

[3] Read '$[\lambda o: \mu.\ \varepsilon]$' as per Heim & Kratzer, 1998 (i.e., as: the smallest function that maps every o such that μ to either (i) or (ii), whichever is applicable: (i) ε, (ii) 1 if ε and 0 otherwise). The shortform '$[\lambda o.\ \varepsilon]$' is used whenever the domain of the function is constrained only by the type of o, and the latter is recoverable from notational conventions.

[4] Since presupposition filtering is characteristic of conjunction (as in *Ted is married and his spouse is nice*; see Karttunen, 1973, 1974), and modification is a form of conjunction, modification exhibits filtering too. Our simplified formulation of PM does not do justice to filtering. This has no bearing on the issues discussed here.

(7) a. $[\![Ag]\!]^w$ = [λx. λe. e has an agent in w & x is the agent of e in w]
b. $[\![Th]\!]^w$ = [λx. λe. e has a theme in w & x is the theme of e in w]

(8) For every possible world w, eventuality e and thematic role θ (agent, theme, etc.), at most one x is a θ-bearer of e in w.

Thematic predicates combine with their non-eventuality arguments via FA, but PM is the rule by which *greet*$^\theta$ combines with its non-eventuality "arguments". [*Ag Mia*] *greet*$^\theta$ [*Th Ted*] may further combine by PM with *passionately*.

(9) $[\![$ [*Ag Mia*] *greet*$^\theta$ [*Th Ted*] $]\!]^w$ = [λe: e has an agent and a theme in w. e is a greeting eventuality in w & Mia is the agent of e in w & Ted is the theme of e in w]

In both Variant I and Variant II, the "closer" ∃ in (10a), or one of its counterparts – e.g., *not* in (10b) – appears at the top of the LF, as illustrated in (10c), where α could be, for example, [*Ag Mia*] *greet*$^\theta$ [*Th Ted*].

(10) a. $[\![\exists]\!]^w = [\lambda P\text{: } \{o|\ P(o) \in \{1, 0\}\} \neq \varnothing.\ \{o|\ P(o) = 1\} \neq \varnothing]$
b. $[\![not]\!]^w = [\lambda P\text{: } \{o|\ P(o) \in \{1, 0\}\} \neq \varnothing.\ \{o|\ P(o) = 1\} = \varnothing]$ (cf. Schein 2020)
c. When $\{e|\ [\![\alpha]\!]^{w,g}(e) \in \{1, 0\}\} \neq \varnothing$, $[\![\exists\ \alpha]\!]^{w,g} = 1$ iff $\{e|\ [\![\alpha]\!]^{w,g}(e) = 1\} \neq \varnothing$.

Variant I and Variant II do not explain the non-optionality of what are traditionally considered to be arguments in the same way. For example, in Variant I, the ill-formedness of *Mia greeted* (as a main clause) follows from the definition of $[\![greet^e]\!]^w$, according to which it takes three arguments. Indeed, the LF [∃ *Mia greet*^{e}] is uninterpretable. In Variant II, on the other hand, the LF [∃ [*Ag Mia*] *greet*$^\theta$] is interpretable, as $[\![greet^\theta]\!]^w$ takes only an eventuality argument. Given this, the ill-formedness of *Mia greeted* must follow from θ-Realization in (11), which requires presupposed thematic information to be syntactically realized (or from some other principle along those lines). Indeed, $[\![greet^\theta]\!]^w(e)$ is defined only if e has a theme, yet the LF [∃ [*Ag Mia*] *greet*$^\theta$] lacks a node of the form [*Th* …].

(11) <u>θ-Realization</u>
For any verb V, let: (i) $A_V = \{\zeta|\ \zeta$ is a thematic predicate and for any (w, g, e), $[\![V]\!]^{w,g}(e)$ is defined only if $\{Z|\ [\![\zeta]\!]^{w,g}(Z)(e) = 1\} \neq \varnothing\}$, and (ii) n_V = the cardinality of A_V.
For any verb V such that $n_V \geq 1$, the largest LF that contains V is well-formed only if there is a sequence $(\zeta_1, \zeta_2, \ldots, \zeta_{n_V})$ and a sequence $(\beta_1, \beta_2, \ldots, \beta_{n_V})$ such that:
(a) $\zeta_1 \in A_V$ and $[\zeta_1\ \beta_1]$ is the sister of V, and
(b) for all m such that $1 < m \leq n_V$,
$\zeta_m \in A_V$ and $[\zeta_m\ \beta_m]$ is the sister of the mother node of $[\zeta_{m-1}\ \beta_{m-1}]$.[5]

It is difficult to determine, solely on the basis of surface verbs such as *greeted*, whether one variant of Event Semantics has an advantage over the other, because there is no obvious reason

[5] For simplicity, the current formulation of θ-Realization is not automatically violated when a verb combines with its "external argument" before combining with its "internal arguments".

to claim that Variant I and Variant II do not deliver the same meaning for, say, *Mia greeted Ted*. In other words, there is no obvious reason to say that the statement in (12) is not valid.

(12) [λw. λe: GRT_w(e, Mia, Ted) is defined. GRT_w(e, Mia, Ted)] =
[λw. λe: e has an agent and a theme in w. e is a greeting eventuality in w & Mia is the agent of e in w & Ted is the theme of e in w]

There are, however, reasons to claim that Variant I and Variant II do not deliver the same meaning for sentences whose main verb is a clause-taking verb. This provides a basis for evaluating the strengths and weaknesses of these two variants. The meanings we propose below for clause-taking verbs, like the meanings we proposed here for *greeted*, are simplified meanings not intended to provide accurate representations of the intuitive meanings of the corresponding sentences, but rather to highlight the challenges Variants I-II face vis-à-vis the optionality problem introduced in Section 1. To keep things simple, we will also ignore the semantic contribution of temporal morphemes (e.g., tense and aspect), as we have done so far.

3. Attitude reports: Variants I vs Variant II

On its 'de dicto' reading, *Ted believes that the red unicorn is happy* has the presupposition and assertion specified in (13) (see Karttunen, 1974). Presumably, *The red unicorn is happy* presupposes that there is exactly one red unicorn, and asserts that the red unicorn is happy.

(13) Ted believes that the red unicorn is happy.
Presupposition: Ted believes the presupposition of *The red unicorn is happy*.
Assertion: Ted believes the assertion of *The red unicorn is happy*.

The standard theory of attitudes (Hintikka, 1962, 1969; Karttunen, 1974; Heim, 1992), according to which *The red unicorn is happy* is an argument of *believes*, predicts these facts. Variant I affords various eventuality-based executions of the standard theory. Let us work with the version in (14), according to which the verb pronounced *believes* is underlyingly *believe*^{p}, whose first non-eventuality argument is a proposition (p – a function from worlds to truth values), and its second non-eventuality argument is a "normal" individual. DOX(x)(e)(w) = {w′| w′ is compatible with what x believes in (w, e)}.[6]

(14) $[\![believe^p]\!]^w$ = [λp. λx. λe: DOX(x)(e)(w) $\neq \varnothing$ & DOX(x)(e)(w) $\subseteq$ {w′| p(w′) $\in$ {1, 0}}. DOX(x)(e)(w) $\subseteq$ {w′| p(w′) = 1}]

FA is the rule by which *believe*^{p} combines with its non-eventuality arguments.

