HAVE as a relation between individuals and properties[1]

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Abstract. This paper argues that the role of HAVE-predicates is to introduce relations into the discourse, one of whose arguments is the individual denoted by the sentence subject. This is the only token-level argument in the relation: the other is modeled as a nominalized property (Chierchia, 1984; Chierchia and Turner, 1988). A number of peculiarities of HAVE are argued to follow from this account, including its connection with existential predicates (McNally, 1992, 2009).

Keywords: have, possession, properties, kinds, nominalized functions.

1. Introduction

Ever since Keenan (1987), a significant share of the semantic literature on HAVE[2] has focused on the compositional challenges posed by relational nouns in object position of this verb, i.e. the phenomenon dubbed 'existential-HAVE'. The goal is to account for the putative contrast between (1a) and (1b):

(1) a. John has a/many/the/every/both car(s)
b. John has a/many/#the/#every/#both sister(s)

From this perspective, what needs to be explained is: (i) why relational nouns trigger a definiteness effect, largely parallel to that found in the pivot of existential sentences, while sortal nouns do not; (ii) how the subject ends up saturating/being identified with the internal argument of the object; (iii) how to factor in the contribution of the determiner within the object; and (iv) what exactly HAVE contributes to the meaning of the whole.

Several analyses of existential-HAVE have been suggested, all of which account for (at least some of) the data but make HAVE –or a small subset of its uses– look like a very peculiar creature full of idiosyncrasies. One of the consequences of such views is that they cast no light on the persistent intuition in the literature on possession that there is a some connection between HAVE, existential predicates and copular sentences.

This paper presents a compositional account of HAVE as a predicate that introduces a 2-place relation into the discourse by linking it to one of its participants, the sentence subject. As a result of introducing a HAVE-sentence into a context, the individual that the subject is in a relation to is also introduced. This result is achieved in an indirect way: HAVE relates its subject not with a token-level entity, but with a description of an individual; this description is modeled as a nominalized property (Chierchia, 1984; Chierchia and Turner, 1988). The nature of the

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[2]HAVE refers to an abstract, language-independent predicate of which English *have*, French *avoir* or Catalan *tenir* are concrete manifestations.

relation introduced into the discourse as a result of uttering an—affirmative—HAVE-sentence depends on the relationality of the noun heading the object-NP.[3]

The analysis builds on the account of English existentials in McNally (1992, 2009), which was designed to account for the similarities between existentials and some copular predicates. It thus intends to capture both the observation that existentials and HAVE-sentences share a number of traits and the fact that if a language has a HAVE-verb, it is going to be an obvious candidate for the role of existential predicate.

The paper is organized as follows: section 2 goes over some of the existing semantic accounts of existential-HAVE; section 3 presents a range of data that challenge the existing views in one way or another; in section 4 I introduce the view of relational nouns that I will assume; section 5 lays out the assumptions I make about the notion of nominalized property and its relation to kinds and tokens; section 6 is devoted to the formal analysis; section 7 concludes.

2. The received view(s)

Space precludes an exhaustive summary of the analyses that have been put forward for existential HAVE in the last decades. I will limit myself to reviewing the assumptions and main elements that some of the existing accounts are built on (see e.g. Myler (2014) and LeBruyn and Schoorlemmer (2016) for up-to-date introductions to possession and HAVE-verbs).

Partee (1999) is the first compositional account of the observation (made in Keenan (1987)) that HAVE takes a 2-place predicate as its object, the internal argument of which seems to be saturated by the sentence subject. She assigns the determiner a relational type, which results in an NP denoting an 'unsaturated generalized quantifier'. HAVE is assigned a denotation that takes this special type, contributes an 'exist' predicate à la Barwise and Cooper (1981) (which explains the definiteness restriction), and makes sure the subject falls into the right place—the internal argument of the relational noun.

Landman (2004) offers a different view that is reminiscent both of Milsark's (1974) account of the English existential predicate and of analyses relying on the notion of semantic incorporation (Van Geenhoven, 1998), whereby HAVE combines with relations and provides existential quantification of one of their arguments—thus explaining the definiteness effect. Bassaganyas-Bars (2015) applies a similar view both to existential-HAVE and to the existential predicate in Old Catalan, a language in which the two constructions differ only in the oblique marking of one of the arguments in the latter.

LeBruyn et al. (2016) is another analysis that relies on the notion of incorporation (formalized in Dynamic Montague Grammar). On their view, HAVE takes properties (with implicit arguments) and 'relationalizes' them. The range of interpretations available is contributed by the lexical item in the case of relational nouns, and by the noun's Qualia Structure (Pustejovsky, 1995) in the case of sortal nouns. This analysis provides an insight I will make use of: it suggests that there is no difference in type between relational and sortal nouns; the distinction

[3]For the purposes of this paper, I am not making use of the NP/DP distinction.

between them, however, is crucial for determining the relation the HAVE-sentence eventually expresses. This implies that there is no difference between the two types of nouns regarding the definiteness restriction, a point I will also argue for.

This family of accounts shares the assumption that the analysis of 'John has a sister' needs to get us to the denotation logically represented in (2):

(2) $\exists x.\mathbf{sister}(\mathbf{j})(x)$

In different ways, they all succeed. However, they encounter problems when the full range of determiners (indefinite and definite) that are possible in existential-HAVE contexts is considered, as we will see below. Two of them (Landman and LeBruyn et al.), in fact, are designed for cases where the determiner is *a*, but they leave unclear how to treat other determiners.

