Good Intensions:
Paving Two Roads to a Theory of the *De re*/*De dicto* Distinction

by

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Submitted to the Department of Linguistics and Philosophy
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

September 2008

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Abstract

The main goal of this dissertation is to determine the best theory of *de re*/*de dicto* intensionality. Recently, it has become apparent that the traditional scope theory of this phenomenon is inadequate, the most marked evidence for this being the scope paradoxes discussed in Fodor (1970), Bäuerle (1983), and Percus (2000). This work therefore discusses two theories designed to replace the traditional theory.

The first such replacement is the *situation pronoun* theory, which posits covert pronouns in the syntax of natural language representing pairs of worlds and times. This theory overgenerates, though, in several areas where the scope theory does not. These are discussed in terms of several generalizations captured by the latter but not the former. First, extending work by Musan (1997), the Intersective Predicate Generalization (IPG) states that two nodes combined via Predicate Modification must be evaluated at the same world and time. To capture this generalization in the situation pronoun theory, a rule of Situation Economy is proposed, which favors natural language structures having fewer situation pronouns. However, three more generalizations are next discussed, based on and extending work by Percus (2000): Generalizations X, Y, and Z rule out *de re* readings for VPs, adverbs, and the head nouns of weak NPs, respectively. Proposals to capture these generalizations by Shimada (2007) and Schueler (2007) are discussed.

The last chapter of the dissertation raises several new ways in which the situation pronoun theory predicts unattested readings of intensional sentences. These cases, involving island constraints, polarity items, and subconstituents of DPs, are all captured under the scope theory. Therefore, a second replacement for the scope theory is proposed, which represents a more modest departure. The *split intensionality* system separates each intensional operator's quantificational force from its intensional force, by use of a new operator, ^ after Montague (1970). Although further work is required, this new system preliminarily seems able to solve the problems with the traditional theory without overgenerating as the situation pronoun theory does.

Thesis Supervisor: Irene Heim
Title: Professor of Linguistics

Acknowledgments

It has been argued that many people have made this dissertation possible. In this section, I will present some empirical data to substantiate this claim.

I will first examine data involving my committee. Irene Heim, the chair of my committee, was the first person to truly inspire my interest in truth-conditional semantics. In the process of writing the dissertation, she was always able to poke holes in my theories; but more importantly, she helped me patch them up. Furthermore, she was consistently encouraging and helped me keep what she called an "internal document" in perspective. It seemed like Danny Fox was present at every major breakthrough in my analysis. He has an uncanny knack for recognizing which parts of an idea are exciting and which are trite; and separating the wheat from the chaff is half of the work. Although our meetings were limited, each one was incredibly productive and each led to a breakthrough. Kai von Fintel pushed me to make my dissertation more of a teaching tool, and in that way assisted in my transition from student to teacher. Also, no one is better at the scholarship side of the semantics, and Kai tracked down my hardest-to-find papers. Sabine Iatridou administered her own brand of tough love, and she and I had a lively series of meetings. She helped me broaden the appeal of the work beyond merely semanticists and gave me endless ideas for data. Last, but not least, Alan Bale was the member of my committee whom I could email four times a day and with whom I could discuss every detail of my work. He was amazingly generous, lending his time, thought, energy, and even his home when I visited Montreal. Alan's influence spans this dissertation, and I have no idea how I would have completed it without his insights and encouragement. Thus, my committee helped make this dissertation possible.

But does a committee constitute *many people*? I will next broaden the number of people involved by showing how others besides committee members have helped me. First, the participants in SNEWS 2007, especially Yael Sharvit and Jon Gajewski made many useful comments and suggestions. Similarly, participants in WCCFL 27 (especially Jon Nissenbaum) and SALT 18 were helpful in molding my ideas. I

also had many productive discussions with other professors and fellow students – in particular, David Pesetsky, Gennaro Chierchia, Junri Shimada, Yasutada Sudo, Giorgio Magri, Lobke Aelbrecht, and Jacopo Romoli. Many colleagues, friends, and family helped with judgments: a few notable such consultants include Jessica Coon, Suzanne Ströer, Darrick Yee, and Kenny Walden. Hence, more people than just my committee contributed to this work.

Last, even beyond the linguistic contributions catalogued above, I would like to highlight the non-linguistic contributions to the dissertation by my parents, who made everything else going on during my dissertation summer a little easier, and by my girlfriend Kay Leopold. Kay was helpful in very tangible ways by organizing my entire thesis-writing schedule, providing innumerable judgments, and proofreading the whole thesis. But her assistance extended to less tangible areas, as well, such providing encouragement and moral support at all stages of this project and providing tactical support such as making many meals, helping me move, and keeping me on task. Kay is the primary reason I did not lose my sanity during this project, and I cannot thank her enough for that.

So, in summary, I have indeed shown that many people assisted in the creation of this dissertation. In future work, I hope to repay them in whatever way they require.

Contents

Chapter 0

Roadmap

The dissertation begins, in Chapter 1, by introducing the classic system of intensionality whereby a parameter on the semantic interpretation function determines the world and time at which every expression is evaluated. This parameter is assumed to be a world-time pair, which, for current purposes, is referred to as a situation. Such a system must account for *de re* readings of DPs via structures where these DPs raise to take a high scopal position. For instance, the sentences in (1) are interpreted as in (2):

(1) a. Someone in this room was outside (an hour ago).
b. Mary thinks someone in this room is outside.

(2) a. $[\![$ **[someone in this room]**$_x$ [PAST x **was outside**] $]\!]^{\langle w,i\rangle} = 1$ iff there exists a person x in this room in w at i such that there exists a time $i' \prec i$ such that x is outside at i' in w.
b. $[\![$ **[someone in this room]**$_x$ [**Mary thinks** x **is outside**] $]\!]\langle w, i\rangle = 1$ iff there exists a person x in this room in w at i such that in all worlds w' which I consider possible candidates for the real world in w at i, x is outside in w' at i.

However, this scope theory runs into problems, since it predicts that every time a DP receives a *de re* reading relative to an intensional operator ω, the quantificational

force of the DP will outscope the quantificational force of ω. For instance, the theory predicts the wrong quantificational force for a *de re* DP inside an if-clause, as shown in (3) and (4):

(3) If everyone in this room were outside, it would be empty.

(4) Predicted *de re* structure:
[everyone in this room]$_x$ [if x were outside, it would be empty]

a. Predicted *de re* reading: $[\![\textbf{(3)}]\!]^{\langle w,i\rangle} = 1$ iff Everyone x in this room in w is such that $\forall w'$ accessible from w where x is outside in w', this room is empty in w'.

b. Actual *de re* reading: $[\![\textbf{(3)}]\!]^{\langle w,i\rangle} = 1$ iff $\forall w$ where everyone in this room in @ is outside in w, this room is empty in w.

After examining several paradoxes such as this, Chapter 1 closes by advancing the situation pronoun theory, where silent pronouns, bound by λ operators higher in the structure, denote the situations at which world- and time-sensitive items are evaluated. For instance, the correct reading in (4-b) can receive the following structure in this new theory:

(5) $s\text{-}\lambda_1 \left[\begin{array}{l} [\text{would [if } s\text{-}\lambda_2[\text{everyone in this room } s_1] \text{ were outside } s_2]] \\ \quad [s\text{-}\lambda_3 \text{ it be empty } s_3] \end{array} \right]$

Here, *everyone in this room* is *de re* simply because its complement s_1 is bound by the highest λ in the structure, avoiding the problem raised for the scope theory, since the DP does not move at all.

The outlook is not entirely positive for the situation pronoun theory, though, and Chapter 2 shows one area where such a theory overgenerates, based on observations by Musan (1997). The new theory predicts readings where one item in a predicate modification structure is evaluated *de re* and the other item *de dicto*, but in fact such readings do not exist. For instance, the sentences in (6) could have the structures in (7) in a situation pronoun account:

(6) a. #Every professor in kindergarten liked finger-painting (in 1964).

b. #Mary thinks every married bachelor is confused.

(7) a. $s\text{-}\lambda_1 \left[\textsc{Past} \left[s\text{-}\lambda_2 \left[\begin{array}{c} [\text{every } [\text{professor } s_1] \ [\text{in kindergarten } s_2]]_x \\ [x \text{ liked finger-painting } s_2] \end{array} \right] \right] \right]$

b. $s\text{-}\lambda_1 \left[\text{Mary thinks} \left[s\text{-}\lambda_2 \left[\begin{array}{c} [\text{every } [\text{married } s_2] \ [\text{bachelor } s_1]]_x \\ [x \text{ is confused}] \end{array} \right] \right] \right]$

Based on this data, involving nouns and intersective modifiers, as well as data from the Existential There Construction and depictive secondary predicates, a new generalization is proposed:

(8) **Intersective Predicate Generalization**:
Two predicates composed via Predicate Modification may not be evaluated at different times or worlds from one another.

Chapter 3 proposes to save the situation pronoun theory by means of a constraint explaining the Intersective Predicate Generalization:

(9) **Situation Economy**: Rule out a structure α if there is a grammatical alternative to α that has fewer situation pronouns.

Under the definitions proposed, the structures in (7) have the following alternatives, with fewer situation pronouns:

(10) a. $s\text{-}\lambda_1 \left[\textsc{Past} \left[s\text{-}\lambda_2 \left[\begin{array}{c} [\text{every } [[\text{professor in kindergarten}] \ s_{1/2}]]_x \\ [x \text{ liked finger-painting } s_2] \end{array} \right] \right] \right]$

b. $s\text{-}\lambda_1 \left[\text{Mary thinks} \left[s\text{-}\lambda_2 \left[\begin{array}{c} [\text{every } [[\text{married bachelor}] \ s_{1/2}]]_x \\ [x \text{ is confused}] \end{array} \right] \right] \right]$

Therefore, under Situation Economy, the structures in (7) are ruled out in favor of those in (10). The situation pronouns remaining in the structures in (10) are not

ruled out, though, since there are no alternatives without these pronouns, due to type considerations. This fact is what allows DPs such as *every bachelor* to receive *de re* interpretations. Near the end, Chapter 3 also shows how the Situation Economy rule makes a correct prediction about bare plurals: if a bare plural can receive a kind reading, it must, because the kind reading involves fewer situation pronouns than the alternative quantificational reading.

Despite this proposal, though, the problems are not over for the situation pronoun theory. Chapter 4 presents three additional generalizations, based on work by Percus (2000), highlighting more cases where the situation pronoun overgenerates. The most significant of these, Generalization X, captures the fact that the sentences in (1), repeated in (11), do not have the readings in (12), despite the fact that the situation pronoun theory predicts these readings under the structures in (13):

(11) a. Someone in this room was outside (an hour ago).
b. Mary thinks someone in this room is outside.

(12) a. Someone who was in this room (an hour ago) is (now) outside.
b. Someone whom Mary thinks is in this room is outside.

(13) a. s-λ_1 [PAST [s-λ_2 [[Someone in this room s_2] is outside s_1]]]

b. s-λ_1 [Mary [thinks [s-λ_2 [[Someone in this room s_2] is outside s_1]]]]

(14) **Generalization X**:
The situation pronoun that a verb selects for must be coindexed with the nearest λ above it (=34, p. 201).

Based on the growing evidence that the situation pronoun account is simply too powerful, Chapter 5 proposes a different system altogether: the split intensionality system. This analysis solves the problems raised in Chapter 1 for the traditional scope theory without moving to a system with situation pronouns. Instead, the system introduces a new operator, $^\wedge$. DPs no longer have to scope above an intensional operator ω in order to receive a *de re* interpretation relative to ω; rather, they merely

have to scope above ^, which appears in each complement of an intensional operator. So, for instance, the following structure, in which a DP receives a *de re* reading inside an if-clause, is available in the split intensionality system:

(15) $\left[\begin{array}{l} \text{[would [if [everyone in this room]}_x \text{ [}^\wedge x \text{ were outside]]]} \\ \quad \text{[it be empty]} \end{array}\right]$

In (15), the DP *everyone in this room* has raised to a position above ^, but below the modal *would*. Therefore, although it receives a *de re* interpretation relative to the modal, its quantificational force still scopes below the modal. Besides a minor adjustment to capture Generalization X, the split intensionality system does not overgenerate. Furthermore, the rest of Chapter 5 explores predictions made by the split intensionality system which are not captured under the situation pronoun account – more cases of this latter theory overgenerating. For instance, the newer theory correctly predicts that a DP within an island, such as a because-clause, should not receive a *de re* interpretation relative to a higher intensional operator:

(16) #The teacher thinks that John should be punished because he didn't write every paper he wrote.
(cf. ... every paper he turned in)

Under a situation pronoun account, the DP *every paper he wrote* should be allowed to receive a *de re* interpretation relative to the verb *thinks* under a structure where the DP's situation pronoun complement is bound by the highest λ in the structure. However, this reading is simply not available, as predicted by the split intensionality account.

Chapter 1

Worlds and Times

This chapter introduces the basic notion of intensionality for both times and possible worlds. The concept of *de re* and *de dicto* DPs is explained and a scope theory to capture such readings is proposed. Next, some arguments against this simple theory are described and a new theory, involving pronouns which represent worlds and times, is advanced.

1.1 Tense and Modality

(1) It is raining.

(2) a. It was raining.
    b. I think it is raining.

The study of tense concerns, in part, the difference between (1) and (2-a), and the study of modality concerns, in part, the difference between (1) and (2-b). Both sentences in (2) seem to shift the meaning of (1) in different ways. For instance, if I utter (1) at 11:46 AM on Monday, June 23rd, 2008, in order for it to be true, it must be raining at 11:46 AM on Monday, June 23rd, 2008. However, this is not the case for either sentence in (2). For (2-a) to be true when uttered at this time, it merely had to have rained at some (unspecified) time prior to 11:46 AM on Monday, June 23rd, 2008. In (2-a), the time of (1) is shifted. For (2-b) to be true, it merely has to

be raining in the world *as I conceive of it*. (2-b) shifts the modality of (1). Therefore, semanticists conceive of the meaning of (1) as a simple proposition which takes two parameters: a *time* representing the time, a *possible world* representing the modality.

This analysis can be represented by the notation in (3), where the semantic interpretation function $[\![]\!]$ is indexed with a world and a time. Every (top-level) utterance is evaluated at the speech time and in the real world, but embedded phrases might be evaluated at a different time or world. When an expression like *it is raining* is evaluated at one particular time and world, it yields a truth value. This is called the expression's *extension*. When the world or time of this extension is abstracted over, the result is a function from worlds or times to truth values. This is the expression's *intension*.

(3) $[\![\textbf{It is raining}]\!]^{w,i} = 1$ iff it is raining at time i in possible world w.

(4) a. Extension of *it is raining* (at a world w and time i): $[\![\textbf{It is raining}]\!]^{w,i}$. This is one of two truth values (1 or 0) depending on whether it is raining at time i in world w.

b. Modal Intension of *it is raining* (at a time i): $\lambda w.[\![\textbf{it is raining}]\!]^{w,i}$. This is a function from possible worlds to truth values.

c. Temporal Intension of *it is raining* (at a world w): $\lambda i.[\![\textbf{it is raining}]\!]^{w,i}$. This is a function from times to truth values.

The basic units of the time index are times. Times represent moments, as identified by expressions such as *11:46 AM on Monday, June 23rd, 2008*.[1] (2-a) can be analyzed as involving quantification over times: it claims that there is a time i before the speech time, such that (3) was true at i. This can be notated as in (5):

(5) $[\![\textbf{It was raining}]\!]^{w,i} = 1$ iff $\exists i'$ such that $i' \prec i$ and $[\![\textbf{it is raining}]\!]^{w,i'} = 1$

[1]This is a simplification: since Bennett and Partee (1978), researchers have conceived of times as intervals, not moments. For this reason, and since t already represents truth values, the variable i is often used to represent times.

The basic units of modality have been identified, since Leibniz (see Leibniz 1973), as possible worlds, which represent ways that the actual world might be. For instance, as I write this, I am not wearing any socks. Yet, it is easy to imagine the world being mostly the way it is, with the one exception that I am wearing socks. This imagined scenario is a possible world. Also, as I write, it is sunny. A few more things would be different if it were raining, but that would be another possible world. (2-b) can be analyzed as involving quantification over possible worlds. There are many things about the real world that I simply do not know: for instance, I have no idea whether my mother is now wearing a sweater or not. Therefore, I can never know exactly which of all the possible worlds is the actual world: instead, there is a set of possible worlds, all of which I consider candidates for being the real world, and a complementary set which I do not consider candidates for being the real world. Philosophers and linguists since Hintikka (1969) have analyzed a statement such as (2-b) as quantifying over the set of possible worlds which I consider as candidates for the real world (also known as my thought worlds): it claims that in all worlds w such that I consider w a candidate for the real world, it is raining in w. This can be notated as (6). (2-b) leaves open many other attributes of my thought worlds – for instance, whether I think my mother is wearing a sweater or not in my thought worlds.

(6) $[\![\textbf{I think it is raining}]\!]^{w,i} = 1$ iff $\forall w'$ such that w' is one of my thought worlds in w at i, $[\![\textbf{it is raining}]\!]^{w',i} = 1$

For the remainder of this work, I will assume that worlds and times come in pairs, consisting of a world followed by a time: $\langle w, i \rangle$. I will call these pairs situations, but please note that this is an atypical usage of the term *situation*, which usually refers to a part or "slice" of a possible world. The move to a world-time pair is mostly for simplicity, since all the same operations in the semantic systems defined below will apply equally to times and worlds. However, I have used the term *situation* on purpose because I hope that future work will tie the situations described herein to the more traditionally defined situations. (See Kratzer (2007) for an overview of how situations are used in semantics.)

1.1.1 Situation Arguments in the Lexicon

So far, we have seen how tense and modality interacts with the meanings of full sentences and DPs. In a compositional system of semantics, however, the meaning of a phrase is a function of the meaning of its parts and ultimately of words; and therefore it is legitimate to ask which words have meanings that interact with times and possible worlds. The embedded clause in a sentence like *I think it's raining* only has one meaningful word: *raining*, a verb. Therefore, it seems reasonable to claim that verbs are sensitive to worlds and times. Nouns seem to share this characteristic; take the following examples adapted from Larson (1983):

(7) a. Bob was the duty officer at 9:00 PM.
b. Mary thinks George Clinton is the president.

The modifier *at 9:00 PM* in (7-a) sets the time at which we evaluate who the duty officer was. Therefore *duty officer* seems to be sensitive to times. Similarly, if one takes proper nouns like *George Clinton* to be rigid designators, referring to the same individual across all possible worlds (see Kripke 1980), the only source of modality in (7-b) is the word *president*. Therefore, nouns are sensitive to possible worlds as well. Prepositions also seem to be sensitive to times and worlds:

(8) a. John was in Mexico at 3:00 PM last Thursday.
b. I think John is in Mexico.

Discounting again as rigid designators the proper nouns *John* and *Mexico*, the source of time- and world-sensitivity in (8) must be the preposition *in*. (8-a) claims that at 3:00 PM last Thursday, John stood in the relation to Mexico of being *in* Mexico. (8-b) claims that John and Mexico are such that in all worlds that I consider as candidates for the actual world, John is *in* Mexico. Next, adjectives seem to be time- and world-dependent as well:

(9) a. Fido was dirty before his bath this morning.

b. I think Fido is dirty.

Once again, the one source of the time- and world-sensitivity in (9) is the adjective *dirty*. Last in this category are adverbs:

(10) a. I ran from 2:00 until 3:00, but I only ran quickly from 2:00 until 2:15.
b. I think many people ran, but I think only John ran quickly.

For (10-a) to be true, it cannot be that I only ran from 2:00 until 2:15, since I ran for longer. What I only did from 2:00 until 2:15 was run *quickly*. Therefore, this adverb must be sensitive to a time interval. For (10-b) to be true, it cannot be that I think only John ran, since I think many people ran. What I think only John did was run *quickly*. Therefore, *quickly* seems to be sensitive to possible worlds, as well. Remaining words, such as determiners, pronouns, and logical connectives (e.g., *and*, *or*, *but*, and negation) I will assume not to be sensitive to worlds and times.

1.1.2 Semantic System

The system I will present here is a modification of that in Heim and Kratzer (1998), changed to use situations instead of just possible worlds. The ideas represented here are much older, though. Since Aristotle and perhaps before, modality has been represented as operators taking scope at the sentential level. Kripke (1963) conceived of these operators as being quantifiers over possible worlds. The particular system that Heim and Kratzer (1998) use is closest to one due to Montague (1974). As for times, Prior (1967) defined operators for times in natural language akin to those that Kripke defined for possible worlds.

The semantic types and domains used in the system are as follows (Heim and Kratzer 1998):

(11) **Semantic types**

a. e is a type.
b. t is a type.

c. If α and β are types, then $\langle \alpha, \beta \rangle$ is a type.

d. If α is a type, then $\langle s, \alpha \rangle$ is a type.

e. Nothing else is a type.

(12) **Semantic domains**

Let W be the set of all possible worlds. Let I be the (ordered) set of all times. Let S be $W \times I$, the set of all situations (i.e., pairs of worlds and times). Associated with each situation s is the domain of all individuals existing in s. Let D be the union of the domains of all situations.

a. $D_e = D$

b. $D_t = \{0, 1\}$

c. If α and β are semantic types, then $D_{\langle \alpha, \beta \rangle}$ is the set of all functions from D_α to D_β.

d. If α is a type, then $D_{\langle s, \alpha \rangle}$ is the set of all functions from S to D_α.

In this system, the semantic interpretation function $[\![]\!]$ is parameterized relative to a situation. Hence, (13-a) is not a valid meta-language expression, but (13-b) is a valid expression, representing the denotation of the expression *it is raining* when evaluated at the time t in the world w. As before, utterances are evaluated with respect to the actual world, which is often written as @, and the speech time, which I will represent as ν. Therefore, in (14), *it is raining* is evaluated at the actual world and the speech time.

(13) a. $[\![\textbf{it is raining}]\!]$

b. $[\![\textbf{it is raining}]\!]^{\langle w, i \rangle}$

(14) $[\![\textbf{it is raining}]\!]^{\langle @, \nu \rangle}$

Every word whose meaning depends on a world and/or time makes use of this index in its definition. Some sample definitions are given in (15).

(15) a. $[\![\textbf{boy}]\!]^s = \lambda x \in D_e$. x is a boy in s.

b. $[\![\textbf{happy}]\!]^s = \lambda x \in D_e \ .\ x$ is happy in s.

c. $[\![\textbf{raining}]\!]^s = 1$ iff it is raining in s.

d. $[\![\textbf{smokes}]\!]^s = \lambda x \in D_e \ .\ x$ smokes in s.

e. $[\![\textbf{likes}]\!]^s = \lambda x \in D_e \ .\ \lambda y \in D_e \ .\ y$ likes x in s.

In addition to words like those in (15), whose arguments are extensional (meaning they do not depend on situations), *intensional operators* take arguments that are intensional (meaning they depend on situations). Some intensional operators are given in (16):

(16) Modal Intensional Operators[2]

a. $[\![\textbf{thinks}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle} \ .\ \lambda x_e \ .\ \forall w' \in W$ such that, in w at i, x entertains w' as a candidate for the actual world $.\ P(\langle w', i\rangle)$

b. $[\![\textbf{might}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle} \ .\ \exists w' \ .\ P(\langle w', i\rangle)$

c. $[\![\textbf{must}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle} \ .\ \forall w' \ .\ P(\langle w', i\rangle)$

d. $[\![\textbf{probably}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle} \ .$ for most $w' \ .\ P(\langle w', i\rangle)$

(17) Temporal Intensional Operators[3]

a. $[\![\textsc{Past}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle} \ .\ \exists i' \prec i \ .\ P(\langle w, i'\rangle)$

b. $[\![\textsc{Pres}]\!]^s = \lambda P_{\langle s,t\rangle} \ .\ P(s)$

c. $[\![\textsc{Future}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle} \ .\ \exists i' \succ i \ .\ P(\langle w, i'\rangle)$

In this system, tense is represented as a syntactic operator that takes scope at the top of the sentence. Tense morphology on verbs is merely an indication of which of these operators is in effect (Stowell 1993).

The familiar (extensional) rules of Functional Application, Predicate Modification, and Predicate Abstraction, which do not change the world parameter of the interpretation function, remain in this system. In addition, in order for an operator to take an intensional argument, there is an additional rule, given in (18). This rule

[2]These are simplifications of these operators. For instance, *must* does not actually quantify over all possible worlds, just those that satisfy a certain requirement, such as being compatible with the speaker's knowledge.

[3]Once again, these are simplifications.

converts an item from an extension into an intension so that it can be the argument of an intensional operator.

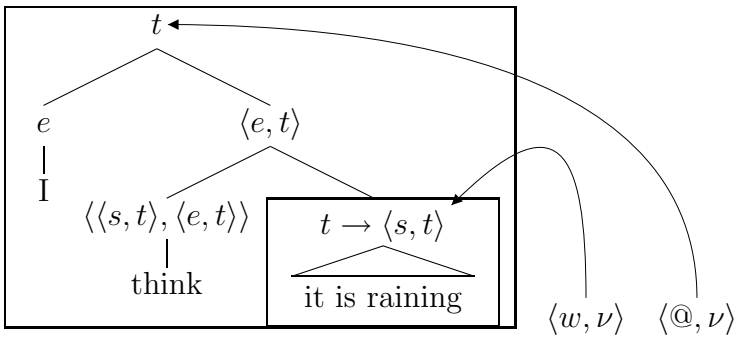
(18) **Intensional Functional Application** (IFA)

If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, then, for any situation s, if $[\![\beta]\!]^s$ is a function whose domain contains $\lambda s' \ . \ [\![\gamma]\!]^{s'}$, then $[\![\alpha]\!]^s = [\![\beta]\!]^s(\lambda s' \ . \ [\![\gamma]\!]^{s'})$.

An example derivation for possible worlds is given below:

(19) a. I think it is raining.

b.



(20) a. $[\![\textbf{I think it is raining}]\!]^{\langle @,\nu\rangle} = 1$ iff

b. $[\![\textbf{think}]\!]^{\langle @,\nu\rangle}(\lambda s.[\![\textbf{it is raining}]\!]^s)([\![\textbf{I}]\!]^{\langle @,\nu\rangle}) = 1$ (via IFA) iff

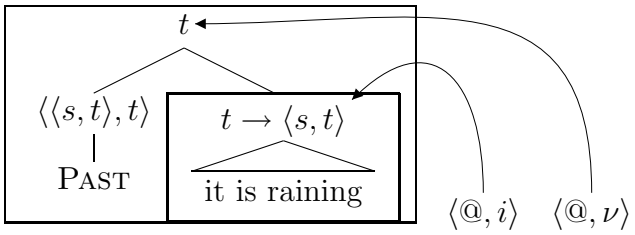
c. in all worlds w in my thought worlds in @ at ν, $[\lambda s.[\![\textbf{it is raining}]\!]^s](\langle w, \nu\rangle)$ iff

d. in all worlds w in my thought worlds in @ at ν, it is raining in w at ν.

As indicated by the arrows in (19), the meaning of the entire utterance *I think it is raining* (the larger box of (19)) is evaluated in the actual world @, but the meaning of *it is raining* (the smaller box) is evaluated in my thought worlds w. Both are evaluated at the speech time ν. Although the extension of the phrase *it is raining* is a truth value (t), its intension is used in (19) by the Intensional Functional Application rule in (20-b) above. This is indicated above by the notation $t \rightarrow \langle s, t\rangle$.

An example for times follows:

(21) a. It was raining.

b. 

(22) a. $[\![\text{PAST } \textbf{it is raining}]\!]^{\langle @,\nu\rangle} = 1$ iff

b. $[\![\text{PAST}]\!]^{\langle @,\nu\rangle}(\lambda s.[\![\textbf{it is raining}]\!]^{s}) = 1$ (via IFA) iff

c. $\exists i \prec \nu$ such that it is raining at time i in @.

The structure in the larger box is evaluated at the speech time ν, but the structure in the smaller box is evaluated at a time i before ν. Both are evaluated in the real world @.

In the two examples given, the meaning for the modal intensional operator *think* only affected the world in the world-time pair that is the index on the interpretation function, and the meaning for the temporal intensional operators PAST only affected the time in the index situation. However, there are some modal items, such as *hope*, given in (23), that seem to affect the tense of their complements. The sentence *John comes home early* in (23-b) is interpreted as taking place in the future, presumably shifted by the verb *hope*. In addition, as Iatridou (2000) points out, even past tense sometimes seems to have an effect on the modality of its complement, as shown in (24). (24-a), without past tense marking is not (necessarily) counterfactual, whereas (24-b), with past tense marking, is necessarily counterfactual. I will not argue for the precise mechanics behind this distinction, but both these cases show how times and possible worlds are potentially linked.

(23) a. $[\![\textbf{hopes}]\!]^{\langle w,i\rangle} = \lambda P_{\langle s,t\rangle}\ .\ \lambda x_e\ .\ \forall w' \in W$ such x's hopes in w at i come true $.\ \exists i' \succ i\ .\ P(\langle w', i'\rangle)$

b. I hope that John comes home early.

(24) a. If John knows the answer, we are saved.

b. If John knew the answer, we would be saved.

1.2 De Re / De Dicto and the Scope Theory

The system given above, however, is not entirely adequate to describe the facts about tense and modality. As outlined above, the system requires the entire complement to a verb like *think* or a tense operator like PAST to be evaluated in the situations determined by these operators.[4] However, sometimes elements appear in the scope of an intensional operator ω that are not evaluated in one of the situations over which ω quantifies. For instance, unless Mary married her husband without ever meeting him, (25-b) describes a situation where at some time in the past, I introduced Mary to the man who is now her husband. So, *her husband* is evaluated at the speech time, while the rest of the sentence is evaluated at some time shifted backwards by the PAST operator. Similarly, if (26-b) describes a scenario where Mary is frightened by her husband in the dark, *her husband* is evaluated in the real world, while *was a burglar* is evaluated in Mary's thought worlds.

(25) a. An hour ago, someone in this room was outside.
b. I introduced Mary to her husband.
c. Hillary lost the nomination to the man who became president.

(26) a. Mary thinks someone in this room is outside.
b. Mary thought her husband was a burglar.
c. Hillary wanted the man who was nominated to drop out of the race.

Sometimes, the two meanings of an ambiguous sentence differ only in whether a phrase is interpreted in the scope of an intensional operator or not. For instance, *a man who became president* in (27) can be evaluated at the speech time, as in (27-a), or at the time of the marriage, as in (27-b). In the former reading, the past tense on *became* indicates a time before the speech time, and in the latter reading, it indicates a time before the marriage. Similarly, in (28), *a linguist* can be evaluated in the real world, as in (28-a), or in Mary's thought worlds, as in (28-b). Following tradition, I

[4] Although if there is another intensional operator inside this complement, the complement of this embedded operator might be evaluated in a situation further shifted.

will refer to readings like the (a) scenarios below as *de re* readings and ones like the (b) scenarios as *de dicto*.[5] For instance, in the reading in (28-a), *a linguist* is *de re* relative to *wants*; and in the reading in (28-b), *a linguist* is *de dicto* relative to *wants*. When it is clear which operator is under discussion, I will simply say, for instance, that *a linguist* is *de re* in (28-a) and *de dicto* in (28-b).

(27) Hillary married a man who became president. (Kusumoto 2005)

a. Hillary married Bill. Later, Bill became president.

b. Bill became president. Later, Hillary married Bill.

(28) Mary wants her daughter to marry a linguist.

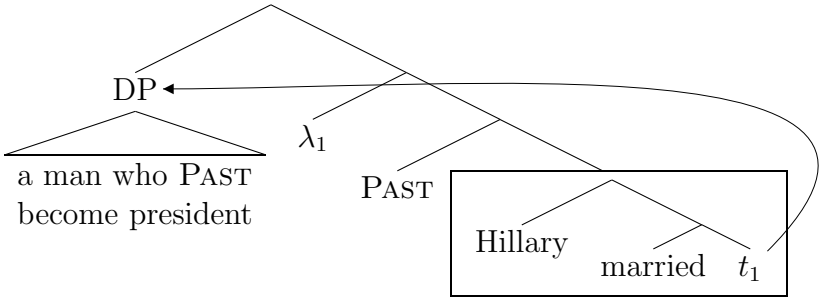
a. Mary wants her daughter to marry Bob. Bob happens to be a linguist (although Mary may or may not know this).

b. Mary has a preference for the man her daughter marries: she hopes the husband will practice linguistics.

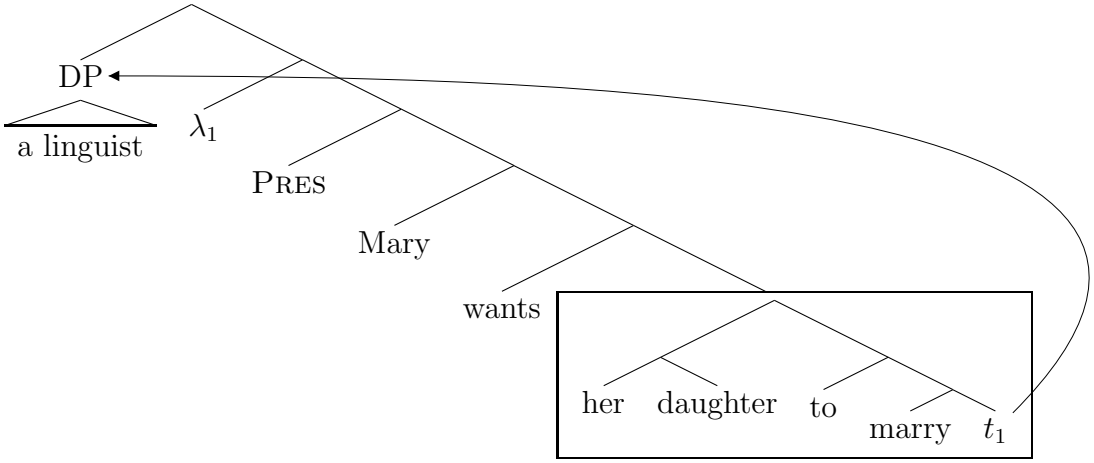
One traditional solution to this problem (see Montague (1973), Ladusaw (1977), Ogihara (1992, 1996), and Stowell (1993)) is that the structure at which sentences like those in (27) and (28) are interpreted differs from their surface structure. In particular, perhaps any phrase that is interpreted *de re* is interpreted as if it were structurally outside the scope of the intensional operator. I will call this the scope theory. For instance, the structures relevant to (27-a) and (28-a) could be as follows:

[5]The term *de re* is Latin for "of the thing," and is so called because a *de re* item picks out the same thing inside and outside of the intensional context. *De dicto* means "of what is said," and is so called because the interpretation of a *de dicto* item depends on how its description is interpreted inside versus outside the intensional context.

