

Events and quantification

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The subject of this article is best introduced by the following set of contrasts.

- (1) It is possible that John is seven feet tall.
- (2) # It is possible for John to be seven feet tall.
- (3) It is possible for John to climb over a seven foot fence.
- (4) It is possible for a linguist to be seven feet tall.

Preliminary examination of these and more sentences of this type reveals that the complement of frame

- (5) It is (im)possible for X to Y

may not contain a permanent (*individual level*, in the terminology of Carlson 1977) predicate that is predicated of a specific subject. The embedded clause in a semantically well-formed sentence must contain either a non-specific subject or a predicate describing an event or temporary state (basically a *stage level* predicate). Thus (4) is well-formed because its subject is the indefinite “a linguist”, and (3) because the predicate is the stage-level predicate “climb over a seven foot fence.”¹

Note that sentence (1) is, in a sense, a red herring. Sentences of the form

- (6) It is possible that S

are not subject to the constraints of frame (5); almost any acceptable matrix sentence can appear as the complement S. (See also Iatridou 1990).

The restrictions on (5) are similar to those discussed in Kratzer (1989), where it was argued that the antecedent of certain conditionals must make a variable available for binding, and that this variable may be an indefinite or an event variable.

- (7) # When Mary knows French, she knows it well.
- (8) When Mary speaks French, she speaks it well.
- (9) When a Moroccan knows French, she knows it well.

I follow Kratzer in adopting a tripartite structure associated with quantifiers and certain operators, an analysis of certain classes of indefinites as variables, and an abstract “Davidsonian” event argument of stage level, but not of individual level, predicates. (See Lewis 1975, Heim 1982, Kratzer 1989, Diesing

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1992). Under the tripartite structure analysis, the quantifier is raised at LF. NPs that are interpreted quantificationally also raise out of the portion of the clause that is mapped to the “Nuclear Scope” (roughly, the sentence proper) to form the “Restrictive Clause,” where they serve to restrict the domain over which the variables represented by their traces are interpreted. Thus in the following example from Diesing (1992), (10a) has the interpretation (b).

- (10) a. A contrabassoonist usually plays loudly.
 b. Usually_{*x*} [*x* is a contrabassoonist] *x* plays loudly.

The sentence is true if “*x* plays loudly” is true of sufficiently many values of $x \in \{y \mid y \text{ is a contrabassoonist}\}$ to satisfy the definition of “usually.”

In the absence of a suitable variable, a sentence of this type is vacuously quantified. It is commonly claimed that natural languages forbid vacuous quantification, requiring that every quantifier bind some variable in its scope. I will refer to this as the Vacuous Quantification Prohibition, henceforth VQP. Kratzer offers the following formulation:

- (11) *Prohibition Against Vacuous Quantification:*
 For every quantifier Q, there must be a variable *x* such that Q binds an occurrence of *x* in both its restrictive clause and its nuclear scope. (Kratzer 1989).

Given the framework of tripartite structure, event arguments and some version of the VQP, the pattern of acceptability of sentences (2–4) can be explained by the same account that Kratzer gave for the above conditionals, namely, that the embedded clause must contribute a variable that binds the matrix operator. For example, I will argue later that the following structure should be associated with (12):

- (12) It is common for John to be drunk.
 Common_{*ℓ*} [John, event(*ℓ*)] drunk(John, *ℓ*)

Frame (5) differs from the conditionals studied by Kratzer in its ability of an indefinite object in the embedded predicate to satisfy this requirement. This issue will be taken up in the next section. (Sentence (13) is only good under the reading “*acquire* a foreign language”).

- (13) # It is possible for John to know a foreign language.
 (14) When Mary knows a foreign language, she knows it well.

In this paper I examine a number of contexts, listed in (15), and show that they are subject to similar restrictions in the complements they accept, namely, that the complement must contain a non-specific subject, an event predicate, or in limited cases a predicate with a non-specific object.

- (15) a. It is possible for X to Y.
 b. It is common/unusual for X to Y.
 c. I hate X to Y.
 d. I hate it if X Y.

e. When X Y, Z.