Sæbø (2009) tackles the problem from a different angle. His account scopes beyond existential-HAVE to cover all the uses of HAVE. He suggests that HAVE always embeds small clauses (the predicate of which can be overt or implicit) and turns them into predicates, and the lambda-abstracted variable (which can come from a relational noun, an anaphoric element or an implicit relation of possession) is co-indexed with the sentence subject. The role of HAVE is, as in the other analyses, to connect the subject with the material in object position, but the options for accomplishing this go well beyond the binding of the internal argument of the relational noun. As in Partee (1999), the definiteness effect is ultimately attributed to an 'exist' predicate associated with relational nouns. Myler (2014) proposes a related analysis in the Distributed Morphology framework.

Sæbø's analysis is technically complex and requires some non-standard assumptions, but it is able to subsume practically all uses of HAVE under an appealing single account. However, it relies heavily on covert material to yield the right interpretation for HAVE-sentences. In addition, by providing HAVE with a very special sort of semantics, it does not capture any similarities between HAVE and existential and copular contexts in an obvious way.

Although there are important differences among these analyses, in the next section we will see that they all run into complications once we consider all the data we naturally find with HAVE and the kinds of interpretation for HAVE-sentences they give rise to.

3. Bringing more data into the picture

The literature on existential constructions has converged on the idea that the definiteness effect requires a more fine-grained explanation than a simple opposition between 'strong' and 'weak' NPs. Most literature on HAVE, however, still relies on this type of account. There are essentially two kinds of cases where we find HAVE embedding a relational noun with a definite or obligatorily quantificational determiner. The first is not problematic for any of the accounts above. The second, however, is harder to accommodate.

The first case comprises those examples where the DP is not discourse-new and saturation of

the internal argument of the relational noun does not depend on the sentence subject. This class of cases requires heavy contextual support. An example of such a context is provided by LeBruyn et al. (2016: 58). While playing a card-game based on the Simpson family, a player could utter (3a) if she had the card corresponding to Abraham J. Simpson, or (3b) if she were holding Bart, Lisa and Maggie's cards in her hands.

(3) a. I have the grandfather.
b. I have every child.

Following Abbott (1993), I will call these readings *contextualized*. They contrast with the normal interpretation of sentences with relational nouns, where the relation expressed by the noun holds between the subject and the object; these are the *non-contextualized* readings. Partee (1999) and LeBruyn et al. (2016) associate contextualized interpretations with another version of HAVE, that works like a regular transitive verb.

The more problematic set of cases are those with definite NPs that clearly correspond to a non-contextualized reading. In some of them we get a kind or amount reading, as these examples from the Corpus of Contemporary American English (Davies, 2008) illustrate:

(4) a. The guy looks good for his age and has the body of an athlete (COCA)
b. Stafford has the arm and the intelligence to be a good NFL QB (COCA)
c. Pigs have the intelligence of a three year old child (COCA)

These sentences express non-contextualized relations between a person/animal and their body, arm, or intelligence, not context-dependent ones. Similar cases have the object of HAVE extracted from a restrictive relative clause. A cursory corpus search suggests that the main verb in the restrictive clause tends to be intensional (5a), but examples with extensional verbs can also be found (5b):

(5) a. I'd like to tell ten-year old Sarwat that at last he has the friends he was looking for (COCA)
b. At twenty you have the face nature gave you (COCA)

Finally, NPs with overt classifiers like 'kind' or 'type' get a non-contextualized interpretation with definite articles and even obligatorily quantificational determiners. In a context where three kinds of sisters are being discussed (e.g. nice sisters, indifferent sisters and bully sisters), (6a) is perfectly possible with a non-contextualized reading; in a context where we assume that sisters come in different, recognizable kinds, (6b) is perfectly felicitous as well.

(6) a. Mary has the three kinds of sisters.
b. Mary has every kind of sister.

The picture that starts revealing itself looks similar to the one we get with existential constructions. Definite or obligatorily quantificational NPs which preserve a non-contextualized reading with relational nouns are parallel to those that preserve a non-contextualized reading in

English existentials (Lumsden, 1988; McNally, 1992; Abbott, 1993, 1997):

(7) a. There was every *(kind of) biologist at that conference.
b. John has been every *(kind of) biologist.

The analyses we have gone over in the previous section do not account in an obvious way for this pattern of data. One can however envisage ways to accommodate the definites, e.g. by invoking type-shifting mechanisms or some operation akin to Chierchia's Derived Kind Predication (Chierchia, 1998).[4] In contrast, the behavior of quantificational NPs if they quantify over kinds is harder to fit into any of the analyses.

Other data point to the fact that HAVE does not behave like a regular, extensional transitive verb that relates two token-level entities. One such case is the resistance of the object of HAVE to be pronominalized with *wh*-relative pronouns. This feature is also shared with existential constructions, and contrasts with a common transitive like 'date':

(8) a. I like some of the friends/qualities *which/that/∅ John has.
b. I talked to some of the people *which/that/∅ there are in this class.
c. I know some of the people which/that/∅ you've been dating.

More evidence comes from dialects of English which allow for *that*-less subject relative clauses. They are permitted in intensional contexts, some copular constructions, existentials and HAVE-sentences (examples from McNally (2009)):

(9) a. I have an idea might work.
b. There's a man here can't speak English.

Finally, there is the fact that the most natural interpretation of an anaphoric pronoun in the object position of HAVE is a kind-level one (Myler, 2014). In a context where someone expresses admiration for a car parked on the street (say it is a Porsche 911), *it* or *one* in (10a) can be interpreted as referring to the car in question, whereas in (10b) they refer naturally to the kind of car, not the specific car-token.

(10) a. Did you know Mary owns it/that's the one Mary owns?
b. Did you know Mary has it/that's the one Mary has?

Data of this kind involving the English existential construction led McNally (1992) to analyze the pivot not as a token-level individual, but a higher-level one—a nominalized property. The introduction of an actual individual into the discourse (satisfying the descriptive content of the property) results from an entailment of the use of a HAVE-sentence.