(29)



(30)



Although the scope theory explains the data we have seen up to now, as we will see below, once you look at more data, several problems arise for the theory.

1.3 Problems for the Scope Theory

Although the scope analysis does explain the cases of *de re* above, several problems have been raised for this analysis.[6] Under the scope theory, a DP must move in order to receive a *de re* reading. However, this feature of the analysis predicts that the quantificational force of the DP will be in its moved position. Most of the criticisms of the scope theory are based on this prediction, presenting scope paradoxes where the quantificational force of a DP indicates that it is in a certain position in the sentence, but the intensional status of the DP (e.g., *de re* or *de dicto*) indicates that it is in a different position. In this section, I will go through a few of these problems and outline a system designed to solve these problems, one where explicit pronouns

[6]This whole chapter, but this section in particular, owes a debt of gratitude to von Fintel and Heim (2008).

representing situations appear in the syntactic representations of sentences.

1.3.1 Fodor: Specific vs. Transparent

(31) Mary wants to buy an inexpensive coat.

a. **Non-specific, Opaque** (*de dicto*): Mary has a preference for whatever coat she ends up buying: she wants it to be inexpensive.

b. **Specific, Transparent** (*de re*): There's a specific coat, say on a rack at Macy's, that Mary wants. She may or may not know its price.

c. **Non-specific, Transparent**: Mary wants an Old Navy pea coat, although she does not have one picked out yet. Old Navy pea coats are inexpensive, although Mary may or may not know this.

d. **Specific, Opaque**: There's a specific coat, say on a rack at Macy's, that Mary wants, under the description *an inexpensive coat*.

In Fodor's 1970 dissertation, she points out that sentences like (31) have more than two readings. (31-a) and (31-b) describe what we have been calling the *de dicto* and *de re* readings. However, Fodor claims that there are two more readings, given in (31-c) and (31-d). She argues that the quantificational force of an indefinite like *an inexpensive coat* can scope separately from its intensional status. She calls readings where the quantificational force scopes above the intensional operator *specific* and those where it scopes below *non-specific*. For instance, in (31-b) and (31-d), there is a specific coat in the actual world that the speaker could point to, whereas this is not the case in (31-a) and (31-c). Fodor calls readings where the intensional status scopes above the intensional operator *transparent* and those where it scopes below *opaque*.

Researchers after Fodor have cast doubt on whether the fourth reading in (31) actually exists. Under such a reading, as Fodor puts it, there is a particular coat that Mary wants to buy and that she wants to buy under the description *an inexpensive coat* (see Fodor (1970), p. 227). In this case, it is not necessarily true that the coat in question is actually inexpensive. This seems like a reasonable idea to express, and in fact this is what (32) means. However, this is simply not a reading for (31), as

shown in (33). The use of the word *it* in the second sentence of (33) forces a specific reading of *an inexpensive coat* (see Ioup 1975). However, once this reading is forced, it is impossible to deny that the coat is inexpensive.[7]

(32) There's a coat that Mary wants to buy. She thinks it is inexpensive. But really, it is quite expensive.

(33) Mary wants to buy an inexpensive coat. #But really, it is quite expensive.

Fodor's other three readings do carry over to the domain of times:

(34) Between 1990 and 1995, John always took a woman his same weight to the world series.

a. **Non-specific, Opaque**: John took a different woman to each world series and each time she weighed the same as him at that time.

b. **Specific, Transparent**: There is a particular woman who is now his weight that John took to each world series.

c. **Non-specific, Transparent**: John took a different woman to each world series and each one weighed the same (at that time) as he does now.

If you take *always* to be a universal quantifier over times, (34) sets up a similar three-way split to (33). The specific reading is one where the quantificational force of *a woman his same weight* scopes above *always*, and the non-specific readings are those where this DP scopes below *always*. The transparent readings are those where the weight is the same at the speech time, and the opaque reading is one where it is the same at the time being quantified over (in this case each world series).

The existence of the third reading above for both possible worlds and times goes against the predictions of the scope analysis, since as noted above, the scope analysis predicts that the quantificational force and intensional status of a DP should scope

[7]Although, if you can construe *it* as referring to the type of coat, rather than one particular coat, this sentence is acceptable.

together.

Please note that for the rest of this work, I will refer to items as *de re* when their intensional status scopes above an intensional operator (i.e., they are transparent in Fodor's terminology), whether their quantificational force scopes above this operator (i.e., they are specific) or below this operator (i.e., non-specific). Similarly, I will refer to items as *de dicto* when their intensional status scopes below an intensional operator.

1.3.2 Bäuerle's Paradox

(35) George thinks a woman from South Carolina loves every Red Sox player.

a. [a woman from South Carolina] > [every Red Sox player]

b. [every Red Sox player] > thinks > [a woman from South Carolina]

Imagine the following scenario: A man named George is passing a bus and hears a woman with a distinct South Carolina accent yelling from inside: *I love all y'all!*. Unbeknownst to him, the entire Boston Red Sox team is on the bus, on their way to a game. Additionally, the woman is not from South Carolina, at all, but rather she is from Tennessee. Bäuerle (1983) points out that a sentence like (35) is acceptable even in a situation like this. This again poses a paradox for the scope analysis, though. The quantificational force of the DP *every Red Sox player* scopes below that of the DP *a woman from South Carolina*, since there is one such woman who loves the whole team. This would argue for a scoping as indicated in (35-a). However, intensional status indicates the scopal relations sketched in (35-b), since *every Red Sox player* is only true of the beloved men in the real world and *a woman from South Carolina* is only true of the woman in George's thought worlds.

A similar scenario can also be constructed for times:

(36) In 2001, a 14-year-old boy interviewed every most-wanted fugitive in America.

a. [a 14-year-old boy] > [every most-wanted fugitive]

b. [every most-wanted fugitive] > PAST > [a 14-year-old boy]

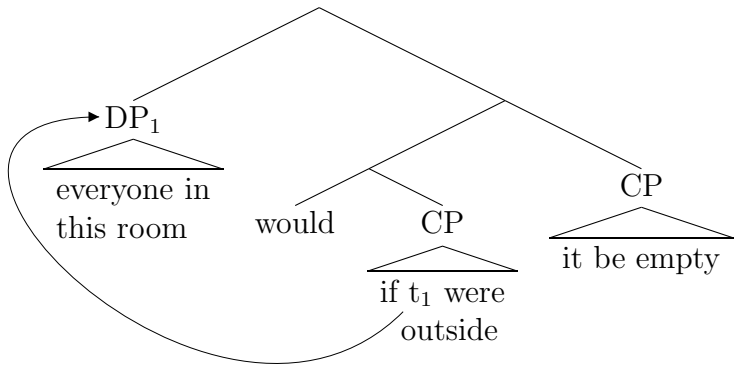
A similar scenario can be devised for tense, as well: In 2001, a boy who was fourteen years old at the time interviewed ten prisoners at a maximum-security penitentiary for his school newspaper. Recently, all ten broke out of prison and are now America's ten most-wanted fugitives. Again, in this situation, the sentence in (36) sounds acceptable. However, this poses a paradox. The scopes of the quantificational force for the two DPs must be as in (36-a), since there is one boy who interviewed all the prisoners. But the intensional status indicates the scoping in (36-b), since the fugitives only escaped recently, and the boy is no longer fourteen years old.

1.3.3 *De re* DPs in If-clauses

(37) If everyone in this room were outside, it would be empty.

Another scope paradox arises in the sentence in (37) (cf. von Stechow (1984), Abusch (1994), and Percus (2000)). Since no one can be in this room and outside in the same world, the theory sketched above predicts the following structure for this sentence (given a few assumptions about the structure of conditionals (see Lewis (1975), Kratzer (1986)):

(38)



a. Predicted reading: Everyone x in this room in @ is such that $\forall w$ where x is outside in w, this room is empty in w.

b. Actual reading: $\forall w$ where everyone in this room in @ is outside in w, this room is empty in w.

The scope theory once again predicts that the quantificational force of *everyone in this room* is outside the scope of the modal *would*. However, this gives a strange reading in which it is sufficient for any one person in the room to be missing in order to make the room empty. The sentence actually only makes sense if it is the totality of the people actually in the room who are outside, not just one.

A similar sentence for times is given in (39):

(39) When everyone in this room was outside, it was empty.

In (39), the items being quantified over are presumably times, not possible worlds, but the problem remains. (39) does not mean that for everyone in this room x, when x was outside, the room was empty.

1.3.4 Purely Contextual Situations

The underlined sentence in (40) presents another problem for the scope theory:

(40) When I last visited my friend, he had two children: a six-year-old and a ten-year-old. The six-year-old graduated from med school two years ago.

a. Predicted reading: The salient person who is now six years old graduated from med school at some time t two years ago.

b. Actual reading: The salient person who at some contextual time was six years old graduated from med school at some time t two years ago.

Here what is needed is a time that is not related to anything else in the sentence. So far, we have been assuming that *de re* readings are evaluated with respect to the real world and the utterance time. However, *the six-year-old* is evaluated with respect to a time well before the utterance time.

(41) ?Elwood's wife wants Elwood to stop talking to the six-foot rabbit.

Arguably, a similar situation arises in (41). The DP *the six-foot rabbit* in the last sentence is not a proper description of anything in the real world or in Elwood's wife's desire-worlds; presumably it is only in Elwood's imagination (pace *Harvey*). Yet (41), although a little odd, is not unacceptable. This time, the world at which the DP is evaluated is set by context, rather than being either the real world or a world being quantified over.

1.4 Situation Pronouns

Clearly, the scope theory in its present form is not adequate to describe all possible *de re* and *de dicto* meanings. In Chapter 5, I will explore a modification of the scope theory designed to solve these problems, but until then I will use an alternative theory of *de re* and *de dicto*. This alternative semantic system is one where items that denote situations appear explicitly in the syntax of natural language. These items are called situation pronouns, and they act just like other pronouns, only their denotations are of type s instead of type e. The semantic domains remain the same in this new system as in (12), but there is a new type, s, for situations. There is no index for situations on the interpretation function, though, and no rule of Intensional Functional Application. Instead, situations are allowed to be passed through the structure via the assignment function parameter on the interpretation function – a parameter I have so far ignored. This assignment function is enriched to include situations as well as individuals as shown in (42). This move allows elements interpreted via the Traces and Pronouns rule (in (43)) to denote situations as well as individuals.

(42) A variable assignment is a partial function from $\mathbb{N}$ into $D \cup S$.

(43) **Traces and Pronouns Rule** (= Heim and Kratzer (9), p. 111)
If α is a pronoun or a trace, g is a variable assignment, and $i \in dom(g)$, then $[\![\alpha_i]\!]^g = g(i)$.

Given this change, if a pronoun is indexed i and the assignment function returns a situation for index i, the pronoun will denote a situation. The definitions of certain words and phrases call for situation arguments, and these arguments can be filled with an explicit situation pronoun. I assume that the structure also contains λ operators, which are the same as Heim and Kratzer's numerical indices; the only difference is that they are typed. For instance a s-λ creates an abstraction over a type-s variable. This requires a change to the rule of Predicate Abstraction:

(44) **Predicate Abstraction Rule** ($\approx$ Heim and Kratzer (4), p. 186)
Let α be a branching node with daughters β_i and γ, where β dominates only a λ operator of type τ. Then, for any variable assignment g,
$[\![\alpha]\!]^g = \lambda a \in D_\tau.[\![\gamma]\!]^{g^{a/i}}$.

These λ operators may bind the situation variables at given points in the sentence, yielding different readings. For instance:

(45) a. s-λ_1 Mary thought s-λ_2 [her husband $s_{1/2}$] was a burglar.
b. s-λ_1 PAST s-λ_2 I introduced Mary to [her husband $s_{1/2}$].

In (45), *her husband* is *de re* when its situation pronoun complement is bound by the higher λ in each structure: s-λ_1. *Her huband* is *de dicto* when this pronoun is bound by the lower λ: s-λ_2.

As we will stipulate below, every sentence in the situation pronoun system has an s-λ above it. Therefore, a sentence denotes a proposition of type $\langle s, t\rangle$, i.e., a function from situations to truth values. Whenever a sentence is uttered, the function it represents is evaluated for truth in the actual world at the speech time.

1.4.1 Solutions to the Problems with the Scope Theory

(46) s-λ_1 Mary wants s-λ_2 to buy [an inexpensive coat s_1].

Fodor's third reading is not a problem for the situation pronoun account. For instance, an NP like *inexpensive coat* in this system will be of type $\langle s, et \rangle$ and therefore can combine with a situation pronoun (of type s) via Function Application. Then, in order to yield a non-specific, transparent reading for (46), we would merely have to index this situation pronoun argument of the NP *inexpensive coat* with the number 1, so that the pronoun is bound by the the topmost λ operator. This way, the pronoun s_1 will denote the situation at which the entire utterance is evaluated, namely the situation comprising the real world and the speech time. Since s is the complement of the DP, the DP will be evaluated in this situation, yielding a transparent reading without changing the existential force. In this way, the situation pronoun system captures the facts presented by Fodor.

(47) s-λ_1 George thinks s-λ_2 [a woman from South Carolina s_2] loves [every Red Sox player s_1].

(48) s-λ_1 if s-λ_2 [every in this room s_1] were outside, it would be empty.

Similarly, (47) and (48) show the structures needed to analyze the Bäuerle sentence and the if-clause cases respectively. Even the case where a DP is evaluated at a time or world unrelated to anything else in the sentence is captured easily in this system: the pronoun complement to the DP is simply unbound; its referent is determined solely by the context.

1.4.2 Summary

This chapter first introduced the idea of tense and modality and showed a simple way to capture these in a semantic system. The phenomenon of *de re* and *de dicto* readings motivated the idea of a scope theory, where certain DPs move above intensional operators. However, several paradoxes arise under this system, and certain sentences cannot be captured by the scope theory. Therefore a new theory involving pronouns representing situations was introduced.

The situation pronoun account is certainly powerful enough to describe all the

sentences which the scope theory could not. However, this power is also a liability, as we will see in the next three chapters, since many unattested readings are predicted by the new system. Constraining the system enough to avoid overgeneration, while still maintaining analyses for all predicted readings, is the main work to be done on the situation pronoun theory.

Chapter 2

The Intersective Predicate Generalization

In Chapter 1, we explored the evidence for the existence of situation pronouns, which for the purpose of this work, I am construing as world-time pairs. The next question after whether such items exist is whether there are any constraints on their distribution and indexing. To answer this question, I will begin by assuming the least restrictive theory possible concerning the distribution and indexing of situation pronouns. This null hypothesis might be as in (1):

(1) **Free Situation Pronoun Hypothesis**: A situation pronoun may be freely inserted and indexed wherever it is the complement to a node of type $\langle s, \alpha \rangle$.

Researchers such as Percus (2000) have noted that this hypothesis overgenerates. In this chapter, I will explore a constraint on situation pronouns: the Intersective Predicate Generalization, based on and extending work by Musan (1997).

(2) #There were <u>many professors</u> in kindergarten in the '80s.

Musan (1997) notes that certain noun phrases must be evaluated at the same time as the main predicates of the sentences in which they appear. For instance, (2) sounds odd because the underlined NP must be evaluated at the same time as its

main predicate, and therefore (2) entails that some people were both professors and in kindergarten at the same time. This restriction poses a problem for the Free Situation Pronoun Hypothesis, which predicts that all situation-dependent words should in theory be able to be evaluated at any world or time.

In this chapter, I first take a closer look at this observation, presenting Musan's Generalization in section 2.1. Next, section 2.2 describes and formalizes the Intersective Predicate Generalization, which extends Musan's Generalization in two ways: to cover worlds, as well as times, and to cover more cases than Musan considers. Section 2.3 presents evidence for the Intersective Predicate Generalization in the Existential There Construction. Section 2.4 provides evidence that a noun and an intersective modifier (such as an adjective, a relative clause, or a prepositional phrase) must also be evaluated at the same world and time as one another. Next, section 2.5 shows how this generalization holds for subject and object depictives, as well. Last, an appendix in section 2.7 will look at some confounds for Musan's original examples and show how, once these are explained, her generalization (and the Intersective Predicate Generalization) can be maintained.

2.1 Musan's Generalization

This section introduces Musan's original generalization. Her observation makes crucial reference to weak and strong noun phrases, though, so these concepts will be introduced in section 2.1.1 before the generalization itself is discussed in section 2.1.2.

2.1.1 Weak and Strong NPs

Milsark (1977) discusses the fact that certain NPs can appear in the Existential There Construction, and certain others cannot, as shown below:

(3) a. There is a/some student in that room.
b. There are two/three/some/many/several students in that room.

(4) a. *There is the/this/that/every/each/Smith's student in that room.

b. *There are the/these/those/both/all/most students in that room.

(5) a. **Weak**: a, some, many, several, two, three, ...

b. **Strong**: the, this, these, that, those, both, each, every, most, all, ...

The NPs that can appear in the Existential There Construction are called weak NPs and those that cannot are called strong NPs. As it turns out, the weak NPs do not only appear in the Existential There Construction; they may also appear in regular sentences:

(6) Three students are in that room.

When they do, however, Milsark points out that weak NPs have two readings. For instance, (6) might mean that the number of students in that room happens to be three. Milsark calls this reading the cardinal reading and points out that it seems to be the same as the reading a weak NP has in the Existential There Construction. Alternatively, (6) might mean that three of the students under discussion are in that room, while others are not. Milsark calls this the quantificational reading[1], and he points out that this reading is not available when the weak NP is in the existential there construction.

Milsark points out that stress seems to play a factor in distinguishing these two readings of weak NPs: when stress is on the noun, the weak, cardinal reading is brought to the fore; when stress is on the determiner, the strong, quantificational reading is highlighted. (But see Büring (2001) for a more complex theory of the relationship between stress/focus and the weak/strong distinction.) However, it is hard to tell for sure whether a weak NP that is not in the Existential There Construction has the weak, cardinal reading, or the strong, quantificational reading. I will therefore mostly rely on cases where an NP is in the Existential There Construction to furnish examples of weak NPs.

[1]Later authors such as Musan call this the presuppositional reading, since it presupposes something – in this case the existence of the students under discussion. It is also called the proportional reading, since it makes reference to a subset of a larger set – in this case the three students in the room versus the entire set of students under discussion.

2.1.2 Musan's Generalization

Musan's observation is that while strong NPs can be evaluated at a time independent from the main predicate of their clause, weak NPs must be evaluated at the same time as this main predicate:

(7) **Musan's Generalization**: A noun phrase can be temporally independent if and only if it is strong (≈ Musan's (10), p. 60).[2]

(8) **Definitions**: A noun phrase is **temporally dependent** if its time of evaluation must be same as the time of evaluation for the main predicate of its sentence. Otherwise, the noun phrase is **temporally independent**.

Take the following sentences, for instance, which are adaptations of Musan's examples:

(9) Some members of congress knew each other in college. In fact, ...

a. ... three U.S. Senators were attending Harvard together in 1964.

b. #... there were three U.S. Senators attending Harvard together in 1964.

(10) The professors in this department are quite young. In fact, ...

a. ... many professors were in kindergarten in the '80s.

b. #... there were many professors in kindergarten in the '80s.

In (9-a), the subject *three U.S. Senators* may be evaluated in the present, meaning something like *three current U.S. Senators*. The VP *were attending Harvard together*, on the other hand, is evaluated in the year 1964. If the two were instead evaluated at the same time, the sentence would sound odd, since most college students are too young to be senators (who must be at least 30 years old according to the U.S. constitution). And, in fact, (9-b) does sound odd for this very reason: the two contradictory descriptions are required to hold at the same time. According to Musan, this odd reading is due to the fact that *three U.S. Senators* is a weak NP in (9-b), as

[2]Musan later revises this generalization to include facts about existence-independent predicates like *is famous*; I will ignore such predicates.

evidenced by the fact that it appears in the Existential There Construction. Since it is weak, the NP must be evaluated at the same time as its main predicate, *attending Harvard together*. Similarly, in (10-a), *many professors* can refer to the speech time and *in kindergarten* to the '80s; but in (10-b), the weak version of the NP *many professors* and the VP *in kindergarten* both must refer to the '80s, yielding an odd reading for the sentence in which people are both professors and kindergartners at the same time and world.

2.2 Intersective Predicate Generalization

Section 2.1 presented Musan's Generalization, which holds that a weak NP must be evaluated at the same world as the main predicate in its sentence. In this section, I will first discuss the idea of predicates being interpreted intersectively and then introduce the Intersective Predicate Generalization, which will be the focus of the remainder of this chapter.

(11) the brown bag

Researchers have held for some time that the meanings of certain phrases combine intersectively with others (see Jackendoff 1977, among others). Looking at (11), for instance, if the meaning of *brown* is conceived of as the set of brown things, and the meaning of *bag* as the set of all bags, then you might compute the meaning of *brown bag* as the intersection of these two sets. One way to capture this intuition is through a rule of Predicate Modification, as given in (14).[3]

(12) Conjoinable type:

a. $\langle t \rangle$ is a conjoinable type.

b. if τ_1 is a conjoinable type, then for any type τ_2, $\langle \tau_2, \tau_1 \rangle$ is a conjoinable type.

[3]This rule is adapted from definition in Winter (1996), who cites Gazdar (1980), Keenan and Faltz (1985), and Partee (1987).

(13) $\sqcap$ **Operator**

For any functions f and g of conjoinable type τ, $f \sqcap g =$

a. $f \wedge g$, if $\tau = t$, or

b. $\lambda a \in D_\alpha \ . \ f(a) \sqcap g(a)$, if $\tau = \langle \alpha, \beta \rangle$.

(14) **(Generalized) Predicate Modification**[4]:

If α is a branching node,$\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ and $[\![\gamma]\!]$ are both functions of conjoinable type τ, then $[\![\alpha]\!] = [\![\beta]\!] \sqcap [\![\gamma]\!]$.

(14) is a rule of composition that combines the meanings of two predicates having the same type, call it τ, into a new predicate of type τ which intersects the meanings of the two original predicates. The evidence I present later in this chapter will support the generalization in (15), which holds that two predicates composed intersectively are always evaluated at the same world and time as one another. Musan's Generalization, which deals only with one case of intersective predicates, is then a special case of this generalization.

(15) **Intersective Predicate Generalization**:

Two predicates composed via Predicate Modification may not be evaluated at different times or worlds from one another.

To formalize this generalization, I will need to examine two cases. Consider a pair of phrases interpreted via Predicate Modification, **A** and **B**, as in (16):

(16)

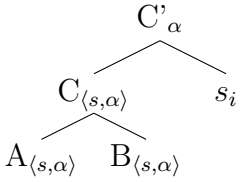
In order for the Intersective Predicate Generalization to apply, **A** and **B** must both have some sort of intensionality: they must either be of type $\langle s, \alpha \rangle$ or dominate a free

[4]The Predicate Modification rule given in example (6), p. 65 of Heim and Kratzer (1998) only covers phrases of type *et*. This generalization allows, e.g., phrases of type *set* to combine.

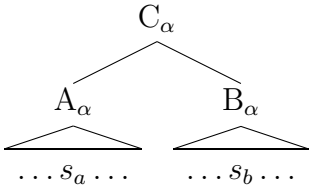
occurrence of a situation pronoun. Otherwise, there is no sense in which **A** and **B** are evaluated at a particular world or time. First, consider the case where the phrases are of type $\langle s, \alpha \rangle$. In this case, the Intersective Predicate Generalization holds by default, since the topmost node **C** will also be of type $\langle s, \alpha \rangle$, and when the type-$s$ argument of node **C** is filled, it determines the world and time at which its daughters **A** and **B** are evaluated, as in (17).

Second, consider the case where **A** and **B** each dominate some free situation pronoun, as shown in (18-a). Call these pronouns s_a and s_b, respectively. In this case, the Intersective Predicate Generalization can be formalized as holding that the intersection of **A** and **B** must be interpreted as if these pronouns were coindexed; so, $a = b$. Another way to look at this is that the structure in (18-a) must be interpreted as if it were the structure in (18-b). Although it might be the case that **A** or **B** dominates more than one such situation pronoun, determining which of these would be bound by the λ's in (18-b) is a question I will leave to the next chapter. For the remainder of this chapter, I will only examine cases where **A** and **B** have no free situation pronouns at all, but rather denote functions of type $\langle s, \alpha \rangle$.

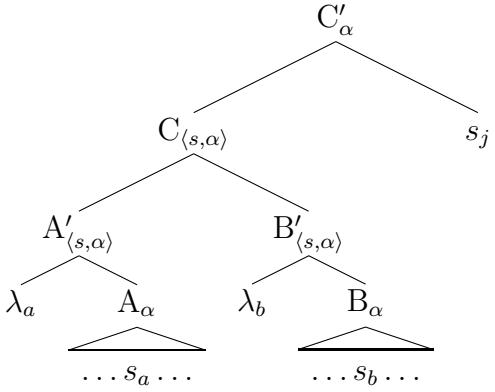
(17)



(18) a.



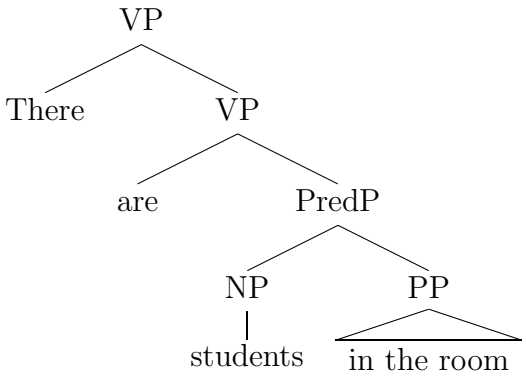
b.



2.3 Existential There Construction

Since the Existential There Construction provides much of the support for Musan's Generalization, I will examine this construction first to provide evidence for the Intersective Predicate Generalization. In section 3.3, I will argue that the NP and the post-nominal predicate in an Existential There Construction are interpreted via the Predicate Modification composition rule. Discounting situation arguments for a moment, I will assume a structure similar to the one shown in (19):

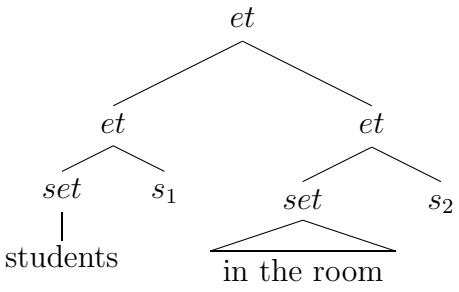
(19) a. There are students in the room.

b. 

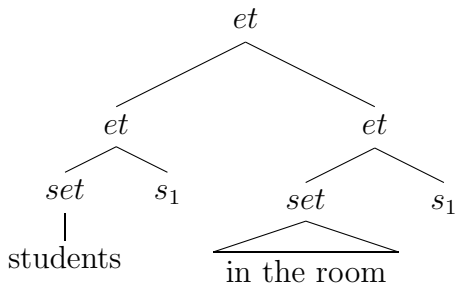
Here the NP *students* combines with *in the room* via Predicate Modification to form a node denoting students who are in the room. Once you add situation pronouns into the picture, the Free Situation Pronoun Hypothesis predicts at least the three structures in (21) for the node marked *PredP*in (19), assuming the lexical entries in (20):

(20) a. $[\![\textbf{students}]\!] = \lambda s\ .\ \lambda x_e\ .\ x$ comprises students in s

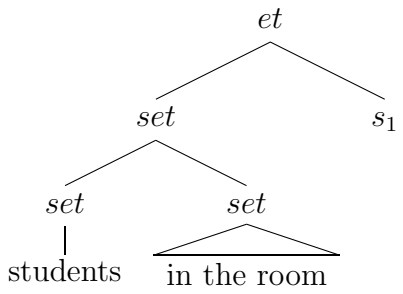
b. $[\![\textbf{in the room}]\!] = \lambda s\ .\ \lambda x_e\ .\ x$ is in the room in s

(21) a. 

b.



c.



In each structure above, *students* and *in the room* combine via Predicate Modification. (This combined predicate is then existentially closed; see section 3.3 for details.) However, how these two phrases combine with situation pronouns differs in each structure. In (21-a), the NP and the predicate take two different situation variables, s_1 and s_2; in (21-b), they take two coindexed pronouns; and in (21-c), they only take one pronoun. The Intersective Predicate Generalization allows only the latter two structures, where the NP *three students* is evaluated at the same world and time as the predicate *in this room*.

In the next two subsections, I will examine evidence that the Intersective Predicate Generalization holds in the Existential There Construction: first showing that the elements of the Existential There Construction must be evaluated at the same possible worlds, and then that they must be evaluated at the same times. In the last subsection, I will present data involving the Have Construction, which turns out to be very similar to the Existential There Construction.

2.3.1 Worlds in the Existential There Construction

Musan (who credits von Fintel, p.c., for this observation) predicts that her generalization will extend to possible worlds as well as times. And indeed, this extension

seems to obtain:

(22) a. Mary thinks someone in this room is outside.
b. #Mary thinks there's someone in this room outside.

(23) a. Mary thinks three professors are (still) in college.
b. #Mary thinks there are three professors (still) in college.

(24) a. Mary thinks many fugitives are in jail.
b. #Mary thinks there are many fugitives in jail.

Take (24), for instance. Example (24-a) is true in a scenario where there are many real-life fugitives that Mary mistakenly believes to be safely locked up in jail; the reading that makes it true is one where *many fugitives* is *de re* and *in jail* is *de dicto*. Under the Free Situation Pronoun Hypothesis, this reading should also be available for (24-b); but in fact, as captured by the Intersective Predicate Generalization, this reading is unavailable. (24-b) sounds odd because it entails that Mary has a contradictory thought, namely that a number of people are both fugitives and in jail in the same world (and at the same time).

2.3.2 Times in the Existential There Construction

(25) Some members of congress knew each other in college. In fact, ...
a. ... three U.S. Senators were attending Harvard together in 1964.
b. #... there were three U.S. Senators attending Harvard together in 1964.

In sentence (9), repeated in (25-a), the NP *three U.S. Senators* is evaluated at a time after the year 1964 (most probably the speech time), whereas the VP *were attending Harvard together* is evaluated in the year 1964.[5] Under the Free Situation Pronoun Hypothesis, this same reading should be available for (25-b); however, as captured by

[5]Due to the confounding factors discussed in section 2.7, I have constructed examples of Musan's Generalization where the NP in question is evaluated at a time after the time at which the main predicate of the sentence is evaluated and hence cannot make use of the silent *former* operator posited below.

the Intersective Predicate Generalization, it is not available, resulting in the oddness of (25-b) as described in section 2.1.2 above. In this way, as well, the Intersective Predicate Generalization subsumes Musan's Generalization, which only covers this particular case.

2.3.3 The Have Construction

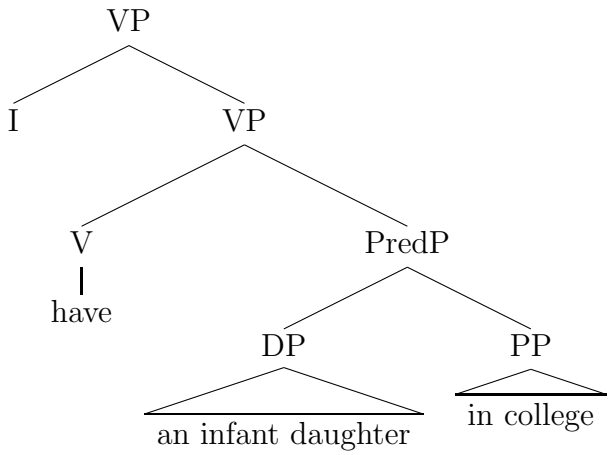
(26) a. #In 1995, there was an 18-year-old in kindergarten.
b. #Mary thinks there is an infant in college.

(27) a. #In 1995, I had an 18-year-old daughter in kindergarten.
b. #Mary thinks I have an infant daughter in college

In both the Existential There Construction in (26) and the Have Construction in (27), the NP and the predicate following it must be evaluated at the same world and time. The (a) sentences above sound odd since they entail that someone is both 18 years old and in kindergarten in the same world and time. Similarly, the (b) sentences entail that someone is both an infant and in college in the same world and time.

In section 3.3.3, I will argue that the structure of the the Have Construction is very similar to the Existential There Construction. The only difference is that the argument of a relational noun like *daughter* (*I* in this case) appears as the subject of the sentence:

(28)

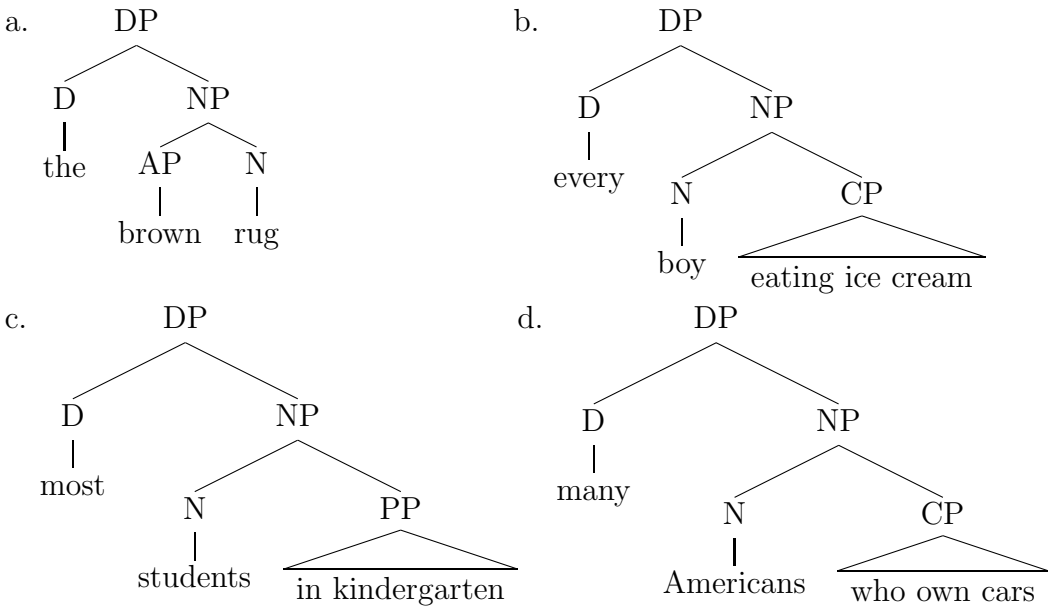


The crucial part of the analysis is that *an infant daughter* and *in college* compose via Predicate Modification and hence must be evaluated at the same world and time, according to the Intersective Predicate Generalization. (See section 3.3.3 for details.) This is indeed consistent with the evidence in (26) and (27).