I will show that for both the subject and the predicate, the salient factor is the presence of a variable, rather than, e.g., (in)definiteness of the subject or (non-)stative status of the predicate. This suggests that a variable must be there so it can be bound by a quantifier, leading to an analysis of the above frames as quantificational. “Variable” in this context turns out to mean a non-specific, non-generic indefinite or an event variable. But I will show that events set in the past cannot contribute a variable in this sense, while non-repeatable and precisely specified events can only contribute a variable in some of the above frames.

Accounting for these phenomena will lead to some elaboration of the factors that allow or disallow an event argument from being treated as a variable for purposes of satisfying the VQP. I will show that accounts of the effects of habitualness, modal force, aspect and repeatability can be unified if we add to the VQP the requirement that a variable satisfying the VQP be interpreted over a range that contains more than a single element.

In the next section, I give a survey of the behavior of the frames in (15). In section 2, I examine the roles of NP and event arguments in more detail. Finally, in section 3 I advocate a modification to the VQP in order to capture the phenomena in a more natural way.

1 Some variable-requiring constructions

The heterogeneous class of sentences in (15) share the property of requiring, to a first approximation, a stage-level predicate or an indefinite subject. There are additional restrictions on each subclass of sentences, which I will show to be a consequence of the different modal properties of each environment.²

- (16) a. # It is common/unusual for John to be a citizen of Australia.
b. It is common/unusual for a linguist to be a citizen of Belgium.
c. It is common/unusual for John to visit Australia.
- (17) a. # I hate John to know my native language.
b. I hate a linguist to know my native language.
c. I hate John to speak my native language.
- (18) a. # John hates it if Mary resembles her thesis advisor.
b. John hates it if a linguist resembles her thesis advisor.
c. George hates it if his wife visits Russia.

In each set of sentences, (a) combines a specific NP with an individual-level predicate, and is bad; (b) and (c) show that an indefinite subject or an event variable in the predicate suffices to give a good sentence.

Sentence (19), which contains a syntactically definite subject, is an acceptable sentence if I don’t know the identity of the winner, and (20), which contains a paradigmatic specific subject, is bad. (Compare with (21)). Thus

it is specificity, not syntactic definiteness, that is the crucial distinction.

- (19) It is possible for the winner to be a vegetarian.
- (20) # It is possible for a certain linguist to be intelligent.
- (21) It is possible for a linguist to be intelligent.

On the predicate side, note that stative stage-level predicates are perfectly capable of contributing a variable. Thus it is really the stage/individual level distinction, not stative status or agentivity, that determines the ability to contribute a variable.

- (22) It is possible for John to be unaware of the most obvious things.
- (23) It is possible for John to be happy one minute and sad the next.
- (24) It is common for the captain to be asleep at the helm.
- (25) It is common for Bob to be all bandaged up.
- (26) It is unusual for John not to have nicks and scratches.
- (27) Rover hates Mary to be asleep when he wants to play.

The various frames in (15) differ in the ability of an indefinite object in the embedded predicate to satisfy the quantification requirement. Kratzer (1989) claims that the antecedent of a conditional has its own internal tripartite structure and undergoes existential closure. This implies that indefinite objects should not ordinarily be able to contribute a variable in the antecedent of a conditional; but there is a large class of “badly behaved objects” that are actually able to contribute a variable. In the complement of frames (15), badly behaved objects are much harder to come by, as the following suggest. (Note that the object of (28) is *well*-behaved).

- (28) # When John is a citizen of a foreign country, he is a model citizen.
- (29) When Mary knows a foreign language, she knows it well.
- (30) # It is common for John to be a citizen of a foreign country.
- (31) # It is possible for Mary to know a foreign language.
- (32) # It is possible for Caruzzo to know an aria by heart.
- (33) ?? It is common for Caruzzo to know an aria by heart.
- (34) It is unusual for Caruzzo to know an aria by heart.
- (35) George hates it if John knows a poem by heart.