(15) LF of *Ted believes that the red unicorn is happy* within Variant I:
$\exists$ *Ted* [*believe*^{p} [$\exists$ *the red unicorn is*^{e} *happy*]]

[6] We ignore, for simplicity, the fact that *believe* is a Neg-raising verb. Some non-Neg-raisers (e.g., *surmise* and *conjecture*) have meanings that are quite close to the "weak" meaning of *believe*.

Alternatives to the standard theory of attitudes are made available by, for example, Moltmann, 1989; Higginbotham, 1999; Kratzer, 2006, 2013, 2022; Moulton, 2009; Elliot, 2017/2020; Bondarenko, 2017; Phillips & Kratzer, 2023; Bondarenko & Elliott, 2023. Let us temporarily work with the specific alternative illustrated in (16)-(17), which is faithful to Variant II. Accordingly, the verb pronounced *believes* underlyingly decomposes into *believe*^{Comp} and the thematic predicates *Comp* and *Bel*. *believe*^{Comp} denotes a function from eventualities with a believer and propositional content to truth values. The propositional content is introduced by *Comp*, and the believer by *Bel*.

(16) $[\![believe^{Comp}]\!]^{w}$ = [λe: {y| $[\![Bel]\!]^{w,g}$(y)(e) = 1} ≠ ∅ & {p| $[\![Comp]\!]^{w,g}$(p)(e) = 1} ≠ ∅ & $[\![att]\!]^{w}$(e) = 1 & (e is a believing eventuality in w iff DOX(the believer of e in w)(e)(w) ⊆ {w′| CON(e)(w)(w′) = 1}). e is a believing eventuality in w]
(where $[\![att]\!]^{w}$ = [λe′. DOX(the believer of e′ in w)(e′)(w) ≠ ∅ & DOX(the believer of e′ in w)(e′)(w) ⊆ {w′| CON(e′)(w)(w′) ∈ {1, 0}}]).

(17) a. $[\![Comp]\!]^{w}$ = [λp. λe. CON(e)(w) is defined & CON(e)(w) = p]
(where CON(e)(w) is the unique p such that p is the content of e in w, if there is one; undefined otherwise).
b. $[\![Bel]\!]^{w}$ = [λy. λe. e has a believer in w & y is the believer of e in w]

Both *Bel* and *Comp* combine with their non-eventuality arguments by FA. PM is the rule by which *believe*^{Comp} combines with its non-eventuality "arguments", namely, [*Bel* …] and [*Comp* ...] (*Exp* is the thematic role that introduces an experiencer).

(18) LF of *Ted believes that the red unicorn is happy* within Variant II:
∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp the red unicorn*] *is*$^{\theta}$ *happy*]

Clearly, Variants I and II do not deliver the same meaning for *Ted believes that the red unicorn is happy*, even if they deliver the same meaning for *The red unicorn is happy*; cf. (12).

(19) [λw. λe: DOX(Ted)(e)(w) ≠ ∅ & DOX(Ted)(e)(w) ⊆ {w′| there is exactly one red unicorn in w′ & {e′| $HPY_{w'}$(e′, the red unicorn in w′) ∈ {1, 0}} ≠ ∅}.
DOX(Ted)(e)(w) ⊆ {w′| {e′| $HPY_{w'}$(e′, the red unicorn in w′) = 1} ≠ ∅]
≠
[λw. λe: e has a believer in w & CON(e)(w) is defined & DOX(the believer of e in w)(e)(w) ≠ ∅ & DOX(the believer of e in w)(e)(w) ⊆ {w′| CON(e)(w)(w′) ∈ {1, 0}} & (e is a believing eventuality in w iff DOX(the believer of e in w)(e)(w) ⊆ {w′| CON(e)(w)(w′) = 1}).
Ted is the believer of e in w & e is a believing eventuality in w & CON(e)(w) = [λw″: there is exactly one red unicorn in w″ & {e″| $HPY_{w''}$(e″, the red unicorn in w″) ∈ {1, 0}} ≠ ∅}. {e″| $HPY_{w''}$(e″, the red unicorn in w″) = 1} ≠ ∅]]

A compelling argument in favor of Variant II comes from the fact that verbs of the class that includes *groan*, *sigh* and *growl* have optional complement clauses (see Levin, 1993; Kratzer, 2013; Bogal-Allbritten, 2016). These verbs contrast with verbs such as *believe*.

(20) a. (With sadness,) Mia groaned (that Ted was miserable).
b. (With sadness,) Mia believes *(that Ted was miserable).

Variant I has to rely on two verbs pronounced *groaned* to account for (20a,b). Variant II can account for (20a,b) by appealing to θ-Realization in (11). Indeed, $[\![believe^{Comp}]\!]^{w}(e)$ is defined only if $\{p|\ [\![Comp]\!]^{w,g}(p)(e) = 1\} \neq \emptyset$ and so, *Mia believes* is ill-formed. According to (21), $[\![groan^{(Comp)}]\!]^{w}(e)$ can be defined when $\{p|\ [\![Comp]\!]^{w,g}(p)(e) = 1\} = \emptyset$, and so, *groan* does not require a "complement" any more than it requires a clause-level modifier such as *with sadness*.

(21) $[\![groan^{(Comp)}]\!]^{w} = [\lambda e\text{: } \{y|\ [\![Ag]\!]^{w,g}(y)(e) = 1\} \neq \emptyset.\ e$ is a groaning eventuality in w]

An argument in favor of Variant I comes from the fact that *believe*^{p} accounts for the fact that intuitively, *Ted believes that Mia is a happy cat* and *Ted doesn't believe that Mia is a cat* cannot be simultaneously true; *believe*^{Comp}+*Bel*+*Comp*, on the other hand, does not account for this fact. This is shown by the contrast between (22) and (23); '=>' (entailment) is defined in (24).

(22) For all (ϕ, φ, w) such that $[\![\phi]\!]_{\not c} \Rightarrow [\![\varphi]\!]_{\not c}$:
if $\{e|\ DOX(Ted)(e)(w) \subseteq \{w'|\ [\![\phi]\!]^{w'} = 1\}\} \neq \emptyset$,
then $\{e|\ DOX(Ted)(e)(w) \subseteq \{w'|\ [\![\varphi]\!]^{w'} = 1\}\} \neq \emptyset$,
and if $\{e|\ DOX(Ted)(e)(w) \subseteq \{w'|\ [\![\varphi]\!]^{w'} = 1\}\} = \emptyset$,
then, $\{e|\ DOX(Ted)(e)(w) \subseteq \{w'|\ [\![\phi]\!]^{w'} = 1\}\} = \emptyset$;
therefore, if $[\![\exists$ *Ted believe*^{p} $\phi]\!]^{w} = 1$, $[\![$*not Ted believe*^{p} $\varphi]\!]^{w} \neq 1$, and
if $[\![$*not Ted believe*^{p} $\varphi]\!]^{w} = 1$, $[\![\exists$ *Ted believe*^{p} $\phi]\!]^{w} \neq 1$.