2.4 Nouns and Intersective Modifiers

Having seen evidence for the Intersective Predicate Generalization in the Existential There Construction and the Have Construction, we turn in this section to the quintessential case of two phrases being composed via Predicate Modification: a noun and an intersective modifier (Jackendoff 1977). In an extensional system, such a configuration looks like the following:

(29)



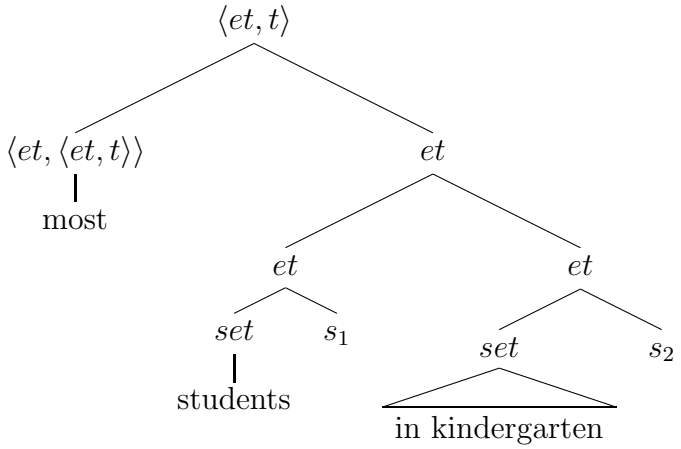
In each case, the noun and the modifier combine via Predicate Modification. Once situation pronouns are factored in, the Free Situation Pronoun Hypothesis would predict both the structures in (31) for (29-c), given the lexical entries in (30):

(30) a. $[\![\textbf{students}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ comprises students in s

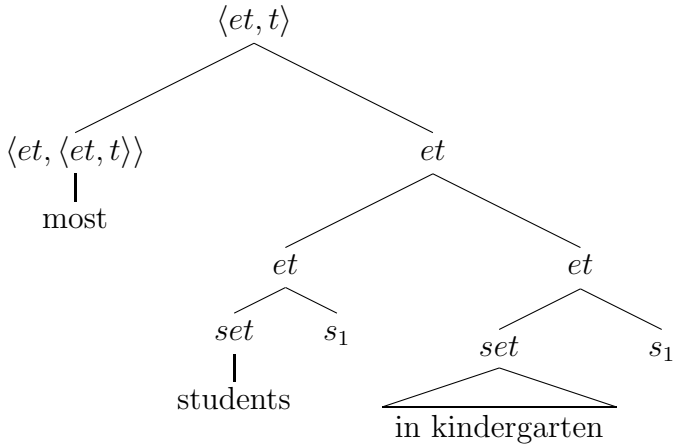
b. $[\![\textbf{in kindergarten}]\!]\ \lambda s_s \,.\, \lambda x_e \,.\, x$ is in kindergarten in s

c. $[\![\textbf{most}]\!] = \lambda P_{et}\ .\ \lambda Q_{est}\ .\ \lambda s_s\ .$ for most x such that $P(x)\ .\ Q(x)(s)$[6]

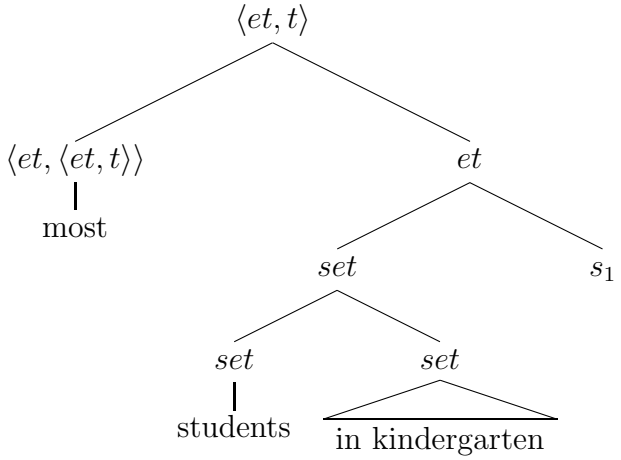
(31) a.



b.



c.



In (31-a), the noun and its modifier take different situation pronouns; in (31-b) they take coindexed pronouns; and in (31-b) they take only one situation pronoun. The

[6]See sections 3.5.1 and 3.5.2 for discussion on the denotations of generalized quantifiers.

Intersective Predicate Generalization is upheld only in the latter two structures, where the noun and its modifier must be interpreted at the same world and time. The next two subsections will show evidence that the Intersective Predicate Generalization holds for nouns and their intersective modifiers, first relative to times and then relative to possible worlds.[7]

2.4.1 Times of Nouns and their Modifiers

(32) #In 1964, every U.S. Senator (then) at Harvard got straight A's.

(33) Every U.S. Senator who was at Harvard in 1964 got straight A's in college.[8]

If the noun *U.S. Senator* in (32) and its modifier *at Harvard* could hold at different times, then the sentence might mean the same as (33). However, pursuant to the Intersective Predicate Generalization, this reading is not available. The sentence sounds odd since it entails that there were people who were sitting senators and at Harvard at the same time.

Now let's look at a slightly more complex sentence:[9]

(34) a. Two years ago, my 10-year-old classmate was in a different class.

b. Two years ago, a 10-year-old in my class was in a different class.

Presuming a student cannot be in two classes at once (in grade school at least), the subject NPs *my 10-year-old classmate* and *a 10-year-old in my class* must be evaluated at a time other than the time at which *was in a different class* is evaluated; in this case, the most salient reading is where these NPs hold at the speech time. Under the Free Situation Pronoun Hypothesis, it should be possible for *classmate* and *in my class* to be evaluated at different times than *10-year-old*. If this were true, then the sentences in (34) should have readings where the speaker's classmate is now twelve years old and was in a different class when he was ten. However, these readings

[7] A suggestion along these lines was first made to me by Jon Gajewski, p.c.

[8] In this sentence, the noun holds at the same time as the entire modifier *who was at Harvard in 1964*; the phrase *at Harvard* holds at the time shifted backwards by the past tense on *was*.

[9] Thanks to Danny Fox for suggesting this kind of example.

are simply not available, confirming again the Intersective Predicate Generalization.

2.4.2 Worlds of Nouns and their Modifiers

(35) #Mary thinks the married bachelor is confused.

(36) a. Mary thinks a baby from Mars is an adult.

b. Mary thinks a baby Martian is an adult.

The reasoning follows similarly for the cases in (35) and (36). In (35), *bachelor* and *married* must be in the same world, despite the fact that it leads to an odd reading. In (36), since nothing – not even an alien – can be a baby and an adult, neither *a baby from Mars* nor *a baby Martian* can be evaluated at the same world as *is an adult*. Therefore, in both cases, the subject must be *de re*, evaluated in the real world. Under the Free Situation Pronoun Hypothesis, part of each subject (i.e., *from Mars* or *Martian*) might still be *de dicto*. If this possibility were available, perhaps the word *baby* alone could be *de re*. As captured by the Intersective Predicate Generalization, though, this is simply not the case; a speaker uttering either sentence in (36) must believe in Martians, and therefore *from Mars* and *Martian* must be *de re* as well.

2.4.3 Relative Clauses

Full relative clauses, as we have seen, do allow a little more disparity between the time at which they are evaluated and the time at which the nouns they modify are evaluated. For instance, a relative clause in the past tense (such as that in (33)) can shift the time of evaluation for items beneath this tense to a time earlier than that of the whole clause, and hence earlier than the time of evaluation of the noun that the relative clause modifies. However, certain relative clauses pose a larger problem for the Intersective Predicate Generalization, as shown in (37):

(37) a. A year ago, I met a bachelor who is now married.

b. Five years ago, Jill married a 30-year-old who made partner two years later.

(37-a) poses a problem because someone cannot be a bachelor and married at the same time. (37-b) is a problem because the noun describing Jill's husband is *30-year-old* and yet the action inside the relative clause takes place when he is probably 32 years old.

Let us first consider (37-a). I will follow Ogihara (1996) (who is following Kamp (1971), among others) in assuming that the present tense operator PRES is indexical to the time of utterance.[10] What this means is that the noun *bachelor* and the relative clause *who* PRES *is now married* can both be evaluated at some time in the past, even when *married* itself is evaluated at the speech time. In this way, (37-a) is no longer a problem for the Intersective Predicate Generalization, because the relative clause as a whole is evaluated at the same time as the noun it modifies.

(37-b) is a little trickier. For this case, I will modify a proposal due to Kusumoto (2005) and assume that the relative clause has an indexical present tense operator above the past tense. Therefore, the noun *30-year-old* can be evaluated at the same time as the relative clause *who* PRES PAST *made partner two years later*; but PAST *made partner* is evaluated at the speech time, and hence *made partner* is evaluated at a time prior to the speech time – namely two years after the matrix past tense time (the time of the marriage). In this way, any modifier with its own tense can circumvent the Intersective Predicate Generalization through a form of indexicality.

2.5 Depictives

So far, we have seen evidence for the Intersective Predicate Generalization coming from the Existential There Construction and from intersective modifiers of nouns. This section turns to the area of depictive secondary predicates. In Chapter 3, I also

[10]See section 2.7.1 for why the word *now* is required in this context. I assume that the *now* itself is not creating this reading due to the oddness of the following sentence:

(i) #There was a now/current professor in kindergarten in the '80's.

Under this analysis, since there is no tense on the phrase *now professor*, it cannot be shifted in time, and therefore the professor must be a kindergartner at the same time. And indeed the sentence sounds odd for this reason.

analyze both subject and object depictives as being interpreted intersectively: I claim that they compose with parts of the VP via Predicate Modification. These structures are not as widely accepted to be cases of intersective predicates as the previous two cases. However, to the extent that one believes they are intersective, they support the Intersective Predicate Generalization, and to the extent that one believes the Intersective Predicate Generalization, it supports an analysis of these predicates as intersective. I will first look at the simpler case of subject depictives before turning to the more complex case of object depictives.

2.5.1 Subject Depictives

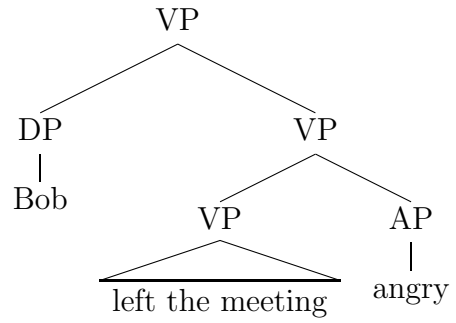
(38) Bob left the meeting angry.
(≈ Schultze-Berndt and Himmelmann (2004) (1))

Certain depictives, such as *angry* in (38), are subject-oriented: they modify the subject of the sentence. (38) means that as Bob left the meeting, he was angry. Subject depictives are canonically described as holding at the same time as the VP of the sentence (Schultze-Berndt and Himmelmann 2004). For instance, as shown in (39-a), Bob must be angry at the same time that he left the meeting. However, evidence suggests that depictives also must hold in the same world as their VPs. For instance, *angry* cannot be *de re* in (39-b). Instead, the depictive and the VP must be evaluated at the same world and time.

(39) a. Bob left the meeting angry, #but he was happy when he left.
b. John thinks Bob left the meeting angry, #but John doesn't think he was angry.

In section 3.4.1, I will propose the following structure for subject-oriented depictives, leaving out situation pronouns for the moment:

(40)



The VP *left the meeting* and the depictive adjective *angry* compose via Predicate Modification and hence this structure will fall under the Intersective Predicate Generalization once situation pronouns are taken into consideration. This is consistent with the fact that a subject depictive and the VP with which it combines must be evaluated at the same time and world as each other. As in the cases above, this either means that the two combine via Predicate Modification before combining with a situation pronoun or that the two situation pronouns with which they combine must be coindexed.

2.5.2 Object Depictives

(41) Jones cut the bread hot. (= Rapoport (1999) (2b))

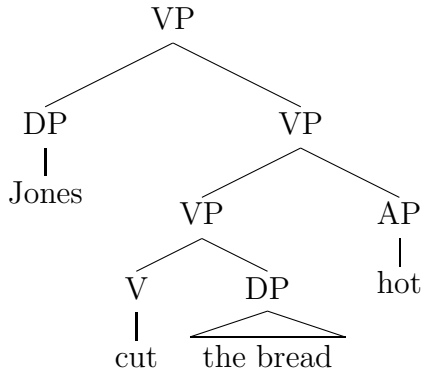
(42) a. Jones cut the bread hot, #but it was cold at the time.

b. Smith thinks Jones cut the bread hot, #but Smith thinks it was cold at the time.

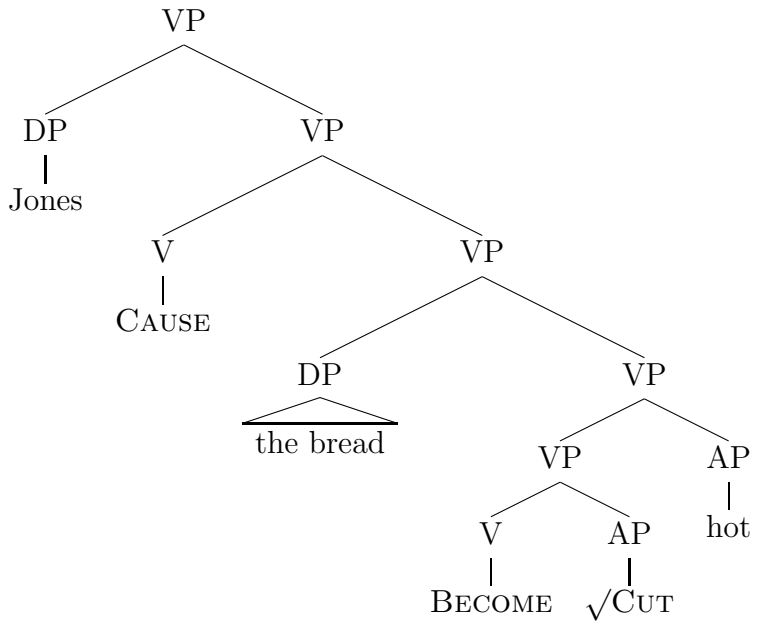
Another class of depictives modifies the object of a sentence, rather than the subject. For instance, (41) means that Jones cut the bread when the bread was hot, not when Jones was hot. Similarly to subject depictives, object depictives also may not be evaluated at a world or time differing from the evaluation world and time of the VP. For instance, (42-a) shows that the bread must be hot at the same time as when it is cut, and (42-b) shows that it must be hot in the same world as that in which it is cut.

This poses a small problem for my analysis, because in the simplest analysis of the object depictive, such as that in (43), it does not appear that the VP and the depictive can compose via Predicate Modification independently of the object. In section 3.4.2, though, I will argue for a more articulated structure, like the one in (44), for sentences with object depictives. In this structure, the VP BECOME $\sqrt{\text{CUT}}$ and the depictive *hot* do in fact combine via Predicate Modification – to the exclusion of the object DP *the bread* – and therefore also fall under the Intersective Predicate Generalization. This again is consistent with the fact that the object depictive and the VP must be evaluated at the same time and world.

(43)



(44)



2.6 Summary

This chapter has shown several pairs of linguistic expressions which must be evaluated at the same time and world as one another: the postcopular NP and the predicate in the Existential There Construction and Have Construction, an intersective modifier and the noun it modifies, and a depictive and the VP with which it combines. The Intersective Predicate Generalization was proposed to link these phenomena together: the generalization assumes that each of the pairs in this list comprises two nodes which are evaluated via the Predicate Modification rule and claims that no item of such a pair may be evaluated at a world or time different from its pair-mate. Chapter 3 argues explicitly that each of these pairs are evaluated via Predicate Modification and proposes an explanation for the Intersective Predicate Generalization involving an economy condition on situation pronouns.

2.7 Appendix: Complexities in Nominal Tense

This appendix addresses some apparent counterexamples to Musan's Generalization and shows how they can be explained using independently required mechanisms. The reader in a hurry may skip this section, since the ideas presented herein do not bear on the remaining chapters.

2.7.1 Maximize Presupposition

There are some pretty glaring exceptions to Musan's Generalization:

(45) a. #The fugitive is in jail.
b. #That bachelor is married.
c. #The employees are unemployed.

According to Musan's generalization, these sentences should be clear-cut cases where the subject can be evaluated at a time different from the VP. Each subject is an inherently strong NP, since none can appear in the Existential There Construction,

as shown in (46).[11] According to Musan, then, these subjects should be temporally independent, but the sentences in (45) all sound odd. They improve greatly, though, with the addition of certain adverbs, as shown in (47). For some reason, in these cases, such an adverb is obligatory.

(46) a. #There is the fugitive in my house.
b. #There is that bachelor out sick today.
c. #There are the employees at the bar.

(47) a. The fugitive is back in jail.
b. That bachelor is now married.
c. The employees are currently unemployed.

It is beyond the scope of this work to make a complete proposal for why this would be, but I will point out a parallel to certain independent data, shown in (48).

(48) a. Person A: Where's John?
b. Person B: He was at home an hour ago.
c. Person C: He's in his office #(now).

Even though (48-c) should have the exact same meaning with or without the word *now*, for some reason, in a context where a previous sentence mentioned John having being somewhere else, *now* is obligatory. In fact, without *now*, (48-c) sounds like Person C is contradicting Person B.

One possible way to explain this is that words like *now* and *currently* trigger presuppositions. The word *again* is often analyzed as taking a proposition argument and presupposing that this proposition was true at a previous time. The word *back* could presuppose the same thing when the proposition involves its subject being in a (literal or metaphorical) position in space. The words *now* and *currently* might take propositional arguments, too, and presuppose that these arguments have not always

[11] Except for the reading of the *There-is* construction where you are naming one item of a list (Milsark 1974).

held – i.e., the proposition was false at a previous time.

Given this possibility, the explanation for (48) could rest on an extension of the principle of Maximize Presupposition, proposed by Heim (1991): in a context where you can felicitously use a word that triggers a presupposition, you must use it. In fact, Amsili and Beyssade (2006) have proposed a similar analysis for words such as *too* and even *again*. This principle would hold in cases like (48): since John was recently not in his office, it is possible to use the presupposition trigger *now* in (48-c); therefore, due to Maximize Presupposition, this adverb is obligatory. Similarly, by describing someone as a fugitive as in (45-a), you are indicating that they were, at some point, not in jail; therefore you can use the presupposition trigger *back* and due to Maximize Presupposition, you must use this adverb. The rest of the Musan Generalization exceptions in (45) are also cases where presupposition triggers are felicitous, and therefore due to Maximize Presupposition, they are obligatory. This is obviously not a complete argument for such an account, but I would hold that it is at least reasonable to assume that whatever constraint is in effect in (48) is also in effect in the ostensive exceptions to Musan's Generalization in (45).

2.7.2 Temporal Interpretation of Nouns

In the previous section, we saw that sentences with temporally independent strong NPs require an adverb like *now* or *again*. With this in mind, we should investigate what happens when such a presuppositional adverb is added to sentences with weak NPs. Indeed, some sentences with weak NPs do improve (for some speakers) with the addition of such an adverb. For instance, given the proper context and adverb, the underlined sentences in (49) sound fine.

(49) a. Five convicts escaped yesterday, but thanks to some great policework, there are three fugitives now back in jail.

b. When I went to my first college reunion, 20 of my friends were still bachelors. But things are different today. Of those 20, there are ten bachelors now married, and five engaged.

c. The steel mill used to employ 800 people. But due to the layoffs last week, there are 200 mill employees currently unemployed.

Once again, this seems like a glaring counterexample to Musan's Generalization; in this case it is weak NPs that are receiving temporally independent readings. In (49-a), the weak NP *three fugitives* is ostensibly evaluated at a time prior to the evaluation time of its main predicate *in jail*. In (49-b), the weak NP *ten bachelors* is evaluated at a time prior to the time at which *married* is evaluated. Last, in (49-c), *200 mill employees* is evaluated at a time prior to the evaluation time for *unemployed*.

The addition of such an adverb does not, however, improve the sentences we first examined in this chapter:

(50) a. #In 1964, there were three U.S. Senators then/at that time/previously attending Harvard together.

b. #In the '80s, there were many professors then/at that time/previously in kindergarten.

In these cases, the NPs *three U.S. Senators* and *many professors* still seem to be temporally dependent on their predicates (*attending Harvard together* and *in kindergarten*, respectively).

To begin to solve this problem, I will present a proposal due to Enç (1981) – in fact, the very proposal that Musan argues against. Enç argues that a noun may be evaluated at any contextually-determined time, whether past, present, or future. For instance:

(51) a. Past: John's murderer escaped through the window.

b. Present: John's murderer is strangling him right now.

c. Future: John's murderer is not yet a murderer.[12]

In (51-a), the murder referred to by the noun *murderer* occurred before the action in the sentence; someone killed John, then escaped through the window. In (51-b), the

[12]Due to Roger Schwarzschild, according to Musan.

murder is happening as the sentence is spoken, and in (51-c), the murder has not yet happened, but the speaker presumes that it will.

These examples show that Enç was right – but only for strong NPs, like those in (51). Once we turn to weak NPs, the picture changes:

(52) a. Past: There are many murderers in San Quentin.
b. Present: A murderer is strangling someone as we speak.
c. Future: There is a #(future) murderer in that crib.[13]

(53) a. Past: There are 150 senators at the funeral.
b. Present: There is a senator in conference room.
c. Future: There is a #(future) senator attending Harvard this year.

The (a) sentences above show cases where a weak noun phrase is evaluated at a time prior to that of the sentence. For instance, in (52-a) the murders were committed well before their perpetrators were locked up in San Quentin. As for (53-a), there are never 150 sitting U.S. senators, so some of the funeral attendees must be former senators. The (b) sentences show cases where a weak NP is evaluated at a time overlapping with that of the sentence. In (52-b), the murder is happening at the speech time, and in (53-b), the senator can be currently serving his or her term. Both of the (a) and (b) sentences are fine, as shown by the acceptability of these sentences; however, when a noun phrase must be evaluated at a time after the action in a sentence, the sentence sounds odd, as in the (c) examples above. In (52-c), it sounds strange to refer to a baby, who could not have yet committed a murder, as a murderer; although if *murderer* could be evaluated in the future, this should be acceptable. In (53-c), it sounds odd to refer to someone as a senator before he or she is even eligible to run for office, although again if *senator* could be evaluated at a future time, this should also be acceptable.

[13]One case where *murderer* may be applied to a baby is when it refers to someone with the capacity to murder; I am ignoring such cases, although they may point to a silent version of a modal adverb like *potential* akin to the silent version of *former* that I propose below.

This evidence indicates that although weak NPs may be evaluated at a past or present time, they may not be evaluated at a future time. Some more examples of unavailable readings are given in (54):

(54) a. There is a #(future) major-league baseball player on my little league team.
b. There was a #(future) 120-year-old in the MIT class of 1880.
c. There is a Derby winner #(to be) at the starting gate.

My analysis of these facts is that Musan's Generalization is indeed true (pace Enç), and weak NPs must hold at the same time as their main predicates. However, there is a silent version of the word *former* (as defined in (55)) that can appear on noun phrases, so that the noun phrase as a whole occurs at the time of the main predicate, but the noun is evaluated at a time shifted backwards by the silent *former*. For instance, in (52-a), there is a silent *former*, and therefore the entire noun phrase *many* $\langle former \rangle$ *murderers* is evaluated at the speech time, but the noun *murderers* itself is evaluated at a time shifted backwards by *former*. Last, there is no such silent version of the word *future*, and this is why the future readings of weak NPs are unavailable.

(55) $[\![\langle former \rangle]\!] = \lambda P_{st} \,.\, \lambda \langle w, i \rangle in D_s \,.\, \exists i' \prec i \,.\, P(\langle w, i' \rangle)$

One problem remains: certain past readings of weak NPs are unavailable, as well:

(56) a. #There is a 10-year-old in the White House.
b. #There is a virgin pregnant for the third time.
c. #There was a kindergartner on the board of directors.

(56-a) cannot mean that the president used to be a 10-year-old. (56-b) cannot mean that a pregnant woman used to be a virgin. And (56-c) cannot mean that the board of directors includes a former kindergartner. Notice, however, that even with the overt word *former*, the sentences in (55) do not improve:

(57) a. #There is a former 10-year-old in the White House.

b. #There is a former virgin pregnant for the third time.

c. #There was a former kindergartner on the board of directors.

Perhaps when a noun is so widely applicable that everyone can be described by it (such as the nouns in (57)), it sounds odd to use the word *former*, and the silent version of *former* fares no better (as in (56))[14].

In summary, Musan's Generalization first seemed to be contradicted by strong NPs showing temporally dependent readings, but this turned out to be an instance of Maximize Presupposition easily remedied with the addition of the appropriate presupposition triggers. Next we examined cases where weak NPs seem to be temporally dependent, but these were explainable by positing a silent version of the word *former*. With these two caveats, Musan's Generalization remains true.

[14]Kai von Fintel, p.c., points out that while the sentences in (57), which have the overt form of *former*, are acceptable under a very obvious reading (*No, duh! Of course there is a former 10-year-old in the White House*), the same is not true for the sentences with the silent *former* (*No, duh! #Of course there is a 10-year-old in the White House*).

Although I do not completely understand why this might be, it may have something to do with the fact that the silent *former* does not imply (whether via presupposition or implicature) that the description in the noun does not still hold. For instance, among the senators in (53-a), some might be currently serving, while others are not; it suffices to render the sentence acceptable that they all were senators at some time prior to the funeral, whether or not they are now. This is not true for the overt word *former*: *There were 150 former senators at the funeral* cannot mean that any of the people described as *former senators* are currently serving. So, perhaps *No, duh! #Of course there is a 10-year-old in the White House* is unacceptable because it leaves open the possibility that the state of being a 10-year-old still holds.

Chapter 3

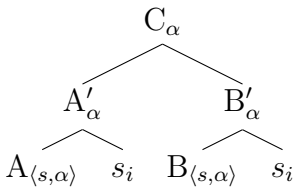
Situation Economy

Chapter 1 proposed an analysis of *de re* and *de dicto* readings involving covert situation pronouns. However, as seen in Chapter 2, the simplest version of this theory overgenerates in allowing readings for intersective predicates where each is evaluated in its own world and/or time. This chapter is an attempt to modify the situation pronoun theory to avoid these unattested readings.

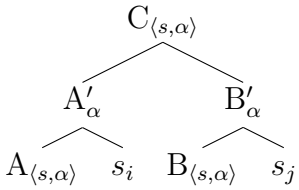
3.1 Situation Economy

Consider two nodes **A** and **B** of type $\langle s, \alpha \rangle$. Suppose each of these nodes combined with a situation pronoun (via Function Application) to form two nodes $\mathbf{A}'$ and $\mathbf{B}'$ of type α. Next, suppose that $\mathbf{A}'$ and $\mathbf{B}'$ combined via Predicate Modification to form a node **C**, also of type α, as shown in (1). The situation pronouns might be coindexed (as shown in (1-a)), constraining **A** and **B** to be evaluated at the same world and time since the two co-indexed pronouns must be bound by the same higher s-λ or, if free, must refer to the same situation. Alternatively, the pronouns might be indexed differently (as shown in (1-b)), allowing the possibility that **A** and **B** be evaluated at different worlds and times since each pronoun might be bound by a different s-λ operator.

(1) a.



b.

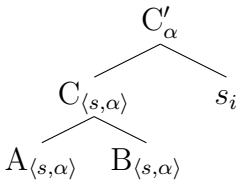


The structure in (1-a), where the situation pronoun arguments to the two intersective predicates are coindexed, is consistent with the Intersective Predicate Generalization, repeated in (2), whereas the structure in (1-b), where the pronouns have different indices, is not.

(2) **Intersective Predicate Generalization**:
Two predicates combined via Predicate Modification may not be evaluated at different times or worlds from one another.

Another structure that combines the two original nodes **A** and **B** to eventually form a node of type α is shown in (3). This structure is equivalent in meaning to (1-a), because there is only one situation pronoun and therefore the two predicates are necessarily evaluated at the same world and time.

(3)



The proposal defended in this chapter is not that (1-a) is preferred to (1-b), but rather that (3) is preferred over both structures in (1). One way to allow (3) but not (1) would be to restrict the Predicate Modification Rule to only apply to items of type $\langle s, \alpha\rangle$. However, as we will see in section 3.5.3 below, we need Predicate Modification to apply to items with other types, such as et. Therefore, instead of restricting Predicate Modification, this chapter will argue for an economy rule restricting situa-

tion pronouns themselves. As we will see in section 3.6, this economy rule correctly predicts facts about an unrelated phenomenon: the interpretation of bare plurals.

The remainder of this section will first discuss economy rules in general, then formalize the rule of Situation Economy, required to capture the Intersective Predicate Generalization. The last subsection goes through an example case using Situation Economy as a preview of the account.

3.1.1 Types of Economy

Researchers have long preferred linguistic analyses with fewer steps and less structure over those with more complexity. Chomsky, in outlining his Minimalist Program, states the following:

(4) Derivations and representations ... are required to be minimal ... with no superfluous steps in derivations and no superfluous symbols in representations (Radford 1997, quoting Chomsky (1989)).

Of course, exactly which steps in derivations or symbols in representations are superfluous is an open question, and numerous economy principles have been proposed to answer this question. Many such economy principles rule out structures entirely, explaining why certain sentences are grammatical and others are not. But other principles sometimes end up choosing between two derivations which yield different interpretations for a single grammatical sentence. Since this work is concerned with restricting the possible meanings of grammatical sentences, it is this latter type of economy principle to which I will eventually appeal.

Sauerland (2000) distinguishes between two types of economy principles, either of which can restrict the interpretations available to a grammatical sentence. The first type, which he calls *interface economy* after Reinhart (1995), may be violated if it leads to a different interpretation. See Fox (1999) for an extensive analysis of quantifier interpretation using interface economy principles. Sauerland's second type of economy principle, *syntactic economy*, is different from *interface economy* in that

it cannot be violated, even if it would lead to a new interpretation. The Intersective Predicate Generalization acts to limit the possible interpretations of sentences with time- and world-sensitive predicates. It is therefore a syntactic economy principle to which I will appeal to explain this generalization.

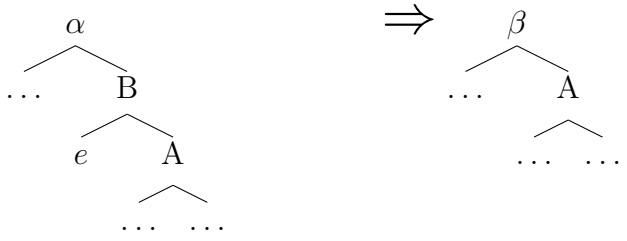
3.1.2 Definition

In order to ensure the use of structures like that in (3) (and therefore account for the Intersective Predicate Generalization), I propose the economy principle in (5), which favors structures having fewer situation pronouns over alternatives having more. The relevant definition of alternative is given in (6).

(5) **Situation Economy**: Rule out a structure α if there is a grammatical alternative to α that has fewer situation pronouns.

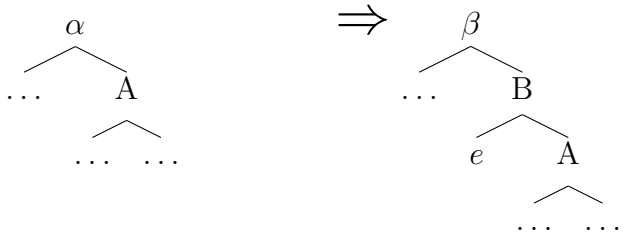
(6) **Alternatives**: β is an alternative to α if β is derivable from α via one or more applications of the following two operations:

a. *Null item deletion*:



A node **B** in α, one of whose daughters is an unpronounceable item e, is replaced by the other daughter of **B**.

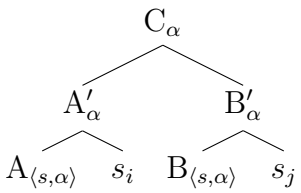
b. *Null item insertion*:



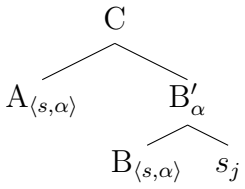
A node **A** in α is replaced by a node **B**, one of whose daughters is an unpronounceable item e and the other of which is **A**.

To take a simple example, assume that the α being evaluated for Situation Economy is the structure in (1-b). Through the following applications of the operations of null item deletion and null item insertion defined above, the structure in (3) is obtained:

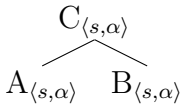
(7) a. *Original*



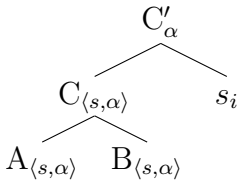
b. *Deletion* $\Rightarrow$



c. *Deletion* $\Rightarrow$



d. *Insertion* $\Rightarrow$



So, (3) is a grammatical alternative with fewer situation pronouns, and therefore (1-b) is ruled out under Situation Economy.

3.1.3 Preview: Nouns and Modifiers

Before I detail the assumptions needed for my proposal, I will present how Situation Economy applies in the case of nouns and modifiers, as a preview of the analysis

below. In Chapter 2, I argued that a noun and an intersective modifier, such as *professor* and *in kindergarten* in the phrase *the professor in kindergarten*, cannot be evaluated at different times or worlds. The relevant evidence is given in (8):

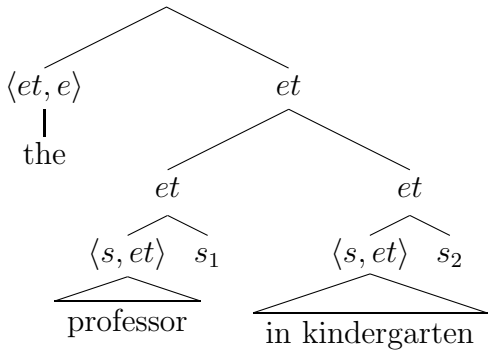
(8) a. #In 1984, the professor in kindergarten learned how to fingerpaint.
b. #Mary thinks the professor in kindergarten is too young to teach college.

The sentences in (8) are odd because *professor* and *in kindergarten* must be evaluated at the same time and world as one another, and it is pragmatically strange to imagine a professor still being in kindergarten.

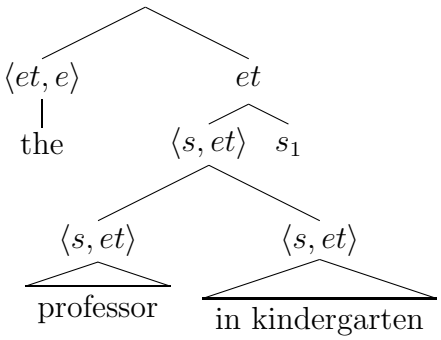
Assuming the definitions in (9), this fact falls out directly from Situation Economy. The structure in (10-a), where *professor* and *in kindergarten* could be evaluated at different worlds or times, is ruled out by the existence of the alternative structure in (10-b) which has fewer situation pronouns:

(9) a. $[\![\textbf{the}]\!] = \lambda P_{et}$. if there is only one x such that $P(x)$ then this x; otherwise, undefined.
b. $[\![\textbf{professor}]\!] = \lambda s_s$. λx_e . x is a professor at s.
c. $[\![\textbf{in kindergarten}]\!] = \lambda s_s$. λx_e . x is in kindergarten at s.