The behavior of HAVE-sentences illustrated in (8), (9) and (10) looks mysterious under any of the accounts reviewed in the previous section, which in all cases consider HAVE a relation

[4]Derived Kind Predication is type-shifting operation that applies to predicates of objects so that they can combine with kind-denoting NPs. See Chierchia (1998: 364) for details.

between token-level individuals. In contrast, it gets a natural account if we consider that the object of HAVE denotes precisely a nominalized property. *Wh*-relative pronouns can be argued to be restricted to token-level entities; *that*-less relative clauses seem to be possible when the antecedent of the omitted pronoun refers to a non-token-level entity, and the kind-level interpretation of the anaphora in the object of HAVE follows if kinds are understood as higher-order individuals as well (as most literature making use of both nominalized properties and kinds assumes—see e.g. Chierchia (1998) and McNally (2009)).

If we consider in addition that, as mentioned above, HAVE is one of the main sources of existential predicates cross-linguistically (Creissels, 2014), which is expected if the object of HAVE and the pivot in existential predicates are ontologically similar, an account that treats HAVE as a relation between a token-level individual and a nominalized property starts looking like a serious candidate for explaining what is it that makes HAVE look like such a strange, slithery creature. Before turning to the formal analysis, I will lay out the assumptions I will make about relational nouns and nominalized properties.

4. A non-transitive view of relational nouns

Most of the accounts of existential-HAVE reviewed above rest on the view of relational nouns which conceives of them as transitive nouns.[5] Making logical representations like (11) fit into the composition of HAVE-sentences is the thread that unifies this line of research.

(11) $[\![\text{mother}]\!] = \lambda x \lambda y.\mathbf{mother}(x)(y)$

This view of relational nouns is not, however, without problems. One of them is that it groups together classes like body-parts, kinship terms, parts and wholes and deverbal and deadjectival nominalizations (Barker, 1995), which on the one hand are treated in disparate ways in different languages, and on the other tend to behave differently with respect to tests within each individual language (Heine, 1997).

A second (related) problem is that tests that select for the class of relational nouns as a whole are scarce. The most used one is compatibility with *of*-PPs in possessive NPs in English. This test is not free of problems either, as the felicity of (12a) (from LeBruyn et al. 2016), and the existence of contrasts like the one in (12b) shows.[6] (See LeBruyn et al. (2016) and references therein for more issues on the conception of relational nouns as transitive nouns.)

(12) a. The blog of Doctor Watson
b. The hammer of Thor/#my uncle

[5] LeBruyn et al. (2016) treat them as being of type $\langle e,t \rangle$, but they ultimately rely on providing them with another argument to explain their interaction with HAVE.

[6] This particular example may point to a contrast between necessary and contingent relations, which some languages mark overtly (Heine, 1997). The relation between Thor and a hammer can be conceived as a necessary one; having a hammer is one of the features that defines Thor. In contrast, it does not define normal people's normal uncles. The fact that relational nouns normally sound felicitous in the *of*-PP construction could stem from the fact that they express necessary relations, but the class of necessary relations is bigger than the ones expressed by relational nouns. Whether this hypothesis is worth pursuing remains for future research.

Although these arguments against treating relational nouns as having argument structure are not absolutely conclusive, there might be room for an alternative treatment that avoids these problems, simplifies composition, and makes additional correct predictions. I will therefore treat relational nouns as one-place predicates with an associated meaning postulate whereby they entail the existence of another entity they are in a particular relation to:

(13) a. $[\![mother]\!] = \lambda x.\mathbf{mother}(x)$
b. $\forall x \forall w[\mathbf{mother}_w(x) \rightarrow \exists y[\mathbf{motherhood}_w(y)(x)]]$

(14) a. $[\![friend]\!] = \lambda x.\mathbf{friend}(x)$
b. $\forall x \forall w[\mathbf{friend}_w(x) \rightarrow \exists y[\mathbf{friendship}_w(y)(x)]]$

(15) a. $[\![top]\!] = \lambda x.\mathbf{top}(x)$
b. $\forall x \forall w[\mathbf{top}_w(x) \rightarrow \exists y[\mathbf{part\text{-}whole}_w(y)(x)]]$

On this view, relational nouns are relation-entailing predicates of individuals. Let us hypothesize that their use in discourse is governed by the condition in (16):

(16) The introduction of a token discourse referent for a relation-entailing individual x needs to be anchored to a discourse referent corresponding to the other argument in the relation they entail.

To see how this works, let us consider the following example, which illustrates how the relational noun 'girlfriend' can be used in discourse:

(17) After a woman found out via Facebook that a man who'd 'poked' her in real life had a long term girlfriend, she turned to digital manners advice givers Farhad Manjoo and Emily Yoffe of Slate to ask whether she should tell the girlfriend. (COCA)

The entity corresponding to the description 'girlfriend' is first introduced into this piece of discourse by a HAVE-sentence. The condition above is respected: the HAVE-sentence anchors it to the other entity in the relation. Once this is done, an entity satisfying the description has entered the discourse and can be referred to freely, as in the last sentence of (17).[7]

(17) illustrates that the most straightforward way English offers to introduce a relational noun into the discourse is a HAVE-sentence.[8] The relation between HAVE and relational nouns seems to be a symbiotic one. These (individual-denoting) nouns need a predicate to introduce them

[7]This view explains another putative test for relational nouns, viz. incompatibility with predicatively used genitives (Partee, 1997):
(i) a. That computer is John's
b. ??That girlfriend is John's
The infelicity of (ib) can be attributed to a violation of (16). Making the relational noun the sentence topic strongly implies that the individual it describes is already part of the discourse model. This entails that the entity it is in a relation to has also been introduced. The only possibility to interpret (ib) is to look for an alternative relation between this 'girlfriend' and John. Lacking any context, we cannot find one.

