**Lexical decomposition of verbs and the notion of an abstract state[[1]](#footnote-1)**

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**Abstract.** This paper will propose a novel semantic and syntactic analysis of stative verbs, more specifically abstract state verbs. On that analysis, abstract state verbs have an underlying structure on which they are complex predicates consisting of the light verb HAVE and a noun for a trope-like thing, a trope or attitudinal, modal or intensional object. That structure is also input to semantic interpretation. Thus, *need a coat* is underlyingly have *need (of) a coat*. This analysis allows for an account of both the restrictions on modifiers of abstract states verbs (including the Stative Adverb Gap) and constraints on explicit property-referring terms, NPs of the sort *the property of needing a coat*.

**Keywords.** Stative verbs, abstract states, concrete states, Kimian states, Davidsonian states, Stative Adverb Gap, lexical decomposition in syntax, properties, nominalizations, natural language ontology

## **Introduction**

Stative verbs form a somewhat neglected topic in formal semantics. Event semantics of the Davidsonian or neo-Davidsonian sort applies best to non-stative verbs. Stative verbs resist, for the most part, the sorts of adverbials applicable to eventive verbs, and thus display the so-called Stative Adverb Gap. Though it has sometimes been argued that stative verbs involve a different semantics, by lacking an event argument position, they are usually subsumed under whatever version of event semantics is chosen. An exception is the proposal by Maienborn (2007), who argues that stative verbs describe Kimian states or what I call abstract states, abstract entities that, for Maienborn, are obtained in the way Kim (1976) introduces events, that is, in the simplest case, on the basis of a property, an individual, and a time. In this paper, I adopt the idea of abstract (‘Kimian’) states being fundamentally different ontologically from Davidsonian events by lacking the sorts of properties of concreteness of events. However, I will make use of them within a different analysis of stative verbs (that is, abstract state verbs), on which such verbs differ both semantically and syntactically from eventive verbs. On that analysis, an abstract state verb is decomposed, syntactically and semantically, into the light verb HAVE and a noun (or nominal root) standing for what I call a ‘trope-like thing’, such as a trope (particularized property) or an attitudinal, modal or intensional object (e.g., a belief, a need, or a debt). The compositional semantics of such an underlying structure will then also be the semantics of the verb as it appears overtly. Abstract state verbs thus have the same semantics as complex predicates of the sort *have wisdom* and *have a cold*, which are likewise abstract state verbs, just like *be wise* and *be sick* (Maienborn, 2007). They all display the Stative Adverb Gap, though with particular exceptions, which I will discuss and account for within the proposed analysis.

In what follows, I first clarify some relevant ontological distinctions, namely between events, tropes, attitudinal objects, concrete states, abstract states and facts and discuss semantic challenges for the notion of an abstract state in the sense introduced by Maienborn. I then present the lexical decomposition analysis of abstract state verbs. Next, I will apply the analysis to explicit property-referring terms, which are subject to a restriction to abstract state predicates. I will conclude with a few general points concerning natural language ontology and reference to abstract objects in natural language.

**1. Concrete and abstract states, events, attitudinal objects and tropes**

1.1. Standard criteria for concreteness

Traditionally the distinction between abstract and concrete entities plays an important role in ontology, and it does so also in the context of the ontology of natural language, in particular with the distinction between abstract and concrete state verbs. It is important, however, to be clear about the criteria used for making the abstract-concrete distinction, which need not always coincide. One standard criterion is that concrete entities come with a spatio-temporal location, but abstract entities do not. Being able to enter causal relations and being potential objects of perception is another standard criterion. A criterion that is less often used explicitly, but that will be quite relevant in the present context is that concrete objects are fully specific rather than being derived from unspecific properties. In what follows, we will see how the criteria apply to various ontological distinctions related to notions of a state.

1.2. Events, tropes, and facts

The difference between events and facts is a distinction that has been well-established as a distinction relevant in the semantics of natural language (Vendler 1967): events are described by verbs and event nouns, facts by *the fact that* S and perhaps factive *that*-clauses. Events but not facts enter causal relations, can be object of perception. Unlike events, facts need not be fully specific (‘the fact that John is tall’ does not tell us how tall John is). Events come with a spatio-temporal location; facts don’t: they may be about a location, but that location is not where the fact is. Facts can be objects of mental attitudes, of course, just like anything can.