Sentences (30), (31) are only acceptable under the readings “*acquire* a foreign language”, “*become* a citizen of a foreign country,” i.e., only if they can be interpreted as stage-level predicates. It appears that the frames *when*, *unusual for*, *hate (it if)* can to various extents allow objects to contribute a variable, while in frames *possible for*, *common for* this is harder if at all possible. I do not have an analysis for the behavior of objects, but will note that the frames that are best able to allow an object to contribute a variable are also those that can license negative polarity items.³

Following Diesing (1992), I let definite as well as indefinite NPs appear in the restrictive clause; their presence there does not imply that they can satisfy the VQP. I present below structures that are semantically motivated; a

syntactic analysis is beyond the scope of this paper. The interpretation of *common*, *unusual* is straightforward enough. *Possible for* can be analyzed similarly, but its representation will later be elaborated to account for its modal force.

- (36) It is common for John to be drunk.
 Common_ℓ [John, event(ℓ)] drunk(John, ℓ)

Given the truth conditions of constructions involving the verb *hate*, the following seems like the correct analysis:

- (37) George usually hates Mary to ride in the back seat.
 Usually_ℓ [event(ℓ) & ride-in-the-back-seat(Mary, ℓ)]
 hates(George, ride-in-the-back-seat(Mary, ℓ))
- (38) Usually, George hates a colleague to know Russian.
 Usually_ℓ [colleague(ℓ) & know-russian(ℓ)]
 hates(George, know-russian(ℓ))

It should be clear that the truth of the above only depends on George’s attitude towards events involving Mary riding in the back seat or colleagues who know Russian. This is captured in the above representation. In the absence of an overt quantifier, we can assume the usual \square (“necessarily”) quantifier to be in effect.

2 The role of the operator

Consider next the behavior of predicates set in the past. Here also there are systematic differences in the properties of the frames in (15), which will serve to illuminate the contribution of the matrix operator to the interpretation of the sentence. In particular, certain classes of event predicates can contribute a variable in some, but not all, of the frames in (15).

Infinitival clauses set in the past typically have perfective aspect, and perfective constructions often have a non-reversible reading, e.g. to have tried dog meat, to have been baptized, to have seen “Saturday Night Fever.” Such readings always appear to make a predicate incapable of contributing a variable, as if it is individual level. In fact such predicates pattern with individual level predicates in independently motivated tests, which indicates that they truly are individual level: absolute constructions involving a stage-level predicate can be understood to give the conditions under which the matrix clause is true, as in (39), while those involving an individual-level predicate can only be understood to give the reason, as in (40). (Stump 1985).

- (39) Standing on a chair, John can reach the ceiling.
 (40) Having long arms, John can reach the ceiling.

Nonreversible perfectives as in (41), (42), as well as some “permanent” but strictly speaking reversible states as in (43), can only be interpreted as giving a reason. Past constructions whose reading is temporary are interpreted

like stage-level predicates, as in (44), (45).

- (41) Having studied Hebrew, John can decipher old inscriptions.
- (42) Having been baptized, Mary is popular with the nuns.
- (43) Having never heard of the blue whale, David thinks the elephant is the world's largest mammal.
- (44) Having just run a mile, John is often too winded to talk.
- (45) Having studied, Mary can ace any exam.

Thus a verb can denote a stage or an individual level predicate, depending on its aspect. (Compare also “John is rude,” which is individual level, with “John is being rude”). For the most part, the distinction is enough to explain the acceptability of perfective complements to frames (15). Here to have been studying French is stage-level, to have studied French and to have visited Australia are individual-level.

- (46) a. When Mary has been studying French, she kisses visitors on both cheeks.
b. # When Mary has studied French, she kisses visitors on both cheeks.
- (47) a. George hates it if Mary has been studying French.
b. # George hates it if Mary has studied French.
- (48) a. ? It is common/unusual for Mary to have been studying French.
b. # It is common/unusual for Mary to have studied French.
- (49) a. # It is common/unusual for John to have visited Australia.
b. It is common/unusual for a senator to have visited Acapulco.
- (50) a. # It is possible for John to have visited Australia.
b. It is possible for a linguist to have visited Australia.
- (51) a. # George hates it if his wife has visited Russia.
b. George hates it if a colleague has visited Russia.

In the complement of “possible for,” even stage-level predicates are often unacceptable:

- (52) # It is possible for Mary to have been studying French.
- (53) # It is possible for John to have eaten.
- (54) It is possible for John to have eaten by the time Mary arrives.