(10) a.



b.



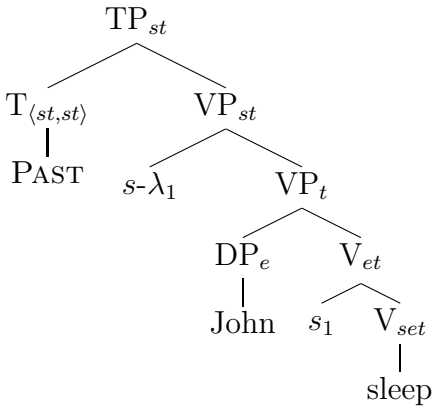
Any other noun and modifier that combine in an analogous way (such as those discussed in section 2.4) will also be subject to Situation Economy in a similar manner and therefore also conform to the Intersective Predicate Generalization.

3.2 Argument Structure

Before analyzing the rest of the intersective predicate cases in terms of Situation Economy, I will outline, in this section, the assumptions I am making about the syntax and semantics of predicates and arguments.

First, I will assume that all one-place predicates, whether they are verbs, nouns, adjectives, or prepostions, are of type *set*. Furthermore, I assume that verbs obligatorily combine with a situation pronoun which is bound by a λ operator[1] at the top of the clause. This assumption is an implementation of a constraint on situation pronouns due to Percus (2000). (See Chapter 4 for extensive discussion of this constraint.) So, for instance, the verb *sleep* is of type *set*, but when it combines with the situation pronoun s_1, it forms a node of type *et*, as shown in (11). This higher node is now of the proper type to combine with an argument, such as *John* below. To simplify the structures, I assume that this subject reconstructs to a position within the VP before LF.

(11) a. John slept.

b. 

DPs, APs, and PPs lack this situation pronoun and therefore may not combine directly with a type-*e* subject, as shown in (12). Instead, English provides a special verb, the copula, which has no meaning, but provides the requisite situation pronoun to fill these phrases's situation arguments and allow them to combine with a subject,

[1]Remember that what I will represent as a λ in example structures is essentially the same as the numerical indices assumed in Heim and Kratzer (1998).

as shown in (13).[2]

(12) a. *John a painter.

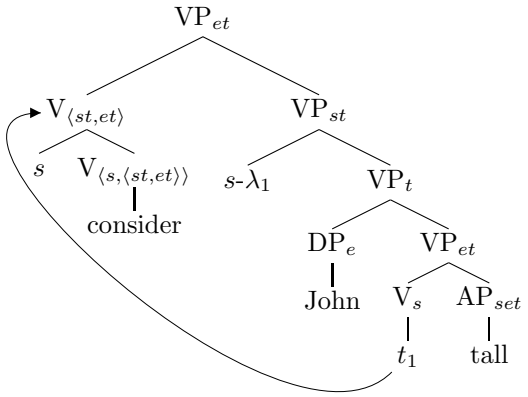
b. *John tall.

c. *John in the garden.

[2]Under certain verbs, such as *consider* and *find*, it seems as though no copula is needed to combine a DP, AP, or PP with a subject (see (i)). One possible explanation for this might be that the verb itself moves, leaving a type-s trace fulfilling the role of the copula in other sentences; such a structure is shown in (ii).

(i) a. I consider John tall.
b. I found John immature.
c. I consider John in a class of his own.

(ii)

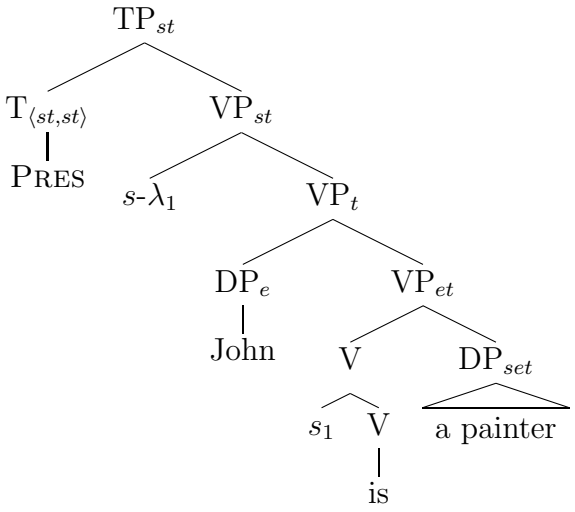


This would also explain why such verbs may never take a simple DP or NP complement, while verbs that take a truly clausal argument often may:

(iii) a. I believe that rumor/story.
b. I used to think that.
c. I want that, too.

(iv) a. *I consider/found that state of affairs.
b. *I used to consider/find that, too.

(13) a. John is a painter.

b. 

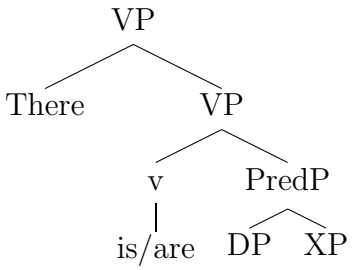
3.3 Existential There Construction

With these assuptions in place, I will now turn to another application of the Intersective Predicate Generalization: the Existential There Construction (ETC). I will take Milsark's (1974) dissertation as the starting point for my analysis of the ETC. Milsark concludes, after exhaustive analysis, that an ETC such as (14-a) is derived from an underlying structure like (14-b) via one or more movement rules (such as lowering the subject and inserting the expletive *there*):

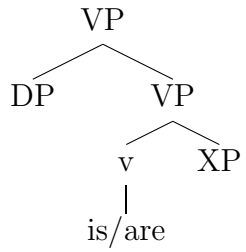
(14) a. There is a man in the garden.

b. A man is in the garden.

Sentences like these can be schematized as in (15):

(15) a. 

b.

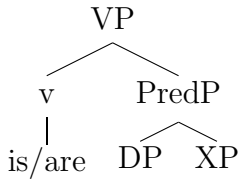


Milsark then introduces a special interpretation rule for ETC sentences, under which they are basically interpreted with existential closure:

(16) The structure in (15-a) is interpreted: the class C denoted by DP has at least one member c such that $P(c)$ is true, where P is a predicate and P is the reading of XP ($\approx$ 58, p. 190).

The analysis I will present in this section tries to remain true to the spirit of Milsark's proposal, while bringing it in line with a few more recent assumptions about syntax and semantics. First, in keeping with the VP-internal subject hypothesis and rules against syntactic lowering, I assume that both structures in (15) are derived from a common ancestor, rather than one being derived from the other. This common structure is given in (17) (see Stowell 1978):

(17)



Given this underlying structure, the two structures in (15) only differ syntactically in that the subject position (Spec,TP) is filled in the ETC (15-a) by inserting the expletive *there*, whereas this subject is filled in the non-ETC sentence (15-b) by raising the DP in (17).

Under my analysis, deriving the meaning of an ETC sentence will require no special interpretation rule. Instead, I propose that the DP and XP in an ETC, both being predicates of type *set*, are combined via Predicate Modification. Then, as described in section 3.2, the copula fills the situation argument of this complex

predicate, allowing a freely insertable existential closure operator ($\exists$) to apply. To take a simple example, consider the following sentence, definitions and structure[3]:

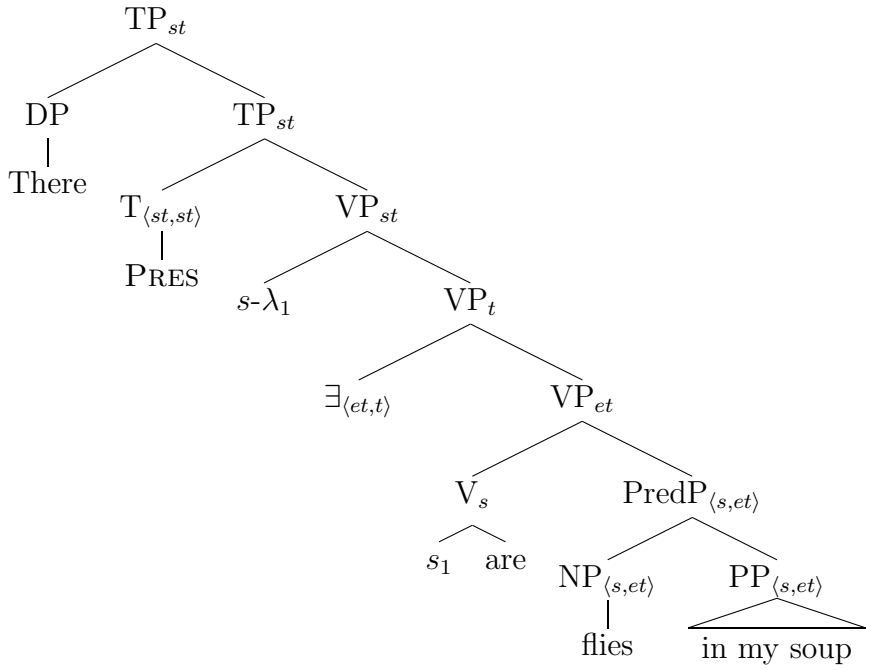
(18) There are flies in my soup.

(19) a. $[\![\textbf{flies}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ comprises flies in s

b. $[\![\textbf{in my soup}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ is in my soup in s

c. $[\![\exists]\!] = \lambda P_{et} \,.\, \exists x_e \,.\, P(x)$

(20)



Ignoring the present tense, the derivation proceeds as follows.

(21) a. $[\![[_{PredP}$ **flies in my soup**$]]\!] =$

$\lambda s_s \,.\, \lambda x_e \,.\, x$ comprises flies in s and x is in my soup in s

b. $[\![[_{VP}\ s_1$ **flies in my soup**$]]\!] =$

$\lambda x_e \,.\, x$ comprises flies in s_1 and x is in my soup in s_1

c. $[\![[_{VP}\ \exists\ s_1$ **flies in my soup**$]]\!] = 1$ iff

$\exists x_e \,.\, x$ comprises flies in s_1 and x is in my soup in s_1

d. $[\![[_{VP}\ s\text{-}\lambda_1\ \exists\ s_1$ **flies in my soup**$]]\!] =$

[3]I assume that the bare plural *flies* is an NP, not a DP. Also, I assume the existence of plural individuals as defined by Link (1983).

λs_s . $\exists x_e$. x comprises flies in s and x is in my soup in s

Therefore, the meaning of (18) is:

(22) λs . There is an x such that x comprises flies in s and x is in my soup in s.

The NP in (18) did not have a determiner or article of any kind – it was a bare plural. For NPs in the ETC having articles, I will adopt what Landman (2004) calls the Adjectival Theory of indefinite determiners, namely that the type of determiners in weak NPs is *set*. In fact, I will consider these to be adjectives, albeit syntactically special adjectives, and hence call their combinations with nouns NPs rather than DPs. Some limited data supporting this view follows, but see Landman (2004) for a complete argument:

(23) a. John was one/a/#every carpenter.

b. The visitors were two/three/?many/?several/#most carpenters.

(24) a. The one/#every man

b. The two/three/many/several/#most men.[4]

(23) shows that generalized quantifiers like *every* and *most* cannot be used as predicates, and (24) shows that they cannot appear under the definite determiner *the*. These positions are generally filled by predicates, so the fact that weak determiners can appear there, but quantifiers cannot, suggests that weak determiners[5] are in fact predicates.

The meanings of a few of these adjectival determiners are given in (25):

(25) a. $[\![\mathbf{a}]\!] = \lambda s_s$. λx_e . $|x| = 1$ in s

b. $[\![\mathbf{two}]\!] = \lambda s_s$. λx_e . $|x| = 2$ in s

c. $[\![\mathbf{three}]\!] = \lambda s_s$. λx_e . $|x| = 3$ in s

[4]The determiner *most* is allowed, of course, when it means *the highest number of*, but this is a different meaning from the generalized quantifier *most*.

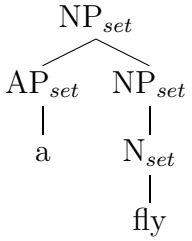
[5]In informal usage, I will continue to call these items *weak determiners*, even though they are not formally determiners.

d. $[\![\textbf{few}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, |x| < n$ in s,
for some contextually determined small n

e. $[\![\textbf{many}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, |x| > n$ in s,
for some contextually determined large n

Under this theory, when a weak NP has a quantificational reading, it appears with a silent generalized quantifier determiner. For discussion of this determiner, see section 3.5.1 below. In the ETC, however, these NPs are analyzed as pure predicates:

(26) a.



b. $[\![\textbf{(26-a)}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ comprises flies in s and $|x| = 1$ in s.

Any quantification force for the NP comes from the existential closure operator above the copula in the ETC, not from the article *a*.[6]

The remainder of this section proceeds as follows. First, this analysis of the ETC is defended by exploring how it captures the properties of the ETC noted by Milsark (1974). The next subsection argues that the Situation Economy rule captures the effects of the Intersective Predicate Generalization in the ETC, and the last subsection argues the same for the related Have Construction.

3.3.1 Properties of the ETC

In this subsection, I will go over a few major properties of the ETC that Milsark (1974) describes, and show how the proposal sketched above derives these properties. First, Milsark points out that in the ETC, there is always an NP after the copula[7].

[6]This assumption does bring up a problem with the adjectival theory of weak NPs, involving non-monotone-increasing determiners. See Landman (2004) for a solution to this problem.

[7]For the purposes of this proposal, I am ignoring ETC sentences which do not have a copula, although I believe that the analysis could in theory be extended to these cases.

This restriction is not surprising, though, under the view that the ETC starts its derivation the same way as any other copular sentence; and all such sentences require an NP in this position:

(27) a. The dog is nice.
b. Singing is nice.
c. *(Being) happy is nice.
d. *(Being) among friends is nice.

(27-a), which has an NP subject, and (27-b), whose subject is a nominal gerund, sound fine. However, even though APs and PPs have the same semantic type as an NP, copular sentences sound quite odd with AP and PP subjects, as in (27-c) and (27-d).[8] I will not offer an explanation for this restriction, but merely suggest that under this analysis, whatever accounts for this restriction in non-ETC copular sentences (and indeed in most sentences overall) will also account for the fact that the first post-copular phrase is an NP.

Milsark also shows that only weak NPs may appear in the ETC; he calls this the Definiteness Restriction. The analysis given above explains this restriction neatly. I will argue below that a generalized quantifier is of type $\langle et, \langle et, t\rangle\rangle$, and hence a quantificational DP is of type $\langle et, t\rangle$. This type clearly will not combine properly with an XP of type *set*. But what if the DP had the type $\langle set, st\rangle$, and therefore could combine (via Function Application) with the XP? Then, the PredP combining the DP and the XP would have type *st*. Combining this PredP with the copula would form a node of type t, which could then be abstracted over by the s-λ with no need for existential closure, deriving the proper type for a clause, *st*. However, although

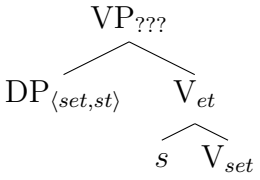
[8]Some poetic or stylistic examples allow the XP to appear in the subject position:

(i) a. Blessed are the meek.
b. On the table was my birthday present.
c. Extremely troublesome for the engineers were the cracks in the foundation.

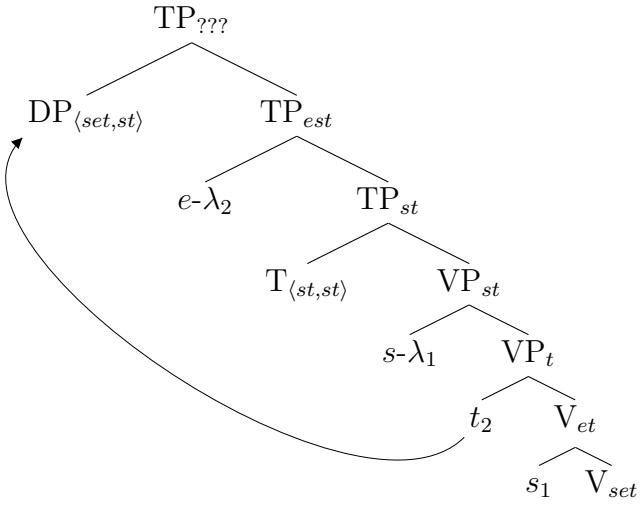
However, Moro (1997) argues that even in these cases, the underlying structure is as in (17); the predicate then may raise to (Spec,TP) to become subject of the whole sentence.

a quantificational DP of type $\langle set, st\rangle$ might work for the ETC, it would no longer work for non-ETC sentences, since (intransitive) verbs are always of type et once they combine with the required situation pronoun, and therefore they could not combine with the DP, as shown in (28). Even if the DP raised to the very top of the sentence, it could not combine properly, as shown in (29).

(28)



(29)



Therefore, quantifiers must be of type $\langle et, \langle et, t\rangle\rangle$ rather than $\langle set, \langle set, st\rangle\rangle$ and hence cannot appear in the ETC.

Unlike Milsark, for whom the Definiteness Restriction arises due to the obligatory existential closure over the NP in his interpretation rule given in (16), this analysis derives the Definiteness Restriction from the types of the expressions involved – and the obligatory appearance of a situation pronoun on the verb. This analysis allows the existential closure operation to remain free, rather than obligatory as in Milsark's account.[9]

[9]It also allows a novel way of looking at Diesing's (1992) idea that items inside the VP are existentially closed: this could also be due to a type restriction, rather than an obligatory existential closure rule.

The last property of the ETC that I will examine is what Milsark calls the Predicate Restriction, which describes which XPs may appear in the ETC:

(30) (cf. Milsark's (100), p. 210)

a. Can appear: *sick, drunk, hungry, stoned, tired, closed, alert, open, clothed, naked*, etc.

b. Cannot appear: all NPs, shapes, colors, *intelligent, beautiful, boring, crazy*, etc.

Milsark calls those that can appear in the ETC *states* and those that cannot appear *properties*, although most more recent work calls the former *stage-level predicates* and the latter *individual-level predicates* after Carlson (1977). Intuitively, stage-level predicates only hold for a limited time, while individual-level predicates are usually permanent. Milsark notes that even outside of the ETC, individual-level predicates may only be predicated of quantificational DPs:

(31) (≈ (107))

a. A man was sick.

b. #A man was tall.

c. Every man was sick.

d. Every man was tall.

e. Two men were sick.

f. Two men were tall.

So, with the weak NP *a man* only the stage-level predicate *sick* sounds good, whereas either predicate sounds fine with the strong DP *every man*. Interestingly enough, (31-f) sounds fine, but only under the quantificational reading of *two men*, namely, *two of the men under discussion were tall*. Therefore, Milsark proposes the following constraint:

(32) (≈ (109)) Individual-level predicates are only predicated of quantificational

DPs. Stage-level predicates may be predicated of quantificational DPs, but may also be predicated of NPs without quantification.

Of course, the same constraint carries over to this analysis: whatever explains such a restriction in normal sentences (see, e.g., a recent proposal by Magri (2006)) should carry over to the ETC.

3.3.2 Situation Economy in the ETC

The last subsection defended the present analysis of the ETC, in which the only situation pronoun in the sentence whatsoever is on the verb. This subsection will show how this account of the ETC, plus Situation Economy, can explain why the DP and XP in the ETC must be evaluated at the same world and time. For instance, take the following sentence:

(33) #In 1964, there were three professors in kindergarten.

(33) is odd, since *three professors* and *in kindergarten* must be evaluated at the same world and time.

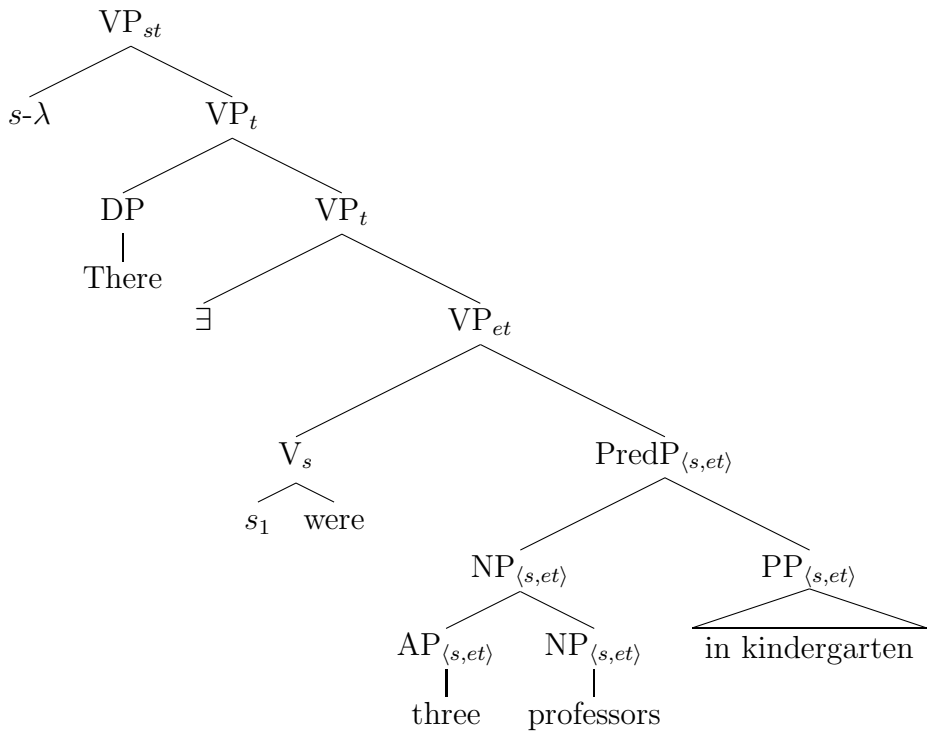
To see how the analysis proceeds, consider the following structure, definitions, and meaning for (33). (I have only represented up to the VP.)

(34) a. $[\![\textbf{three}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, |x| = 3 \text{ in } s$

b. $[\![\textbf{professors}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ comprises professors in s

c. $[\![\textbf{in kindergarten}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ comprises students in kindergarten in s

(35)



(36) a. $[\![[_{NP}$ **three professors**$]\!] =$
λs_s . λx_e . $|x| = 3$ in s and x comprises professors in s

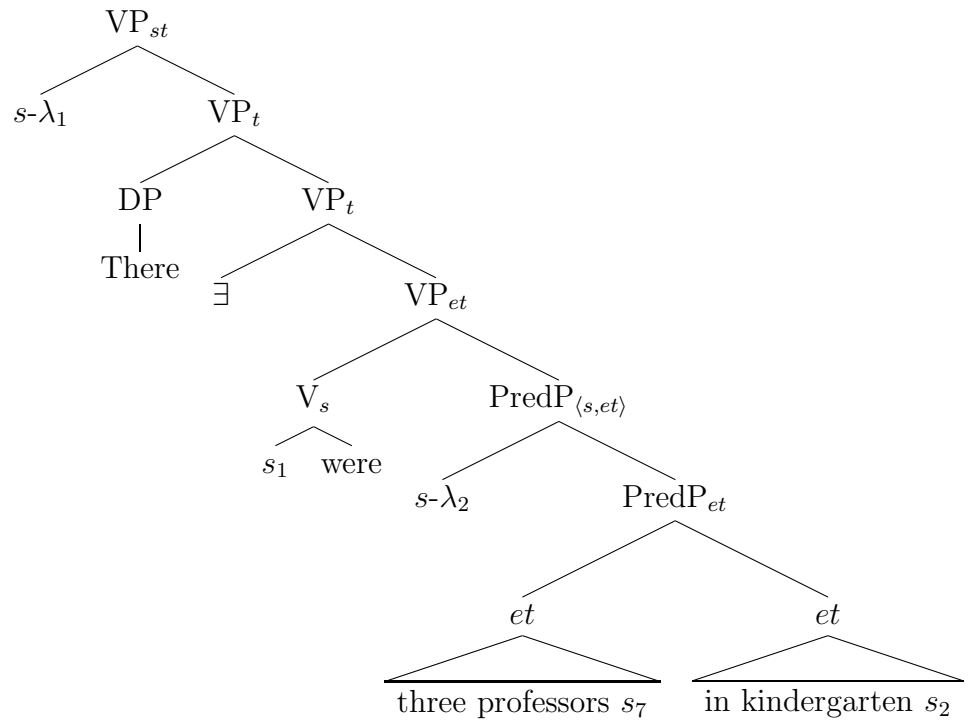
b. $[\![[_{PredP}$ **three professors in kindergarten**$]\!] =$
λs_s . λx_e . $|x| = 3$ in s, x comprises professors in s and x comprises students in kindergarten in s

c. $[\![$**(35)**$]\!] = \lambda s$. there was an x such that $|x| = 3$ in s, x comprised professors in s, and x comprised students in kindergarten in s.

Given this structure, the predicates *three professors* and *in kindergarten* must be evaluated at the same time and world. However, consider another grammatical structure for the sentence[10]:

[10]I assume the null hypothesis whereby a λ operator may appear freely and be interpreted by the rule of Predicate Abstraction (see Bittner 1994).

(37)



In (37), *three professors* and *in kindergarten* take differently-indexed situation pronouns and therefore might be evaluated at different worlds or times from one another. However, under the definitions in (6), (35) is an alternative to (37) and (35) has fewer situation pronouns than (37); therefore, (37) is (correctly) ruled out by Situation Economy.

3.3.3 Have Construction

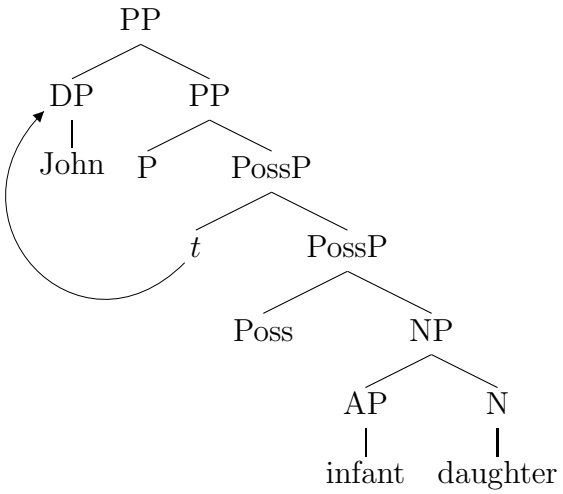
As discussed in Chapter 2, the Have Construction (HC) shares a number of important properties with the ETC. For instance, consider the example sentences in (38):

(38) a. #There's an infant daughter of John's in college.
b. #John has an infant daughter in college.

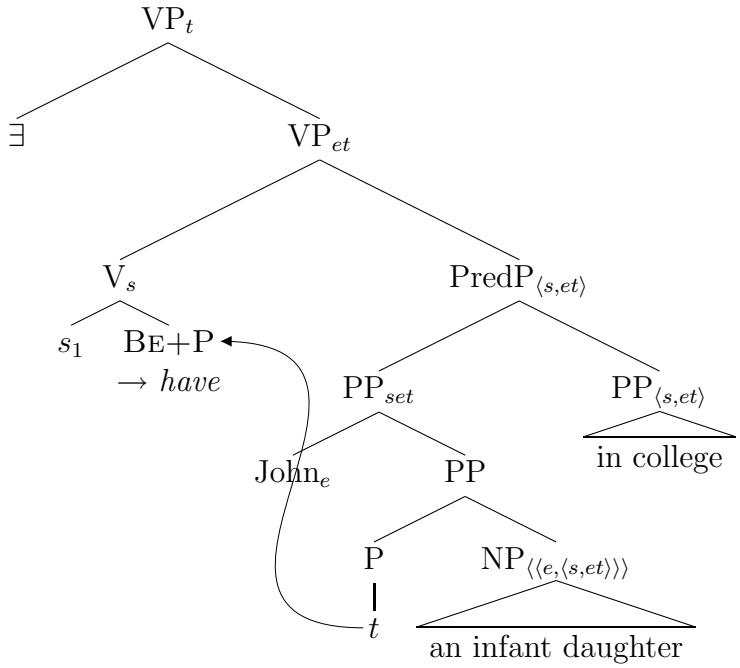
Just as (38-a) is odd due to the constraint that *infant* and *in college* be evaluated at the same world and time, (38-b) is odd, presumably, since *infant daughter* and *in college* must be evaluated at the same world and time.

I would like to suggest that under a particular analysis of the Have Construction, these similarities would be predicted. Kayne (2000), following Freeze (1992) and Benveniste (1966), analyzes the Have Construction as a copular construction, where the word *have*, underlyingly, is the copula *be* plus an incorporated preposition. The subject in his analysis begins as specifier of the Possesive Morpheme, and raises to be specifier of a silent preposition, as in (39). From here, the DP eventually moves to subject position, as it appears in (38-b). Also, the abstract preposition incorporates with the copula to form the verb *have*, as shown in (40).

(39)

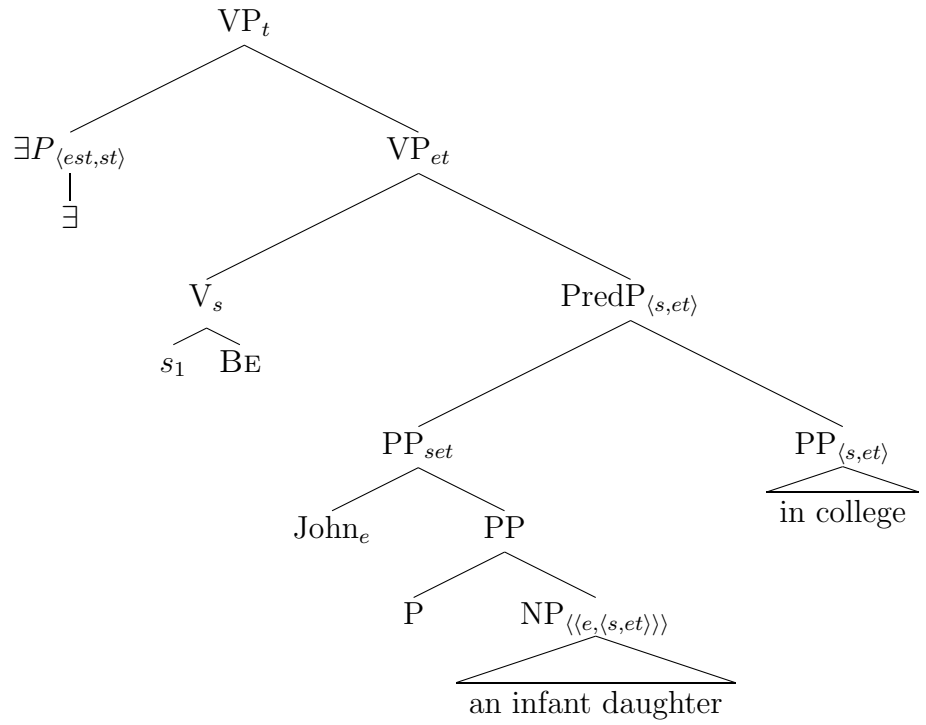


(40)



However, the structure which is interpreted at LF is the following:

(41)



Obviously, many details would need to be fleshed out to turn this into a full proposal. For instance, above I assumed that the post-copular phrase is always an NP (or DP) and Kayne assumes it can be a PP. However, the similarities between the Have Construction and the ETC are highly suggestive that some structure like Kayne's might be correct for the Have Construction.

3.4 Depictives

Another pair of phrases that must be evaluated at the same world and time as one another is a depictive and the VP to which it attaches. I will first describe how Situation Economy explains this phenomenon for subject depictives, which are a little more straightforward than their cousins, object depictives.

3.4.1 Subject Depictives

Depictives, also known as secondary predicates, are predicates other than the main VP of a sentence that modify a DP in that sentence (Schultze-Berndt and Himmelmann 2004):

(42) a. John left the room angrily, but he wasn't really angry.
b. #John left the room angry, but he wasn't really angry.

The adverb *angrily* modifies the action in the VP in (42-a), not the subject, John. It is conceptually possible for someone to leave a room in an angry manner, without actually being angry; hence the acceptability of (42-a). However, the depictive *angry* in (42-b) is predicated of John directly, and therefore it is anomalous to assert (42-b), which entails that John was both angry and not angry at the same time.

One of the defining features of a depictive is that it is evaluated at the same time as the VP (Schultze-Berndt and Himmelmann 2004). But, not surprisingly, the depictive also has to be evaluated in the same world as the VP:

(43) a. Mary thinks my brother left angry, but she doesn't know that he's my brother.
b. #Mary thinks my brother left angry, but she doesn't know that he was angry.

In (43-a), it is possible for *my brother* to be *de re*, and therefore be evaluated in the real world, rather than in Mary's thought worlds. However, as shown in (43-b), it is not possible for the depictive *angry* to be *de re*: once you assert that Mary thinks my brother left the room angry, it sounds odd to deny that she knows he was angry. I will analyze this fact as indicating that the depictive must be evaluated at the same world and time as the VP, which in turn is constrained by Percus's (2000) Generalization X to be *de dicto* (see Chapter 4 for details).

The analysis that I will present for depictives is a simplification of the one found in Pylkkänen (2002)[11]. The main idea of the analysis is that a depictive combines with the verb via Predicate Modification[12]. In the case of a subject depictive, the node resulting from this combination later combines with the subject via Function Application, and therefore the subject is the argument of both the verb and the depictive.

In order to adapt this proposal to the current system, a small change will be necessary. In previous subsections, the required situation pronoun in the VP has combined directly with the verb, as in (44).

(44) $[_{\mathrm{V}_{et}}\ \mathrm{leave}_{set}\ s]$

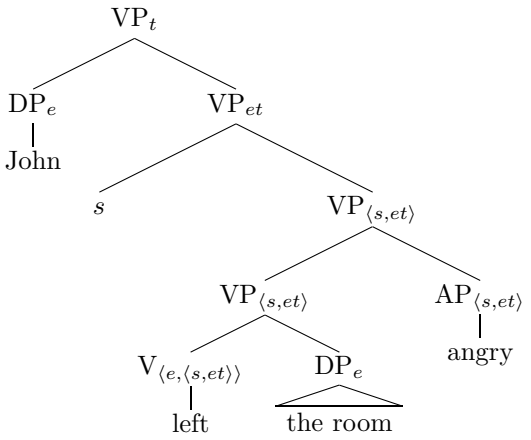
Instead, we must assume that the verb combines first with the depictive via Predicate Modification, and then the verb-plus-depictive complex combines with the situation pronoun:[13]

[11]Pylkkänen's analysis assumes event arguments and many more projections in the VP. Although I believe both of these assumptions would be compatible with this proposal, I am ignoring them for the sake of simplicity.

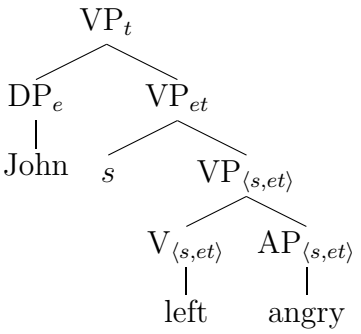
[12]Pylkkänen credits Yatsushiro (1999) with having a similar proposal.