[8]Another possibility is the use of a possessive NP (either with *'s* or an *of*-PP), in which case the existence of the relation is presupposed and needs to be accommodated by the hearer.

into the discourse by linking them to an individual, to which they are in the relationship they entail. The job of HAVE, in turn, is precisely to introduce into the discourse relations linked to an individual—and eventually resulting in the addition of an individual describable with the relational noun into the discourse model. HAVE cannot supply a value for the relation, but the meaning postulate associated with the relational noun is there to contribute one.

The treatment of relational nouns presented here is parallel to the one for deverbal nouns in Grimm and McNally (2013), a class of nouns which is usually analyzed as relational (Barker, 1995: 60-62). Grimm and McNally treat them as one-place, relation-entailing nouns. They denote properties of events and are subject to a discourse condition very similar to (16): when they are introduced into the discourse, they need to be anchored to one of the participants they entail (see Grimm and McNally (2013) for details).

The account presented so far explains the relations conveyed by HAVE-sentences with discourse-new relational nouns. Turning to discourse-new sortal nouns, I will argue that they are used to convey non-ambiguous relations as well. Their value does not come from entailments of the noun, but from a combination of the semantics of the object and the subject, and world-knowledge. This is illustrated by the following sentences:

(18) a. My neighbor has many dogs
b. Have you visited John's pet shop? He has many dogs!
c. If you want to buy a dog, go to the dog pound first: they have many dogs

Sentence (18a), uttered in a context where no specific information about the neighbor in question is part of the conversational background, expresses the standard relation that holds between human beings and dogs, the one we could call a 'person-dog relation'. This relation, provided by world knowledge, entails things like having the dog at home, feeding it, walking it, petting it, etc. This contrasts with the relations between dogs and pet-shop owners (18b) and dog-pounds (18c), for which different sets of entailments hold.

The upshot of that is that, when we hear a HAVE sentence with a non-relational noun like *dog* in object position, in a certain context, and after we have identified what kind of entity the subject is, world knowledge gives us a default relation between the two entities; this is how the nature of the relation introduced by HAVE is determined with non-relational nouns.[9]

It follows from the present account (as it does from LeBruyn et al. 2016) that the contrast between (1a) and (2) is an illusory one, and that something much like the definiteness effect should also hold for sortal nouns. That is, the way the full interpretation of (19a) and (19b) is determined differs.

[9]This view thus goes against accounts that rely entirely on free 'pragmatic determination' to settle the actual relation holding between the subject of the sentence and a noun like 'dog'. In contrast, it could in principle be compatible with the most elaborate account of how the meaning of these sentences is determined (LeBruyn et al., 2016), although how to factor in the contribution of the subject in this account is not immediately obvious. It is also compatible with a 'co-composition' account along the lines of Spalek (2014). Further details concerning this aspect of the analysis must be left for future research.

(19) a. John has a/two/many beautiful car(s)
b. John has the/every/both beautiful car(s)

Tham (2006) defends this view. She argues that (19a) is an instance of 'presentational *have*', which requires the NP to be discourse-new; the definiteness effect is given a pragmatic explanation à la Abbott (1993). (19b), in contrast, is a special use where HAVE can take definite NPs, which is only possible when previous context supplies a relation between the two entities (Tham, 2006: 143). LeBruyn et al. (2016) reach a similar conclusion. Tham argues that there are languages (e.g. Mandarin Chinese) with a HAVE-verb that forbids definite objects. In the same vein, Heine (1997) points out that 'there exists a strong correlation between have-constructions and the presence of indefinite possessees, to the effect that, in many languages, have-constructions assume meanings other than possessive ones unless associated with indefinite possessees' (Heine, 1997: 35).

Therefore, there seems to be some evidence for an account that teases apart how we determine the meaning in (19a) and (19b), so that (19b) is grouped with (20) instead.

(20) John has the/every/both child(ren)

This sentence is possible in a context where a child (or some children) are already part of the discourse model. According to (16), this requires that the entity they are in a parent-child relation to has been introduced into the discourse as well. Therefore, the relation between John and the child(ren) in question that (20) refers to has to be determined in some other way. Tham and LeBruyn et al. argue that in at least some of these cases it is up to discourse context to provide a salient interpretation. For instance, (20) could be uttered in a context where a group of paparazzi are following a celebrity family and they are assigned family members as specific targets. Partee (1999) and Sæbø (2009) seem to rely on vague interpretations of 'possessive' relations such as control, part-whole, etc. The issue cannot be settled here—although see Tham (2006) for some examples that do not imply 'control' in any intuitive way.

Equipped with these assumptions about relational and sortal nouns and the way they interact with HAVE, we can now tackle the next piece of the analysis: nominalized properties.

5. Nominalized properties, kinds and tokens

Nominalized properties, also called 'nominalized functions' and 'entity correlates of properties' in the literature, are a sort in the domain of entities corresponding to the reification of the description of a standard $\langle e,t\rangle$ property. They were introduced by Gennaro Chierchia (Chierchia, 1984) as part of his Property Theoretic analysis of nominalization. Chierchia's motivation was to give a compositional account for sentences like (21):

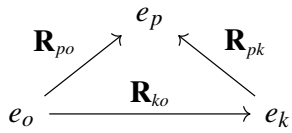
(21) {Being nice/Goodness/That John is here/Red} is nice.

The operators $^{\cup\cap}$ are used to type-shift back and forth from properties as predicates to properties as individuals. Entity correlates of properties (generally adapted to a model-theoretic

framework) have since been used for the analysis of existential sentences (McNally, 1992; McCloskey, 2014), kinds (Chierchia, 1998) and possessives (Koontz-Garboden and Francez, 2010), and have been argued to offer an alternative to semantic incorporation of $\langle e,t\rangle$-type objects (McNally, 2009) with different empirical consequences.