(23) There is at least one (ϕ, φ, w) such that $[\![\phi]\!]_{\not c} \Rightarrow [\![\varphi]\!]_{\not c}$ and:
(a) $\{e|\ DOX(Ted)(e)(w) \neq \emptyset\ \&\ DOX(Ted)(e)(w) \subseteq \{w'|\ [\![\phi]\!]^{w'} = 1\}\ \&\ [\![att]\!]^{w}(e) = 1\ \&$ Ted is the believer of e in w & $CON(e)(w) = [\![\phi]\!]_{\not c}\} \neq \emptyset$, and
(b) for all e′ such that $[\![att]\!]^{w}(e') = 1$, Ted is not the believer of e′ in w or $CON(e')(w) \neq [\![\varphi]\!]_{\not c}$,
therefore,
$[\![\exists$ [*Bel Ted*] *believe*^{Comp} [*Comp* ϕ] $]\!]^{w} = [\![$*not* [*Bel Ted*] *believe*^{Comp} [*Comp* φ] $]\!]^{w} = 1$.

(24) If f and h are of type t: f => h iff f = 0 or h = 1
If f and h are of type (σ,ρ): f => h iff for any z such that f(z) is defined:
h(z) is defined and f(z) => h(z).

Let us address this shortcoming of Variant II by revising *Comp* and *Bel* as in (26)-(27), based on (25). The revised *Comp* and *Bel* avoid the unwelcome outcome in (23).[7]

(25) $e' \sim_{w} e$ iff e′ is just like e in w with the possible exception that:
one of {CON(e)(w), CON(e′)(w)} is defined and the other is not, or CON(e)(w) and CON(e′)(w) are defined but CON(e)(w) ≠ CON(e′)(w).

[7] This revision of *Bel* and *Comp* is reminiscent of some accounts of the homogeneity of plural definite descriptions, which is illustrated by the fact that *The students complained* implies that all the students complained, and *The students didn't complain* implies that no student complained (see Fodor, 1970; Löbner, 2000).

(26) $[\![Comp]\!]^{w}$ = [λp. λe:
(CON(e)(w) = p & for all q such that p => q, {e′| e′ $\sim_{w}$ e & CON(e′)(w) = q} ≠ ∅) or
(for all q => p, {e′| e′ $\sim_{w}$ e & CON(e′)(w) is defined & CON(e′)(w) = q} = ∅).
CON(e)(w) is defined & CON(e)(w) = p]

(27) $[\![Bel]\!]^{w}$ = [λx. λe: if CON(e)(w) is defined, then:
(for all q such that CON(e)(w) => q, {e′| e′ $\sim_{w}$ e & CON(e′)(w) = q & e′ has a believer in w & x is the believer of e′ in w} ≠ ∅) or
(for all q such that q => CON(e)(w), {e′| e′ $\sim_{w}$ e & CON(e′)(w) = q & e′ has a believer in w & x is the believer of e′ in w} = ∅).
e has a believer in w & x is the believer of e in w]

(28) By Variant II modified according to (26)-(27), for all (ϕ, φ, w) such that $[\![\phi]\!]_{¢}$ => $[\![\varphi]\!]_{¢}$:
if {e| $[\![Bel]\!]^{w}$(Ted)(e) = $[\![Comp]\!]^{w}([\![\phi]\!]_{¢})$(e) = $[\![believe^{Comp}]\!]^{w}$(e) = 1} ≠ ∅,
then {e| $[\![Bel]\!]^{w}$(Ted)(e) = $[\![Comp]\!]^{w}([\![\varphi]\!]_{¢})$(e) = $[\![believe^{Comp}]\!]^{w}$(e) = 1} ≠ ∅,
and if {e| $[\![Bel]\!]^{w}$(Ted)(e) = $[\![Comp]\!]^{w}([\![\varphi]\!]_{¢})$(e) = $[\![believe^{Comp}]\!]^{w}$(e) = 1} = ∅,
then {e| $[\![Bel]\!]^{w}$(Ted)(e) = $[\![Comp]\!]^{w}([\![\phi]\!]_{¢})$(e) = $[\![believe^{Comp}]\!]^{w}$(e) = 1} = ∅;
therefore, if $[\![$∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ϕ] $]\!]^{w}$ = 1, $[\![$*not* [*Bel Ted*] *believe*^{Comp} [*Comp* φ] $]\!]^{w}$ ≠ 1, and
if $[\![$*not* [*Bel Ted*] *believe*^{Comp} [*Comp* φ] $]\!]^{w}$ = 1, $[\![$∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ϕ] $]\!]^{w}$ ≠ 1.

To account for "negative" verbs, we may assume additional decomposition. For example, *doubt* decomposes into *not*+*believe*^{Comp} (and *not* scopes over the subject, yielding the LF [*not* [*Bel* …] *believe*^{Comp} [*Comp* …]]).

This solution to the problem illustrated in (23) is at odds with any account of the variability among verbs regarding complement-taking that relies on θ-Realization. We elaborate on this in the remainder of the paper.

4. DP-complements with propositional content

4.1. More variability regarding complement-taking

As we saw, *groaned* – as opposed to *believes* – need not take a complement. There is additional variability among predicates regarding complement-taking. As (29a) illustrates, some nouns are optionally clause-taking (see Higgins, 1972; Stowell, 1981; Grimshaw, 1990; Elliott, 2017/2020). As (29b) shows, such nouns do not, themselves, take DP complements. As (30) shows, some DP-taking verbs are clause-taking, some clause-taking verbs are not DP-taking, and some DP-taking verbs are not clause-taking.

(29) a. Ted believes/denies/rejects/questions the claim (that Mia has been happy).
b. Ted believes/denies/rejects/questions the claim (*the rumor) that Mia has been happy.

(30) a. Ted believes/denies (the claim) that Mia has been happy.
b. *Ted surmises/conjectures the claim.

c. Ted surmises/conjectures (*the claim) that Mia has been happy.
d. Ted rejects/questions *(the claim) that Mia has been happy.

Suppose that in Variants I-II, when the determiner *the* precedes a singular predicate (as in, for example, *the dog*), it has the meaning in (31). By convention, u is a variable over eventualities or "normal" individuals.

(31) $[\![the]\!]^w$ = [λP: there is exactly one u such that P(u) = 1. the unique u such that P(u) = 1]

According to Variant I, the ambiguity of *claim* is lexical (see (32)): $[\![claim^{p-}]\!]^w$ takes only an eventuality argument; $[\![claim^{p}]\!]^w$ takes a proposition in addition to an eventuality, the proposition supplies the content of the eventuality. By convention, s is a variable over eventualities that are claims, rumors, beliefs and the like. The ambiguity of *believes* is also lexical (see (33)): $[\![believe^{p}]\!]^w$ takes a proposition as its first argument; $[\![believe^{s}]\!]^w$ takes an eventuality as its first argument (e.g., $[\![the\ claim^{p-}]\!]^w$ or $[\![the\ [claim^{p}\ \phi]\,]\!]^{w,g}$, where ϕ is a clause such as [∃ *Mia was*^{e} *happy*]).