Less established than events in the context of natural language semantics are tropes (particularized properties or modes). Tropes are concrete entities by being fully specific, being potentially causally efficacious and perceivable, and being dependent on a particular entity, their bearer. Tropes play the very same role for the semantics of adjectives as events for the semantics of verbs (Moltmann 2013a). First of all, nominalizations of adjectives figure in philosophical discussions of tropes since Aristotle (who takes them to be ‘accidents’). ‘Socrates wisdom’, ‘the apple’s redness’, ‘the stick’s length’ are tropes. Second, the range of modifiers applicable to adjectives corresponds to the sorts of properties that tropes can have, such as properties relating to a specific manifestation (*intensely red*) and perceivability (*visibly uneven*) (Moltmann 2013a).

1.3. Abstract and concrete states (Kimean and Davidsonian states)

Let us now turn to the less familiar distinction between abstract states and concrete states. The distinction has been motivated by the so-called Stative Adverb Gap (Katz 2003)

The Stative Adverb Gap consists in the generalization that most stative verbs (*own, owe, lack, believe, know, resemble, have, be, reside in*) do not accept adverbials (e.g., location and manner adverbials) except for temporal adverbials and adverbials of mental attitudes, and they cannot form the naked infinitival complement of perception verbs:

(1) a. ??? John knows French in Munich.

b. ??? John believes with the help of Mary that he can win.

c. ??? Bill owns the house with a lot of effort.

d. ??? John visibly owes Bill a bottle of wine.

e. ??? I saw Bill own the house.

f. ??? I heard Bill know French.

Some researchers have taken the Stative Adverb Gap to show that stative verbs lack an event argument position (Katz 2003). But taking stative verbs to have such a different semantics from eventive verbs is hardly satisfying. Neo-Davidsonian event semantics, for one thing, would be inapplicable to stative verbs, and thematic relations could not be conceived for stative verbs in the way they apply to eventive verbs, as relations between individuals and events. In addition, it has been observed that all stative verbs provide states for anaphoric reference and so do seem to describe states (Maienborn 2007):

(2) John owes Bill money. That has been so for a long time.

Moreover, just like eventive verbs, stative verbs come with nominalizations, now denoting states:

(3) John’s owning of the house

Certain stative verbs do not display the Stative Adverb Gap. These are mostly verbs of bodily position such as *lie, stand, sit, wait, kneel* but also, for example *sleep* and *wait*. Those verbs allow for the same sorts of adverbials as eventive verbs:

(4) a. John is standing with a lot of effort.

b. John is waiting with Mary.

c. Joe is waiting in the garden.

d. I saw Bill sit on the chair.

e. I heard Bill sleep next door.

Maienborn’s (2007) proposal to account for those data is in terms of an ontological distinction between two sorts of states. Stative verbs not permitting the greater class of adverbials describe *Kimian states*. The other stative verbs take *Davidsonian states* as implicit arguments. ‘Kimian states’ are socalled because they are taken to fall under Kim’s (1976) account of events, as abstract entities derived from individuals and properties and times:

### (5) The Kimian account of events

For properties *P* and *P’* and objects *o* and *o’*, and times *t* and *t’*,

i. the event f(*P*, *o*, *t*) = the event f(*P’*, *o’*, *t’*) iff *P* = *P’*, *o* = *o’*, and *t* = *t’*,

ii. the event f(*P*, *o*, *t*) exists at a time *t* iff *o* has *P* at *t.*

‘Davidsonian states’ are on a par with Davidsonian events: they are concrete entities. That is, they are fully specific (or involve a particular manifestation), they have a spatial location, and they enter causal and perceptual relations. Kim’s account of events, it has generally been agreed, does not define a notion of an event as a particular entity, but rather the notion of a fact. Facts are not states, of course. Facts obtain – states obtain at a time. Taking states to obtain relative to a time only, this gives the following Kimian account of states:

### (6) The Kimian account of an abstract state (as an open-ended state)

For properties *P* and *P’* and objects *o* and *o’*,

i. the state s(*P*, *o*) = the state s(*P’*, *o’*) iff P = *P’* and *o* = *o’*,

ii. the state s(*P*, *o*) exists at a time *t* iff *o* has *P* at *t.*

The Kimian account of events and states is an abstractionist account, which introduces entities by implicit definition. This means that abstract states come out as having just those properties that are fixed by the method of introduction, that is, they have only identity conditions and a temporal duration (and of course they, like all entities, can be the objects of mental attitudes). The method of introduction does not specify a spatial location, a particular manifestation, involvement in perception or causal relations, and hence the so introduced states won’t have properties of that sort.