The acceptability of these appears to correlate with the ability of the frame to provide a nonspecific reading for the time with respect to which the predicate has (just) occurred. The complement of frame “it is possible for” is normally interpreted relative to the time of utterance. and so cannot accept an event set in the past unless the context explicitly provides a temporally unspecified event interpretation, as in (54). “Common” and “unusual” can also carry this presumption, hence the marginal status of (48a).

All frames under consideration share the requirement that an event must be somehow “vague” in order to satisfy the VQP. Several constructions are unacceptable for all frames in our sample except *possible for*. In particular,

explicitly time-specified or “punctual” (as Pesetsky 1991 calls them) events set in the future, and even unspecified events that cannot be repeated fall in this category. The examples in (55) show that a time specification is acceptable only in the complement of “possible for” (sentences a–c), or when an indefinite subject is present, as in (d).

- (55) a. It is possible for Dr. Jekyll to be drunk tonight.
 b. # It is common/unusual for Dr. Jekyll to be drunk tonight.
 c. # George hates Mary to be drunk tonight.
 d. It is common for an office worker to be drunk tonight.
 e. It is possible/common/unusual for Dr. Jekyll to be drunk.

It is not the time specification itself that is the problem, but the punctuality of the event.

- (56) a. # It is common for the Blazers to lose the game today.
 b. It is common/unusual for the Blazers to go on the defensive today.
 (57) a. # I hate John to come to the party tonight.
 b. I hated John to smoke this week.

Similarly, events of creation or destruction, which can only occur once, can contribute a variable in the complement of “possible for”, but not of any of the other operators.

- (58) a. It is possible for this acorn to grow to be a tall oak tree.
 b. # It is common/unusual for this acorn to grow to be a tall oak tree.
 c. # I hate it if this acorn will grow to be a tall oak tree.
 (59) a. It is possible for John to destroy this book.
 b. # When Mary burns this book, she douses it with lighter fluid.
 c. # It is common for John to destroy this book.

There is an extra twist concerning events explicitly set in the present: Since drunkenness is a state we don’t have instantaneous control over, sentence (60) is also bad, in contrast to (61).

- (60) # It is possible for Dr. Jekyll to be drunk right now.
 (61) It is possible for Dr. Jekyll to be accommodating right now.

The common thread in these examples is whether the event in question is *fully specified*, in the sense of either being an event that can occur only once or of being described “punctually,” i.e., with a degree of precision that can describe only one event. An event that is fully specified does not contribute a variable that can satisfy the VQP. But why would fully specified future events behave differently with different operators? And why can “possible for” receive a variable from a fully specified future event, but not from a past event? One can begin with the observation that “common”, “unusual” are *habitual*, and the above sentences are ruled out because they only concern a single candidate event. But what has the name “habitual” really told us? In the present context, it appears to mean that the variable that is be-

ing quantified over must have non-trivial range, i.e., several things must be under consideration.

Similarly, sentences (56a,b)) are said to have an aspectual difference that makes one event fully specified and the other not, and again only the non-fully specified event can function as a variable. A closer look at the interpretation of modal operators reveals that we can account for the entire pattern of acceptability of punctual events by appeal to this principle.

In a possible-worlds account of modality such as that adopted by Kratzer (1991), modal operators quantify over suitable collections of accessible possible worlds. A proposition is *possible* in world w_0 if it is true in some world in the collection accessible from w_0 . Consider again frames (5), (6).

(5) It is possible for X to Y.

(6) It is possible that X Y.

That these frames mean different things was shown in Iatridou (1990). In (6), the modal is *epistemic*. The sentence is true if and only if there is some world, compatible with all the speaker knows, where the embedded clause is true. Since we can imagine a speaker being unaware of almost anything, there seem to be no restrictions on the content of this frame. This interpretation is built in, so to speak: frame (6) cannot be used to express judgments with respect to any state of knowledge other than the speaker's own state of knowledge at the time of utterance. Hence a matrix tense marker would be redundant and is in fact disallowed, as Iatridou has noted.