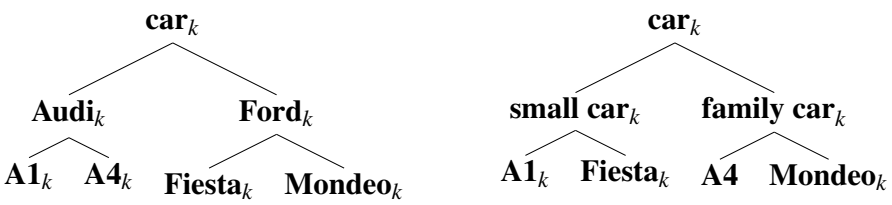
Nominalized properties are similar to kinds (Carlson, 1977); both are higher-order entities in D_e that are reified by token-level (possibly plural), particular individuals. How to tease the two notions apart has not been definitely established in the literature. It is generally agreed that kinds are a subset of nominalized properties; differences that have been suggested are the requirement that kinds have some degree of well-establishedness and a domain structured as a taxonomic hierarchy, whereas this does not necessarily hold for nominalized properties (Krifka, 1995; Chierchia, 1998; McNally, 2009; Müller-Reichau, 2011). In this section I will make a concrete proposal regarding the structure of the domain of entities, the relation between the different sorts inside this domain, and about NP-semantics. Full justification of each step would be beyond the scope of this article; see Bassaganyas-Bars (forthcoming).

I will assume a subdivision within D_e into token-level entities (e_o), kind-level entities (e_k) and nominalized properties (e_p). The latter two form the sub-domain of higher-order entities. Variants of the realization relation **R** (Carlson, 1977) connect higher-order individuals to token-level individuals, but also nominalized properties to kinds.



The relation $\mathbf{R}_{ko}$ is the Carlsonian **R**, the one that holds between an entity x_o and the kind y_k that it is an instance of. Unlike kinds, entities of sort e_p can include information on degree and number.[10] $\mathbf{R}_{po}$ is the relation that holds between e.g. a (complex) individual x_o which is the sum of two object cars, and the (nominalized) property of being two cars (**two cars**$_p$).

Introducing the role of $\mathbf{R}_{pk}$ requires first outlining how the sub-domain of kinds is organized. This sub-domain is structured by a (transitive, asymmetric) taxonomic relation **T** (Krifka et al., 1995): $\mathbf{T}(x,y)$ holds if x is a subkind of y. Turning away from artificially constructed Linnaean taxonomies, what counts as a subkind of what is context-dependent. If we take the kind **car**$_k$, either of these taxonomies –and many others– can be operative depending on context:



$\mathbf{R}_{pk}(x,y)$ holds if x is an individual or a sum consisting of a number n of individuals of sort e_k, which are in the **T** relation with a kind z_k, and y is the property of being n sub-kinds of z_k.

[10] For the present purposes, I will focus on count nouns, so I will consider only information on number.

In the taxonomies above, $\mathbf{A1}_k$ or $\mathbf{Ford}_k$ are in the $\mathbf{R}_{pk}$ relation to $\mathbf{one\ kind\ of\ car}_p$. Likewise, $\mathbf{R}_{pk}(\mathbf{A1}_k \bigoplus \mathbf{A4}_k, \mathbf{two\ kinds\ of\ Audi}_p)$ and $\mathbf{R}_{pk}(\mathbf{small\ car}_k \bigoplus \mathbf{family\ car}_k, \mathbf{two\ kinds\ of\ car}_p)$ also hold.

I will not consider well-established ness as a prerequisite for kind-level denotation.[11] This implies that most instances of noun modification can be treated as kind-level modification. In addition, I will consider, following Müller-Reichau (2011: 51), that a set of sub-kinds (e.g. $\lambda x_k[\mathbf{dog}(x_k)]$) and the corresponding kind-qua-entity ($\mathbf{dog}_k$) are informationally equivalent. A variant of the $^{\cap\cup}$ operators allows us to type-shift between the two kinds of denotation.

This view draws heavily from the NP-semantics posited in Krifka (1995) which he terms 'concept-level', and which I will consider analogous to the view of nominalized properties I am defending. Combining Krifka's insights and the assumptions made so far, I will adopt the following logical representation of the denotation of 'two cars':

(22) $[\![\text{two cars}]\!] = \lambda y_p \forall x[(\mathbf{R}_{ko}\mathbf{T}(x, \mathbf{car}_k) \wedge \mathbf{two}(x)) \leftrightarrow \mathbf{R}_{po/pk}(x, y_p)]$

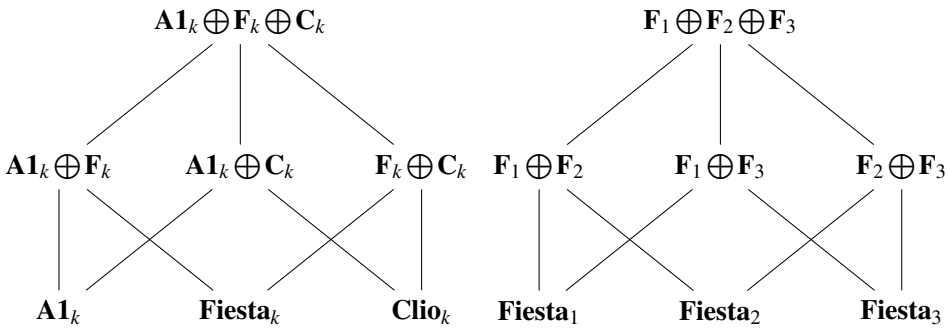
This representation means that, in a classifier-less language like English, 'two cars' denotes the set of higher-order entities y_p such that either (i) any complex entity x which realizes the kind $\mathbf{car}_k$, and is the sum of two atoms, is in the $\mathbf{R}_{po}$ relation to y_p, or (ii) any complex entity x comprised by sub-kinds of the kind $\mathbf{car}_k$ is in the $\mathbf{R}_{pk}$ relation to y_p.[12]

Whether (i) or (ii) is the right interpretation will depend on context. If a conversation is about a new neighbor, 'two cars' in 'she only has two cars' will most likely refer to the property of being two object cars; if it is about where to buy a new car, the same NP in 'this dealer only has two cars' can very plausibly refer to the property of being two sub-kinds of $\mathbf{car}_k$.