The Stative Adverb Gap is explained ontologically: abstract states, given the Kimian account, lack the sorts of properties that would be attributed by adverbials of the relevant sorts. By contrast, concrete states, being on a par with Davidsonian states, come with a spatio-temporal location, a concrete manifestation, enter causal relations, and can be objects of perception.

I have used the theory-independent terms ‘abstract state’ and ‘concrete state’ instead of Maienborn’s (2007) terms ‘Kimian state’ and ‘Davidsonian state’. In fact, the Kimian account of an abstract state is highly problematic, which means that the notion of an abstract state should not itself be tied to the Kimian theory of it.

One problem with the Kimian definition of an abstract state is that it overgenerates: the property *P* in (5) could be the content of an eventive predicate, for example, which would predict that eventive predicates could describe abstract states and thus resist the relevant types of adverbials. But this is of course not the case.

The second problem for the Kimian account concerns its integration into Davidsonian event semantics. The Kimian account requires two meanings of abstract state verbs. For a transitive verb, the underived meaning would be a two-place relation without Davidsonian argument.

The derived meaning will have a state argument introduced on the basis of the relation expressed by the underived verb. Thus, we have:

(7) a. *own*(John, the house)

b. *own’*(s([*own*], John, the house), John, the house) iff *own*(John, the house).

This is in fact the kind of analysis Maienborn (2017) suggests. One problem with that suggestion is of course the need to distinguish two homophonous versions for any abstract state verb. Can both versions be used or only the second version, and then what is the status of the first version in the first place?

A Neo-Davidsonian event semantics with abstract states on a Kimian account is not even possible. If *own* were to be a one-place predicate applicable to an abstract state *e*, i.e., own(e), then *e* would itself have to be defined in terms of a two-place relation expressed by *own*, but there is no such relation, since all verbs are now one-place predicates of events.

1.4. The semantic role of tropes

As mentioned, there is the same evidence for adjectives taking tropes as arguments as there is for verbs taking events as arguments: the range of adjective modifiers constitutes typical properties of tropes: *intensely, deeply, strikingly, visibly* are the adverbial correlates of intense, *deep*, *striking*, and *visible*, which are applicable to tropes like ’the apples redness’ or ‘Socrates’ wisdom’. A Davidsonian semantics for adjectives then will look as follows, where an adjective modifier acts as a predicate of an implicit trope argument:

(8) a. Socrates is wise

b. ∃*t*(wise(*t*, Socrates))

A Neo-Davidsonian semantics for adjectives would require making use of a thematic relation of bearerhood holding between individuals and the tropes on which they depend:

(9) ∃*t*(BEARER(Socrates, *t*) & wise(*t*))

Such a semantics and its syntactic basis are yet to be explored in detail.

Given the presence of tropes in the argument structure of adjectives, (10a) and (10b) should now have a parallel semantics:

(10) a. Socrates has wisdom.

b. Socrates is wise.

However, *have* and *be* denote different relations: (predicative) *be* takes adjectives and predicative nominals, where *have* applies to two individuals. This means that *be* applies to an individual of type *e* and a higher-order property (of type <e, t>). Thus, (10a) has the logical form in (11a), whereas (10b) has the one (11b) (on a Davidsonian account of adjectives):

(11) a. ∃*t*(HAVE(Socrates, *t*) & wisdom(*t*))

b. ∃*t*(BE(Socrates, λ*x*[∃*t* wise(*t*, *x*)]))

Obviously, the truth conditions come out the same. For such reasons, I will largely focus on the semantic role of *have* only, setting the semantics of predicates with *be* aside.

1.5. Attitudinal, modal, and intensional objects

An important category of concrete entities with connections to events that is well reflected in natural language is attitudinal objects such as beliefs, claims, assumptions, impressions, ideas, proposals, and demands, that is, the entities denoted by nominalizations or (non-gerundive) nouns corresponding to attitude verbs (Moltmann, 2013a, 2024). Attitudinal objects are fully specific (for example, beliefs and demands involve a particular strength). Yet they sharply differ from events, for example by being bearers of truth or satisfaction conditions.