On the other hand, (5) must bind a variable in its complement, that is, it must express modality *de re* where (6) expresses modality *de dicto*. In effect, it has *root* modality, quantifying over the set of possible worlds that are compatible with what we might call the “persistent properties” of the reference world.⁴ Since abilities can change with time, this frame may include a time specification in the matrix: “It was possible for ...”, “it will be possible for ...”, etc. Since most of the examples so far have been about animate subjects, it is reasonable to inquire as to what their persistent properties might be. It is an empirical fact that properties that are voluntary are not persistent. Suppose that John is a naturally gifted swimmer, but he is so lazy that he would never undertake a long swim. Then the first, and only the first, of the following may be true:

(62) It is possible for John to swim across the English channel.

(63) It is possible that John will swim across the English channel.

Suppose, on the other hand, that although John is a gifted swimmer, he has become deathly afraid of water, and cannot bring himself to enter it under any circumstances. In that case both of the above sentences become false.

Returning now to the data of (46–61), recall that under Diesing's account, strong NPs and presuppositionally quantified indefinites (i.e., all specific NPs) are mapped to the restrictive clause, but do not contribute a variable for the purposes of satisfying the VQP. I propose that the same ef-

fect obtains when an event variable is fully specified (in the sense defined earlier) with respect to the operator that binds it. We could go so far as to identify fully specified events as specific, i.e. referential, in the same sense that definite determiners can give an NP referential force and prevent it from functioning as a variable.

Of the frames in (15), “possible for” alone is modal; the quantifiers “common” and “unusual”, as well as “when-” conditionals and the factive “hate”, quantify over time or objects in the actual world. When the operator is one of the latter and the time of an event is fixed, the event becomes uniquely specified, and the event variable assumes status equivalent to that of a specific, rather than an indefinite, NP. Since on the other hand there are many future states of affairs compatible with the present time, even a precise event can still be instantiated in any number of possible worlds, and even fail to occur in others. Thus the operator “possible” alone can bind a nonrepeatable or a precise event non-trivially; but events set in the past (or sometimes the present, see (60)) are cast in stone: they have occurred in every root-modally compatible world. Such events cannot supply a variable to frame (5).⁵

Thus (58a) is acceptable, since there are many possible fates for the acorn in question. But events in the complement of “common”, “unusual” “when” and “hate” range over time in the actual world only. Since an acorn can grow into a tree only once, the event variable in (58b,c) is fully specified and hence cannot satisfy the VQP.

3 A closer look at the VQP

It may seem problematic to leave to the quantifier the determination of what is a variable. After all, indefinites are assumed to be inherently variable-like, and definites are not. Now I am proposing to treat an event argument, with a given set of specifications, as a variable in one context and a nonvariable in another.

I see two main approaches to the situation. The most conservative is to utilize the notion that a variable can only be bound by one quantifier. We have seen that in addition to the modal properties of the operator, a number of factors such as definiteness, presuppositionality, location in time, and aspectual properties can each allow or fail to allow an argument to satisfy the VQP for the matrix operator. Noting that these factors can in some sense be interpreted as quantificational, we can assert that if an argument variable cannot satisfy the VQP, it must be bound by some other operator. Event variables must be complex things that can be bound for aspect, time, and even modality separately. The result is not unlike claiming that definite NPs are nonvariable because they are inherently quantified.

Then to explain why punctual events are acceptable solely with the modal operator “possible for,” we can assume that an event “variable” contains,

among other things, a possible-world variable; but that non-modal operators are insensitive to (unable to bind) the possible-world part of event variables, which presumably ends up being bound by some sort of “modal closure” operator.

But there are reasons to prefer a different approach: First, the above account ignores the unifying characteristic of the phenomena it purports to explain, namely, that event variables can satisfy the VQP exactly when they are fully specified, i.e., when their interpretation ranges over a set of cardinality one. Second, not only can an event’s status as a variable apparently be conditioned by the very modal operator that is expected to bind it: it strikes me that definiteness, presuppositionality, aspect, time location and modality comprise a quite disparate collection of factors that are all claimed to somehow affect the status of an argument as a variable. Moreover, their effects seem to be cancellable: sentence (19) contains a syntactically definite subject that functions as a perfectly good variable.

(19) It is possible for the winner to be a vegetarian.

Although it can be claimed that the determiner here is a special type of definite determiner, this only adds to the diversity of mechanisms claimed to affect the status of an argument as variable or nonvariable.