[11] Well-established ness might be a prerequisite for some constructions (e.g. kind-denoting definite singular NPs), but not for kind-level denotation in general. That is, 'blue shoe with pink dots' can be as much of a kind as 'mountain shoe'.

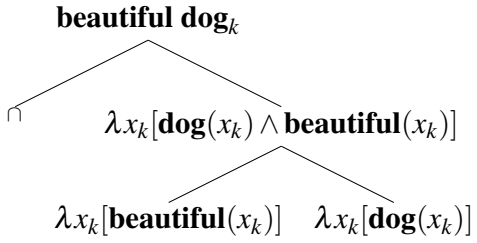
(i) Blue shoes with pink dots are rare/common/trendy this year.

[12] What this amounts to is that 'two cars' in English can denote the set of individuals in the second row of either of these lattices (corresponding to the domain of kinds and the domain of objects):



The atomic individuals in the object domain are the members of the set of objects resulting from applying R_{ko} to one of the individuals in the kind-domain (in that case, $\lambda x.R_{ko}(x, Fiesta_k)$).

How do we get to the logical representation in (22)? I will follow the literature on so-called 'layered' approaches to the semantics of noun phrases in considering that the innermost layer of the NP denotes in the kind-domain. Common nouns denote predicates of kinds, adjectives can be treated as predicates of kinds as well, and composition with modifiers can be treated as predicate modification. As already mentioned, I follow Müller-Reichau's (2011) claim that a set of subkinds and its corresponding kind-qua-entity are informationally equivalent. A variant of Chierchia's $\cap$ type-shifter applies to yield an output of type e_k.



Following Krifka (1995), and deviating somewhat from the usual layered-DP accounts, I suggest that the layer that contributes information on number does not involve turning the kind-level denotation inherited from the innermost layer into the set of objects realizing it. Instead, at this point we create the nominalized property y_p of being a number n of realizations or subkinds of a certain kind z_k. I will call this layer ClassP (Borer, 2005). Its head is a—covert or overt—classifier taking two arguments, a kind-level entity and a cardinality word (with N being a variable over cardinality predicates).[13]

(23) $[\![\text{Class}]\!] = \lambda z_k \lambda N \lambda y_p \forall x[((\mathbf{R}_{ko}\mathbf{T}(x, z_k) \wedge N(x)) \leftrightarrow \mathbf{R}_{po/pk}(x, y_p)]$

After combination with the two arguments, we reach (22), repeated here as (24).

(24) $[\![\text{two cars}]\!] = \lambda y_p \forall x[(\mathbf{R}_{ko}\mathbf{T}(x, \mathbf{car}_k) \wedge \mathbf{two}(x)) \leftrightarrow \mathbf{R}_{po/pk}(x, y_p)]$

(24) denotes a set. At this point, two things can happen: this set can either be the input to a definite or obligatorily quantificational determiner, or we can pragmatically bind the variable corresponding to the nominalized property with the iota-operator, reflecting the fact that the nominalized property introduced into the discourse is presupposed to be unique, thus yielding (25). As we will see in the next subsection, this is of the type HAVE looks for.

(25) $[\![\text{two cars}]\!] = \iota y \forall x[(R_{ko}T(x, \mathbf{car}_k) \wedge \mathbf{two}(x)) \leftrightarrow R_{po/pk}(x, y_p)]$

English has some overt classifiers; one of them is 'kind/sort/type of'. This classifier restricts the interpretation of the NP to the property of being n sub-kinds of a certain kind.

[13] By making the cardinality word obligatory, the fact that overt classifiers in English need some kind of determiner is captured. That is, it rules out bare plurals with classifiers like 'kind', which are ungrammatical.

(i) a. *Kinds of whales are extinct.
b. *John sells kinds of cars.

(26) $[\![\text{kind of}]\!] = \lambda z_k \lambda N \lambda y \forall x[(\mathbf{T}(x, z_k) \wedge \mathbf{N}(x)) \leftrightarrow \mathbf{R}_{pk}(x, y)]$

At this point I have finally introduced the necessary pieces to undertake the compositional analysis of HAVE-sentences.

6. Analysis

This is the logical representation I propose for HAVE, where π is an unspecified relation:

(27) $[\![\text{HAVE}]\!] = \lambda x_p \lambda y \lambda s[\pi(s) \wedge \text{PROTO-WHOLE}(s)(y) \wedge \text{PROTO-PART}(s)(x_p)]$

This denotation assumes the view on argument structure in Dowty (1991). However, the proto-roles used here are the ones proposed in Barker and Dowty (1993) for possessive NPs. Although it is not crucial, this move has two welcome consequences. First, it captures the fact that the relations expressible with a HAVE-sentence overlap with those that can be conveyed by possessive NPs (for which the PROTO-WHOLE and PROTO-PART proto-roles were designed).[14] Second, it naturally filters out odd sentences like (28a)–(28c):

(28) a. #Three windows have a house.
b. #A problem has John.
c. #The tail has a cat.

With all the assumptions in place, let us begin with HAVE-sentences with a discourse-new object-NP containing a relational noun, as in (29). Relational nouns are treated as are one-place predicates with an associated meaning postulate, as (30) illustrates:

(29) John has two smart sisters.