Modal objects are important as well, that is, needs, offers, invitations, permissions, obligations, as are intensional objects such as searches, purchases, debts, and lacks (Moltmann 2024).

What is characteristic of such satisfiable objects (as I call them in Moltmann, 2024) is that they have both content-related properties and properties of concreteness. The content-related properties include satisfaction conditions and a part structure based on partial content only. The properties of concreteness include being able to enter causal relations (*a shocking claim*), being perceivable (*the remark that was overheard*), and being fully specific (*a strong claim / belief*).

Attitudinal objects differ sharply from facts and abstract states in that the latter do not come with those sorts of properties. For example, *strong* and *true* are applicable to beliefs, as in (12a), but not corresponding facts, as denoted by the gerunds in (12b):

(12) a. John’s belief that the world is round is strong / true.

b. ??? John’s believing / having the belief that the world is round is strong / true.

Note, also, that *strongly* is acceptable as an adverbial modifier of *believe*:

(13) John strongly believes that the world is round.

Given the semantic role of attitudinal objects as denotations of nominalizations, the question arises whether they act as implicit arguments of attitude verbs. The application of adverbials like *strongly* to *believes* suggest they are.

*Strongly* is likewise applicable to *resemble*. The nominalization of *resemble, resemblance,* stands for a (relational) trope, and in fact *strong(ly)* is applicable to both *resemblance* and *resemble*, targeting the trope:

(14) a. Mary strongly resembles Bill.

b. Mary’s resemble of Bill is strong.

However, *strong* is inapplicable to the corresponding fact nominalization:

(15) ??? Mary’s resembling of Bill is strong.

Thus, attitudinal objects share significant ontological and semantic similarity with tropes, as do modal and intentional objects.

1.6. Lexical decomposition of abstract state verbs

In previous work (Moltmann, 2021, 2024), I argued for a decompositional analysis of attitude verbs, on which attitude verbs are derived from a light verb and a noun for an attitudinal object (see also Arsijenevic, 2009). Clausal complements are then treated as predicates of attitudinal objects (Moltmann, 2021, 2024). Such an analysis was also proposed for the modal verb *need* by Harves and Kayne (2012), who take the verb *need* to be derived from *have need*. Such an analysis of intensional verbs in general will be based on correlations of the following sorts:

(16) a. John believes that p - John has the belief that p.

b. John needs to work - John has need to work.

c. John needs a coat. – John has need of a coat.

(17) John knows that p - John has knowledge that p.

The same kind of lexical decomposition furthermore applies to stative intensional transitive verbs such as *lack*, given the equivalence of the following a- and b-examples:

(18) a. Sue lacks understanding.

b. Sue has a lack of understanding.

(19) a. Sue greatly lacks understanding.

b. Sue’s lack of understanding is great.

The general proposal then is that all abstract state verbs will be decomposed into a light verb *HAVE* and a noun for a trope-like thing, a trope or an attitudinal, modal, or intensional object.

Lexical decomposition is also suited for verbs describing tropes such as *resemble*, given the equivalence of the a- and b-examples below:

(20) a. John resembles Joe.

b. John has resemblance to Joe.

(21) a. John closely / strongly resembles Mary.

b. John’s resemblance of Mary is strong / close.

Complex abstract state predicates may also be formed with *have* and a noun for an ordinary object (*have a sister, have a house, have an idea*). In addition, complex abstract state predicates may be formed with the copula *be* with an adjectival or nominal complement (*be happy*, *be nervous*, *be a teacher*, b*e a candidate*). Often *be* + adjective can be reduced to *have* + noun (or abstract nominal root), as indicated by the rough equivalence between *be happy* and *have happiness,* and *be nervous* and *have nervosity*. As already mentioned, I will set aside complex predicates with *be* and focus on those with overt or underlying HAVE only.

On the proposed view, all abstract state verbs are underlyingly complex predicates of the form HAVE – noun / nominal root. Let me call this the *Stative Verb Decomposition Hypothesis*:

(22) The Abstract State Verb Decomposition Hypothesis

Abstract state verbs are syntactically derived from HAVE and a (possibly abstract)

nominal standing for a trope-like entity (a trope, attitudinal object, modal object,

intensional object).