Rather than try to satisfy the VQP as it stands, we can instead modify our notion of it. Suppose we simply add to Kratzer’s formulation the requirement that the variable in question be interpreted over a non-trivial range; we can then account for the data as well as capture the connection between being a variable and not being fully specified, which was an accidental side effect of the proliferation of binding elements proposed by the previous method. The result is the following stronger statement of the VQP, which I will dub the “Trivial Quantification Prohibition” (TQP):

(64) For every quantifier Q , there must be a variable x such that Q binds an occurrence of x in both its restrictive clause and its nuclear scope, and the range over which x is interpreted is not *explicitly* given to have a cardinality of one.

(The restriction “explicitly” is given to allow sentences containing indefinites about entities of which there just happens to be only one). In the simplest cases, this formulation explains why non-specific indefinites, but not definites, can function as variables, thus recovering the VQP. In the case of punctual and unique events, it tells us that an event argument that has only one possible interpretation within the range of the quantifier does not satisfy the requirement for a variable.

Under this account the interpretation of variables is affected by two kinds of entities: quantifiers, which introduce tripartite structure, and modifiers such as “contrabassoonist” or “today” that do not. A variable can only appear within the scope of the quantifier that binds it. Modifiers are essentially predicated of their argument, rather than bind it; when they appear in the

Restrictive Clause of a quantifier, they constrain (by placing additional conditions) the range over which their argument is interpreted. If an argument's range is explicitly constrained to be of unit cardinality, quantification over it is trivial and it ceases to be capable of satisfying the TQP.

Thus I have presented two approaches to explaining the ability of event variables to satisfy the VQP. The first involves stipulating hidden binding elements wherever a class of arguments is incapable of satisfying the VQP. This treats the connection between non-uniqueness of interpretation and ability to satisfy the VQP as an accident. The second is to add to the VQP the requirement that the range over which a variable is interpreted must be non-trivial. This predicts that any variable that is uniquely interpreted as a result of a type of modifier not considered here should fail to satisfy the TQP.

In the remainder of this section I will present some examples that present problems for the binding approach and provide support for the proposed alternative.

In a standard analysis of quantification, NPs are inherently typed as variables or non-variables. A quantifier must bind an object of variable type, which is limited to appearing in the quantifier's scope; the quantifier-variable complex is of nonvariable type. Recalling that nonrepeatable event arguments cannot satisfy the VQP, we might treat them as being inherently non-variable (like proper names), or as being bound by an aspectual operator. It is also plausible to treat time specification as a "quantifier" in this sense, i.e., as something that binds an event variable to give a non-variable complex. This would explain why punctual events also fail to satisfy the VQP, and is supported by the fact that individual-level predicates, which do not have an event argument, cannot receive a time specification.

(65) # John will be tall tomorrow.

The problem is this: in the complement of a frame like "it is common for," the presence of *either* a nonrepeatable or a punctual event is sufficient to render it incapable of satisfying the VQP (see again (58b), (55b)). This must mean that the time specification and the aspectual operator can each "completely" bind the event variable. However, nonrepeatable events are readily bound by time specifiers.

(66) This acorn will grow to be a sperm whale tomorrow.

Somehow in a sentence like (66), aspect and time specification share a single event variable. We are forced to say that they must somehow combine to yield a single quantifier that binds the only variable around. This manages to account for the example, but is obviously stipulative and ad hoc.

If what matters is the cardinality of the variable's range, as I propose, we can give a much simpler account. Time adverbials as well as aspect modify event arguments rather than quantify over them, and appear in another operator's restrictive clause (and scope) rather than introduce their own. Either modifier can modify any kind of event, repeatable or not, punctual or not.

Moreover, a time-specified event may or may not be punctual, depending on the context. (cf. (56a), (56b)).

Another problem for the standard variable–quantifier approach involves modality. If the acceptability of time-specified complements to *possible for* is the result of its modal force, we might expect the other environments to improve if they are modalized. Indeed, Carstairs (1973) and later Pesetsky (1991) noted that the requirement for a variable appears to vanish when a construction with *hate* is modalized:⁶

- (67) a. # Mary hates John to be over six feet tall.
- b. Mary would hate John to be over six feet tall.
- (68) a. # George hates Mary to know Russian.
- b. George must hate Mary to know Russian.