(32) a. $[\![claim^{p-}]\!]^w$ = [λs. s is a claim in w]
b. $[\![claim^{p}]\!]^w$ = [λp. λs: CON(s)(w) = p. $[\![claim^{p-}]\!]^w$(s) = 1]

(33) a. $[\![believe^{p}]\!]^w$ is as in (14)
b. $[\![believe^{s}]\!]^w$ =
[λs. λx. λe: $[\![believe^{p}]\!]^w$(CON(s)(w))(x)(e) is defined. $[\![believe^{p}]\!]^w$(CON(s)(w))(x)(e)]

Unlike *believes*, verbs such as *surmises* and *rejects* are not lexically ambiguous (the former takes only propositions; the latter only eventualities). Some lexical meanings (e.g., those of *believe*^{s} and *claim*^{p}) make explicit reference to CON (borrowed from Variant II) but crucially, FA is still the rule by which verbs and nouns combine with their complements.

According to Variant II, all verbs and nouns combine with their "complements" via PM. Thus, the ambiguity of *believes*, like that of *claim*, is not lexical; it follows from the definedness conditions of *believe* and *claim*, in conjunction with θ-Realization and pragmatic principles. We illustrate how this works with (34)-(38) and relevant assumptions from Section 3.

(34) $[\![believe^{Comp}]\!]^w$ is as in (16)

(35) $[\![surmise^{Comp,Th-}]\!]^w$ = [λe: {y| $[\![Bel]\!]^{w,g}$(y)(e) = 1} ≠ ∅ & {p| $[\![Comp]\!]^{w,g}$(p)(e) = 1} ≠ ∅ & {y| $[\![Th]\!]^{w,g}$(y)(e) = 1} = ∅ & $[\![att]\!]^w$(e) = 1 & (e is a surmising eventuality in w iff DOX(the believer of e in w)(e)(w) ⊆ {w′| CON(e)(w)(w′) = 1}}).
e is a surmising eventuality in w]

(36) $[\![reject^{Th,Comp-}]\!]^w$ = [λe: {y| $[\![Rej]\!]^{w,g}$(y)(e) = 1} ≠ ∅ & {p| $[\![Comp]\!]^{w,g}$(p)(e) = 1} = ∅ & {y| $[\![Th]\!]^{w,g}$(y)(e) = 1} ≠ ∅ & CON(the theme of e in w)(w) is defined & $[\![att']\!]^w$(e) = 1 & (e is a rejecting eventuality in w iff DOX(the rejecter of e in w)(e)(w) ⊆ {w′| CON(the theme of e in w)(w)(w′) = 0}).
e is a rejecting eventuality in w],

where $[\![att']\!]^w = [\lambda e'.\ \text{DOX(the rejecter of e}' \text{ in w)(e}')(\text{w}) \neq \varnothing\ \&\ \text{DOX(the rejecter of e}' \text{ in w)(e}')(\text{w}) \subseteq \{\text{w}'|\ \text{CON(the theme of e}' \text{ in w)(w)(w}') \text{ is defined}\}]$

(37) $[\![claim^{Th-}]\!]^w = [\lambda s\text{: } \{y|\ [\![Th]\!]^{w,g}(y)(e) = 1\} = \varnothing.\ \text{s is a claim in w}]$

(38) a. *Rej* is a thematic predicate that introduces a rejecter.
b. $[\![Th]\!]^w = [\lambda u.\ \lambda e\text{: if CON(e)(w) is defined, then CON(e)(w) = CON(u)(w). e has a theme in w \& u is the theme of e in w}]$

By θ-Realization, a verb that presupposes that $\{p|\ [\![Comp]\!]^{w,g}(p)(e) = 1\} \neq \varnothing$ (e.g., $surmise^{Comp,Th-}$) has [*Comp* β] as a sister (cf. Section 3). In addition, by θ-Realization, a verb that presupposes that $\{y|\ [\![Th]\!]^{w,g}(y)(e) = 1\} \neq \varnothing$ (e.g., $reject^{Th,Comp-}$) has [*Th* β] as a sister, and a verb like $believe^{Comp}$ can – but need not – have [*Th* β] as a sister. In order to derive that $believe^{Comp}$ can have [*Th* β] instead of [*Comp* β] as a sister, we assume that a theme can be a proxy of CON for θ-Realization purposes (though not the other way around); economy principles ban the co-occurrence of [*Th* β] and [*Comp* β]. Importantly, for any thematic predicate ζ and verb V, if V presupposes that $\{Z|\ [\![\zeta]\!]^{w,g}(Z)(e) = 1\} = \varnothing$ (e.g., $surmise^{Comp,Th-}$, $reject^{Th,Comp-}$), V cannot have [ζ β] as a sister, as for any e, $[\![V\ [\zeta\ \beta]\ ]\!]^{w,g}(e) \neq 1$ (resulting in presupposition failure, trivial truth, or trivial falsity). By extending θ-Realization to nouns, we derive that $claim^{Th-}$ can, but need not, have [*Comp* β] as a sister (though it cannot have [*Th* β] as a sister; cf. $surmise^{Comp,Th-}$). Accordingly, $[\![Th]\!]^w$ can take as its argument $[\![the\ claim^{Th-}\ [Comp\ \phi]\ ]\!]^{w,g}$, $[\![the\ claim^{Th-}]\!]^w$, etc.

It is far from obvious that Variant II offers a more explanatory theory of complementation compared to Variant I, despite being lexically more economical, as it is far from clear that the thematic presuppositions are predictable in all cases. For example, it is not clear why a regretting eventuality must have a theme with propositional content but cannot, itself, have propositional content; see (36). Still, for the sake of the discussion, let us concede that the lexical economy of Variant II gives it a significant advantage relative to Variant I.

Crucially, there are intuitive inferences that Variant II cannot explain in a manner that is consistent with θ-Realization. Consider (39)-(40). Clearly, (39a) does not intuitively entail (39b), because existence of a unique claim that Mia is a cat does not follow from the existence of a unique claim that Mia is a happy cat. Similarly, (40a) does not entail (40b).

(39) a. Ted believes the claim that Mia is a happy cat.
b. Ted believes the claim that Mia is a cat.

(40) a. Ted doesn't believe the claim that Mia is a cat.
b. Ted doesn't believe the claim that Mia is a happy cat.

However, (39a) intuitively Strawson entails (39b), and (40a) intuitively Strawson entails (40b) (*p* Strawson entails *q* iff *q* follows from [*p* and what *q* presupposes]; see von Fintel, 1999). We base this claim on grammaticality judgments regarding counterparts of (39)/(40) that contain

NPIs (e.g., *ever*, *any*).[8] As we show, assuming the standard theory of NPI-licensing, only Variant I can predict those grammaticality judgments and, at the same time, account for the attested variability regarding complement-taking.