Note that the noun complement of HAVE need not match the nominalization of the abstract state verb. Rather it may consist in an abstract nominal root, as in the case of *know*, which can of course not be derived from *have knowledge*, but should be derived from something like *have know,* for a nominal root *know.*

Modifiers of concreteness such as *strongly* when applying to abstract state verbs will then apply to the noun for a trope-like thing in the underlying complex predicate. This means that *strongly resemble* is interpreted as *have strong resemblance*, and *strongly believe* as *have (a) strong belief*.

The HAVE-relation includes a range of relations, including kinship, possession, experiencer relations and bearerhood. The following sorts of HAVE-relations apply to trope-like things, conveyed by the light verb HAVE. *Having wisdom* means being the bearer of a wisdom trope; *resembling Paul* means being the bearer of a resemblance trope shared by Paul. For attitudinal objects as in *believing that* p (*having the belief that* p), *knowing that* p (*having knowledge that* p) the relation is to be understood as ‘being the intentional subject of a belief or of knowledge’. The HAVE-relation in the sense of bearerhood applies also to modal objects (*needing to* VP - *having (the) need to* VP), as well as intensional objects (*owning a house* - *having ownership of a house*, *lacking understanding* - *having a lack of understanding*).

One important assumption is to be made about the light verb HAVE. That is the assumption that HAVE does not have an implicit event argument position (or on a Neo-Davidsonian account, is not a predicate of events). Rather HAVE will be a two-place predicate, in fact the only two-place predicate (besides BE) without event argument position (or, on a Neo-Davidsonian account, the only verb expression a relation).

Given that proposal, the Kimian account of abstract state verbs is no longer needed for explaining the Stative Adverb Gap. Abstract state verbs resist the relevant adverbial modifiers for one of two reasons: first, because HAVE, as part of the underlying complex predicate, lacks an event argument; second, because the trope-like entity the nominal stands for lacks the relevant features attributed by adverbials.

Trope-like things, even though they are concrete in some respects (being fully specific, have a limited life span), lack certain features of concreteness, such as a spatial location. Tropes in general lack a direct spatial location, not mediated by their bearer, making location predicates inapplicable (Moltmann, to appear). Thus, the following examples are unacceptable even if the apple is round and is on the table and even if the frame lacking a door is in front of me:

(23) a. ??? The roundness of the apple is on the table.

b. ??? The lack of a door was in front of me.

Eventive attitude verbs (*assume, offer, reach*), on a Neo-Davidsonian account, would be one-place predicates of events, as would be concrete state verbs (*sit, lie, sleep* etc.). But eventive verbs may also be underlyingly considered complex predicates composed of BECOME, MAKE, GIVE, or TAKE, that is, dynamic light verbs, and a nominal root for an event in te spirit of Hale and Kayser (2002). Dynamic light verbs come with a Davidsonian event argument position, and on a Neo-Davidsonian view, would be one-place predicates of events.

**2. Explicit property-referring terms**

2.1. The construction of explicit property-referring terms

I now turn to another construction, which exhibits a surprising constraint to abstract state predicates (Moltmann 2023). The decompositional analysis of stative verbs allows for a straightforward account of that constraint. The construction in question is what I call ‘explicit property-referring terms’:

(24) *the property of* XP

In English, the XP in that construction is a gerund:

(25) a. the property of being wise

b. the property of having wisdom

### In French, German, Italian, by contrast, the XP is an infinitival clause, as seen in the respective translations of (25a) below:

(26) a. la propriété d’être sage

b. die Eigenschaft, weise zu sein

c. la proprietà di essere saggio

A common view about explicit property-referring terms (e.g., Chierchia and Turner, 1988) is that they simply pick up the property denoted by the predicate following *of. The property of walking* refers to the property denoted by *walk*, as Chierchia and Turner (1988) say.Thus, explicit property-referring terms involve the notion of a property as an abundant property (Lewis, 1986) or non-natural property (Armstrong, 1978). This can be stated as the Property Reference Hypothesis:

(27) The Property Reference Hypothesis

The NP *the property of* XP refers to the property expressed by XP.

The property being referred to may be a reification of the content of the VP. That is, the construction would involve a mapping of a semantic value of type <*e*, *t*> to an entity of type *e*, an account pursued by Chierchia and Turner (1988) and others. Alternatively, an explicit property-referring terms may be taken to refer to a property as a higher-order entity, in line with recent developments of higher-order metaphysics (Skiba 2021).