This is entirely consistent with the view of modal force as quantification. Modal “would” is much less restrictive than epistemic or root modality; it considers worlds that can differ from the reference world at least with respect to the explicitly mentioned proposition. Since the truth of even individual-level predicates is allowed to vary in this context, the above sentences are acceptable.

We must ask, however, what the structure of a sentence like (67b) can be. The simplest interpretation, “there are possible worlds in which Mary hates John to be over six feet tall,” presents a problem: In any given possible world, (67a) does not express a well-formed proposition. How can embedding it in a modal context allow the VQP to be satisfied?

We might attempt to interpret (67b) as stating that Mary hates the prospect, in any possible world, of John’s being over six feet tall (that is, that “hate” has wide scope over the modal). But this cannot be right: (69), said of some chair in my office, does not say that Jerome Kersey hates the thought of sitting in it; it can be a perfectly true sentence even if he doesn’t even know the chair exists!

- (69) Jerome Kersey would hate to have to sit in this tiny chair.

Thus we must seek an account that gives the modal operator wide scope over the *hate* clause, yet allows it to participate in satisfying the requirement for a variable in the complement of “hate”. The way out is to note that in the modal context provided by “would,” the property of being over six feet tall is no longer invariably fixed, but can change between possible worlds. In support of this, note that even in the scope of “would,” it is possible to force a predicate to be invariably interpreted. In (70), free variation of the proposition conflicts with its being fixed by the appositive clause. Sentence (72), containing a similar but semantically opaque appositive, is better.

- (70) # I would hate [John to be intelligent]_i, which_i is a fact.
- (71) # I would hate [John to be intelligent]_i, which_i is not the case.
- (72) I would hate [John to be intelligent]_i, which_i Mary claims is a fact.
- (73) I would hate [John to be intelligent]_i, which_i may be the case.

Thus in sentence (67b), the complement of “would” must be indexed with the possible world with respect to which it is interpreted, which is assigned a non-unique interpretation by the enclosing modal; in (67a), either there is no such argument or some default rule (presumably, modal closure) assigns the single interpretation “in the actual world.”

The last examples serve to rule out an analysis claiming that “would hate” is a compound operator that does not require a variable: a variable is in fact required. They also suggest why the modal force of “possible for” is not sufficient to make a complement like “John to be intelligent” acceptable: since individual level predicates denote permanent properties, they cannot vary in the scope of a root-modal operator. Still, it is evident that my account of the interplay of possible worlds with predicates that lack an event argument is very vague and in need of further elaboration.

4 Conclusions

I have identified a class of environments that, like the conditionals studied by Kratzer (1989), require a variable in their scope. Complements to the present frames tend to have “well-behaved” objects, in Kratzer’s terms, more often than the antecedents to conditionals. (That is, objects are less likely to be bindable by the matrix quantifiers). I noted that frames that can have badly behaved objects are downward-entailing environments, and can license negative polarity items. I do not provide an explanation for this phenomenon.

The same frames behave differentially with respect to punctual and non-repeatable event arguments. I attribute this to the modal properties of each frame, and sketch a variant of the Prohibition Against Vacuous Quantification that explicitly forbids trivial quantification. This variant requirement has the advantage of unifying the description of a number of the factors that affect the ability of a nominal or event variable to satisfy the quantification requirement of the quantifier that binds it.

I will conclude with some speculative comments on the quantifier–variable paradigm, motivated by the Trivial Quantification Prohibition. Recall that definite NPs are said to be inherently quantified, and in a way that assigns them a single possible interpretation; if we agreed to call them “variables”, this uniqueness of interpretation would automatically rule them out as candidates for satisfying the TQP. Suppose then that every argument is potentially a variable, and its ultimate status depends on the interpretation, i.e. the range, that is associated with it. Arguments that can range over more than one value behave as “variables”, those that cannot are constants (specific, definite, referential, fully specified, whatever). We can now formulate the TQP without reference to the notion of variables, only of arguments:

- (74) For every quantifier Q , there must be an *argument denotation* x such that Q binds an occurrence of x in both its restrictive clause and its

nuclear scope, and the domain of x is not *explicitly* given to have a cardinality of one.