4.2. DP-complements and NPI-licensing

Relying on insights from Fauconnier, 1975; Ladusaw, 1979; Lahiri, 1998; von Fintel, 1999; Guerzoni & Sharvit, 2007; Gajewski & Hsieh, 2014, we assume that NPIs are licensed only in environments that support inferences that are SDE (Strawson downward entailing) and not SUE (Strawson upward entailing). In other words, we assume (41) (where $\delta_{[\gamma/\gamma']}$ is just like δ except that any occurrence of γ is replaced with γ'). '$=>_{ST}$' – Strawson entailment – is defined in (42): '=>' in (24) is stronger than '$=>_{ST}$'.

(41) a. An NPI α is acceptable only if α is dominated by an LF node β such that β is SDE, but not SUE, with respect to α.[9]
b. (i) δ <u>is SDE with respect to γ</u> iff for any g and γ' such that $[\![\gamma']\!]^{g}_{¢} => [\![\gamma]\!]^{g}_{¢}$: $[\![\delta]\!]^{g}_{¢} =>_{ST} [\![\delta_{[\gamma/\gamma']}]\!]^{g}_{¢}$.
(ii) δ <u>is SUE with respect to γ</u> iff for any g and γ' such that $[\![\gamma']\!]^{g}_{¢} => [\![\gamma]\!]^{g}_{¢}$: $[\![\delta_{[\gamma/\gamma']}]\!]^{g}_{¢} =>_{ST} [\![\delta]\!]^{g}_{¢}$.

(42) If f and h are of type t: f $=>_{ST}$ h iff f => h
If f and h are of type (σ,ρ): f $=>_{ST}$ h iff for any z such that f(z) and h(z) are defined: f(z) $=>_{ST}$ h(z).

Both Variant I and Variant II account for the NPI pattern in (43), based on the assumption that the NPI *ever* is an indefinite expression, as implied by (44) (cf. Ladusaw, 1979, regarding *any*).

(43) a. Ted doubts/doesn't believe that Mia has (ever) been happy.
b. Ted believes that Mia has (*ever) been happy.
c. Only Ted believes that Mia has (ever) been happy.
d. Ted believes/doesn't believe the claim that Mia (*ever) made.

(44) Where $[\![\gamma]\!]^{w,g}$ is a function from eventualities to truth values, $[\![\textit{ever}\ \gamma]\!]^{w,g} = [\![\gamma]\!]^{w,g}$.

Suppose γ is a (possibly silent) modifier such as *in Mia's youth*. It follows that: (i) the Variants I-II LFs of (43a) – i.e., (45a,b) – are SDE, but not SUE, with respect to *ever* γ; and (ii) the Variants I-II LFs of (43b) – i.e., (46a,b) – are SUE with respect to *ever* γ.

[8] Grammaticality judgments are more reliable, in this case, than inference judgments. Consultants do not always understand the question *Does 'Ted believes the claim that Mia is a happy cat' Strawson entail 'Ted believes the claim that Mia is a cat'?* (even if it is accompanied by an explanation of what is meant by *Strawson entailment*). Asking, instead, *Does 'Ted believes the claim that Mia is a cat' follow from 'Ted believes the claim that Mia is a happy cat and there is a unique claim that Mia is a cat and …'?* does not make the task easier.

[9] This version of the condition on NPIs is based on Gajewski, 2011; Homer, 2008; and Crnič, 2019. An alternative version requires NPIs to be in the scope of an operator that is itself, semantically, SDE and not SUE.

(45) a. *not Ted believe*^{p} [∃ *Mia was*^{e} *happy ever* γ]
b. *not* [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever* γ]

(46) a. ∃ *Ted believe*^{p} [∃ *Mia was*^{e} *happy ever* γ]
b. ∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever* γ]

In addition, the Variants I-II LFs of (43c) in (47) are exclusively SDE with respect to *ever* γ, assuming (48) (cf. von Fintel, 1999; Horn, 1969) and Predicate Abstraction (PA) in (49).

(47) a. *only Ted* [*believe*^{p} [∃ *Mia was*^{e} *happy ever* γ]]
b. *only Ted* [6 [[*Bel* t_6] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever* γ]]]

(48) $[\![$*only Ted*$]\!]^{w}$ = [λf: {e| f(Ted)(e) = 1} ≠ ∅. {y| {e| f(y)(e) = 1} ≠ ∅} = {Ted}]

(49) <u>PA</u>
a. If α is a branching node, k is a numerical index and {k, β} is the set of α's daughters, then $[\![\alpha]\!]^{w,g} = [\lambda o\text{: } [\![\beta]\!]^{w,g[k\to o]}\text{ is defined. } [\![\beta]\!]^{w,g[k\to o]}]$.
b. If k a numerical index, $[\![t_k]\!]^{w,g}$ is defined only if g(k) is. If defined, $[\![t_k]\!]^{w,g}$ = g(k).

As for (43d), the relative clause *that Mia made* has the LF [6 ∃ *Mia made*^{e} t_6 *ever* ...] in Variant I and the LF [6 ∃ [*Ag Mia*] *made*$^{\theta}$ [*Th* t_6] *ever* ...] in Variant II; those LFs are interpreted by PA, and combine – respectively – with *claim*$^{p-}$ and *claim*$^{Th-}$ by PM. By the meaning of *the* in (31), the claim that Mia made at some point in her youth and the claim that Mia made at some point in her life are one and the same claim. In other words, the LFs of (43d) are both SUE and SDE with respect to *ever* within Variants I-II, as illustrated in (50) ($[\![$*ever in Mia's youth*$]\!]_{¢}$ => $[\![$*ever in Mia's life*$]\!]_{¢}$, and $[\![$*ever in Mia's life*$]\!]_{¢}$ ≠>$_{ST}$ $[\![$*ever in Mia's youth*$]\!]_{¢}$).

(50) (i) $[\![$*Ted believe*^{s} *the* [*claim*$^{p-}$ [6 ∃ *Mia made*^{e} t_6 *ever in Mia's youth*]] $]\!]_{¢}$
$_{ST}$<=>$_{ST}$
$[\![$*Ted believe*^{s} *the* [*claim*$^{p-}$ [6 ∃ *Mia made*^{e} t_6 *ever in Mia's life*]] $]\!]_{¢}$
(ii) $[\![$[*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [6 ∃ [*Ag Mia*] *made*$^{\theta}$ [*Th* t_6] *ever in Mia's youth*]] $]\!]_{¢}$
$_{ST}$<=>$_{ST}$
$[\![$[*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [6 ∃ [*Ag Mia*] *made*$^{\theta}$ [*Th* t_6] *ever in Mia's life*]] $]\!]_{¢}$

Crucially, only Variant I predicts – correctly and straightforwardly – the existence of dialects of English that allow NPIs in complements of nouns N such that [$_{DP}$ *the* N [$_{Complement}$ …]] serves as the complement of *doesn't believe* or of inherently negative verbs such as *doubt*, as shown in (51a,b).[10] The acceptable (51a,b) contrast with (43d), with *Ted doubts the claim that Mia (*ever) made*, and with (52).