(30) a. $[\![\text{sister}]\!] = \lambda x.\mathbf{sister}(x)$
b. $\forall x \forall w[\mathbf{sister}_w(x) \leftrightarrow \exists y[\mathbf{siblinghood}_w(y)(x)]]$

Applying the NP-semantics outlined in the previous section, we start from 'sister' as a set of (sub-)kinds and combine it with 'smart' (modeled as a predicate of kinds as well) by predicate modification, yielding (31). Following the assumptions above, $^\cap$ steps in, returning (32):

(31) $[\![\text{smart sister}]\!] = \lambda x_k.\mathbf{sister}(x_k) \wedge \mathbf{smart}(x_k)$

(32) $[\![\text{smart sister}]\!] = \mathbf{smart\ sister}_k$

Class, defined in (23) above, takes (32) as an argument, and the result combines with the

[14] Note that 'John has two houses' denotes different relations if we refer to John as a regular guy, a realtor, a kid with divorced parents, etc, and that all of these relations can be expressed by a possessive NP like 'John's two houses'. However, the opposite might not be true, as Heine (1997) points out, because the NP can also mean in context 'the two houses that John likes', but it is not clear whether this relation can be expressed by the HAVE sentence 'John has two houses'. The relevant point is that the same roles hypothesized for nominal possession could be used for HAVE-sentences.

cardinality predicate, eventually yielding (34):

(33) $\lambda z_k \lambda N \lambda y_p \forall x[((\mathbf{R}_{ko}\mathbf{T}(x, z_k) \wedge N(x)) \leftrightarrow \mathbf{R}_{po/pk}(x, y_p)]$ (**smart sister**$_k$) =
$\lambda N \lambda y_p \forall x[((\mathbf{R}_{ko}\mathbf{T}(x, \textbf{smart sister}_k) \wedge N(x)) \leftrightarrow \mathbf{R}_{po/pk}(x, y_p)]$

(34) $\lambda N \lambda y_p \forall x[((\mathbf{R}_{ko}\mathbf{T}(x, \textbf{smart sister}_k) \wedge N(x)) \leftrightarrow \mathbf{R}_{po/pk}(x, y_p)]$ ($\lambda z.$**two**(z)) =
$\lambda y_p \forall x[((\mathbf{R}_{ko}\mathbf{T}(x, \textbf{smart sister}_k) \wedge \textbf{two}(x)) \rightarrow \mathbf{R}_{po/pk}(x, y_p)]$

The contextually triggered iota-operator applies at this point, yielding (35):

(35) $\iota y_p \forall x[((R_{ko}T(x, \textbf{smart sister}_k) \wedge \textbf{two}(x)) \rightarrow R_{po/pk}(x, y_p)]$ =
two smart sister$_p$

This is the input that HAVE can take, giving us (37) after combination with the subject:

(36) $\lambda x_p \lambda y \lambda s[\pi(s) \wedge \text{PROTO-WHOLE}(s)(y) \wedge \text{PROTO PART}(s)(x_p)]$ (**two smart sister**$_p$) =
$\lambda y \lambda s[\pi(s) \wedge \text{PROTO-WHOLE}(s)(y) \wedge \text{PROTO-PART}(s)(\textbf{two smart sister}_p)]$

(37) $\lambda s[\pi(s) \wedge \text{PROTO-WHOLE}(s)(\textbf{john}) \wedge \text{PROTO-PART}(s)(\textbf{two smart sister}_p)]$

After this set of states is existentially closed at some point further in the derivation, (37) introduces an entity of sort e_p into the discourse and an unspecified relation π linking it to John. Following McNally (1992), I suggest that adding a HAVE-sentence into the discourse entails the introduction of a discourse referent satisfying the description. A token-level individual in the $\mathbf{R}_{po}$ relation to **two smart sisters**$_p$ thus enters the discourse model.

This is the point where the value of π is determined. 'Sister' is a relational noun. Condition (16) above established that entities describable by such predicates can only be introduced into the discourse by anchoring them to the other argument in the relation they entail. This is what the HAVE-sentence does. Therefore, as a result of updating the discourse with (37), a relation (π) between John and two token-level individuals satisfying the descriptive content of **two smart sisters**$_p$ is asserted. Then, by virtue of the entailments on the introduction of a relational noun into the discourse, this relation is set to 'siblinghood': π gets its value. We reach the desired interpretation in an indirect way which allows us to account for the fact that the object of HAVE does not behave as a token-level individual, as shown in section 3.

The derivation of a sentence with a discourse-new sortal noun, like (38), is only minimally different. Following the same steps as for (29) above, we reach the representation in (39).

(38) John has three bicycles.

(39) $\lambda s[\pi(s) \wedge \text{PROTO-WHOLE}(s)(\textbf{john}) \wedge \text{PROTO-PART}(s)(\textbf{three bicycles}_p)]$

As a result, the nominalized property **three bicycles**$_p$, and an unspecified relation π between this property and John, are added into the discourse model; by the entailments of the use of

HAVE-sentences, three object bicycles are introduced as well. 'Bicycle' is a sortal noun, so there is no meaning postulate to fall back on to retrieve a value for π. The object is discourse-new, so no context-dependent relations involving bicycles are being discussed. In such cases, world-knowledge is resorted to. Assuming that John is an individual with no particular relation to bicycles (he is not a professional cyclist, bicycle repairer or seller, etc.), the value of π will be set to the 'person-bicycle-relation', the one most of us have with our bikes (entailing exclusive right of use, responsibility for taking care of it, etc.). If John had been a cyclist, π would have been set to 'cyclist-bicycle-relation', with different entailments, and so forth.

So far we have considered the most straightforward cases among the ones discussed in section 3. It will be useful to consider how this analysis treats other cases where HAVE-sentences get a non-contextualized reading. One of them involves sentences like (40).

(40) John has three kinds of brothers.