However, the Property Reference Hypothesis cannot be right. Explicit property-referring terms are highly restricted in what sorts of complements they may take and thus do not simply reify or stand for the content of a predicate.

First, explicit property-referring terms do not allow for eventive predicates (pace Chierchia and Turner, 1988):

(28) a. ??? the property of walking / laughing / jumping / speaking / thinking

b. ??? the property of meeting / kissing / watching someone

Eventive predicates are only allowed when the predicate has a habitual reading, not when describing a particular event:

(29) a. the property of speaking French

b. ??? the property of speaking right now

(30) a. the property of eating meat (regularly)

b. ??? the property of eating that piece of meat

On the habitual reading, ‘eventive’ verbs are of course abstract state verbs, and not eventive verbs.

Second, explicit property-referring terms do not permit concrete-state verbs:

(31) ??? the property of standing / sitting / kneeling / sleeping / waiting

Explicit property-referring terms permit the full range of abstract-state verbs: verbs describing qualitative or quantitative tropes, as in (32), verbs describing mental states, as in (33), and modal verbs, as in (34):

(32) a. the property of resembling Napoleon

b. the property of weighing 100 pounds

c. the property of measuring 2 meters

(33) a. the property of believing that the world is round

b. the property of expecting to win

(34) the property of needing to work

Moreover, explicit property-referring terms allow for stative intensional transitive verbs:

(35) a. the property of needing a coat

b. the property of lacking understanding

Explicit property-referring terms always allow for complex predicates with *have*, whether the noun complement describes an ordinary object or a permanent or episodic particularized property:

(36) a. the property of having a sister / a vacation / a house

b. the property of having wisdom / pride / intelligence

c. the property of having a cold / a migraine / backpain / a nervous feeling / fear

In addition, complex predicates with the copula *be* are always acceptable, and that regardless of the nature of the complement, whether it describes an episodic or permanent property:

(37) the property of being wise / angry / sick / nervous / sleepy / upright / sleep / alive

Explicit property-referring terms display striking contrasts between episodic verbs and *be* with an episodic adjective with minimal pairs such as:

(38) a.??? the property of sleeping

b. the property of being asleep

(39) a. ??? the property of suffering

b. the property of being in pain

(40) a. ??? the property of living (as opposed to being dead)

b. the property of being alive

Below is another from German, which has both the complex predicate *krank sein* ‘be sick’ and the synonymous verb *kraenkeln*:

(41) a. die Eigenschaft, krank zu sein

the property sick to be

‘the property of being sick‘

b. ??? die Eigenschaft, zu kraenkeln

the property to sick (verb)

‘the property of being sick’

Similar contrasts hold for predicates describing thematic relations with eventive verbs and predicates describing them with *be* + complement:

(42) a. the property of being the cause of something

b. ??? the property of causing something

(43) a. the property of being an agent

b. the property of being active / having an activity

c. ??? the property of acting

(44) a. the property of being the initiator of an investigation

b. ??? the property of initiating an investigation

Explicit property-referring terms admit only the stative copula verb *be* and not dynamic ones, that is, *remain* and *become*:

(45) a. the property of being sick / cancer free

b. ? the property of remaining sick / cancer free

c. ??? the property of becoming sick / cancer free

As Maienborn (2007) points out, the copula verb *be* classifies with abstract-state verbs, regardless of the complement it takes. Thus, *be*+complement always resists adverbials of the relevant sort (including comitatives) and cannot function as complement of verbs of perception, contrasting in that respect with eventive verbs, including *become*:

(46) a. ??? Mary was nervous with Bill.

b. ??? Mary was asleep with Joe’s help.

c. Mary was sleeping with Joe’s help.

(47) a. ??? John saw Mary be nervous / sleepy

b. John saw Mary become nervous / sleepy.

Stative and dynamic existence predicates also display the contrast:

(48) a. the property of existing / being

b. ??? the property of taking place / happening / occurring

*Exist* can of course be understood as ‘have existence’, permitting a decompositional analysis as HAVE + nominal root.

The constraint on explicit property-referring terms does not pertain to the conceptual content of the complement, but rather, also, its underlying structure, requiring predicates describing abstract states, though these may involve episodic properties.