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[10] Two naturally occurring examples found online are a.-b. below (Gary Thoms, pc).

a. Pettygrove, however, having built the first building on the levee, denied the claim that they ever intended public ownership.
b. Some of us with E5 licenses might dispute the claim that they ever really cleaned up their act in the objective sense …

(51) a. Ted doesn't believe the claim that Mia has (ever) been happy.
b. Ted doubts the claim that Mia has (ever) been happy.

(52) Ted believes the claim that Mia has (*ever) been happy.

The definedness and truth conditions of *Ted believes/doesn't believe the claim that Mia is …* are derived from (53) within Variant I: the embedded noun combines with its clausal complement by FA; the embedding verb combines with its DP complement in the same way.

(53) a. When defined, $[\![$*the* [*claim*^{p} ϕ] $]\!]^{w,g}$ is the unique s such that s is a claim in w and CON(s)(w) = $[\![\phi]\!]^{g}_{\not{c}}$.
b. $[\![$*Ted believe*^{s} *the* [*claim*^{p} ϕ] $]\!]^{w,g}$ = [λe: DOX(Ted)(e)(w) $\neq \emptyset$ & $[\![$*the* [*claim*^{p} ϕ] $]\!]^{w,g}$ is defined & DOX(Ted)(e)(w) $\subseteq$ {w′| $[\![\phi]\!]^{w',g}$ is defined}. DOX(Ted)(e)(w) $\subseteq$ {w′| $[\![\phi]\!]^{w',g}$ = 1}]

According to (53a), the claim that Mia was happy at some point in her youth and the claim that Mia was happy at some point in her life are distinct claims. Moreover, as shown in (54), the Variant I LF of (51a) is SDE with respect to *ever*.

(54) For all w:
if $[\![$*not Ted believe*^{s} *the* [*claim*^{p} [$\exists$ *Mia was*^{e} *happy ever in Mia's life*]] $]\!]^{w}$ = 1, and $[\![$*not Ted believe*^{s} *the* [*claim*^{p} [$\exists$ *Mia was*^{e} *happy ever in Mia's youth*]] $]\!]^{w}$ is defined, then:
$[\![$*the* [*claim*^{p} [$\exists$ *Mia was*^{e} *happy ever in Mia's life*]] $]\!]^{w}$ and $[\![$*the* [*claim*^{p} [$\exists$ *Mia was*^{e} *happy ever in Mia's youth*]] $]\!]^{w}$ are defined, and
{e| DOX(Ted)(e)(w) $\subseteq$ {w′| $[\![\exists$ *Mia was*^{e} *happy in Mia's life*$]\!]^{w'}$ is defined}} $\neq \emptyset$, and
{e| DOX(Ted)(e)(w) $\subseteq$ {w′| $[\![\exists$ *Mia was*^{e} *happy in Mia's youth*$]\!]^{w'}$ is defined}} $\neq \emptyset$, and
{e| DOX(Ted)(e)(w) $\subseteq$ {w′| $[\![\exists$ *Mia was*^{e} *happy in Mia's life*$]\!]^{w'}$ = 1}} = $\emptyset$, therefore,
{e| DOX(Ted)(e)(w) $\subseteq$ {w′| $[\![\exists$ *Mia was*^{e} *happy in Mia's youth*$]\!]^{w'}$ = 1}} = $\emptyset$.
Therefore, $[\![$*not Ted believe*^{s} *the* [*claim*^{p} [$\exists$ *Mia was*^{e} *happy ever in Mia's life*]] $]\!]_{\not{c}}$ $\Rightarrow_{ST}$ $[\![$*not Ted believe*^{s} *the* [*claim*^{p} [$\exists$ *Mia was*^{e} *happy ever in Mia's youth*]] $]\!]_{\not{c}}$.

Variant II cannot straightforwardly reproduce this result. The definedness and truth conditions of *Ted believes/doesn't believe the claim that Mia is …* are derived from (55): the embedded noun combines with its clausal "complement" by PM; the embedding verb combines with its DP "complement" in the same way.

(55) a. When defined, $[\![$*the claim*$^{Th-}$ [*Comp* ϕ] $]\!]^{w,g}$ is the unique s such that s is a claim in w and CON(s)(w) = $[\![\phi]\!]^{g}_{\not{c}}$.
b. $[\![$ [*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [*Comp* ϕ]] $]\!]^{w,g}$ = [λe: $[\![$*Bel Ted*$]\!]^{w,g}$(e) and $[\![$*Th*$]\!]^{w,g}$($[\![$*the claim*$^{Th-}$ [*Comp* ϕ] $]\!]^{w,g}$)(e) and $[\![$*believe*$^{Comp}]\!]^{w,g}$(e) are defined. $[\![$*Bel*$]\!]^{w,g}$(Ted)(e) = $[\![$*believe*$^{Comp}]\!]^{w,g}$(e) = $[\![$*Th*$]\!]^{w,g}$($[\![$*the claim*$^{Th-}$ [*Comp* ϕ] $]\!]^{w,g}$)(e) = 1]

According to (55a), the claim that Mia was happy at some point in her youth and the claim that Mia was happy at some point in her life are distinct claims. Nevertheless, the Variant II LF of (51a) is not SDE with respect to *ever*. As shown in (56), when *q* entails *p* and *the claim*$^{Th-}$

Comp p is not the theme of any *p*-believing eventuality of which Ted is the believer, it is possible that *the claim*$^{Th-}$ *Comp q* is the theme of some *q*-believing eventuality of which Ted is the believer.

(56) There is at least one w such that:

(a) ⟦*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's life*] ⟧^{w} is defined,

(b) there is an e such that ⟦*Bel Ted*⟧^{w}(e) = ⟦*believe*^{Comp}⟧^{w}(e) = ⟦*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's youth*] ⟧^{w}(e) = 1
(therefore, ⟦*not* [*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's youth*]] ⟧^{w} = 0), and

(c) for all e′ such that ⟦*Bel Ted*⟧^{w}(e′) = ⟦*believe*^{Comp}⟧^{w}(e′) = 1, ⟦*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's youth*] ⟧^{w}(e′) is defined and e′ has a theme in w and ⟦*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's life*] ⟧^{w} is not the theme of e′ in w)
(therefore, ⟦*not* [*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's life*]] ⟧^{w} = 1).

Therefore, ⟦*not* [*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's life*]] ⟧$_{c}$ ≠>$_{ST}$ ⟦*not* [*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in Mia's youth*]] ⟧$_{c}$.

Notice that neither (57a) nor (57b) is SDE with respect to *ever*. Thus, both Variant I and Variant II account for (52) (= *Ted believes the claim that Mia has (*ever) been happy*). However, (57a) is SUE with respect to *ever* but (57b) is not.

(57) a. ∃ *Ted believe*^{s} *the* [*claim*^{p} [∃ *Mia was*^{e} *happy ever in* …]]
b. ∃ [*Bel Ted*] *believe*^{Comp} [*Th the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^{\theta}$ *happy ever in* …]]

Given this, only Variant I predicts that (39a) (= *Ted believes the claim that Mia is a happy cat*) intuitively Strawson entails (39b) (= *Ted believes the claim that Mia is a cat*). This, too, favors Variant I, despite the difficulty in obtaining direct support for that prediction.[11]

We now explore, and discard, three attempts to salvage Variant II. One of them involves treating *the* as ambiguous; the other two involve revising the meaning of *Th*.