[13]This gets a little complicated for transitive verbs. For now, I will assume that transitive verbs have the type $\langle e, \langle set \rangle \rangle$, as shown in (i):

(i)

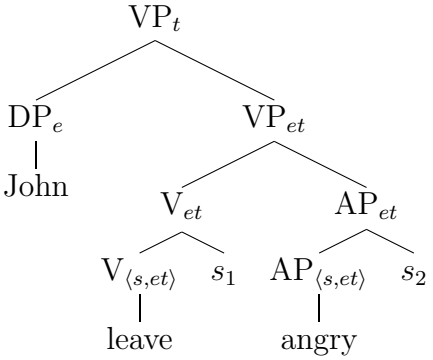


(45)



Once again, any alternative structure with more situation pronouns, such as (46), will be ruled out by Situation Economy:

(46)



In this way, given this analysis of depictives, Situation Economy predicts that these secondary predicates must be evaluated at the same time and world as the main predicate of the sentence.

3.4.2 Object Depictives

Sometimes a depictive modifies an object rather than a subject, as shown in (47). (I have used boldface to indicate the depictive and the DP that it modifies.)

(47) (= Rapoport (1999) (2))

a. Jones fried **the potatoes raw**.

b. Jones cut **the bread hot**.

c. Jones chopped **the wood wet**.

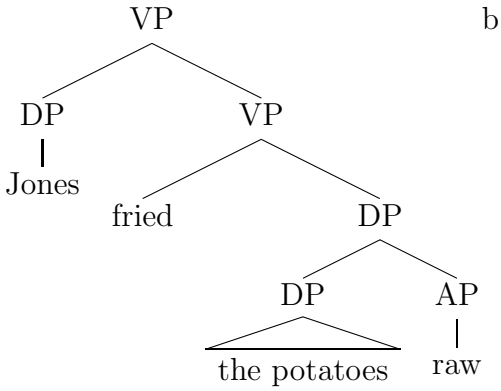
d. Jones froze **the juice fresh**.

e. Jones boiled **the lobster alive**.

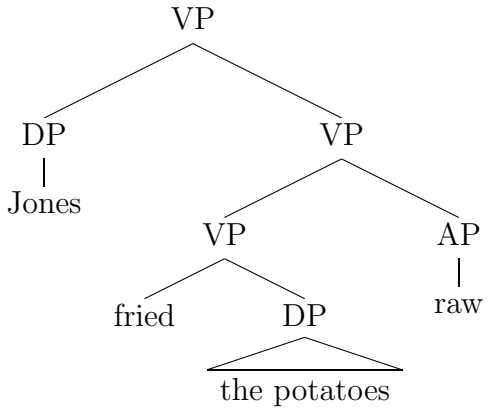
f. Jones bought **the dog sick**.

In (47-a), it is the potatoes that are raw, not Jones. On the face of it, this seems to pose a problem for the simple analysis given above. Neither of the two naive structures for (47-a), given in (48), is compatible with our analysis of depictives. In (48-a), the depictive *raw* is not the sister to the VP, so it cannot combine with VP via Predicate Modification. And in (48-b), *raw* is the sister of the VP, but this is the same structure as for a subject depictive, so *raw* would be predicated of the subject, not the object in (48-b).

(48) a.

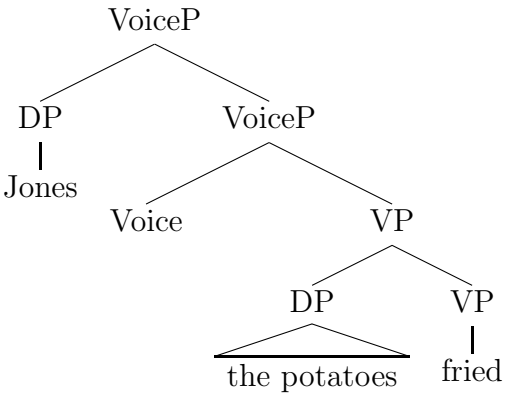


b.

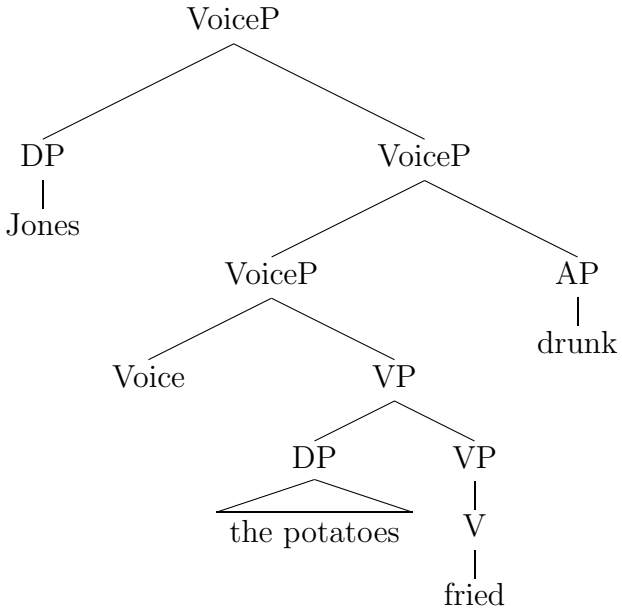


This issue does not arise for Pylkkänen, though, because in her system, following Kratzer (1996), among others, the subject is not an argument of the verb, but rather a higher Voice head, as shown in (49). Therefore, a subject depictive may combine with the VoiceP, as shown in (50-a), and an object depictive may combine with the VP, as shown in (50-b):

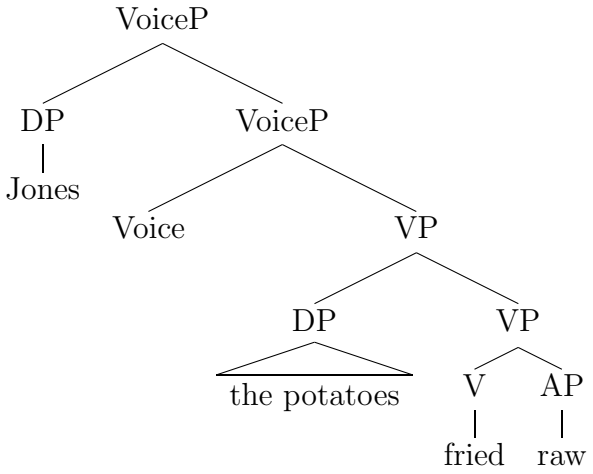
(49)



(50) a.



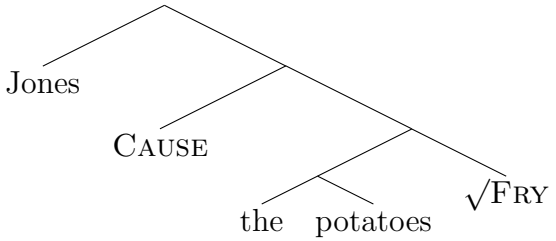
b.



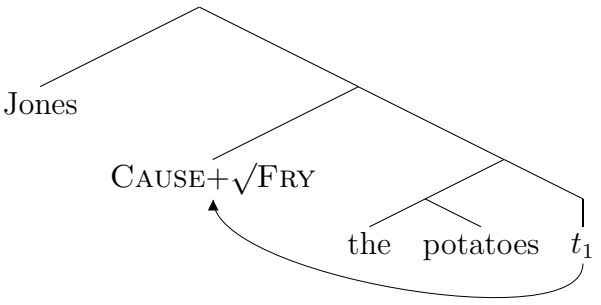
Although I believe this structure would be suitable for my purposes, for the semantics to work out, it would require the introduction of an event argument to link the the subject and the VP below (see Pylkkänen (2002) for details). Eventually, if

situation pronouns were truly construed as situations along the lines discussed in Kratzer (2007), perhaps these pronouns themselves could take the place of such an event argument. For the time being, though, for simplicity and consistency with the rest of this propsal, I will assume a less complex version of Pylkkänen's structure for (47-a), akin to those proposed by Dowty (1979):

(51) a. Jones fried the potatoes.

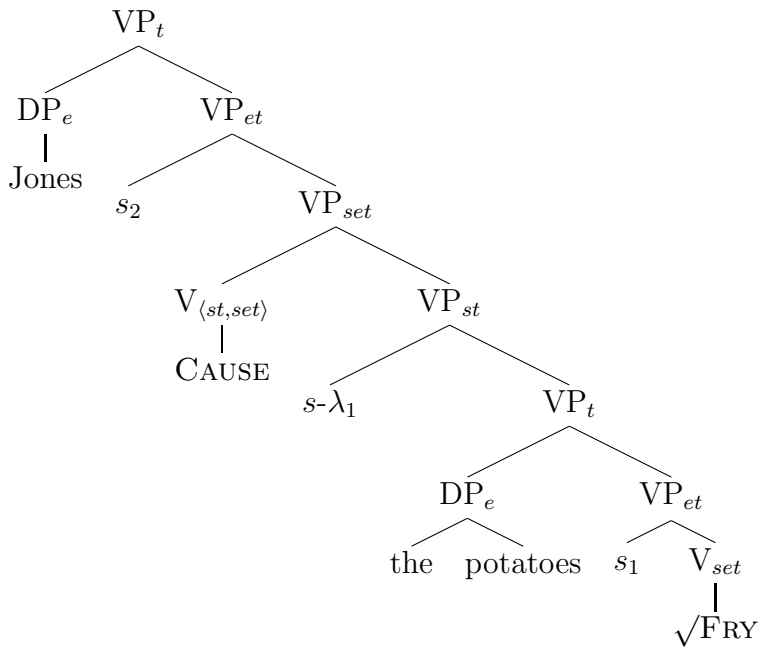
b. 

The surface structure for verbs supporting object depictives might arise via the following movement operations:

(52) 

The complex head CAUSE+√FRIED is filled by a single lexical item *fried*. Semantically, though, the structure is interpreted as follows:

(53)



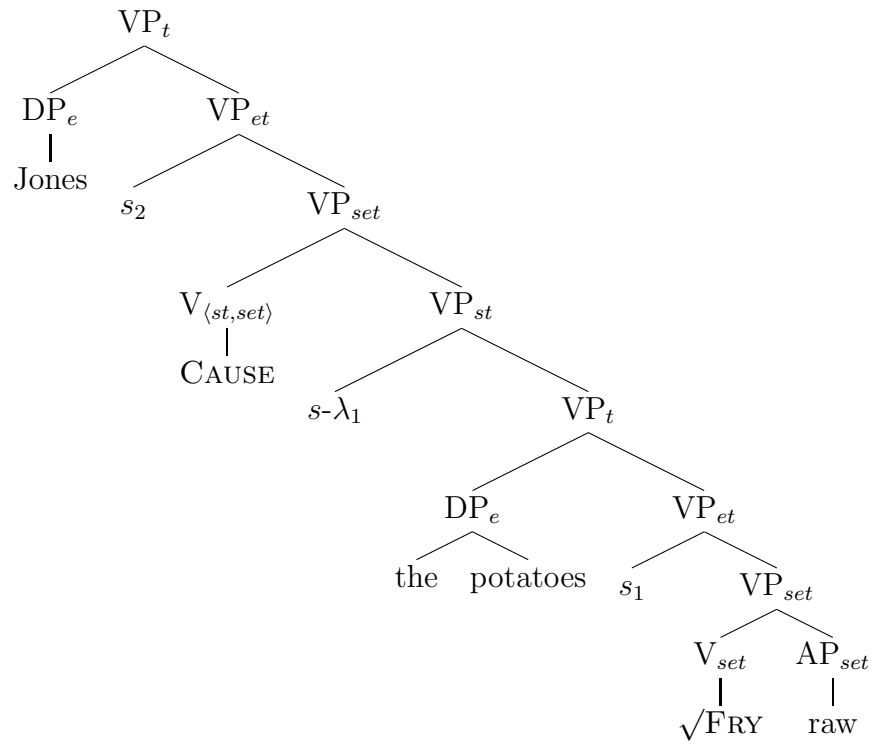
(54) a. $[\![\sqrt{\text{FRY}}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ fries in s

b. $[\![\text{CAUSE}]\!] = \lambda P_{st} \,.\, \lambda s_s \,.\, \lambda x_e \,.$ in every situation s' otherwise similar to s except for x's actions, $P(s')$ is false.

(55) λs . If Jones had not done what he did in s, the potatoes would not have fried.

Now, if the depictive attached to the lower VP in (53), it could modify the object, just as in Pylkkänen's structure:

(56)



Once again, any such structure with added situation pronouns will run afoul of the Situation Economy rule. This derives the fact that object depictives, like subject depictives must be evaluated at the same time and world as the (lower) VP.

I will make a few notes on these meanings before continuing. First, notice that for (47-a) to be true, the potatoes only have to be raw before they are fried, not afterwards. I will take this to be a general property of verbs like *fry*, that they are true of their starting times. For instance:

(57) John fried the potatoes at 5:00, ...

a. so he was done by 5:15.

b. #so he started at 4:45.

(58) When John fried the potatoes, they were raw.

As shown by its possible continuations, (57) cannot mean that John finished frying the potatoes at 5:00; it means that 5:00 is when he started. Similarly, (58) equates the time when John fried the potatoes with when they were raw, not when they were fried. I will appeal to whatever principle explains these data to explain the depictive's

temporal properties. Second, notice that although both $\sqrt{\text{FRY}}$ and *raw* are in the scope of CAUSE, the only reading is that John caused the potatoes to fry, not that John caused the potatoes to be raw. In an analysis that has event variables or true situation variables, this CAUSE head could actually specifiy the subject (*Jones*) as the agent of the event described by $\sqrt{\text{FRY}}$. For now, I must assume that the subject is somehow pragmatically construed as the causer of the event of the potatoes frying in the complement of CAUSE, and not, for instance, as the causer of the state of the potatoes being raw.

Impossible Object DPs

(59) (= Rapoport (3))

a. *Jones phoned **Smith sad**.

b. *Jones pushed **Smith sick**.

c. *Jones chased **Smith angry**.

d. *Jones slapped **Smith sober**.

e. *I kicked **John depressed**.

f. *The policeman punched **John drunk**.

The depictives in (59) can only refer to the subject, not the object, of these sentences.[14] I take this to indicate that the verbs in (59) do not have the same structure as those in (47). As seen above, the structure of the VP is very important to the analysis of the object depictive. Before we continue, consider the following sentences, which have explicitly complex VPs:

(60) a. *Jones sent an email to **Smith drunk**.

b. *Jones sent **Smith** an email **drunk**.

(60) shows that a depictive may not modify an indirect object, since *drunk* can only apply to Jones in these sentences, not to Smith. (See Pylkkänen (2002) for details on

[14]Some of the adjectives in (59), when they are thought of as applying to the object, have a resultative meaning, for instance that Jones slapped Smith, causing him to become sober. These readings, though interesting, are not the subject of this section.

why the structures in (60) do not support (indirect) object depictives.) Interestingly, the verb form of the word *email* does not support an object depictive either:

(61) *Jones emailed **Smith drunk**.

Once again, *drunk* can only modify *Jones*, not *Smith*. I take this to indicate that the underlying structure for the sentence in (61) is like those for the sentences in (60), and this is why (61) also may not support an object depictive. Simply put, the ostensive direct object in (61) is actually an indirect object underlyingly. The rest of the verbs that do not support object depictives, such as those in (59), also have underlyingly indirect objects rather than direct objects. Some evidence for this comes from paraphrases of the sentences in (59) which use indirect objects for the ostensive direct objects in (59):

(62)
a. Jones made a phone call to Smith. / Jones gave Smith a phone call.
b. Jones gave Smith a push.
c. Jones gave chase to Smith.
d. ?Jones gave Smith a slap.
e. I gave John a kick.
f. The policeman threw a punch at John.

I submit that these verbs underlying contain indirect objects, and no depictive may modify an indirect object, as shown in (60).

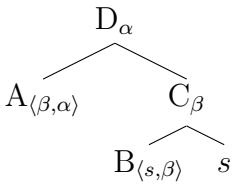
3.5 Situation Pronouns

To this point in the analysis, we have only seen structures with one single situation pronoun per clause: the obligatory pronoun on the VP. This dearth of situation pronouns has successfully explained several applications of the Intersective Predicate Generalization. In every case where an extra situation pronoun was possible, an alternative structure without such pronouns has been available, and therefore the

structure with more pronouns is ruled out by Situation Economy. However, as argued in Chapter 1, some structures do require additional situation pronouns, namely those involving *de re* readings of DPs. How these structures arise is the topic of this section.

I propose that situation pronouns only arise in structures schematized in (63):

(63)



In (63), **A** calls for an argument of type β, but **B** is of type $\langle s, \beta\rangle$; therefore, before **B** can combine with **A**, **B** must take a situation pronoun and become of type β. I will argue below that strong determiners are items like **A**, in that they call for a type-*et* argument, requiring NPs of type *set* to take a situation pronoun before combining with them.

In the next subsection, I will go over how this idea works for items that can be *de re*, namely strong DPs and quantificational readings of weak DPs. Next, I will make a hypothesis motivating the fact that these items in particular should require their arguments to be extensional. The last subsection explores a prediction made by this hypothesis.

3.5.1 Strong and Quantificational DPs

Under the analysis put forth in Chapter 1, all items that are interpreted *de re* must take a situation pronoun. So far, the only *de re* items we have seen have been quantificational DPs, whether they are inherently strong, as in (64-a), or they are weak NPs under quantificational readings, as in (64-b):

(64) a. Mary thinks the/every professor is a student.

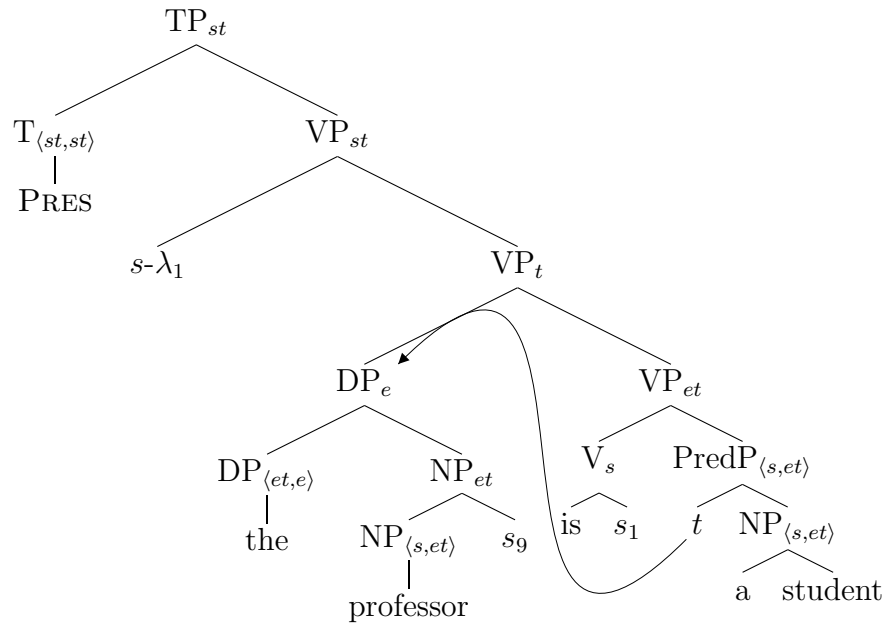
b. Mary thinks many/three professors are students.

I presume the definitions and structures for sentences with strong determiners are as follows[15]:

(65) a. $[\![\textbf{the}]\!] = \lambda P_{et}$. if there is only one x such that $P(x)$, then this x; otherwise, undefined.

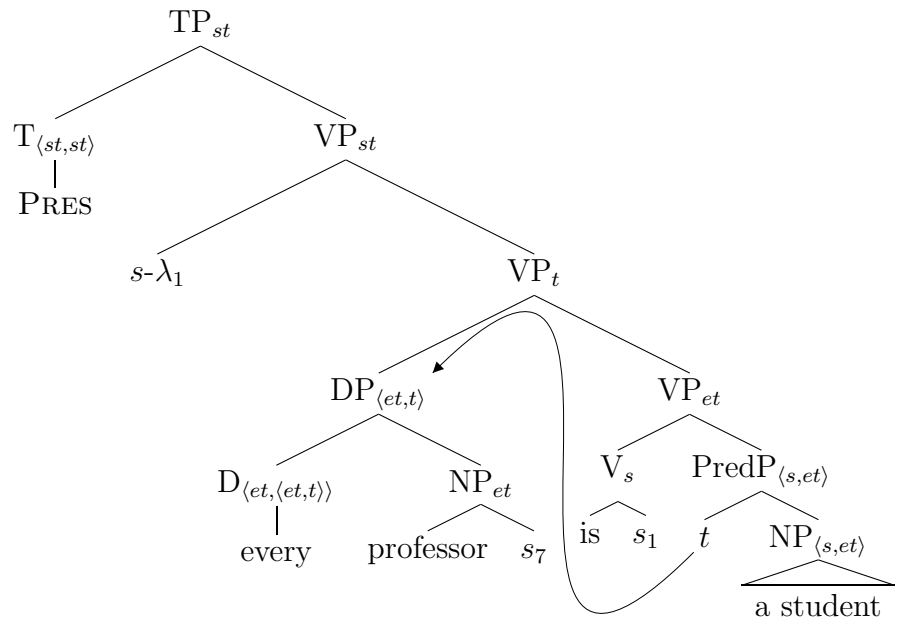
b. $[\![\textbf{every}]\!] = \lambda P_{et}$. λQ_{et} . $\forall x$. $P(x) \rightarrow Q(x)$

(66)



[15]I assume that every DP is generated inside the PredP with its predicate. This means that even a definite such as *the professor* must move to be interpreted, since a node of type e cannot combine with one of type *set*.

(67)

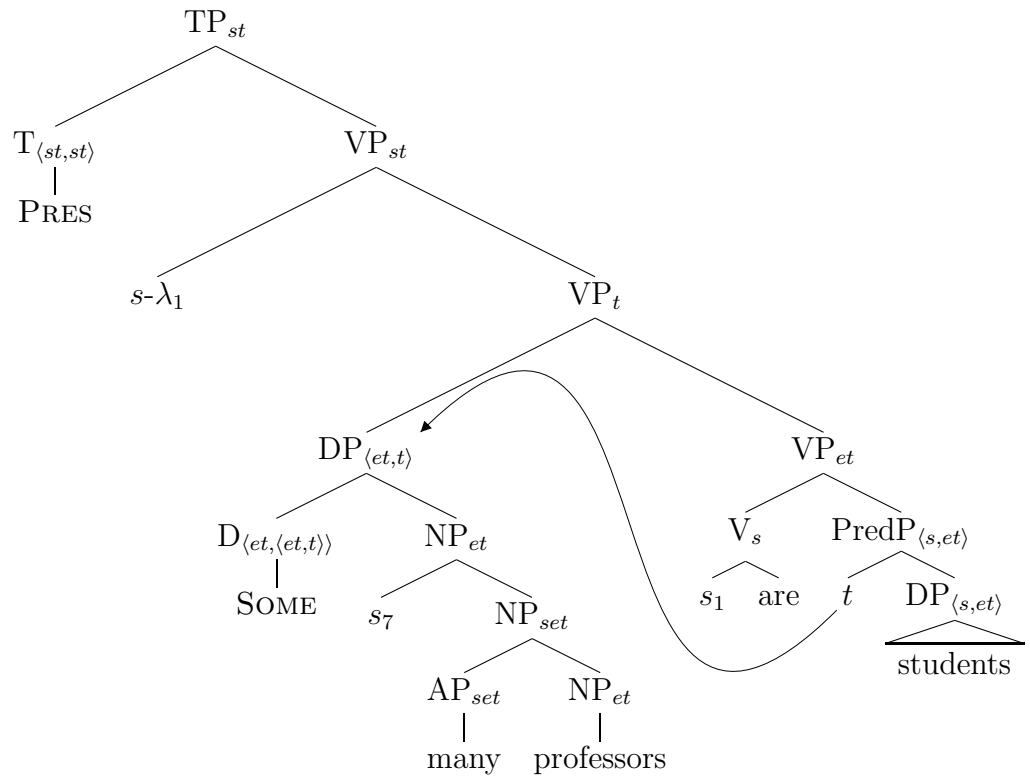


The only argument of a one-place strong determiner such as *the* is of type *et*, forcing the introduction of a situation pronoun. The restrictive clause of a generalized quantifier such as *every* is also *et*, again forcing a situation pronoun to appear. Situation Economy does not rule these structures out, though, because there is no grammatical alternative where *the* or *every* combines with *professor* without using a situation pronoun. Notice that as shown in (66) and (67), the DPs will receive *de re* readings, since they combine with situation pronouns that are free in the structures. However, if they had combined with bound situation pronouns, they would have received *de dicto* readings.

As for the weak NPs with quantificational readings, I presume that there is a silent generalized quantifier-determiner SOME that turns weak DPs into strong ones (again, see Landman (2004) for discussion). The definition of this determiner and the structure for the sentence containing it are as follows:

(68) $[\![\text{SOME}]\!] = \lambda P_{et} \,.\, \lambda Q_{et} \,.\, \exists x \,.\, P(x) \,\&\, Q(x)$

(69)



Since these structures are entirely parallel to the ones with overt generalized quantifiers, they have the exact same range of meanings: if the situation pronoun below SOME is bound, the DP receives a *de dicto* reading; otherwise it receives a *de re* reading.[16]

3.5.2 Extensional Type Hypothesis

This analysis of *de re* phrases depends crucially on the the semantic types stipulated above. The aim of this subsection is to provide a conceptual motivation for the fact that strong determiners have extensional types. I will propose a constraint like the following:

(70) **Extensional Type Hypothesis** (informal)[17]: If a lexical item is definable without reference to worlds or times, it cannot take a situation argument.

[16]This analysis runs into the same problem with non-monotone-increasing articles that my analysis of the ETC does; see Landman (2004) for the discussion of this problem. Also, this silent SOME determiner must have some further component to its meaning to account for the presuppositionality of quantificational readings of weak NPs.

[17]A version of this was first suggested to me by Danny Fox.

The intuition behind (70) is that, unlike most lexical items, those that we stipulated must take extensional arguments could actually be defined without any reference to worlds or times at all.[18] Lexical predicates like *sleep*, *boy*, and *married* intrinsically must be evaluated at a world or a time. An individual may be a boy at one world or time and not a boy at another. Once situation arguments become a part of the type system, though, you could define a word such as *every* to take one or more situation pronouns, and merely pass them onto its other arguments:

(71) $\llbracket \textbf{every} \rrbracket = \lambda P_{set} \ . \ \lambda Q_{set} \ . \ \lambda s' \ . \ \lambda s \ . \ \forall x \ . \ P(s')(x) \rightarrow Q(s)(x).$

However, most traditional meanings for *every* simply define it as a subset relation between two sets of individuals. Thus, the definition in (71) could also be rewritten without situation arguments[19]:

(72) $\llbracket \textbf{every} \rrbracket = \lambda P_{et} \ . \ \lambda Q_{et} \ . \ \forall x \ . \ P(x) \rightarrow Q(x).$

Under this definition, if two predicates A and B are of type $\langle s, et \rangle$, they will each have to combine with a situation pronoun prior to the application of *every*.

Taking this intuition to its logical conclusion, the Extensional Type Hypothesis claims that no word definable without a situation argument is allowed to take such an argument. More formally, this hypothesis is a constraint on the arguments of functions representing the meanings of lexical items[20]:

[18] See section 1.1.1 for a discussion of this issue.

[19] Sometimes one gets the feeling that a mistake in someone's belief might be due to the word *every* varying in different world:

(i) Mary thought that every boy was late, but really only most of them were.

However, (i) could just as easily be analyzed as the predicate *be late* or *boy* varying from world to world. In Mary's thought worlds, the set of individuals who were late includes every boy; whereas in the real world, this set only includes most of the boys.

[20] This restriction bears a similarity to a more general constraint on superfluous arguments of any kind proposed by von Fintel and Heim (2002).

(73) **Extensional Type Hypothesis** (formal): A n-place function f representing the meaning of a lexical item whose arguments include a type-s argument s and m type-$\langle s, \alpha \rangle$ predicates $P^1 \ldots P^m$ is disallowed if there is an $(n-1)$-place function g such that $\forall s_s \ . \ \forall P^1 \ldots P^m \in D_{\langle s,\alpha \rangle} \ . \ f(s, P^1, \ldots, P^m) \leftrightarrow g(P^1(s), \ldots, P^m(s))$.

Basically (73) says that since *every* **could** be defined as in (72), it **must** be defined this way, rather than as in (71). Under this hypothesis, then, the lexical items that must take extensional types include those that can head *de re* phrases: definite determiners and generalized quantifiers. The restrictive clause and the nuclear scope of a generalized quantifier both must be of type *et*. However, the nuclear scope cannot be *de re* due to Percus's (2000) Generalization X; see chapter 4 for details.

3.5.3 Prediction: Adjectival Determiners

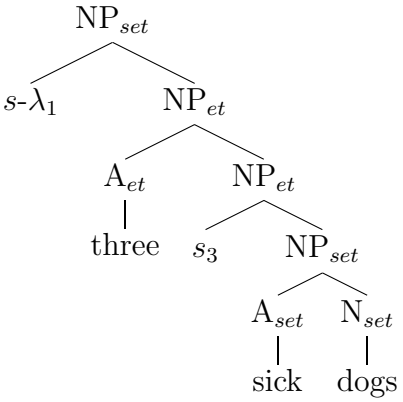
The Existential Type Hypothesis also makes predictions about the types of many other lexical items. For instance, the cardinal determiners, as defined in section 3.3, all have superfluous type-s arguments. According to the Extensional Type Hypothesis, the definitions of these words should be as in (74)– i.e., they should have extensional types.

(74) a. $[\![\textbf{a}]\!] = \lambda x_e \ . \ |x| = 1$
b. $[\![\textbf{two}]\!] = \lambda x_e \ . \ |x| = 2$
c. $[\![\textbf{three}]\!] = \lambda x_e \ . \ |x| = 3$
d. $[\![\textbf{few}]\!] = \lambda x_e \ . \ |x| = n$, for some contextually determined small n
e. $[\![\textbf{many}]\!] = \lambda x_e \ . \ |x| = n$, for some contextually determined large n

On the face of it, this poses a problem for the Situation Economy theory. For instance, in the analysis of ETC given above, a numeral like *three* is presumed to be of type *set*, so it may combine with other predicates of type *set* directly via Predicate Modification.

Perhaps one way to solve this problem would be to assume that the internal structure of an NP mirrors that of a VP in that the noun combines with a situation pronoun which is obligatorily bound by a λ operator higher in the phrase. I will not make a complete proposal for this idea, but the main idea can be seen in (75):

(75)



In (75), the noun *dog* combines with a type-*set* adjective *brown*. Then the NP *brown dog* takes a situation pronoun argument before combining with the type-*et* adjective *three*.[21]

Having an obligatory situation pronoun inside the NP could also help explain the distribution of cardinal determiners. If these words are actually adjectives, as assumed above, why are the following (b) sentences unacceptable?

(76) a. Three sick dogs followed me home.
b. *Sick three dogs followed me home.

(77) a. There are three dogs sick.
b. *There are sick dogs three.

Although the details remain to be worked out, an explanation for (76) might be that a type-*set* adjective such as *sick* must appear beneath the situation pronoun inside the NP, and a type-*et* adjective such as *three* must appear above the situation pronoun, as (75). Therefore, the extensional adjective must precede the intensional one. (76-b)

[21]This is an example of Predicate Modification applying to nodes of type $\langle e, t\rangle$, as mentioned above.

is out because this order has been reversed. (77-b) could be out because inside the PredP, the NP is of type *set* and cannot combine with an AP of type *et* like *three*.

3.6 Bare Plurals

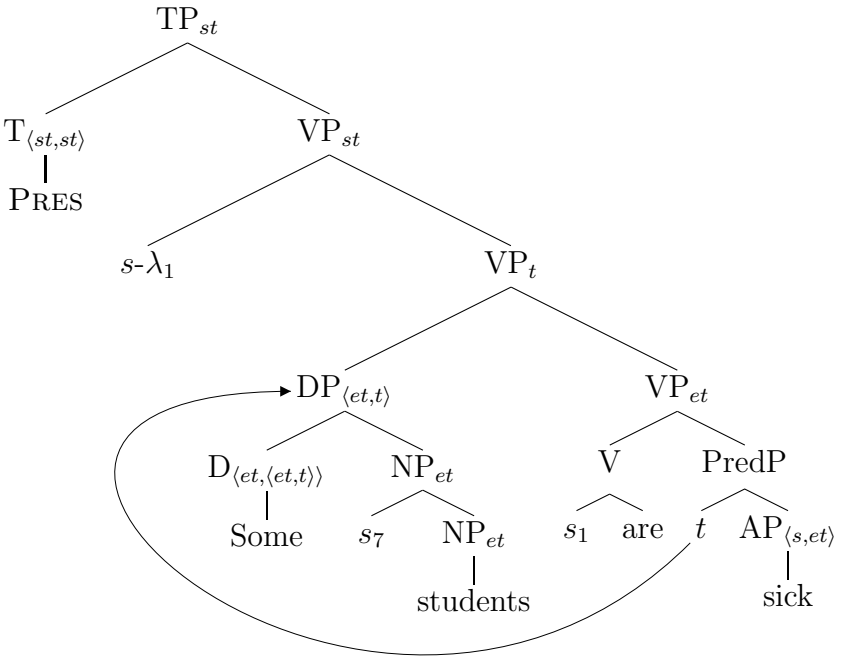
As mentioned above, another way to capture the Intersective Predicate Generalization might be to restrict Predicate Modification to apply only to intensional items, so for instance it would apply to items of type $\langle s, \langle e, t\rangle\rangle$ but not of type $\langle e, t\rangle$. It would be an argument for the Situation Economy account if it made predictions beyond just capturing the Intersective Predicate Generalization and if these predictions were correct. To find such a prediction, I turn in this section to bare plurals.