2.2. Evaluation and analysis of the data

Two points can be made about the constraint on explicit property-denoting terms. First, what matters is not the situations described, but the compositional semantics of the complement of *property*. Second, the constraint involves the notion of an abstract state, but as a predicable entity. Such a notion of a property is clearly distinct from the notions of property discussed in contemporary metaphysics (Lewis’ (1986) sparse properties and abundant properties; Armstrong’s (1978) natural properties and non-natural properties).

How should the constraint be formulated? A first option is that *property* applies only to abstract states, but, as ‘properties’, that is, predicable entities. Thus, informally stated, *property* would be subject to the semantic selectional constraint below:

### (49) The Abstract-State Constraint

The complement of *property* must describe an abstract state (but as a predicable

entity).

There are several problems with that option. The first is, of course, how abstract states could be predicable entities, since they do not come out that way on the Kimian account, and while one can ‘have a property’, one cannot ‘have an abstract state’. Second, we have seen that the notion of an abstract state, on a Kimian account at least, is seriously problematic, since abstract states could be obtained from eventive relations. Third, the Abstract-State Constraint seems to be too restricted: nominals that refer to qualities are not in fact not that bad as modifiers of *property*:

(50) the property of wisdom / awkwardness / softness …

Another option is that *property* applies to the reification of the bearer relation (conveyed by HAVE) when applied to a trope-like trope, that is, a trope, attitudinal object, modal object, or intensional object. But that would not be sufficiently general. Explicit property-referring terms also allow for HAVE when applying to an ‘ordinary’ object:

(51) the property of having a sister / a house / a nightmare

The content conveyed by HAVE consist not just in the bearerhood relation (applied to a trope-like thing), but also includes kinship, possession, experiencer relations. The generalization thus is that explicit property-referring terms always allow for HAVE applying to a trope-like thing or an ordinary object. (In addition, of course, they allow for BE+complement.)

Why should explicit property-referring terms refer to the reification of the content of the complement of *property* (HAVE + NP), rather than referring to that content itself? The reason is a range of differences between explicit property-referring terms and gerundive or infinitival clauses, differences that are parallel to those between bare adjective nominalizations and explicit property-referring terms (Moltmann 2013a). Thus, predicates applying to an abstract property object like *evaluative* and *complex* are inapplicable to gerundive and infinitival clauses, but are perfect with explicit property-referring terms:

(52) a. ??? Being nice is evaluative / complex.

b. The property of being nice is evaluative / complex.

Other predicates, like *widespread* and *is always appreciated* can apply to gerundive and infinitival clauses, but not to explicit property-referring terms:

(53) a. Being nice is always appreciated.

b. ?? The property of being nice is always appreciated.

(54) a. Being truly generous is rare.

b. ?? The property of being generous toward everyone is rare.

Such data point to another problem for the Chierchia/Turner-approach, on which explicit property-referring terms pick up the property denoted by the complement: the complement of *property* does not have an abstract property as its denotation. Rather the gerundive or infinitival clause to which *property* applies behaves like a bare adjective nominalization (*wisdom, happiness*) in that it seems to stand for a plurality of instances or tropes or states, across different circumstances (a modalized plurality, cf. Moltmann, 2013a). Thus (53a) is roughly equivalent to (55b) and (54a) to (55b):

(55) a. Niceness is always appreciated.

b. True generosity is rare.

*Appreciated* when applied to *being nice* or *niceness* evaluates the reception of instances of niceness. *Rare* when applied to *being generous toward everyone* or to *true generosity* evaluates the frequency of instances of generosity across different times and circumstances.

For the formal semantics of explicit property-referring terms, let us focus on *having generosity* and *having niceness* as potential complements of *property*, rather than *being generous* and *being nice*. (Recall that whereas *have* denotes a relation between individuals, *be* denotes a relation between an individual and higher-order property.) The semantics of explicit property-referring terms then involves reification as a property object of the HAVE-relation when applied to some entity:

(56) [*the property of* HAVING NP] = ιp[p = reif(λx: HAVE(x, [NP])]

What is a reification of the HAVE-relation applied to an entity, that is, ‘object-related HAVE’ λx: HAVE(x, d), for some entity d? For making that precise, we can make use of an abstractionist, Kimian account,. However that account will now apply just to object-related HAVE, yielding a property object. It will consist in application and identity conditions on the reified property obtained from object-related HAVE:

(57) A Kimian account of reified properties obtained from object-related HAVE

For an object *d*, the function *reif* maps the relation **HAVE** and d onto a property object

reif(**HAVE**, *d*) such that:

a. reif(**HAVE**, *d*) holds of an entity *a* just in case **HAVE**(*a,* *d*)

b. for entities *d* and *d’*, reif(**HAVE**, *d*) = reif(**HAVE**, *d’*) iff *d* = *d’*.