4.3. Some potential solutions

The first attempt to salvage Variant II that we explore is based on the idea that the surface definite determiner *the* can sometimes be interpreted the same way as the surface indefinite determiners *a* and *any*. That idea has been used to account, for example, for the ambiguity –

[11] See Footnote 8. It should also be noted that in those dialects of English where (51a,b) are well-formed, they contrast with their possessive counterparts in (i) below (Gary Thoms, pc; Tim Stowell, pc). This contrast is not currently explained by either Variant I or Variant II. However, (i) is consistent with (41) within Variant I, as (41) is merely a necessary condition on NPIs.

(i) a. Ted doubts/doesn't believe Jim's claim that Mia has (*ever) been happy.
b. Ted doubts/doesn't believe Jim's claim that Mia has (*ever) been happy.

illustrated in (58) – of superlative DPs such as *the highest mountain*. This is shown in (59)-(60), modified from Heim, 1999 (d is a degree variable, t_5 is a degree-denoting trace, and t_3 and t_4 are "normal"-individual-denoting traces).

(58) a. Absolute reading of *Ted climbed the highest mountain*:
The highest z in {x| x is a mountain} was climbed by Ted.
b. Relative reading of *Ted climbed the highest mountain*:
There is some z in {x| x is a mountain and Ted climbed x} such that for all y in {x′| x′ is a mountain and someone who is not Ted climbed x′}, z is higher than y.

(59) a. ⟦*the* β⟧^{w,g} is the unique u such that ⟦β⟧^{w,g}(u) = 1 (if there is one, otherwise undefined).
b. ⟦~~*the*~~ β⟧^{w,g} = ⟦*a* β⟧^{w,g} = ⟦*any* β⟧^{w,g} = ⟦β⟧^{w,g}
c. ⟦*-est*⟧^{w} = [λR. λx: {d|R(d)(x) = 1} ≠ ∅. {d| {y|R(d)(y) = 1} = {x}} ≠ ∅]
d. ⟦*mountain*⟧^{w} = [λx. x is a mountain in w]
e. ⟦*high*⟧^{w} = [λd. λx. x is at least d-high in w]

(60) a. Absolute LF of *Ted climbed the highest mountain*:
∃ [*Ag Ted*] *climbed*$^{\theta}$ [*Th the* [*-est* [5 [t_5*-high mountain*]]]]
b. Relative LF of *Ted climbed the highest mountain*:
Ted [*-est* [5 4 ∃ [[~~*the*~~ [t_5*-high mountain*]] [3 ∃ [*Ag* t_4] *climbed*$^{\theta}$ [*Th* t_3]]]]]

Suppose the two options in (59a,b) are available, not only in degree constructions, but also in *the claim that*-constructions. It is thus correctly predicted *Ted doesn't believe the claim that Mia has ever been happy* has a reading that is equivalent to *Ted doesn't believe any claim that Mia has ever been happy*. This is a welcome prediction. However, both sentences are incorrectly predicted to be unacceptable. The determiner *any* is – like *ever* – an NPI, but both LFs in (61) are not SDE with respect to *any* and/or *ever*, as implied by (56) and by the fact that when *q* entails *p* and no *claim*$^{Th-}$ *Comp p* is the theme of a *p*-believing eventuality of which Ted is the believer, there can be a *claim*$^{Th-}$ *Comp q* that is the theme of some *q*-believing eventuality of which Ted is the believer.

(61) a. *not* [*Bel Ted*] *believe*^{Comp} [*Th the* [*claim*$^{Th-}$ [*Comp* ∃ ... *was*$^{\theta}$ ... *ever* ...]]]
b. *not any/*~~*the*~~ [*claim*$^{Th-}$ [*Comp* ∃ ... *was*$^{\theta}$ ... *ever* ...]] [3 ∃ [*Bel Ted*] *believe*^{Comp} [*Th* t_3]]

The availability of (59b) also makes an unwelcome prediction regarding *Ted doesn't believe the claim that Mia (*ever) made*. We expect it to be acceptable, with or without *ever*, just like *Ted doesn't believe any claim that Mia (ever) made*, because the LF in (62) is SDE (and not SUE) with respect to *any* and *ever*: when there is no eventuality of Ted believing some *claim*$^{Th-}$ made by Mia in Mia's life, it follows that there is no eventuality of Ted believing some *claim*$^{Th-}$ made by Mia in Mia's youth (but not the other way around).

(62) *not any/*~~*the*~~ *claim*$^{Th-}$ [3 ∃ [*Ag Mia*] *made*$^{\theta}$ [*Th* t_3] *ever* ...] [3 ∃ [*Bel Ted*] *believe*^{Comp} [*Th* t_3]]

Two other attempts to salvage Version II are given in (63)-(64). (63) illustrates how all the thematic predicates can be re-analyzed as denoting constant functions whose domains are constrained by the relevant thematic information, and whose value is always the truth value 1. (64) re-analyzes *Th* on a par with *Bel* and *Comp* in (26)-(27).

(63) a. $[\![Comp]\!]^w$ = [λp. λe: CON(e)(w) = p. 1]
b. $[\![Bel]\!]^w$ = [λx. λe: x is the believer of e in w. 1]
c. $[\![Th]\!]^w$ = [λu. λe: u is the theme of e in w & (if CON(e)(w) is defined, then CON(e)(w) = CON(u)(w)). 1]
d. $[\![Ag]\!]^w$ = [λx. λe: x is the agent of e in w. 1]

(64) *Bel* and *Comp* are defined as in (26)-(27). In addition:
$[\![Th]\!]^w$ = [λu. λe: if CON(e)(w) is defined, then CON(u)(w) = CON(e)(w) and
(for all q such that CON(e)(w) => q, {(e′, u′)| e′ $\sim_w$ e & u′ $\sim_w$ u & CON(e′)(w) = CON(u′)(w) = q & e′ has a theme in w & u′ is the theme of e′ in w} ≠ ∅) or
(for all q such that q => CON(e)(w), {(e′, u′)| e′ $\sim_w$ e & u′ $\sim_w$ u & CON(e′)(w) = CON(u′)(w) = q & e′ has a theme in w & u′ is the theme of e′ in w} = ∅).
e has a theme in w & u is the theme of e in w]

Indeed, both (63) and (64) predict that the Variant II LF of (51a) is SDE with respect to *ever*, and that the Variant II LF of (52) is SUE with respect to *ever*.