Without any further assumptions, the system above predicts that a bare plural will have the same meaning as a plural DP headed by *some*:

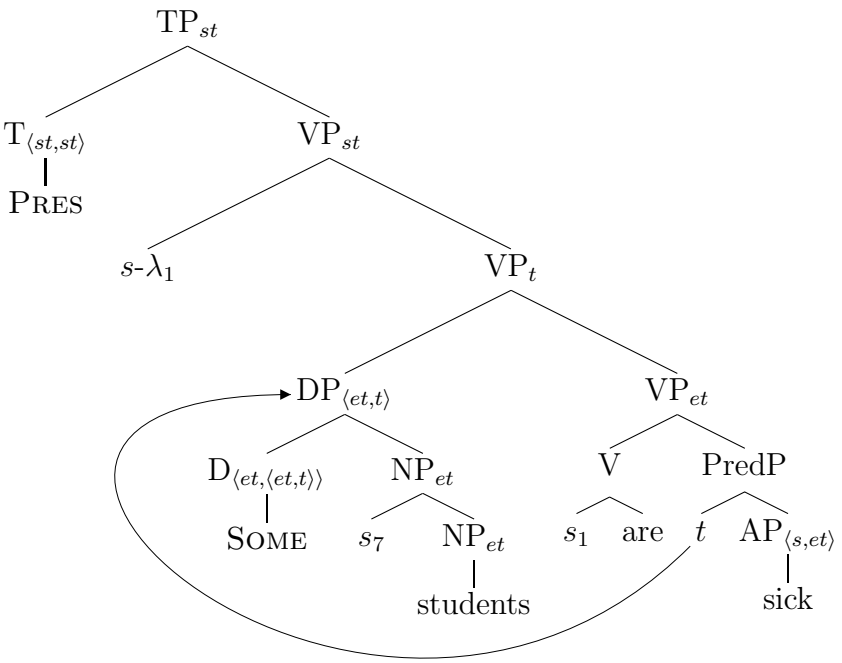
(78) a. Some students are sick.

b. Students are sick.

(79) a.



b.



However, most bare plurals actually have a different range of meanings from DPs with determiners.[22] Most significantly for this analysis, simple bare plurals cannot receive a *de re* interpretation:

(80) Mary is confused about whether my friends are married.

a. She thinks some bachelors are married.

b. #She thinks bachelors are married.

Although (80-a) describes a coherent scenario where Mary mistakenly believes that a few of my friends who happen to be bachelors are married, (80-b) can only perhaps mean that Mary is mistaken about the definition of what a *bachelor* is[23].

To solve this problem, I turn to a proposal by Chierchia (1998), who assumes that bare plurals in English that can denote kinds can be reconstrued as kind individuals.

[22] Although this may not be the case for non-kind-denoting NPs like *parts of that machine*. See Carlson (1977) for details on both these claims.

[23] Interestingly, this sentence improves in the following scenario:

(i) a. Person A: Mary is confused about which of my friends are married and which are not.
b. Person B: Does she think that some of your married friends are bachelors?
c. Person A: No, she thinks BACHELORS are MARRIED.

The sentence is still odd, but I am not sure why it improves with contrastive focus.

Chierchia assumes an ontology where kinds are individuals (type e)[24], each of which is in a one-to-one correspondence with a property (type *set*). He defines two meta-language operators $\cap$ and $\cup$ which convert to and from kinds, respectively:

(81)

PROPERTIES (type e)	$\overset{\text{`down'}\ \cap}{\underset{\text{`up'}\ \cup}{\rightleftarrows}}$	KINDS (type *set*)	($\approx$ Chierchia's (13))

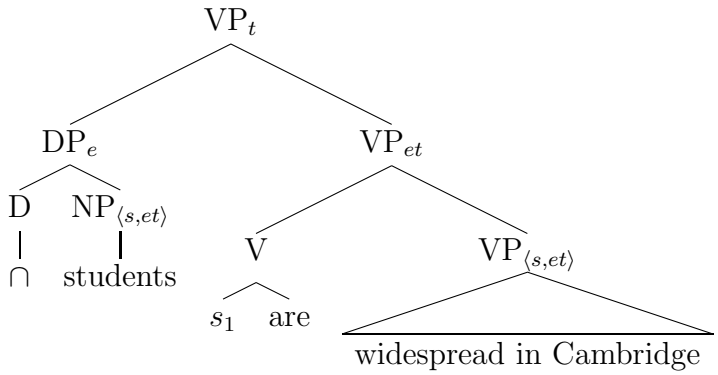
For the purposes of this analysis, I will not define these meta-language operators any further than to say that they are functions which map between corresponding properties and kinds. I will define an object language operator $\cap$, though, which is freely insertable into English sentences, as given in (82).

(82) $[\![\cap]\!] = \lambda P_{set}\ .\ \cap P$, if $P \in dom(\cap)$; otherwise undefined.

Chierchia assumes that individuals are sorted corresponding to whether they denote kinds, pluralities, or atoms; and predicates may select (semantically) for some subset of individuals. For instance, as defined in (82), $\cap$ is undefined when it takes a non-kind argument. (83) shows an example of $\cap$ used with a predicate which selects for kinds, *widespread in Cambridge*. I will indicate variables over kinds with the subscript k and variables over atoms or pluralities with the subscript o for object. This does not mean that this is a syntactic distinction; a predicate selecting for a kind is simply undefined for objects and vice versa.

[24]Chierchia's kinds are actually of type $\langle s, e\rangle$; he defines a kind k as a function from a world w to to the totality of instances of k in w. This allows him to define $\cap P_{set}$ as $\lambda w_s.\iota P(w)$. From this, he derives the fact that $\cap$ may only apply to plural nouns, since if it applied to a singular noun denoting P_{set}, $P(w)$ would have to be a singleton in every world w in order for $\iota P(w)$ to avoid presupposition failure. And, by stipulation, no kind may have a single manifestation in every world. In my system, I will have to merely stipulate that $\cap$ requires a plural argument.

(83)



(84) $[\![\textbf{widespread in Cambridge}]\!] = \lambda s_s\ .\ \lambda x_k \in D_e\ .$ the distribution of the x_o such that $[\cup x_k](s)(x_o)$=1 is equal over all of Cambridge

(85) a. $[\![s_1$ **widespread in Cambridge**$]\!]([\![\cap$ **students**$]\!]) = 1$ iff

b. $[\![s_1$ **widespread in Cambridge**$]\!](\cap[\![$**students**$]\!]) = 1$ iff

c. The distribution of the x_o such that $[\cup[\cap[\![$**students**$]\!]]](s_1)(x_o)$=1 is equal over all of Cambridge iff

d. The distribution of the x_o such that $[\![$**students**$]\!](s_1)(x_o)$=1 is equal over all of Cambridge iff

e. The distribution of the x_o such that x_o comprises students in s_1 is equal over all of Cambridge

Notice that, as employed in (85-d), $\cup \cap P = P$. The predicate *to be widespread in Cambridge* takes a kind for an argument, and therefore the structure in (84) is easily interpreted, as shown. One way to paraphrase (84) is that the kind **students** has the property of being widespread in Cambridge. However, some predicates select for object (non-kind) individuals. In order for a kind-denoting bare plural to be the argument of a predicate over simple individuals, I assume that there is an operator called DKP (for Derived Kind Predication) that turns a predicate over simple individuals into a predicate over kind individuals[25]:

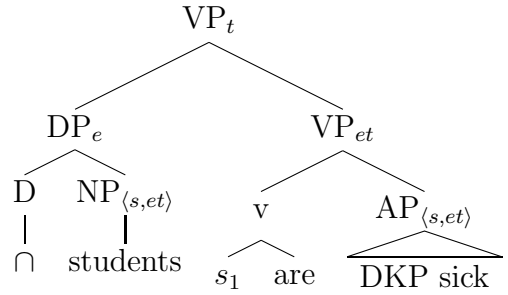
[25]Chierchia (1998) assumes that this effect is achieved by a special interpretation rule, triggered by a sortal type mismatch between a predicate which takes an object individual and an argument which is a kind individual. In my system, though, object and kind individuals are not distinguished syntactically. Instead, the DKP operator may be freely inserted, and structures with sortal type mismatches are discarded via a general rule against uninterpretable structures.

Also, Chierchia, p.c., notes that the eventual meaning of an operator version of DKP might have to be able to bind a variable to deal with cases such as (i), where the object individuals quantified

(86) $[\![\textbf{DKP}]\!] = \lambda P_{\langle s,et\rangle} \,.\, \lambda s_s \,.\, \lambda x_k \,.\, \exists x_o \,.\, [\cup x_k](s)(x_o) = 1 \text{ and } P(s)(x_o) = 1$

This operator allows a kind-denoting NP to combine with a predicate over object individuals:

(87)



(88) a. $[\![s_1 \textbf{ DKP sick}]\!]([\![\cap \textbf{ students}]\!]) = 1$ iff

b. $[\![s_1 \textbf{ DKP sick}]\!](\cap [\![\textbf{students}]\!]) = 1$ iff

c. $[\lambda x_k \,.\, \exists x_o \,.\, [\cup x_k](s_1)(x_o) \text{ and } [\![\textbf{sick}]\!](s_1)(x_o)](\cap [\![\textbf{students}]\!]) = 1$ iff

d. $\exists x_o \,.\, [\cup[\cap[\![\textbf{students}]\!]]](s_1)(x_o) \text{ and } [\![\textbf{sick}]\!](s_1)(x_o)]$ iff

e. $\exists x_o \,.\, [\![\textbf{students}]\!](s_1)(x_o) \text{ and } [\![\textbf{sick}]\!](s_1)(x_o)]$ iff

f. $\exists x_o \,.\, x_o$ comprises students in s_1 and x_o is sick in s_1

One way to paraphrase (87) is that the kind **student** has a manifestation in s comprising sick people in s.

In order to fully derive the facts in (80), namely that a bare plural may not be *de re*, Chierchia must find a way to force the bare plural to take the $\cap$ operator and denote a kind rather than taking SOME and being existentially quantified over. Otherwise, (80-b) could have a reading identical to (80-a), which it does not. Chierchia makes the following suggestion for why $\cap$ is obligatory when the bare plural can be kind-denoting:

(89) There is a clear sense in which $\cap$ is more meaning preserving than $\exists$. $\cap$ merely changes the type of its argument, leaving the information associated with it

over by DKP can bind a pronoun:

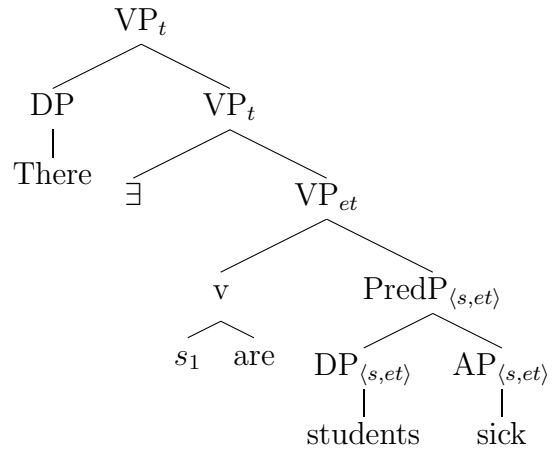
(i) Dogs were biting themselves.

> otherwise unchanged. [...] Not so for ∃, which adds existential import. Since of the available options, ∩ is the more meaning preserving one, it gets picked over ∃ whenever possible. (Chierchia (1998), p. 374)

I would like to suggest an alternative solution to the problem, or perhaps merely an alternative cashing out of what it means to be "more meaning preserving." Notice that the structure proposed for a sentence involving DKP such as (87) only has one situation pronoun, the pronoun required by the verb. Next, notice that (87) is in fact an alternative to the structure in (79), according to the definitions in (6). Since (89) has fewer situation pronouns, however, (79) is ruled out by Situation Economy. So, with a few standard assumptions about bare plurals and kinds, Situation Economy is able to explain why bare plural subjects must be *de dicto*: when bare plurals are interpreted as kinds, the resulting structures have fewer situation pronouns.[26]

Additionally, since for Chierchia ∩ is always preferred to SOME, he must assume that DKP applies inside the ETC. However, under this proposal, nothing special need be said about bare plurals in the ETC. Here, since they can receive an interpretation without the kind-forming operator (and in fact could not receive an interpretation with the ∩), there is no kind reading in such contexts:

(90)

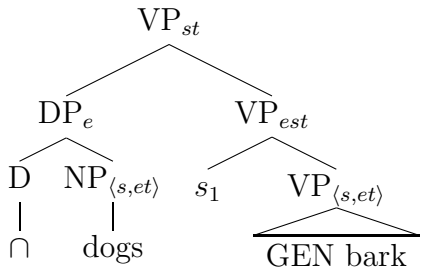


[26]Irene Heim, p.c., notes that a bare plural in object position would remain *in situ* if interpreted via a DKP operator, but raise to a higher position if interpreted with the silent SOME determiner. Therefore, these two methods of interpretation would lead to structures which are not alternatives under the definition in (6). There are several ways to patch this problem, one of which is simply to redefine the alternatives to allow the base structures of quantifier movement to count as alternatives.

To finish off the analysis of bare plurals, I will assume a GEN operator, analogous to the DKP operator, only having generic, rather than existential quantification:

(91) $[\![\textbf{GEN}]\!] = \lambda P_{\langle s,et\rangle} \,.\, \lambda s_s \,.\, \lambda x_k \,.\, \forall x_o$ (given the property opportunity) . $[\cup x_k](s)(x_i) \rightarrow P(s)(x_i)$

(92)



(92) means that the kind **dog** has the property that its manifestations in s, given the proper opportunity, bark in s.

3.7 Conclusion

This chapter has explored an explanation for the Intersective Predicate Generalization based on a syntactic economy principle, which disallows certain structures for sentences and hence certain readings. In particular, the rule of Situation Economy was proposed to rule out structures that have more situation pronouns than relevant alternative structures. We have seen how such a rule explains the Intersective Predicate Generalization for nouns and intersective modifiers, the Existential There Construction and Have Construction, and subject and object depictives. The Extensional Type Hypothesis was next proposed to explain why strong determiners must have extensional types and therefore must take arguments which have already combined with situation pronouns. This obviated the Situation Economy rule and allowed *de re* readings for strong DPs and weak NPs with quantificational readings. Last, it was shown that the Situation Economy approach may explain why bare plurals must have kind readings: namely, since such readings involve fewer situation pronouns.

Some interesting questions remain for this analysis. For instance, where exactly

does the economy principle apply? And why is it situation pronouns which are economized? As for the first question, it seems that Situation Economy could easily be classified as a parsing constraint. Notice that the process of generating alternatives, as defined in (6), never involves adding or removing a word that was actually spoken or heard. At a certain point during the process of understanding an utterance, a hearer must generate possible structures for what she has heard. Part of generating these structures is determining which covert words are in these structures. Situation Economy is a way of ruling out a good number of such structures – namely those with more than the necessary number of situation pronouns – and hence making the hearer's job that much easier. As for why situation pronouns are economized, this, too, makes sense. As we have seen, situation pronouns add a great deal of power to the semantic system. As such, the fewer of these items there are, the fewer possible binding ambiguities there will be involving the pronouns. Other remaining questions include how the situation economy account interacts with the copy theory of movement, and whether unpronounced individual variables, such as pro, PRO, and traces, could come under a similar economy principle.

3.8 Appendix: Comparatives

There is one other area where *de re* readings are often cited in the linguistics literature: comparatives. The precise analysis of comparatives is a hotly debated topic (cf. Bresnan 1973, von Stechow 1984, among others), but I would like to suggest that under at least one analysis of comparatives, they fit perfectly with the story of *de re* DPs given above. Furthermore, comparatives are an interesting case, since I will argue below that they show an example where a full clause, not just a DP, is *de re*. If the analysis is correct, then, it would rule out the possibility that *de re* readings are only available inside strong DPs.

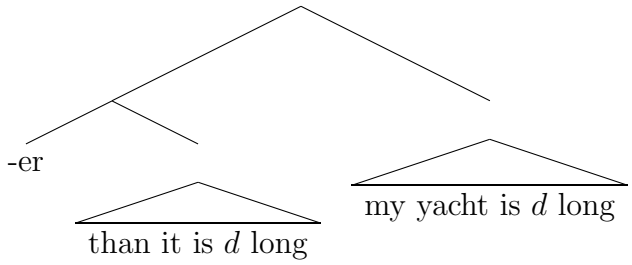
Since Russell (1905), the than-clause of comparatives has been shown to have peculiar intensional properties:

(93) Mary thinks my yacht is longer than it is. (≈ Russell, p. 489)

Unless Mary has a contradictory thought, the meaning of (93) is that she thinks that my yacht has a length d, when in fact it has a length d' less than d. In other words, my yacht's length in Mary's thought worlds is longer than its length in the real world.

These sentences are analyzed by Heim (2001) to have a generalized-quantifier-like structure:

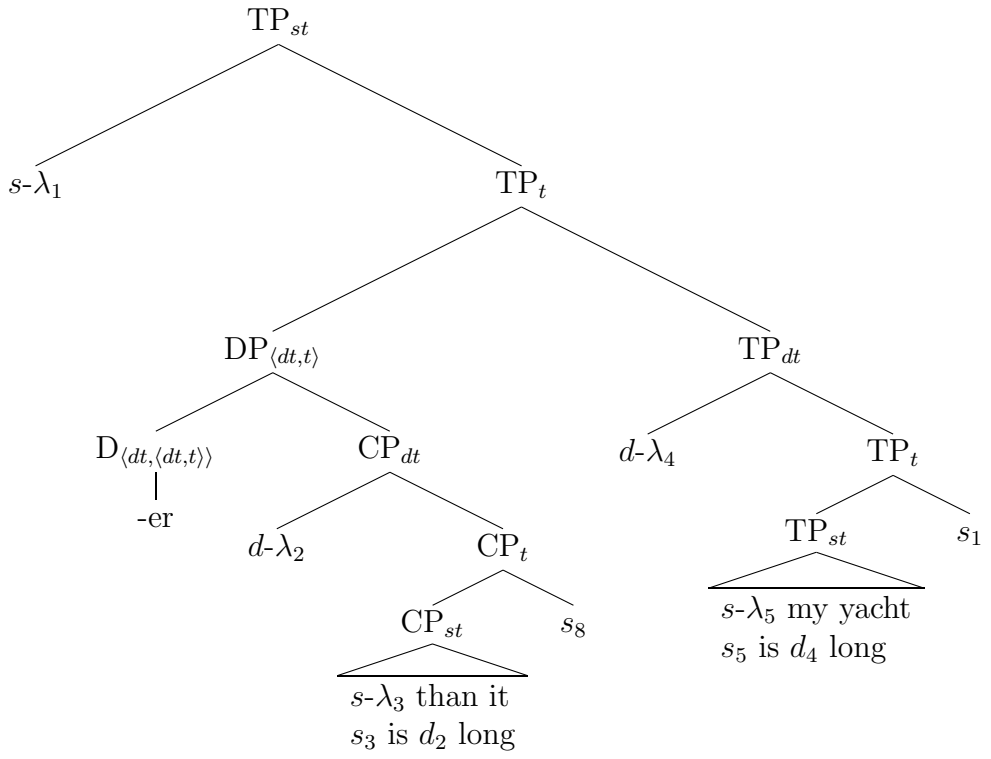
(94)



In the current system, I would analyze this structure as follows:

(95) $[\![\textbf{-er}]\!] = \lambda P_{dt}\ .\ \lambda Q_{dt}\ .$ the maximal d such that $Q(d)$ is greater than the maximal d' such that $P(d')$.

(96)



The situation pronoun s_8 in the previous structure allows the than-clause to be *de re*, and in effect this allows it to be evaluated in the actual world, yielding the correct reading for the sentence. So, in these few cases where situation pronouns actually appear, Situation Economy does not apply, since there is no alternative grammatical structure to the ones including situation pronouns. Many details would need to be worked out, such as the connection between verb mood and *de re* and *de dicto* readings noted by von Stechow (1984), but comparatives at least suggest a possible parallel cases of *de re* to those involving DPs.

Chapter 4

Generalizations X, Y, and Z

Chapter 1 argued against the scope theory of *de re* and *de dicto* readings and proposed an analysis with covert situation pronouns. The simplest version of this theory, the Free Situation Pronoun Hypothesis, would allow a freely indexed situation pronoun wherever it is sister to a node of type $\langle s, \alpha \rangle$. However, as seen in Chapter 2, the Free Situation Pronoun Hypothesis overgenerates in allowing readings for intersective predicates where each is evaluated in its own world and/or time. Building on work by Musan (1997), this chapter proposed the Intersective Predicate Generalization to describe the unavailability of such readings. Chapter 3 proposed a rule of Situation Economy, capturing this generalization by disallowing structures with more situation pronouns than their relevant alternative structures.

The next question is whether the addition Situation Economy constrains the situation economy account enough to avoid further overgeneration. Unfortunately this is not the case. This chapter will explore three more such areas where a situation pronoun account overgenerates. The first two, Generalization X and Generalization Y, were proposed by Percus (2000), and the third constraint is a new one, which I call Generalization Z.

4.1 Generalization X

Percus (2000) argues for his Generalization X by showing that the following sentence

is missing a reading predicted under the Free Situation Pronoun Hypothesis:

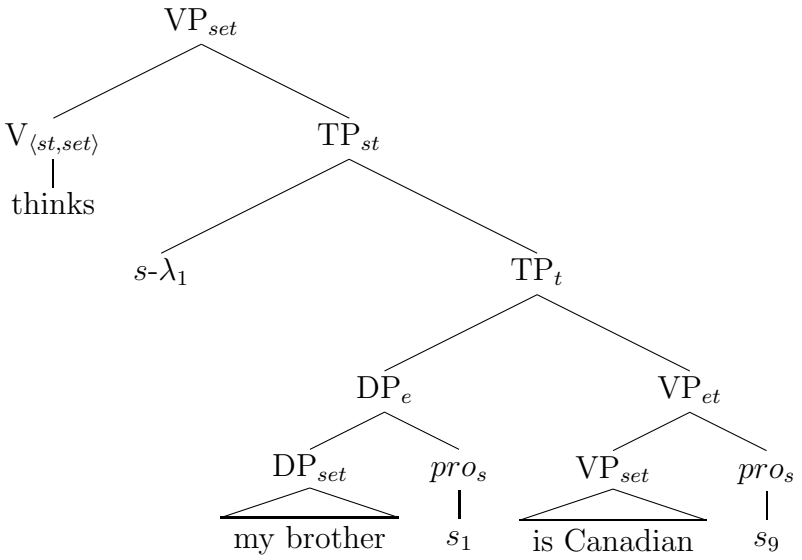
(1) Mary thinks my brother is Canadian. (=26a)

The embedded sentence in (1) has two predicates which take type-s arguments – *my brother* and *is Canadian* – and therefore, according to the Free Situation Pronoun Hypothesis, a structure like (3) should be available, given the definitions in (2).

(2) a. $[\![\textbf{my brother}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ is my brother in s

b. $[\![\textbf{is Canadian}]\!] = \lambda s_s \,.\, \lambda x_e \,.\, x$ is Canadian in s

(3)



Recall from section 1.4 that when a situation pronoun s in the scope of an intensional operator α is not bound by a λ operator directly below α, any predicates that are evaluated in the world and time denoted by s are *de re* (with respect to α). In (3), therefore, the VP *is Canadian* is *de re*, since it is evaluated at the world and time determined by the situation pronoun s_9, which is not bound by the λ operator directly below the verb *thinks*. Note that in order for this structure to be non-trivial, the subject *my brother* must be *de dicto*. Otherwise, there would be nothing at all bound by the s-λ_1.[1]

Percus notes that despite this possible structure, there is no reading where *is*

[1]See Percus's footnote 18, p. 200, for discussion.

Canadian is *de re*. He describes the meaning of such a reading as follows:

(4) "... we would take the sentence to be true whenever there is some *actual* Canadian who *Mary thinks* is my brother – even when this person is not my brother in actuallity, and *even when Mary mistakenly thinks that he is not Canadian*" (p. 200).

In other words, it would mean that someone Mary thinks is my brother is Canadian. Based on this and other evidence, Percus proposes his Generalization X:

(5) **Generalization X**: The situation pronoun that a verb selects for must be coindexed with the nearest λ above it (=34, p. 201).

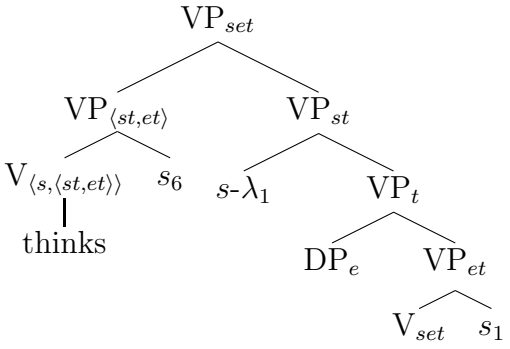
If we construe situation pronouns as world/time pairs, the generalization applies to both worlds and times. It constrains the world and time at which a verb is evaluated to be the worlds and/or times quantified over by the next highest modal or temporal operator. For example, consider the simplified definitions in (6) and the structures in (7):

(6) a. $[\![\textbf{thinks}]\!] = \lambda\langle w, i\rangle \in D_s \ . \ \lambda P_{st} \ . \ \lambda x_e \ . \ \forall w' \in W$ such that w' is one of x's thought worlds in $w \ . \ P(\langle w', i\rangle)$

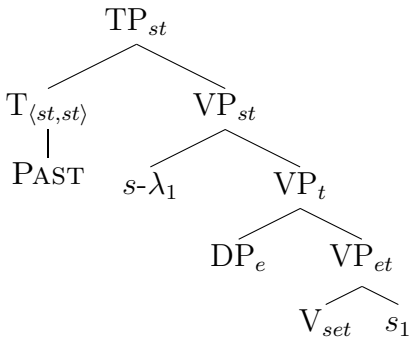
b. $[\![\textbf{always}]\!] = \lambda\langle w, i\rangle \in D_s \ . \ \lambda P_{st} \ . \ \forall i' \in I$ such that i' is a relevant time in $w \ . \ P(\langle w, i'\rangle)$

c. $[\![\textsc{Past}]\!] = \lambda P_{st} \ . \ \lambda\langle w, i\rangle \in D_s \ . \ \exists i' \prec i \ . \ P(\langle w, i'\rangle)$

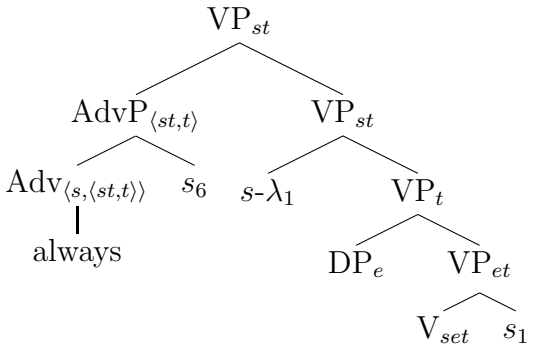
(7) a.



b.



c.



The worlds at which the verb in (7-a) is evaluated must be the thought worlds that *thinks* quantifies over. Similarly, the time at which the verb in (7-b) is evaluated is that determined by the tense operator PAST; and the worlds and times at which the verb in (7-c) is evaluated are those quantified over by *always*. In the two sections below, I will examine evidence for this constraint, first for possible worlds and then for times.

4.1.1 Generalization X for Worlds

In this section, I will examine cases where Generalization X holds for worlds. First, some simple cases:[2]

(8) Verb

a. Mary thinks that the man drowning in the pool is practicing his underwater swimming.

b. Mary thinks the man practicing his underwater swimming is drowning in the pool.

[2]Thank you to Sabine Iatridou for helping to devise these sentences.

(9) Verb

a. The police think a man taking out a pen is reaching for a gun.

b. The police think a man reaching for a gun is taking out a pen.

(10) Adjective

a. The insurance adjustor thinks that an injured person is uninjured.

b. The insurance adjustor thinks that an uninjured person is injured.

(11) PP

a. His parents think the boy at his girlfriend's house is at the library.

b. His parents think the boy at the library is at his girlfriend's house.

In each example above, there is a pair of sentences where the NP modifier of the first sentence is the VP of the second and vice versa.[3] Also, in each case, the NP modifier contradicts the VP, so they cannot both be true in the same world and time. Assuming that people do not have contradictory thoughts, this forces one or the other to be *de re*[4].

Looking at (8), consider the following scenario:

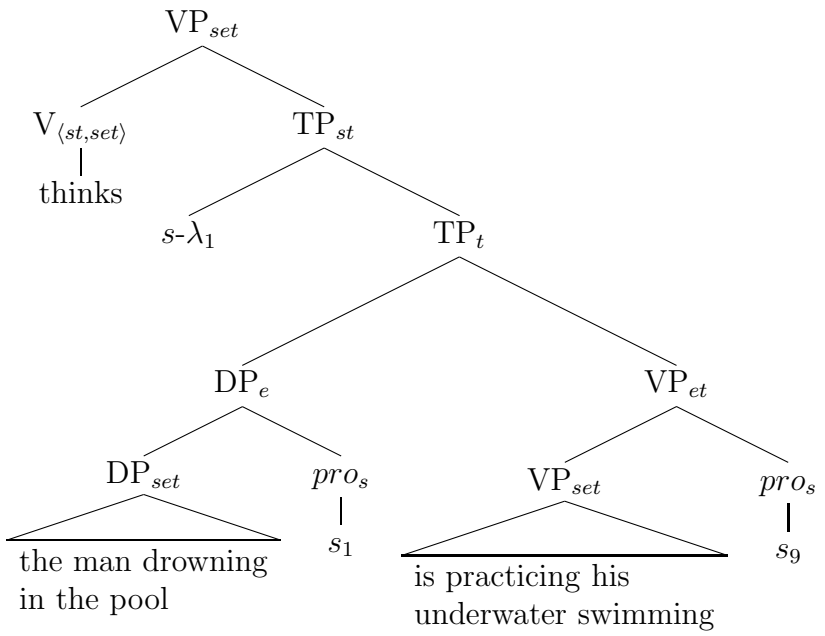
(12) Mary sees someone who is practicing his underwater swimming and actually has complete control of his actions, but she thinks he is (unintentionally) drowning.

Under the Free Situation Pronoun Hypothesis, you would expect to be able to describe the situation as (8-a) if the following conditions held: the subject *the man drowning in the pool* would have to be *de dicto*, and the VP *is practicing his underwater swimming* would have to be *de re*:

[3] I have used exclusively present tense to avoid any complications arising due to Sequence of Tense.

[4] Remember from section 2.4 that nouns and intersective modifiers are evaluated at the same world and time.

(13)



However, the fact of the matter is that this scenario may only be described truthfully by (8-b).

In fact, under the Free Situation Pronoun Hypothesis, you would expect each pair of sentences above to be synonymous under particular readings of each sentence. This is simply not true. Furthermore, recall that in section 1.2, I used sentences similar to these to show that subjects can be *de re*:

(14) a. Mary thinks someone in this room is outside.
b. Mary thought her husband was a burglar.
c. Hillary wanted the man who was nominated to drop out of the race.

Since the subject and the VP are contradictory if they are evaluated in the same world, such sentences force one of them to be *de re*. But Generalization X is so robust that it does not even enter your mind that it might be the VP that is *de re*!

Next, consider a slightly more complex scenario:

(15) Imagine that it is fraud to report the same injury to a particular insurance company for two months in a row, but there is an insurance adjustor who is unaware of this rule. This clueless fellow receives such a claim – the claimant

is reporting the same injury for the second month in a row.

Now, consider the following sentence under this scenario:

(16) The insurance adjustor thinks that the claimant is committing fraud.

The VP in (16) must be *de re*, since the insurance adjustor does not know that reporting the same injury twice is fraud. However, this sentence is not true under the scenario in (15). In other words, (16) may not mean:

(17) There is a method m of committing fraud such that the insurance adjustor thinks that the claimant is doing m – even though the adjustor does not think of m as committing fraud.

4.1.2 Generalization X for Times

For times, a *de re* reading is one where the phrase in question is evaluated at a time different from the main time of the sentence. The *de re* item is usually evaluated at the speech time, but, as we saw in section 1.3.4, it is sometimes evaluated at another contextually salient time. For the examples below, I will indicate the main time of the sentence by using an overt temporal adverbial for clarity.

Pretheoretically, one might think that since the tense for the main sentence actually appears overtly on the verb, it is rather obvious that the verb must be evaluated at the main time of the sentence. However, as outlined in section 1.1.2, the system we are assuming treats tense as a sentential operator, taking scope above a sentence. Under such a system, given the Free Situation Pronoun Hypothesis, it should be possible for the verb to be evaluated at a time differing from the main time of the sentence, as illustrated in (7-b). However, this is not the case. Consider, for instance, the following sentence:

(18) In 1980, my syntax professor was in kindergarten.

Since kindergartners cannot be syntax professors (nor vice versa), once again either

the subject or the VP must receive a *de re* analysis. Here, the most salient reading is one where *my syntax professor* means my current syntax professor, and is therefore *de re*, since it is evaluated at a time other than the main time of the sentence, 1980. However, the Free Situation Pronoun Hypothesis would predict another reading, namely where the person who was my syntax professor in 1980 is now currently in kindergarten – perhaps he or she went back to elementary school for a refresher. But this is simply not an available reading.

Next, consider the following:

(19) Remember that attractive unmarried guy you remarked on last month? Well, unfortunately for you, now that bachelor is married.

Here, *is married* holds at the speech time (*de dicto*) and *bachelor* holds before the speech time (*de re*). The addressee presumably wants this attractive man to be available, so it is unfortunate that he is now married. However, under the Free Situation Pronoun Hypothesis, the reverse should be possible, too:

(20) Remember that attractive married guy you remarked on last month? #Well, fortunately for you, now that bachelor is married.

Under this putative reading, the addressee is fortunate, because the attractive man, who used to be married, is now available. However, this reading is simply not possible; the way to express this scenario would be:

(21) Well, fortunately for you, now that married man is a bachelor (again).

Thus, once again, Generalization X is confirmed.

4.2 Generalization Y

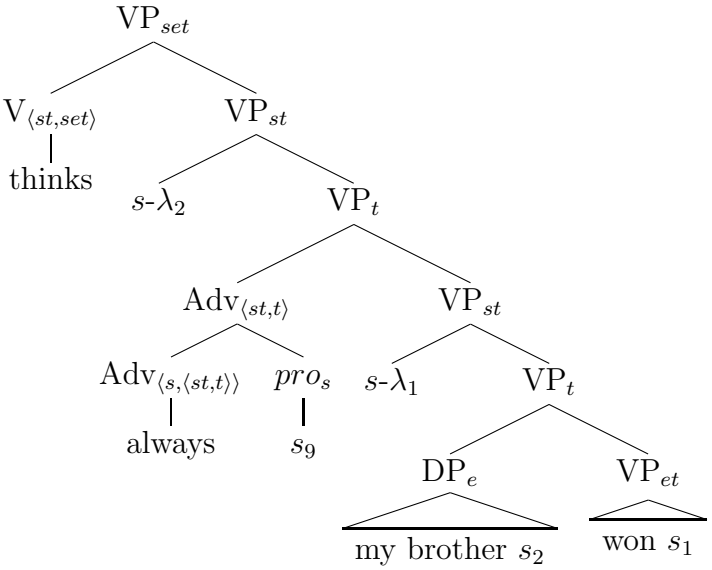
As we have seen, Generalization X constrains the world and time at which a verb may evaluated. Percus (2000) also argues for a constraint on how certain adverbs are eval-

uated. He describes a missing reading for the sentence in (22), which includes another item that takes a type-s argument: *always*. Under the definition repeated in (23), the situation variable that *always* takes determines the world in which its propositional argument are evaluated. Therefore, under the Free Situation Pronoun Hypothesis, it should theoretically be possible for *always* to have a *de re* interpretation, as shown in (24):[5]

(22) Mary thinks that my brother always won (=35a).