Here ‘**HAVE’** stands for the content of the light verb HAVE, a very general or disjunctive relation comprising bearerhood, possession, experiencer and kinship relations.

This account is applicable to both gerunds of the sort *having generosity* and of the sort *having a sister.* How would it apply to the property of generosity? In that case, the **HAVE**-relation would be implicit, as the bearerhood (ontological dependence) relation essentially tied to trope-like things (but not ordinary objects).

Properties of properties such as ‘being evaluative’ (*The property of being good is evaluative*), given this proposal, will be accounted for in terms of the application conditions on the HAVE-relation when applied to an object. Properties such as ‘being complex’ (*The property of being round and big* is complex) are to be understood in terms of how the property is defined explicitly.

**3. Further remarks and conclusion**

The semantic constraint on complex property-referring terms raises interesting general issues. We have seen that the constraint does not correspond to the more restricted notions of a property familiar from contemporary metaphysics (natural properties, sparse properties).

Even more interestingly, the restriction, it appears, can hardly have been learned from exposure to data. It is very unlikely that a child learning English will be exposed to uses of explicit property-referring terms and will be corrected when using such terms herself.

We thus seem to have a version of the poverty-of-the-stimulus argument at the level of natural language ontology, supporting a particular ‘innate’ notion of a property, namely as the HAVE-relation applied to a trope-like thing or ordinary object, a notion in stark contrast to the familiar notion of a property based on the content of predicates. While the constraint on explicit property-referring terms is an ontological one, at the same time it seems entirely on a par with constraints of universal grammar. It may even be considered part of universal grammar itself if the notion of grammar is extended so as to comprise part of ontology itself (Moltmann, 2020a).

The constraint on explicit property-referring terms is in apparent violation of a general restriction on reference to abstract objects put forward in my book *Abstract Objects and the Semantics of Natural Language* (Moltmann, 2013a, 2020b). This is the Abstract Objects Hypothesis:

(58) The Abstract Objects Hypothesis

Natural language does not permit reference to abstract objects in its core, but only in

its periphery.

The periphery of language includes technical expressions and technical, or more generally non-ordinary, uses of expressions (Moltmann 2020b). The construction of explicit property-referring terms is not in the periphery since it is subject to a condition on ontology that is part of universal grammar and hence part of the core of language (Chomsky 1981). It is to be seen whether the Abstract Objects Hypothesis is to be modified in view of the constraint on explicit property-referring terms.

There is another puzzle that needs to be addressed. That is, why can a philosopher (or non-philosopher, for that matter) use the noun *property* by itself having the notion of an abundant property in mind or else the notion of a sparse property? Note, though, that this is not possible with explicit property-referring terms (*the property of* XP): no philosophical intention can render *the property of walking* felicitous. This suggests that a distinction between nouns as such and ‘nouns-in-construction’ matters. (A noun with a complement such as *property of being wise* would be a noun-in-construction.) The generalization then will be that nouns-in-construction do not permit non-ordinary (technical) uses, whereas nouns by themselves do.

This matches the two uses of the noun *existence.* *Existence* without specifier or complement can be used to convey a univocal notion of existence, applicable to anything there is (*They discussed existence*, *as a univocal property applying to everything there is*). But as soon as *existence* takes a specifier or complement it is restricted to enduring or abstract objects and cannot no longer apply, for example, to events (??? *the existence of the rain yesterday*).

To conclude, explicit property-referring terms display a notion of property tied to the light verb HAVE applied to a trope-like thing or ordinary object. More precisely, explicit property-referring terms refer to the reification of object-related HAVE. Abstract states, as the denotations of anaphora and gerundive nominalizations of abstract state predicates, likewise, should be obtained from object-related HAVE and an individual, rather than just a property and an individual, as on the original proposal of Kim (1979).

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   [↑](#footnote-ref-1)