(65) By Variant II revised according to (64)/(63), for all w such that E^{yth}_w ≠ ∅ and E^{lf}_w ≠ ∅ (where E^{yth}_w = {e| $[\![believe^{Comp}]\!]^w$(e) and $[\![Bel]\!]^w$(Ted)(e) and $[\![Th]\!]^w$($[\![$*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^\theta$ *happy ever in Mia's youth*] $]\!]^w$)(e) are defined}, and E^{lf}_w = {e| $[\![believe^{Comp}]\!]^w$(e) and $[\![Bel]\!]^w$(Ted)(e) and $[\![Th]\!]^w$($[\![$*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^\theta$ *happy ever in Mia's life*] $]\!]^w$)(e) are defined}):
if {e| e ∈ E^{yth}_w & $[\![believe^{Comp}]\!]^w$(e) = $[\![Bel]\!]^w$(Ted)(e) = $[\![Th]\!]^w$($[\![$*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^\theta$ *happy ever in Mia's youth*] $]\!]^w$)(e) = 1} ≠ ∅,
then {e| e ∈ E^{lf}_w & $[\![believe^{Comp}]\!]^w$(e) = $[\![Bel]\!]^w$(Ted)(e) = $[\![Th]\!]^w$($[\![$*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^\theta$ *happy ever in Mia's life*] $]\!]^w$)(e) = 1} ≠ ∅,
and if {e| e ∈ E^{lf}_w & $[\![believe^{Comp}]\!]^w$(e) = $[\![Bel]\!]^w$(Ted)(e) = $[\![Th]\!]^w$($[\![$*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^\theta$ *happy ever in Mia's life*] $]\!]^w$)(e) = 1} = ∅,
then {e| e ∈ E^{yth}_w & $[\![believe^{Comp}]\!]^w$(e) = $[\![Bel]\!]^w$(Ted)(e) = $[\![Th]\!]^w$($[\![$*the claim*$^{Th-}$ [*Comp* ∃ [*Exp Mia*] *was*$^\theta$ *happy ever in Mia's youth*] $]\!]^w$)(e) = 1} = ∅.

Nevertheless, neither (63) nor (64) has a significant advantage over Variant I. Contra what (63) implies, when it is known that Ted did nothing to Mia, *Ted didn't greet Mia* is uninformative, not a presupposition failure (cf. *Ted didn't greet his friends*, which is a presupposition failure when it is known that Ted has no friends). Some conjunction facts corroborate this. (66) illustrates the well-known fact that *p CONJUNCTION q* is infelicitous if *p* is incompatible with the presuppositions of *q*. (67) shows that: (i) *p furthermore/and q* is felicitous only if *p* ≠> *q*, and (ii) *p in particular q* is felicitous only if *p* => *q*. The fact that (68) patterns like (67), rather than (66), suggests that if *greet* indeed decomposes into thematic and non-thematic predicates, the information contributed by the thematic predicates is, like the non-thematic information, asserted rather than presupposed.

(66) a. #Ted has no friends at all; in particular/and, he didn't greet his friends.
b. #Ted has no friends at all; furthermore/and he didn't (even) greet his friends.

(67) a. Ted has no friends at all; in particular/#furthermore/#and, he doesn't have (any) close friends.
b. Ted has no close friends; furthermore/and//#in particular, he doesn't (even) have (any) distant friends.

(68) a. Ted didn't do anything to Mia; in particular/#furthermore/#and, he didn't greet her.
b. Ted didn't hug Mia; furthermore/and/#in particular, he didn't (even) greet her.

As for (64), it cannot be compatible – simultaneously – with the θ-Realization account of the variability regarding complement-taking, and with the condition on NPI-licensing in (41), because the presupposition of *Th* in (64) is sometimes too easily satisfied. Take, for example, the verb pronounced *rejects*, which licenses NPIs (as shown by the acceptability of *Ted rejects the claim that Mia has ever been happy*), and takes DP-complements but not clausal complements (see (29)-(30)). The presupposition of its theme argument is too easily satisfied, regardless of whether or not *reject*$^{Th,Comp-}$ decomposes into *not*+*posrej*$^{Th,Comp-}$, where *posrej*$^{Th,Comp-}$ is the "positive" counterpart of *reject*$^{Th,Comp-}$ (cf. Section 3 on *doubt*). According to (36), the domain of ⟦*reject*$^{Th,Comp-}$⟧^{w}/⟦*posrej*$^{Th,Comp-}$⟧^{w} includes only eventualities e such that {p| ⟦*Comp*⟧^{w}(p)(e) = 1} = ∅. As a result, the domain of ⟦*reject*$^{Th,Comp-}$ [*Th the claim*$^{Th-}$ [*Comp* ϕ]] ⟧^{w,g}/⟦*posrej*$^{Th,Comp-}$ [*Th the claim*$^{Th-}$ [*Comp* ϕ]] ⟧^{w,g} may include eventualities e such that ⟦*Th the claim*$^{Th-}$ [*Comp* ϕ] ⟧^{w,g}(e) is trivially defined. This reproduces for *rejects* the problem illustrated in (56) regarding *believes*. All alternatives to (64) that are compatible with the θ-Realization account of the attested variability regarding complement-taking face a similar problem. This, in turn, makes it extremely difficult – if not impossible – to derive the attested variability regarding complement-taking from the same principles that govern the optionality of non-arguments (such as *passionately*), effectively depriving Variant II of its advantage relative to Variant I.[12]

It is also worth noting that while (63)/(64) account for the licensing of NPIs by *doesn't believe* (illustrated in (43a)), they do not account for the fact that intuitively, *Ted believes that Mia is a happy cat* entails – rather than merely Strawson entails – *Ted believes that Mia is a cat*. By (64)/(63), it is the case that ⟦*not* [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *is*^{θ} *a cat*] ⟧$_{¢}$ =>$_{ST}$ ⟦*not* [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *is*^{θ} *a happy cat*] ⟧$_{¢}$, but it is also the case that ⟦∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *is*^{θ} *a happy cat*] ⟧$_{¢}$ ≠> ⟦∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *is*^{θ} *a cat*] ⟧$_{¢}$ (though ⟦∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *is*^{θ} *a happy cat*] ⟧$_{¢}$ =>$_{ST}$ ⟦∃ [*Bel Ted*] *believe*^{Comp} [*Comp* ∃ [*Exp Mia*] *is*^{θ} *a cat*] ⟧$_{¢}$). Within Variant I, ⟦∃ *Ted believe*^{p} [∃ *Mia is*^{e} *a happy cat*] ⟧$_{¢}$ => ⟦∃ *Ted believe*^{p} [∃ *Mia is*^{e} *a cat*] ⟧$_{¢}$.

The picture that emerges is that adopting Variant II requires either attributing to the thematic predicates and/or the definite determiner grammatical presuppositions that do not reflect the intuitive presuppositions of the sentences that (supposedly) contain them, or giving up the idea that the variability regarding complement-taking follows from the same principles that account for the optionality of modifiers such as *passionately*.

[12] It seems fair to say that if Bondarenko & Elliott (2023), which offers an account of the NPI facts, offered an account of the variability regarding complement-taking as well, a similar concern would arise there.

5. Conclusion

We evaluated two variants of Event Semantics against variation regarding complement-taking and intuitive inferences supported by clause-taking and DP-taking predicates. Variant I, which preserves the traditional distinction between complements and modifiers, accounts for these facts, but only at the expense of positing lexical ambiguity. Variant II, which defies that traditional distinction, fails to offer a more explanatory account of the facts. It is worth noting that a hybrid theory along the lines of Wang, to appear, might offer an account that avoids the shortcomings of both variants.

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