(23) $[\![\textbf{always}]\!] = \lambda\langle w, i\rangle \in D_s \ . \ \lambda P_{st} \ . \ \forall i' \in I$ such that i' is a relevant time in w . $P(\langle w, i'\rangle)$

(24)



Percus takes the following to be the meaning of this missing reading:

(25) "... we would take the sentence to allude to rounds of a game held in the *actual* world, and we would take it to be true whenever someone who Mary *thinks* is my brother won each of the *actual* game rounds" (p. 203).

In other words, it would mean that someone Mary thinks is my brother always won. To account for these facts, Percus proposes another generalization:

[5]Due to Generalization X, the situation pronoun that *won* takes must be coindexed with s-λ_1. Therefore, for the situation pronoun that *always* takes to be free, the situation pronoun that *my brother* takes must be co-indexed with s-λ_2, or else s-λ_2 would not bind any variables in its scope.

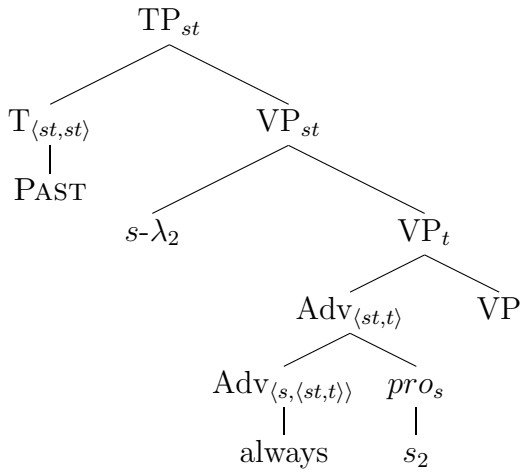
(26) **Generalization Y**: The situation pronoun that an adverbial quantifier selects for must be coindexed with the nearest λ above it (=39, p. 204).

This generalization requires, for instance, that *always* in the structure in (24) be evaluated in the same world as *thinks*; it also requires *always* in (28) to be evaluated at the same time as PAST. Definitions for *think* and PAST are repeated in (27).

(27) a. $[\![\textbf{thinks}]\!] = \lambda\langle w, i\rangle \in D_s \,.\, \lambda P_{st} \,.\, \lambda x_e \,.\, \forall w' \in W$ such that w' is one of x's thought worlds in $w \,.\, P(\langle w', i\rangle)$

b. $[\![\text{PAST}]\!] = \lambda P_{st} \,.\, \lambda\langle w, i\rangle \in D_s \,.\, \exists i' \prec i \,.\, P(\langle w, i'\rangle)$

(28)



One way of thinking about Generalization Y is that it merely ensures that an adverb cannot interfere with Generalization X and somehow allow the VP to be evaluated in a different world or time than the operator above the adverb (e.g., *think* or PAST). The next two sections will present evidence for Generalization Y, first for possible worlds, and then for times.

4.2.1 Generalization Y for Worlds

Consider the following two readings of sentence (22), repeated below:

(29) Mary thinks my brother always won (the game).

a. *De dicto* for *always*: Mary thinks that every round of the game that she

believes took place is such that my brother won it.

b. *De re* for *always*: The man who Mary thinks is my brother won every actual round of the game.

I will follow Percus in assuming that when *my brother always won* is *de re* it means that he won in every round of the game in the actual world, and when it is *de dicto* it means that he won in every round of the game in Mary's thought worlds. Given this assumption, the *de dicto* reading should be true in the scenario in (30); and indeed, (29-a) is true under this scenario. However, consider the scenario in (31). This scenario is only compatible with the *de re* reading of (29), and, as predicted by Generalization Y, (29) is false under this scenario.

(30) Mary was told, and believes, that there were 10 rounds of the game and my brother won all of them; when in fact there were no rounds of the game.

(31) There really were 10 rounds of the game, and Pierre won them all. However, Mary does not think any rounds took place (she was never told about the game), but she thinks (incorrectly) that Pierre is my brother.

4.2.2 Generalization Y for Times

Generalization Y also makes predictions about the times at which adverbs are evaluated. The Free Situation Pronoun Hypothesis would allow an adverb to be evaluated at a time different from the main time of the sentence. However, this reading is not available, as shown in (32):

(32) In 1984, my syntax professor was always picked first for kickball.

a. *De dicto* for *always*, *de re* for *professor*: My current syntax professor is such that in 1984 (perhaps in grade school) he was always picked first for kickball.

b. *De dicto* for both: My syntax professor in 1984 was such that, in 1984, he was always picked first for kickball.

c. *De re* for *always*, *de dicto* for *professor*: #My syntax professor in 1984 is such that he is (now) always picked first for kickball.

Here, although (32-a) and (32-b) are fine meanings for (32), it is quite clear that (32-c) is not what (32) means. This also holds for a modal adverb:

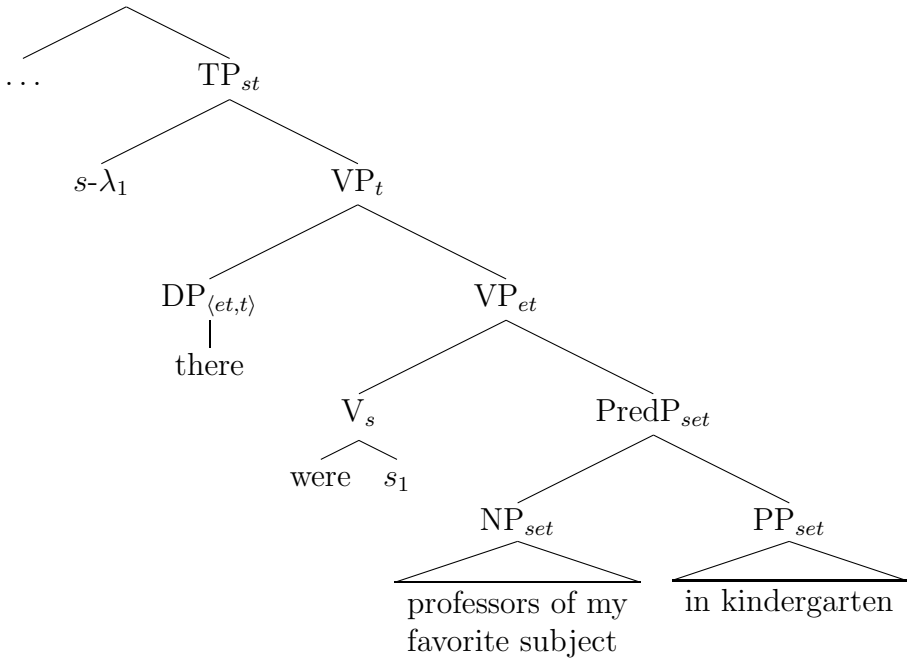
(33) In the 70's, my professors obligatorily wore ties.

a. *De re* for *obligatorily*: #The professors I had in the 70's are now obliged to wear ties.

If you take the time at which *obligatorily* is evaluated to indicate when the obligation holds, the *de re* reading of this adverb in (33) would be as in (33-a). And, as predicted by Generalization Y, this reading is not available.

4.3 Generalization Z

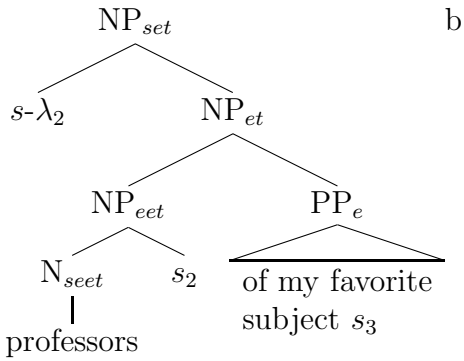
(34)



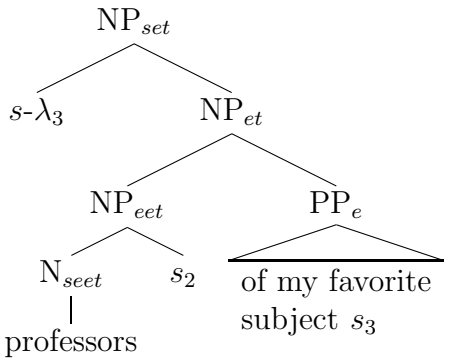
(35) #Mary thinks that there were professors of my favorite subject in kindergarten.

In this section, I will examine a new generalization, similar to Percus's Generalization X, but holding inside an NP. The sentence in (35) sounds odd because it entails that people who are professors, and therefore adults, are in kindergarten. Due to the Intersective Predicate Generalization (see Chapter 2), *professors of my favorite subject* and *in kindergarten* must be evaluated in the same world. However, direct your attention now to the NP in (34). Under the Free Situation Pronoun Hypothesis, either structure in (36) should be available for the NP in (34).

(36) a.



b.



In (36-a), the situation pronoun argument of *professors* is bound by the λ at the top of the NP, and therefore *professors* is evaluated at the world and time of s_1 in (34) – which is *de dicto* relative to the verb *thinks*. In (36-b), though, it is the situation pronoun argument of *my favorite subject* which is bound by the λ atop the NP and is therefore *de dicto*.

The reading represented by the structure in (36-a) does in fact exist. For instance, Mary does not need to know what my favorite subject is in order for (37) to be true:

(37) Mary thinks there were professors of my favorite subject in the kitchen.

So, even though *professors of my favorite subject* must be *de dicto* in (37), *my favorite subject* may be *de re*, evaluated in the real world instead of Mary's thought worlds. However, the reading represented by the structure in (36-b) is not attested; if it were, then (35) might be acceptable: *professor* could be in the actual world, and *in kindergarten* in Mary's thought worlds, for instance. Based on this, I propose the following generalization, analogous to Percus's Generalization X for verbs:

(38) **Generalization Z**: The situation pronoun selected for by a noun in a weak NP must be coindexed with the nearest λ above it.

4.3.1 Generalization Z for Times

The previous section has already shown that Generalization Z holds for worlds, but this section will show that it also holds for times. Consider the following:

(39) #In 1982, there were some professors of my favorite subject in kindergarten.

In 1982, my favorite subject happened to be finger-painting, as I was in kindergarten. Now, my favorite subject is semantics. But why can (39) not mean that current professors teaching what was my favorite subject in 1982 (finger-painting) were themselves in kindergarten in 1982? You can actually get that meaning for (41) in the scenario set up in (40):

(40) At certain avant-garde universities these days, there is a new discipline of higher learning devoted to finger-painting, but its professors are pretty young. Also, in 1982, when I was in kindergarten, my favorite subject was finger-painting.

(41) As it turns out, most professors of my favorite subject – finger-painting – were (also) in kindergarten in the '80s.

In (41), unlike (39), there is no constraint that the DP *most professors of my favorite topic* and the PP *in kindergarten* have the same time of evaluation. Therefore, the entire DP can get a *de re* tense reading, where it is evaluated at the speech time. However, when this DP must be *de dicto*, as in (39), the noun *professor* itself also must be *de dicto*. This is why (39) sounds odd, since no one can be a professor and in kindergarten at the same time. So, Generalization Z holds for times, too.

Chapter 5

Split Intensionality

At this point, let us take a step back and assess what we have seen so far. We learned in Chapter 1 that the traditional scope theory of *de re* and *de dicto* expressions suffers from several scope paradoxes, and therefore we moved to a theory in which situation pronouns appear explicitly in the syntax of natural language. However, this new theory was not without problems, either. Chapter 2 explored one way in which an unconstrained theory using explicit situation pronouns overgenerates and used the Intersective Predicate Generalization to describe the phenomenon. To explain this generalization, Chapter 3 proposed an economy principle which favors structures having the fewest situation pronouns. The Intersective Predicate Generalization is not the only way in which the situation pronoun account overgenerates, though, and Chapter 4 presented three more generalizations: Percus's Generalizations X and Y, and the new Generalization Z.

Faced with these additional complications for the situation pronoun account, it seems appropriate to once again weigh the advantages and disadvantages of the scope theory versus the situation pronoun theory. Although there are convincing arguments against the scope theory, a simple situation pronoun theory overgenerates in several areas. If, after everything is considered, it seems that the preponderance of the evidence still favors the situation pronoun account, an explanation for Generalizations X, Y, and Z will be needed. This is the route chosen by Shimada (2007) and Schueler (2007), both of whom have explanations for Percus's Generalization: Shimada (fol-

lowing Percus (2000) and von Fintel and Heim (2008)) derives the generalization from the head movement constraint and Schueler from a constraint on s-λ's. (I refer the reader to these works for details.)

This chapter, on the other hand, will take a slightly different tack. First, I present new data supporting the scope theory over the situation pronoun theory, involving island constraints, polarity items, and subconstituents of DPs. I also note that the Intersective Predicate Generalization and Generalizations X, Y, and Z simply do not arise in the scope theory. Weighing these considerations versus the arguments against the scope theory, it seems possible that we were too hasty to dismiss the traditional theory. This chapter is an attempt to revive the scope theory, modified so that it does not suffer from the problems raised in Chapter 1.

5.1 Data

In this section, I will explore several new ways that an unconstrained situation pronoun theory overgenerates. And for each such case where the situation pronoun account would allow an unacceptable reading, we will see that the traditional scope theory makes the correct prediction.

5.1.1 Islands

In this section, I will examine cases where an island is embedded inside an intensional clause and show that the situation pronoun theory predicts readings in such cases that are actually unavailable.[1]

(1) $\omega \ldots [_{Island} \ldots \text{DP} \ldots]$

[1]In this section, I ignore islands that are sisters to intensional operators, such as an if-clause and its conditional modal. Instead, I will examine cases where the island is embedded well within the complement of the intensional operator in question, such as an if clause under a propositional attitude verb. See section 5.3 for discussion of this distinction.

(2) a. $s\text{-}\lambda_1 \ldots \omega \; s\text{-}\lambda_2 \ldots [_{Island} \ldots [\text{DP } s_1] \ldots]$

b. $\text{DP}_1 \; \omega \ldots \quad [_{Island} \quad \ldots t_1 \ldots]$

X

Consider a sentence with an intensional operator ω c-commanding an island for movement which contains a DP, as schematized in (1). A situation pronoun theory would predict a reading where the DP in (1) is *de re* relative to ω, since the DP does not need to move out of the island in order to be *de re* under this analysis. The structure for this reading is schematized in (2-a), where the situation pronoun complement to the DP is bound by the highest s-λ in the structure. The scope theory predicts that such a reading will not exist, though, since the DP must move out of the island in order to be *de re* relative to ω, as schematized in (2-b). Therefore, any reading where the DP is *de re* relative to ω must be one where the DP violates an island constraint.

One syntactic island that we have already encountered in this dissertation is if-clauses. As shown in (3), DPs are not allowed to move out of an if-clause:

(3) a. *Who will you be happy if ___ comes?

b. *What, if John says ___, will Mary slap him?

Therefore, a scope theory would predict that if a DP is inside an if-clause that is underneath an intensional operator ω, then the DP will not be able to receive a *de re* interpretation relative to ω. And, indeed, this is true:

(4) a. Mary doubts that each/every professor is a professor.

b. #Mary doubts that if each/every professor were a professor, the classes would be better taught.

(5) a. Mary (correctly) believes that at least five people in this room are in this room.

b. #Mary believes that if at least five people in this room were in this room, we could have a party.

(4-b) and (5-b) sound odd since the embedded counterfactuals contain tautologies (which cannot be counterfactual): in any world w, every professor in w is a professor in w and everyone who is in this room in w is in this room in w. Under a situation pronoun account, though, these sentences could receive coherent readings akin to those available for (4-a) and (5-a), assuming the structures given in (6). However, these readings are simply not available for (4) and (5).

(6) a. s-λ_1 Mary doubts that if [every professor s_1] were a professor, we would get along well.
(e.g., Mary doesn't know that certain professors are professors, but she doubts that if they were, the classes would be better taught.)

b. s-λ_1 Mary believes that if [at least five people in this room s_1] were in this room, we could have a party.
(e.g., Mary doesn't know that anyone is in this room, but she believes of the people who happen to actually be in this room that if at least five of them were in this room, we could have a party.)

Other islands for movement show the same pattern. For instance, (7) shows a *de re* reading being blocked for a DP inside a because-clause, (8) for a DP inside an NP complement, and (9) for the DP subject of a finite clause:

(7) Because-clause:

a. The teacher thinks Sally wrote every paper John wrote.

b. #The teacher thinks John should be punished because Sally wrote every paper he/John wrote.

(8) NP complement:

a. Mary didn't believe that John married his wife.

b. #Mary didn't believe the rumor that John married his wife.

(9) Subject of a finite clause:

a. Mary reported that all five people in this room were in this room, but she thinks there were ten people here.

b. #Mary thinks that she reported that all five people in this room were in this room, but she thinks there were ten people here.

It is somewhat harder to show a coordinate-structure constraint (Ross 1967) violation, but it is possible. (10) is an example with a coordinate structure that actually sounds acceptable, even though one conjunct (*a hat that looks awful on her*) is clearly *de re*, and therefore, under the scope analysis, must have moved. However, consider the two possible continuations of the sentence in (10). (10-a), which forces the second conjunct (*an inexpensive coat*) to also be *de re*, sounds fine. (10-b), which forces the second conjunct to be *de dicto*, on the other hand, sounds quite odd. An analysis of this case involving the movement of the entire coordinate structure captures this data without violating any island constraint.

(10) Mary wants to buy a hat that looks awful on her and an inexpensive coat.

a. ✓But she doesn't know that the coat is inexpensive.

b. #But the coat she picked out is actually expensive.

(11) [a hat that looks awful on her and an inexpensive coat]$_x$
[Mary wants to buy x]

So, contrary to the predictions of the situation pronoun theory, a DP that is trapped by an island low enough in the structure cannot receive a *de re* interpretation.

5.1.2 Polarity Items

The next prediction that separates a scope system from a situation pronoun system involves polarity items. Negative polarity items must scope below negation, and positive polarity items must not scope below negation. Therefore, a scope theory predicts that such items should have a limited number of intensional readings versus

non-polarity items. The situation pronoun theory makes no such prediction, since *de re* and *de dicto* readings are not contingent on an item scoping in a particular position in the sentence. Again, the prediction of the scope system is confirmed by the data. For instance, in (12), where the positive polarity item *some* requires the DP *some inexpensive coat* to scope above negation, this DP can only receive a *de re* interpretation. The continuation in (12-a), which forces a *de re* reading, is fine, while the continuation in (12-b), which forces a *de dicto* reading, sounds odd.

(12) Mary doesn't want to buy some inexpensive dress at Macy's ...

a. ✓... because she thinks it is expensive.

b. # ... but she hasn't picked one out yet.

Conversely, a negative polarity item like *any* can eliminate a *de re* reading. For instance, the DP *a coat that costs any more than $300* in (13) can only have a *de dicto* reading, since it must be below the negative quantifier *none of her children*.[2] Every reading of (13) is one where Mary knows the price of the coats in question.

(13) Mary wants none of her children to buy a coat that costs any more than $300.

So, the facts involving polarity items also support a scope-based theory.

5.1.3 Subconstituents

One additional fact which supports a scope theory over one with situation pronouns was noticed by Romoli and Sudo (to appear):

(14) John wants to meet the wife of the president.

a. The wife of the president, Laura Bush, is such that John wants to meet her, though perhaps he does not even know she's the wife of the president.

b. The president, George W. Bush, is such that John wants to meet his

[2] Assuming that this DP is *de dicto* – i.e., Mary's desire is about her children as such – anything below it will also be *de dicto* under a scope theory analysis.

wife, whoever she may be.

c. John wants to meet whoever the wife of the current president is, though perhaps he does not even know who the president is, or who his wife is.

d. #The wife of the man John thinks is the president is such that John wants to meet her. E.g., John thinks Bill Clinton is still president and wants to meet his wife, Hillary Clinton. He may or may not know that she is his wife.

Romoli and Sudo note that the sentence in (14) has the readings in (14-a)-(14-c), but not the reading in (14-d). The problematic reading is one where *the president* is *de dicto* (since Bill Clinton is only still president in John's thought worlds) and *the wife* is *de re*, since he may not know that Hillary is Bill Clinton's wife. The situation pronoun account could give the following valid structure to the reading in (14-d):

(15) s-λ_1 John wants s-λ_2 to meet the [wife s_1] of the [president s_2].

However, the scope theory correctly predicts that this reading is unavailable. The only way to derive the missing reading via a scoping operation would be with one of the following illicit structures:

(16) a. [the wife]$_x$ John wants to meet [x of the president].

b. [wife]$_x$ John wants to meet [the x of the president].

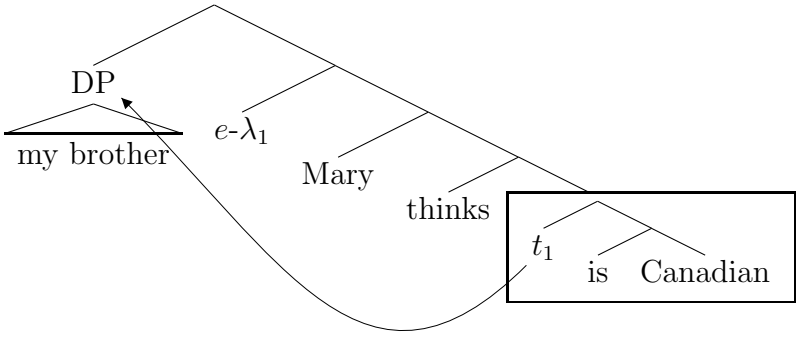
In (16-a), a non-constituent has moved, which is an illicit movement. In (16-b), a constituent has moved, but it is a single head. So far, every item which has moved to get a *de re* interpretation has been a maximal projection. So, it stands to reason that this type of movement targets maximal projections, not heads. Additionally, even if head movement were allowed, the structure in (16-b) violates the head movement constraint (Travis 1984), since there are several heads between the starting position for *wife* and its landing position.

5.2 Split Intensionality

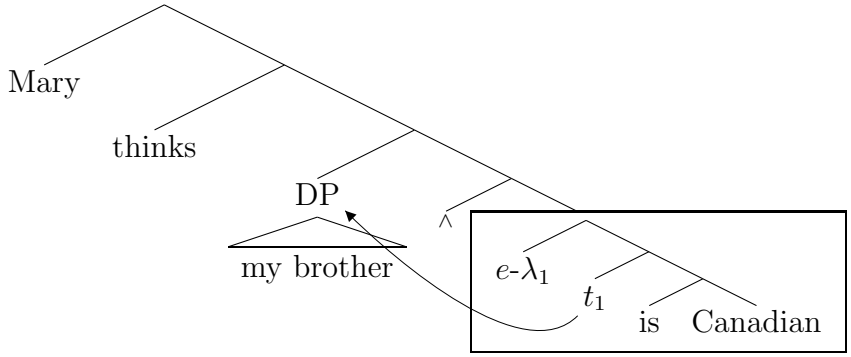
Faced with these additional complications for the situation pronoun account, it seems appropriate to once again weigh the advantages and disadvantages of the scope theory versus the situation pronoun theory. The Intersective Predicate Generalization and Generalizations X, Y, and Z are easily explained by the scope theory. The new data presented in this chapter are also captured under that system. Although there are convincing arguments against the scope theory, a simple situation pronoun theory overgenerates in so many ways that it is starting to seem less and less like a viable alternative. Therefore, in this section, I will propose a less radical change to the scope theory that addresses the problems of the traditional theory without overgenerating like the situation pronoun account does.

The proposal in this chapter returns to a system where intensionality is only represented as an index on the interpretation function. The new system maintains that one part of the scope theory is correct: in order to receive a *de re* reading, a DP must scope above a certain item in the structure of a clause. In the scope theory, this is the intensional operator itself. Everything below the operator (e.g., in the box in (17)) is *de dicto* and everything above it is *de re*. However, in the new system, there is an item *lower* than the intensional operator that serves this purpose, the operator ^ (after the "up" operator of Montague (1970)), as shown in (18). Since the work of intensionality is now divided between an intensional operator like *think* and the ^ operator, I call the new system *split intensionality*.

(17)



(18)



In the new system, the only region of the tree that is *de dicto* is the subtree below the ^ (e.g., in the box in (18)). Therefore, instead of having to scope above an intensional operator ω (as *my brother* does in (17)) in order to receive a *de re* reading relative to ω, a DP may now merely scope above the ^ below ω (as *my brother* does in (18)). As we will see below, this creates an intensional twilight zone, where DPs may be evaluated *de re* relative to an operator, but still scope beneath this operator in terms of quantificational force. As discussed in sections 5.3 and 5.4, this feature allows the split intensionality theory to keep the benefits of the original scope theory, but avoid many of the scope paradoxes which plagued the traditional account.

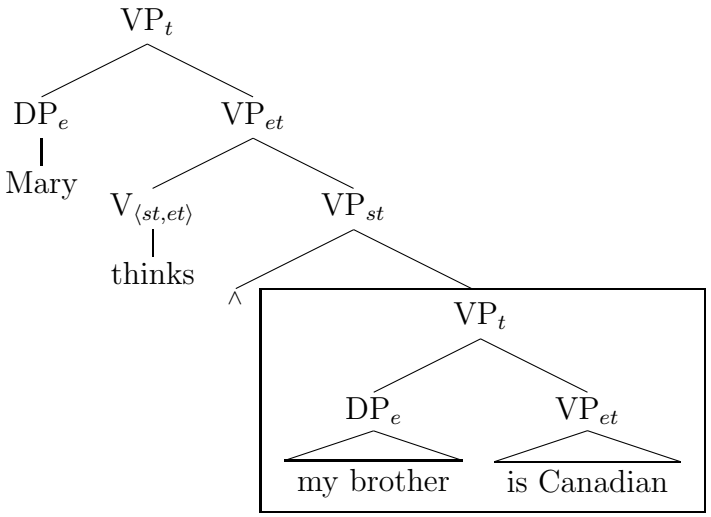
The main innovation of this new system is the ^ operator. This operator, by means of the Intensional Abstraction rule in (19), creates intensions out of extensions, replacing the Intensional Functional Application rule from the Heim and Kratzer (1998)-style intensional system in 1.1.2.

(19) **Intensional Abstraction** ($\approx$ Heim and Kratzer (4), p. 186)
If α is a branching node and $\{\beta, \gamma\}$ is the set of its daughters, where β dominates only an ^ operator, then, for any situation s and variable assignment g, $[\![\alpha]\!]^{s,g} = \lambda s' \in D_s \,.\, [\![\gamma]\!]^{s',g}$.

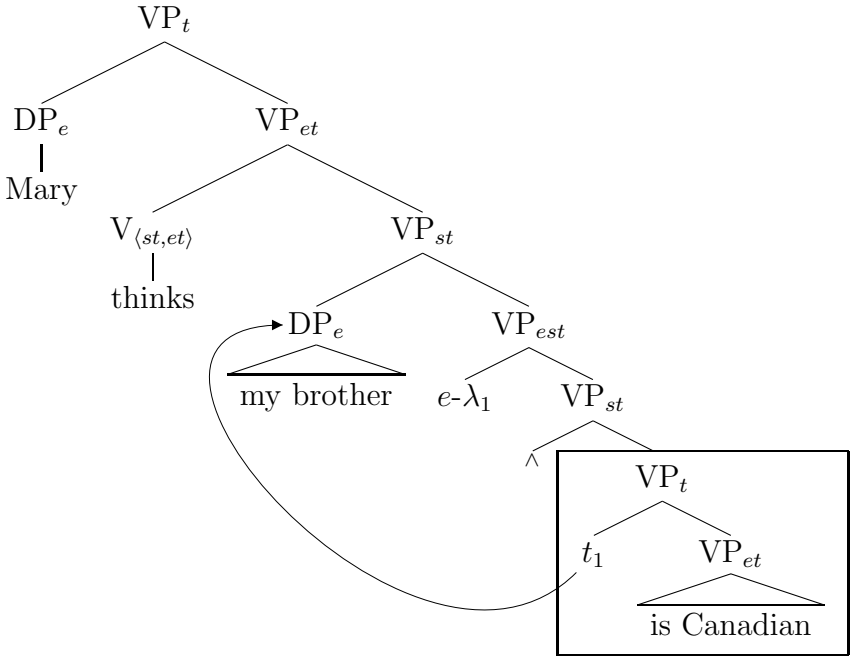
Take, for instance, Percus's (2001) example for Generalization X, repeated in (20). Using this new rule, a *de dicto* reading of *my brother* is derived when *my brother* is below the ^ and a *de re* reading is derived when this DP is above the ^.

(20) Mary thinks my brother is Canadian.[3]

a. *De dicto* for *my brother*:



b. *De re* for *my brother*:



(21) a. $[\![\textbf{thinks}]\!]^{\langle w,i\rangle,g} = \lambda P_{\langle s,t\rangle}\ .\ \lambda x_e\ .\ \forall w' \in W$ such that x entertains w' as a candidate for w at $i\ .\ P(\langle w', i\rangle)$

b. $[\![\textbf{is Canadian}]\!]^{s,g} = \lambda x_e\ .\ x$ is Canadian in s

c. $[\![\textbf{my brother}]\!]^{s,g} =$ my brother in s

[3]These structures omit the TP for space reasons.

(22) Derivation for (20-b):

a. $[\![\text{VP}_t \text{ [} t_1 \text{ VP}_{et} \text{ [is Canadian]] }]\!]^{s,g} = 1$ iff $g(1)$ is Canadian in s

b. $[\![\text{VP}_{st} \text{ [} \wedge \text{ VP}_t \text{ [} t_1 \text{ is Canadian]] }]\!]^{s,g} =$ $\lambda s' \in D_s$. $g(1)$ is Canadian in s'

c. $[\![\text{VP}_{est} \text{ [} e\text{-}\lambda_1 \text{ VP}_{st} \text{ [} \wedge\, t_1 \text{ is Canadian]] }]\!]^{s,g} =$ $\lambda x \in D_e$. $\lambda s' \in D_s$. x is Canadian in s'

d. $[\![\text{DP}_e \text{ [my brother]}]\!]^{s,g} =$ my brother in s

e. $[\![\text{VP}_{st} \text{ [DP}_e \text{ [my brother]] [VP}_{est} \text{ [} e\text{-}\lambda_1 \wedge\, t_1 \text{ is Canadian]] }]\!]^{s,g} =$ $\lambda s' \in D_s$. my brother in s is Canadian in s'

f. $[\![\text{VP}_{et} \text{ [V}_{\langle st,et \rangle} \text{ [thinks]] [VP}_{st} \text{ [my brother } e\text{-}\lambda_1 \wedge\, t_1 \text{ is Canadian]] }]\!]^{\langle w,i \rangle,g} =$ $\lambda x \in D_e$. $\forall w' \in W$ such that x entertains w' as a candidate for w at i . my brother in $\langle w, i \rangle$ is Canadian in $\langle w', i \rangle$

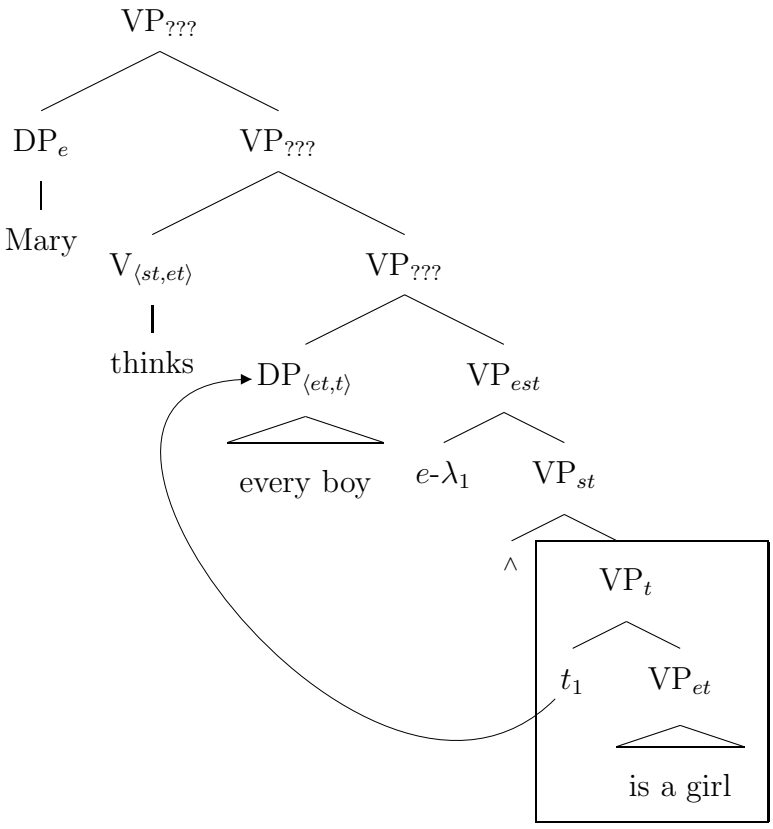
g. $[\![\text{VP}_t \text{ [DP}_e \text{ [Mary]] [VP}_{et} \text{ [thinks my brother } e\text{-}\lambda_1 \wedge\, t_1 \text{ is Canadian]] }]\!]^{\langle @,\nu \rangle,g} = 1$ iff $\forall w' \in W$ such that Mary entertains w' as a candidate for @ at ν . my brother in $\langle @, \nu \rangle$ is Canadian in $\langle w', \nu \rangle$

The derivation for (20-b) proceeds as shown in (22), using the definitions in (21). First, the $\wedge$ applies to the VP, of type t, to form a node of type st. Then, the

subject *my brother* moves above this node, first abstracting over a type-e argument to form a node of type *est*, then filling this argument, creating another node of type *st*. Last, the verb *thinks* takes this type-*st* node as its argument, without any need for Intensional Functional Application.