Note that condition (16) does not apply to kind-level NPs with relational nouns. (41) relies on a discourse context containing individuals of sort e_k corresponding to sub-kinds of brothers. Whether it contains token-level individuals realizing them is immaterial. 'Kinds of brothers' can be introduced without having to anchor them to any other individual.

(41) Some kinds of brothers are harder to put up with than others.

Still, the natural interpretation of (40) is the one where John is one of the arguments of a siblinghood relation. How does this come about? Adding (40) to a context introduces the nominalized property **three kinds of brother**$_p$ and a relation π linking it to John. By entailment, a token-level discourse referent has to be added. The only way to satisfy this is by adding a complex individual whose atoms are (an unspecified number of) realizations of three different sub-kinds of brothers, with at least one token-level individual per sub-kind (e.g. two nice brothers, one bully brother, and two nerdy brothers). This means that token-level entities that satisfy the description 'brother' enter the discourse, and at this point, by virtue of the meaning postulate associated with token-level relational nouns, π is interpreted as 'siblinghood' and John is interpreted as the other member of the relation for each of the token-level entities eventually introduced into the discourse model.

Sentence (42) differs from (40) in the presence of the definite article, which nonetheless does not block a non-contextualized interpretation.

(42) John has the three kinds of brothers.

The interpretation is derived similarly: the definite article implies that previous context contains entities corresponding to three sub-kinds of brother, but not necessarily entities realizing them. The nominalized property **the three kinds of brother**$_p$, which refers to the property of being the specific three kinds of brother being discussed, is made the object of a HAVE-sentence, and this entails the introduction of an unspecified number of object-level entities such that there is at least one for each of the three sub-kinds. Again by virtue of the meaning postulate associated

with relational nouns, the relation between the entities and the subject of the sentence will be 'siblinghood'. What (42) illustrates is that, in its role of introducing relations into the discourse with a non-contextualized interpretation, HAVE cares more about the sort of its object-NP (it needs to be higher-order) than about its being discourse-new.

Let us now consider HAVE-sentences with obligatorily quantificational determiners which nonetheless yield non-contextualized interpretations, such as (43).

(43) John has every kind of brother.

The result of combining the overt classifier 'kind of' to a kind-denoting NP, as defined in section 5, yields the following representation:

(44) $[\![\text{kind of brother}]\!] = \lambda N \lambda y_p \forall x[(\mathbf{T}(x, \mathbf{brother}_k) \wedge N(x)) \rightarrow \mathbf{R}_{pk}(x, y_p)]$

'Every' requires arguments of type $\langle e,t \rangle$, so there will be a type-mismatch. I will assume that, in cases where phrases headed by overt classifiers combine with quantificational determiners, there is a covert cardinality predicate (**At**) predicating atomicity, which saturates the N in the derivation.[15] As a result, we get the desired type:

(45) $[\![\text{kind of brother}]\!] = \lambda y_p \forall x[(\mathbf{T}(x, \mathbf{brother}_k) \wedge \mathbf{At}(x)) \rightarrow \mathbf{R}_{pk}(x, y_p)]$

Since (45) denotes a set of entity correlates of properties, 'every' will quantify over higher-order entities, as illustrated by the simplified representation in (46). Sentences like (43) are thus licensed. The non-contextualized interpretation comes about as in (40) and (42) above.

(46) $\text{Every}\, x_p[\lambda y_p \forall x[(\mathbf{T}(x, \mathbf{brother}_k)) \wedge \mathbf{At}(x)) \rightarrow \mathbf{R}_{pk}(x, y)]]\,(\pi(x_p)(\mathbf{John}))$

Derivation of sentences like (47a)–(47c) rely on the existence of covert kind classifiers. With all the assumptions about the interpretation of HAVE-sentences with kind-denoting NPs discussed in this section, their interpretation should be straightforward.

(47) a. John has the hair of a metal star from the 80's.
b. John has the hair of Joey Tempest/Joey Tempest's hair.
c. John has the hair he always dreamed of.

Space only allows for a brief remark on contextualized readings, cases like (3a), (3b), (19b) or (20) above. It was mentioned in section 3 that only some languages have a version of HAVE that supports these readings. On this analysis, it will be a version of HAVE that preserves its function of introducing relations linked to an entity in the discourse, but in this case the other entity in the relation will be of sort e_o instead of e_p, as in (48).

(48) $[\![\text{HAVE}_{context.}]\!] = \lambda x_o \lambda y \lambda s[\pi(s) \wedge \text{PROTO-WHOLE}(s)(y) \wedge \text{PROTO-PART}(s)(x_o)]$

[15] This covert atomicity predicate has an overt expression in 'every single kind of'. Note as well that there are cases of 'every' taking NPs with overt cardinality predicates (e.g. 'every two days').

The main difference lies in the value π can take: the strategies used above with discourse-new NPs are not available, so previous context, or an all-encompassing notion of 'control', has to be called on. There are languages that distinguish these two uses of HAVE overtly: Spanish, for instance, does it through the presence or absence of Differential Object Marking.[16]

7. Conclusions

The syntactic and semantic peculiarities of HAVE can be explained by analyzing it as a relation between token-level individuals and nominalized properties, and by considering that the way this relation is specified depends on the noun being sortal or relational. I have focused on cases where HAVE embeds NPs. Whether this approach can be extended to other uses of HAVE remains for future research (see Bassaganyas-Bars (forthcoming)).

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[16] In Spanish, Differential Object Marking is forbidden in non-contextualized interpretations (i), but preferable in contextualized ones (ii).

(i) Tengo (*a) tres profesores muy buenos.
I-have (DOM) three teachers very good
'I have three very good teachers.'

(ii) Para la fiesta, ya tengo ?(a) tres profesores.
for the party, already I-have (DOM) three teachers
'I already have three teachers for the party.'

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