When presented this way, the TQP is not a stipulated addition to the VQP but rather its restatement given the proposed view of what makes a “variable”. In fact, (74) replaces both the VQP *and* the a priori typology of variables and non-variables. The exact same effect could have been achieved by defining a variable as “an argument denotation that is not explicitly given to have a range whose cardinality is one” and retaining the VQP in its original form, (11).

Formal logic draws a fundamental distinction between constants and variables. But the formal structure of natural language differs from formal logic in a number of ways, including the presence of the VQP (or as I argue the TQP). If we treat definite determiners as quantifiers with a uniqueness predicate, natural language does not appear to have any true constants except perhaps for proper names. (Note also that event arguments appear to be always variables, never constants).

If the phenomena studied in this paper are really a result of the nature of the notion “variable” rather than a quirk of my subject matter, we expect that in all variable-requiring environments, variables with trivial range will behave like non-variables. That is, there can be no cases where the plain VQP (with the ordinary notion of variable), rather than the TQP, is in effect. Thus although I cannot provide evidence for or against the revised view of variables that I outlined, such evidence may be found as more variable-requiring environments are identified.

Endnotes

1. In these examples and all others, the predicate “be seven feet tall” is to be interpreted as a permanent property, not, e.g., as something one can achieve by wearing high heels. Also, I only consider sentences where the NP that follows the complementizer “for” is (semantically at least) the subject of the embedded predicate. In the sentences

- (i) It is convenient for the rich for the poor to do all the work.
- (ii) It is good for the children PRO to take them along on road trips.

the PP “for the rich” and “for the children” are not of interest in the present context.

2. Verbs of the *hate* class were first studied by Carstairs (1973), who noted that they tend to accept stage-level, but not individual-level, infinitival complements, and that the behavior of *hate + Infinitive* and *hate it if . . .* is very similar, and different from *hate it when . . .* (Carstairs, whose paper predates the terms “stage-” and “individual-level”, used the names “iterative” and “non-iterative” to describe essentially the same thing). Pesetsky (1991) studies *hate* verbs in detail and notes many of the characteristics that I iden-

tify here.

3. It should be noted that these facts present a problem for Diesing's analysis of the readings of indefinites. Diesing attributes the wide ("quantificational") reading of the indefinite in (i) to its movement to the restrictive clause. (See Diesing 1992, pp. 105-107; under this reading the story exists independently, and "write up" does not function as a verb of creation).

- (i) Mary always writes up a witty story about Millard Fillmore.
- (ii) It is possible for Mary to write up a witty story about Millard Fillmore.
- (iii) It is possible for a novice to know a witty story about Millard Fillmore.
- (iv) # It is possible for Mary to know a witty story about Millard Fillmore.

But the same readings are available for the indefinites in (ii) and (iii); if they are licensed by movement to the same Restrictive Clause that subjects and event arguments go, they should be able to satisfy the VQP. But in fact (iv) is ungrammatical, suggesting that another interpretation for the readings of indefinite objects must be provided.

4. Despite the shortcomings of *essentialism*, the attempt to separate the "essential" from the incidental properties of objects, as a philosophical approach, this seems to be the meaning natural language assigns to the operator "possible for." See Gamut (1991), p. 47.

5. As Iatridou (pc) points out, if I am discussing a friend that is in the middle of running a marathon, but of whose progress I have not had news since the start of the race, I would be able to say:

- (i) It is possible for John to have reached the finish line already.

Thus the modal base (reference world) might actually not include all events up to the present time. For simplicity I will continue to make references to events set "in the past."

6. Pesetsky (1991) also claims (p. 149) that such constructions are illegal when the matrix verb is punctual. But I believe the ungrammaticality of examples like his (122)a,

- (i) * Bill hated Mary to ride in the back seat yesterday.

is the result of punctual readings of the *lower* clause (which he shows elsewhere to be bad). The following paradigm shows that a punctual matrix is allowable.

- (ii) Artists generally hate/hated the government to interfere in the arts.
- (iii) You know, right now I hate the government to interfere in the arts.
- (iv) # Artists generally hated Jesse Helms to interfere in the arts last year.

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