One problem arises for this analysis, though, when the items scoping above $^\wedge$ are quantifiers. Quantifiers are not arguments of the VP; rather, they are functions that take the VP as their argument (see Barwise and Cooper 1981). Therefore, they require their VP complement to be of a certain type, and if it is not of this type, the two nodes may not combine. For instance, under the Heim and Kratzer (1998) definition of Functional Application, a quantifier of type $\langle et, t\rangle$ cannot combine with a node of type *set* or *est*:

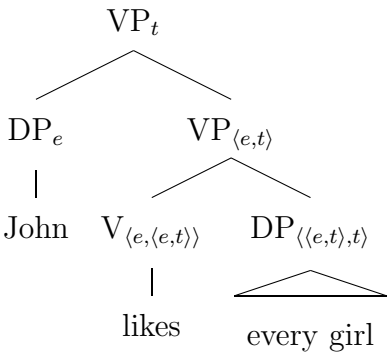
(23) Generalized Quantifier:



To solve this problem, I turn to a proposal in Keenan (1993), (roughly) as implemented by Büring (2005). Under Büring's proposal, generalized quantifiers of type

$\langle\langle e,t\rangle,t\rangle$ can combine with any predicate whose first argument is an individual (type e) and whose eventual result is a truth value (type t). This way, an object quantifier can combine with a two-place predicate (type $\langle e,\langle e,t\rangle\rangle$) directly, without needing to move for type reasons:

(24)



In (24), the DP *every girl* combines directly with the verb *likes*, even though the rule of Functional Application cannot combine these two nodes. This is achieved via a new function, $\mathcal{C}$ for *Combine*, and a new composition rule, *Argument Saturation*:

(25) $\mathcal{C}(\phi, q)$ is defined if q is of type $\langle et,\tau\rangle$ (with τ being any type) and ϕ is a predicate denotation (see below). If defined, $\mathcal{C}(\phi, q) =$

a. $q(\phi)$ if $\phi \in D_{et}$,

b. $\lambda\psi.[\mathcal{C}(\lambda y.[\phi(y)(\psi)], q)]$, otherwise.

(26) a. Predicate denotation:
If τ is a conjoinable type, $\langle e,\tau\rangle$ is a predicate type. For any predicate type τ_p, all elements in D_{τ_p} are predicate denotations.

b. Conjoinable type:

(i) $\langle t\rangle$ is a conjoinable type.

(ii) if τ_1 is a conjoinable type, then for any type τ_2, $\langle\tau_2,\tau_1\rangle$ is a conjoinable type.

(27) **Argument Saturation**:

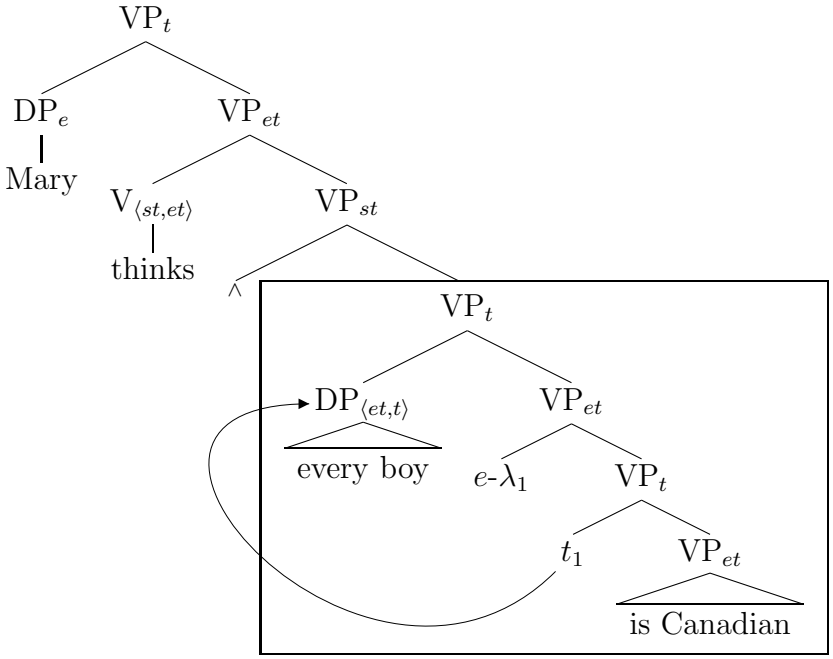
If α is a branching node and $\{\beta, \gamma\}$ is the set of its daughters, where β is of type $\langle et, \tau\rangle$ (with τ being any type) and γ has a predicate type, then, for any situation s and variable assignment g, $[\![\alpha]\!]^{s,g} = \mathcal{C}([\![\gamma]\!]^{s,g}, [\![\beta]\!]^{s,g})$.

Basically, the rule in (27) allows a quantifier to saturate the first argument of its complement predicate and pass up any remaining arguments to be saturated in later steps of the derivation.

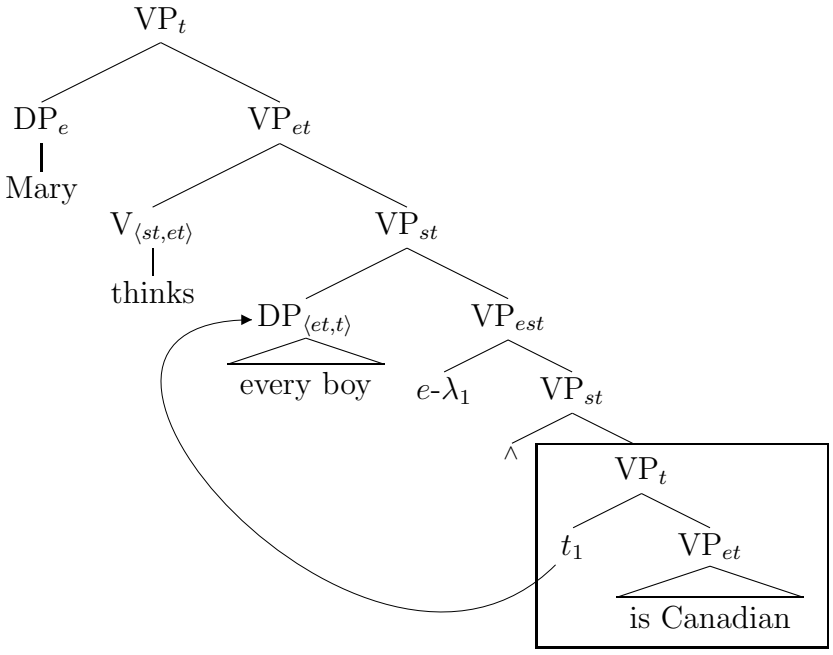
Turning back to the split intensionality system, Büring's rule will solve our problem without any modification. Using the rule above, a quantifier of type $\langle\langle e, t\rangle, t\rangle$ can combine directly with a predicate of type $\langle e, \langle s, t\rangle\rangle$ as shown in the examples at the end of this section. Thus, with Intensional Abstraction and Argument Saturation, the split intensionality system can reproduce the results of the traditional scope theory. In the next few sections, I will show how the new system eliminates the disadvantages of the scope theory while maintaining its advantages.

(28) Mary thinks every boy is Canadian.[4]

a. *De dicto* for *every boy*:

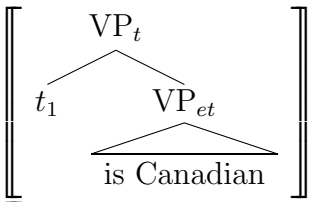


b. *De re* for *every boy*:

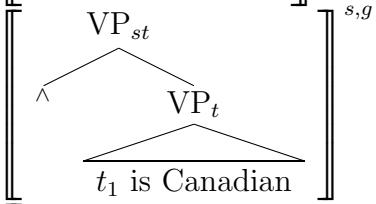


[4]Once again, TP is omitted.

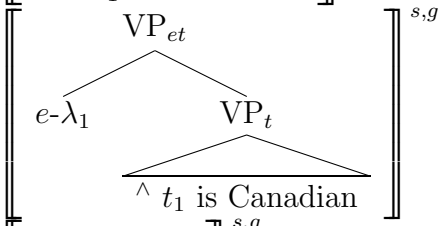
(29) Derivation for (29-b):

a. 

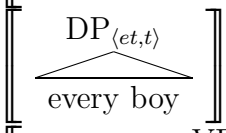
$= 1$ iff $g(1)$ is Canadian in s

b. 

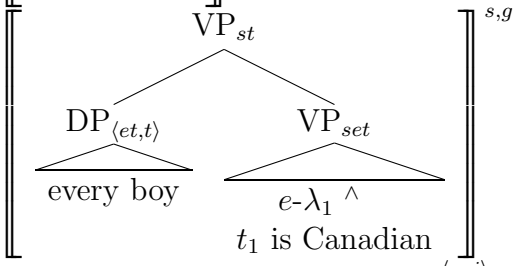
$=$ $\lambda s' \in D_s$. $g(1)$ is Canadian in s'

c. 

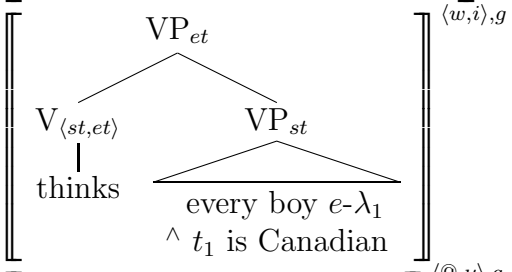
$=$ $\lambda x \in D_e$. $\lambda s' \in D_s$. x is Canadian in s'

d. 

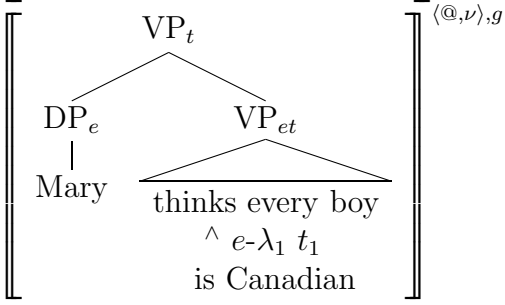
$=$ $\lambda P \in D_e^{D_t}$. $\forall x$ such that x is a boy in s . $P(x)$

e. 

$=$ $\lambda s' \in D_s$. $\forall x$ such that x is a boy in s . x is Canadian in s'

f. 

$=$ $\lambda x \in D_e$. $\forall w' \in W$ such that x entertains w' as a candidate for w at i . $\forall x$ such that x is a boy in $\langle w, i\rangle$. x is Canadian in $\langle w', i\rangle$

g. 

$= 1$ iff $\forall w' \in W$ such that Mary entertains w' as a candidate for @ at ν . $\forall x$ such that x is a boy in $\langle @, \nu\rangle$. x is Canadian in $\langle w', \nu\rangle$

(30) $[\![\textbf{every bachelor}]\!]^{s,g} = \lambda P_{st}$. $\forall x$ such that x is a bachelor in s . $P(s)$

5.3 Scope Theory Advantages

The advantage that the scope theory has over the situation pronoun theory is that it does not overgenerate: namely, it explains the phenomena in section 5.1, the Intersective Predicate Generalization, and Generalizations X, Y, and Z. If the new theory overgenerates as much as the unconstrained situation pronoun theory, it is no better. However, as we will see, the new theory captures these generalizations just as well as the traditional one.

5.3.1 Islands, Polarity Items, and Subconstituents

The data presented in section 5.1 argued for a scope theory, but not necessarily one where the position a *de re* DP must scope above is the intensional operator itself. For instance, if a subconstituent has to move at all, it will be an illegal movement, as shown in (31):

(31) a. John wants [the wife]$_x$ ^ to meet [x of the president].
b. John wants [wife]$_x$ ^ to meet [the x of the president].

Here, *wife* or *the wife* has moved, not above *wants* but above ^, but the same arguments apply for why this movement is illicit. Similarly, if a polarity item must scope above negation, which is in turn above ^ (as in (32-a)), this item must be *de re*; and if such an item must scope below negation, which is in turn below ^ (as in (32-b)), this item must be *de dicto*:

(32) a. Mary doesn't want ^ to buy some inexpensive dress.
b. Mary wants ^ none of her children to buy a coat that costs any more than $300.

The question of islands is a little trickier under the split intensionality system. For instance, if the ^ operator were to scope below an island for movement, a DP would simply have to scope above this operator in order to be *de re*. Therefore, the split

intensionality system predicts that such DPs inside islands should be able to be *de re*, as shown in (33):

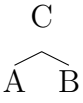
(33) $\omega \ldots [_{Island}$ DP $\ldots \wedge \ldots]$

And in fact, this is the very mechanism by which the split intensionality system solves many of the problems with the traditional scope theory, as will be shown in section 5.4. However, the cases discussed in section 5.1.1 are mostly ones where one intensional operator is embedded under another – for instance, a conditional under a propositional attitude verb. This is schematized in (34), where ω and ω' are both intensional operators. In these cases, the island boundary is marked by the embedded intensional operator ω' (such as the conditional modal), and therefore any DP scoping above an $\wedge$ operator inside the island will merely be *de re* relative to the embedded intensional operator ω', not the matrix-level intensional operator ω.

(34) $\omega \ldots \omega' [_{Island}$ DP $\ldots \wedge \ldots]$

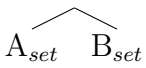
This schema holds for if-clauses, because-clauses, NP complements, and finite clauses. The one other island discussed above is the coordinate structure constraint. In this case, if the $\wedge$ operator is above the coordinate structure, as shown in (35), the same argument holds: one of the coordinated phrases must move out of the structure in order to become *de re* independently of the other. If the $\wedge$ is in one coordinated phrase but not the other, the structure would not be interpretable, as discussed in the next section. So, the data presented at the beginning of this chapter is indeed still captured by the split intensionality system.

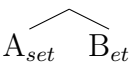
5.3.2 Intersective Predicate Generalization

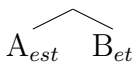
(35)


The Intersective Predicate Generalization basically says that if two predicates like **A** and **B** in (35) are evaluated via Predicate Modification, they must be evaluated at the same time and world. This generalization is trivial to prove under the split intensionality system, since there are no situation pronouns, and hence no long-distance determination of the world or time in which an expression is evaluated. Thus, if both **A** and **B** are extensional, as in (36-a), they will both be evaluated in the situation index of the interpretation function. If they are both intensional, as in (36-b), they will both be evaluated at whatever situation fills the type-s argument of the denotation of **C**. However, if only one is intensional, as in (36-c) or (36-d), the two will simply not be allowed to combine via Predicate Modification, which requires both nodes to have the same type.

(36) a. 

b. 

c. 

d. 

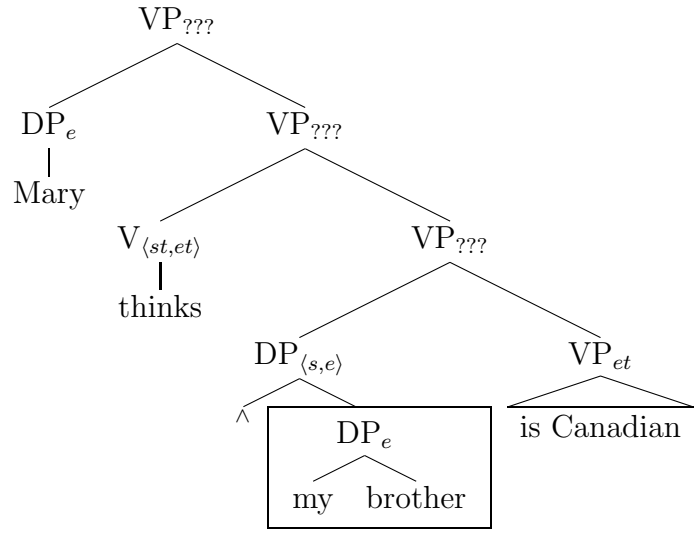
Although split intensionality can capture the Intersective Predicate Generalization, perhaps the previous explanation, Situation Economy, still has some empirical advantages. One possible advantage of a Situation Economy story over this one is the explanation given in section 3.6 for why simple bare plurals must always receive kind readings. However, one could easily imagine another economy story which might explain this. For instance, non-kind readings of bare plurals require these NPs to move in order to receive an interpretation, while kind readings do not. Perhaps a general principle against unnecessary movement could explain the preference for kind readings. Thus, overall, the split intensionality theory provides an even simpler explanation of the Intersective Predicate Generalization than the Situation Economy theory does, without giving up too many of the advantages of the economy story.

5.3.3 Generalizations X, Y, and Z

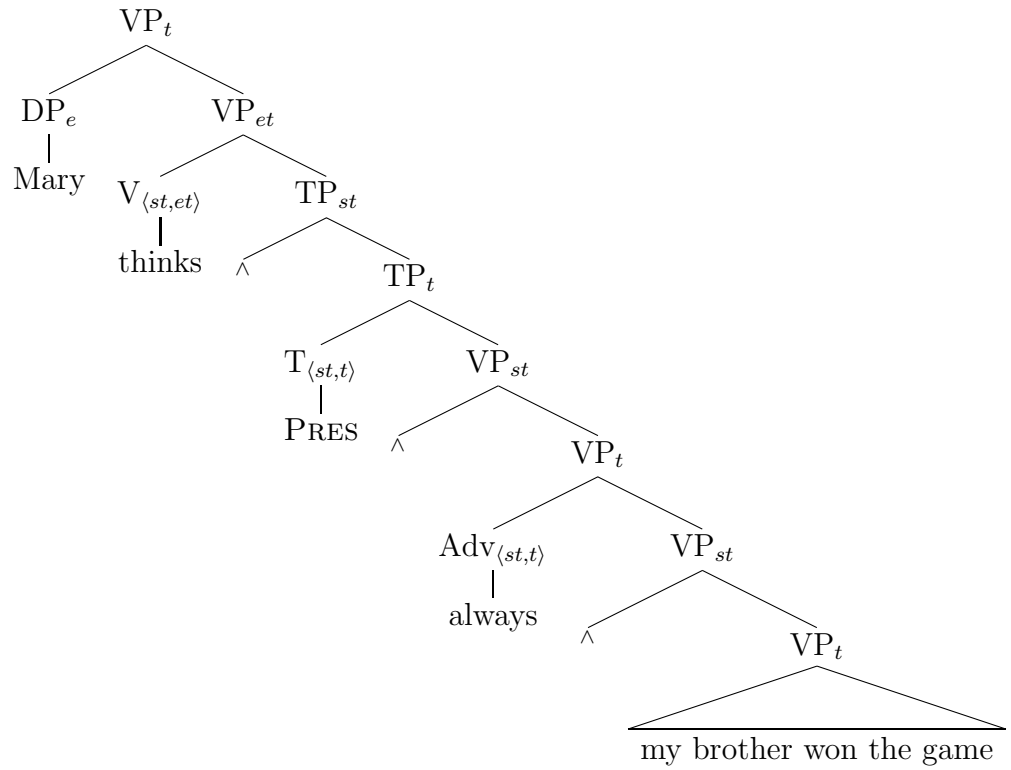
The main reason that a scope theory (like split intensionality) is better at explaining Generalizations X, Y, and Z is that DPs can raise, while VPs cannot. Thus, a DP

may raise to be above the $^\wedge$ operator and hence be *de re*, while a VP may not do so and therefore may not be *de re*. In this section, though, I will go through a few details concerning these generalizations. Consider the following examples for Generalization X (37) and Y (38):

(37)



(38)



First, for Generalization X, (37) is the closest that split intensionality comes to violating Generalization X. In (37), the ^ operator combines with the DP *my brother* to form a node of type $\langle s, e\rangle$. However, this node has no way to combine with the type-$\langle e, t\rangle$ VP. Neither Functional Application nor Argument Saturation may apply in this case, so the structure is not interpretable.

As for Generalization Y (the example of which is shown in (38)), since the only tool available to shift the evaluation situation is the ^ operator, there is simply no way for *always* to be evaluated in a world other than those quantified over by *thinks* or a time other than that provided by PRES.

Generalization Z is also trivially avoided in the split intensionality system. In fact, the conditions that this constraint was designed to avoid do not ever even arise in the new system. Such conditions were merely an artifact of using situation pronouns and situation λ binders.

5.3.4 Summary

In short, the split intensionality system does not overgenerate in most of the ways that the situation pronoun account does. The new data presented in this chapter are captured under this new system and the Intersective Predicate Generalization and Generalizations X, Y, and Z essentially do not even arise under this system.

5.4 Scope Theory Disadvantages

An important step in evaluating the split intensionality system is to determine if it suffers from the same disadvantages that the original scope theory does. To that end, this section will review the three main arguments against the scope theory from Chapter 1 and show how the new system solves these problems.

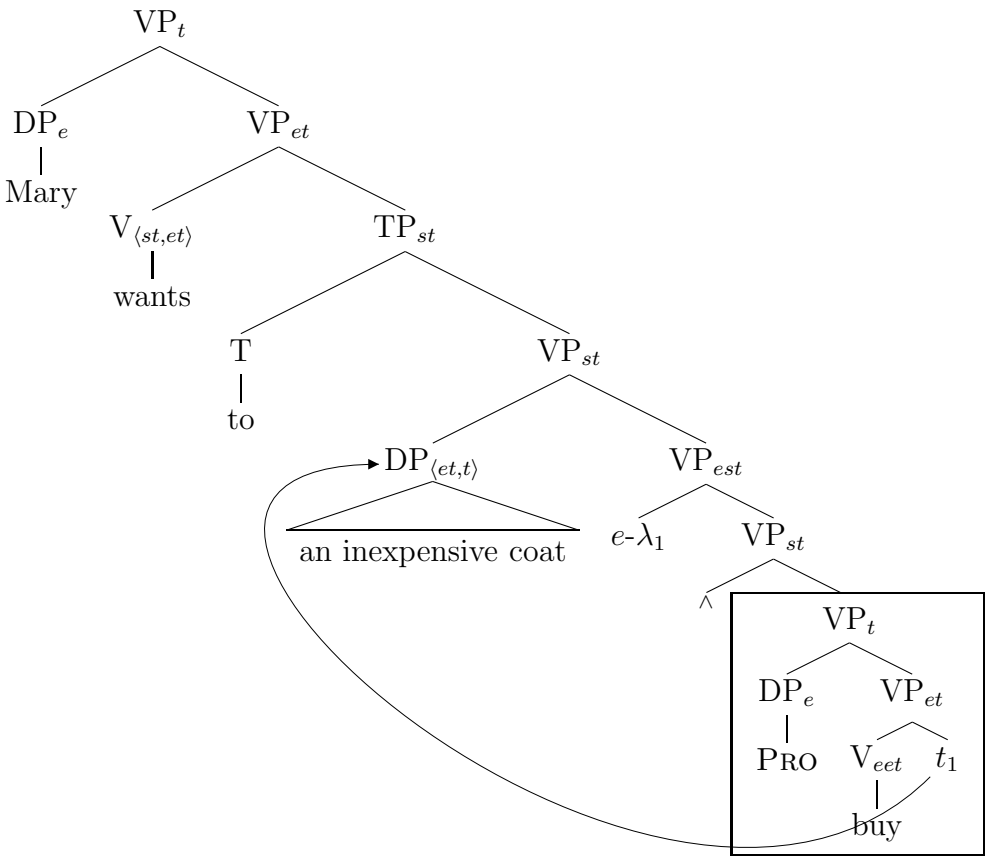
5.4.1 Fodor

(39) Mary wants to buy an inexpensive coat.

Fodor (1970) shows that (39) has a reading where the DP *an inexpensive coat* is *de re*, in the sense that Mary does not know that what she wants is an inexpensive coat, but the DP still takes scope below the verb *want* in the sense that there is no one single coat that Mary wants. For instance, imagine that Mary wants to buy an Old Navy coat, but has not picked out one in particular. In this scenario, whether or not she knows that Old Navy coats are inexpensive, (39) is acceptable. The reading poses a paradox for the scope theory as follows. Since Mary might not know that the coat is inexpensive, the DP should be *de re* and therefore scope above *wants*. However, since she does not have one particular coat in mind, the existential force of the DP should scope below *wants*.

This problem is obviated in the split intensionality system, where a DP may scope (i.e., take quantificational force) below an intensional verb and yet still be interpreted *de re* relative to that verb. For instance, consider the structure in (40):

(40)



(41) In all of Mary's desire worlds w, there's an x such that x is an inexpensive coat in the real world and Mary buys x in w.

As described above, everything below the ^ operator is evaluated at the shifted intensional index – in this case in Mary's desire worlds. In this structure, for instance, the verb *buy* is the only item interpreted in Mary's desire worlds. Everything above the ^, on the other hand, is interpreted at the same index as the higher clause. Therefore, *an inexpensive coat* is interpreted in the actual world, even though it scopes below the verb *wants*.

So, the split intensionality system predicts that a reading of this sentence will be one where, as Fodor describes, there is no one coat in the real world which Mary wants and yet the description *inexpensive coat* holds in the real world. Incidentally, the new system does not predict Fodor's fourth reading, where the quantificational force of the DP is above the intensional operator but the intensional status is *de dicto*. See section 1.3.1, though, for an argument that this reading does not, in fact, exist.

5.4.2 If-clause Sentences

(42) If everyone in this room were outside, it would be empty.

(43) a. Predicted reading: Everyone x in this room in @ is such that $\forall w$ where x is outside in w, this room is empty in w.

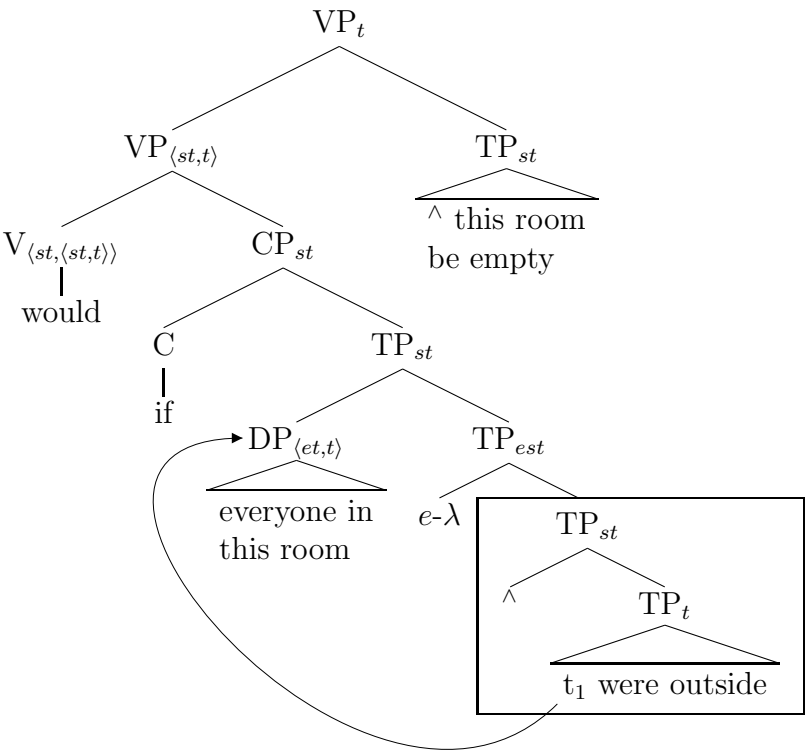
b. Actual reading: $\forall w$ where everyone in this room in @ is outside in w, this room is empty in w.

The second major argument against the scope theory that I will discuss is very similar to the first. The idea, as discussed in 1.3.3, is that the scope theory predicts (42) to mean (43-a), but it really means (43-b). The scope theory requires *everyone in this room* to be above the conditional modal *would* in order to be *de re*, but if the quantification force of this DP were above the modal, the reading would be as in (43-a). The beauty of this example is that since an if-clause is a downward-entailing environment, the reading where the universal quantifier *everyone in this room* scopes

below the modal is significantly different from the reading where it scopes above.

Once again, split intensionality captures this case correctly, and the reasoning is parallel to the previous case. Inside the if-clause, the DP *everyone in this room* has raised to a position above the ^. Only the items below ^ (those in the box shown in (44)) are interpreted in the supposition worlds of the conditional. Since *everyone in this room* has moved out of this box, it is evaluated in the real world, although it still scopes below the modal in terms of quantificational force.

(44)



(45) $[\![\textbf{would}]\!]^{s,g} = \lambda P_{st}\ .\ \lambda Q_{st}\ .\ \forall s'$ accessible from $s\ .\ P(s') \rightarrow Q(s')$

(46) $[\![\textbf{if [everyone in this room]}\ e\text{-}\lambda_1\ \hat{}\ t_1\ \textbf{were outside}]\!]^{s,g} = \lambda s'_s\ .$ everyone in this room in s is outside in s'

(47) $[\![\textbf{(44)}]\!]^{s,g} = 1$ iff $\forall s'$ where everyone in this room in s is outside in s', this room is empty in s'

5.4.3 Bäuerle's Paradox

(48) The teacher thinks some girl wrote every paper John wrote.

(48) is an example similar to those Bäuerle (1983) discusses, only modified to sharpen the judgments. Imagine that a teacher suspects John of cheating because the papers he turns in are written in very neat handwriting. She suspects that some girl must have written the papers, since (in her mind) no boy has such neat handwriting. However, in fact, John just has excellent penmanship, and he wrote all the papers himself. Under this scenario, (48) can apply.

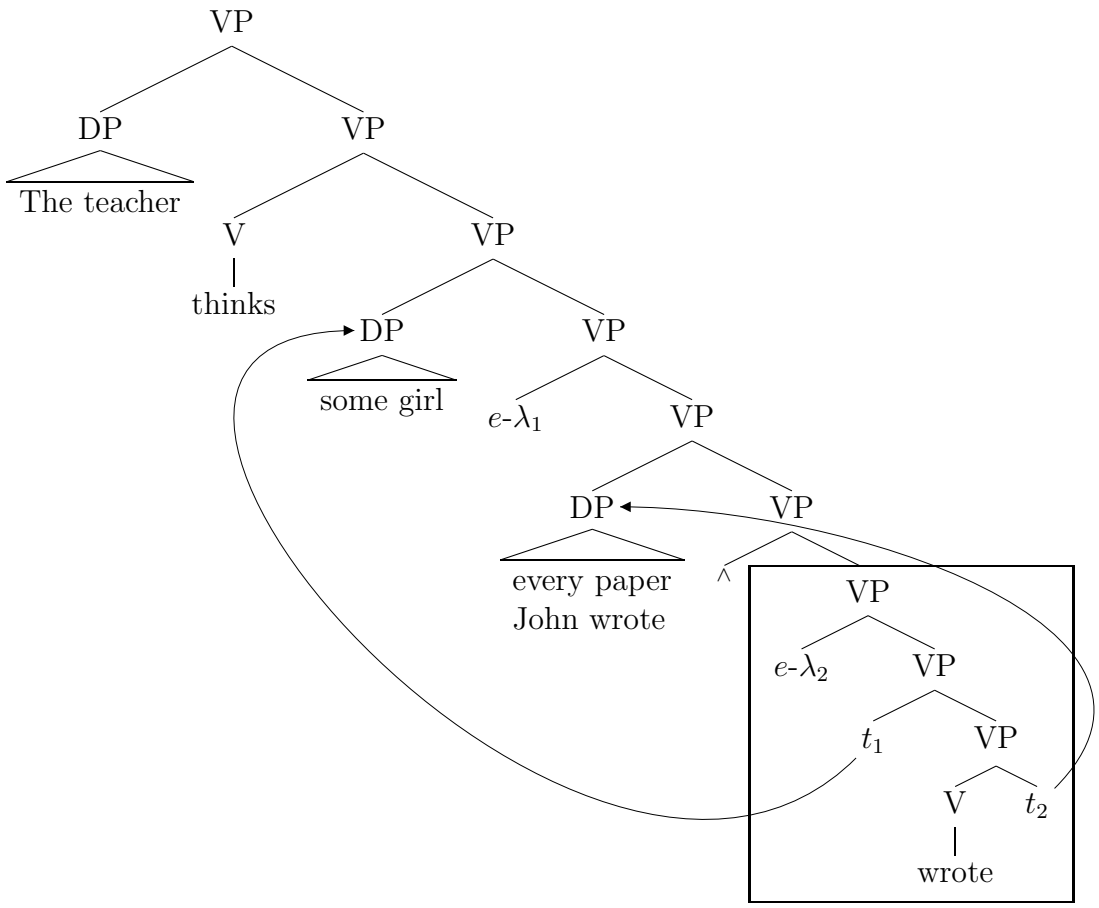
As discussed in section 1.3.2, this example poses a problem for the scope theory, as follows. The DP *every paper John wrote* is *de re*, since the teacher thinks John did not write any papers. The DP *some girl* is *de dicto*, since the teacher does not have a particular girl in mind. Under the scope theory, in order to be *de re*, a DP must scope above the intensional operator. So, since *every paper John wrote* is *de re*, if *some girl* were to scope above *every paper John wrote*, *some girl* would have to be *de re*, too. However, in this sentence, under this scenario, *some girl* scopes above *every paper John wrote* (since the teacher suspects that the same girl wrote each paper), and yet *some girl* is still *de dicto*.

This particular sentence is not actually a problem for the split intensionality system. If you take *some girl* to range over the actual girls in the class, the structure in (49), interpreted under the split intensionality system, derives the problematic reading. There is no one particular girl the teacher has in mind, and yet *some girl* can still be *de re*.[5]

[5]Indeed, in Bäuerle's original article, where the phrase in question is *Stuttgarterin*, the only justification he gives for the phrase being *de dicto* is that there is no one particular individual being referred to:

(i) Nehmen wir nun an, daß Georg nicht von einer Stuttgarterin glaubt, daß sie jeden VfH-ler liebt, sondern lediglich, daß es eine solche Stuttgarterin gibt. Eine Stuttgarterin ist also opak. (p. 123)

(49)



(50) $[\![\textbf{(49)}]\!]^{\langle @,\nu\rangle,g} = 1$ iff in all of the teacher's thought worlds w in @ at ν, there is some girl x in @ such that for every paper y that John wrote in @, x wrote y.

So, in this way, (48) is captured by the split intensionality system. However, there is another, very similar sentence that is more problematic for the new system. The sentence in (51) is acceptable even when John has never actually dated anyone. Thus, the structure in (49) is not possible for (51), since in such a structure, there would have to be at least one girl who John dated in the real world.

(51) The teacher thinks that some girl John dated wrote every paper that John wrote.

Wide-Scope Indefinites and Intensionality

To solve this puzzle, I will make use of a proposal explaining the exceptional scope properties of indefinites due to Kratzer (1998), and I will extend this proposal to cover intensional contexts. Kratzer, following several researchers since Fodor and Sag (1982), points out that certain indefinites seem to be able to scope out of islands. For instance, imagine that I bet all my money on one particular dog in a dog race, and I did not bet on any other dogs. (52-a) is a perfectly fine way of describing this scenario, even though the reading that is consistent with the scenario is one where *some dog* outscopes the conditional modal, violating an island constraint. (52-b), on the other hand, is not an accurate way of describing the scenario. The only reading that (52-b) can have is one where I get rich in any case in which no more than one dog wins – no matter which dog it is that wins.

(52) a. If some dog wins, I will be rich.
b. #If only one dog wins, I will be rich. (# under the reading: only one dog is such that if that dog wins, I'll be rich.)

Kratzer's explanation for this phenomenon is that an indefinite like *some dog* (but not one like *only one dog*) can denote a choice function which picks out one individual from a set of individuals, such as one dog from the set of dogs running the race:

(53) If f(some dog) wins, I will be rich. (Where f picks out one dog from the set of its argument *some dog*.)

Under Kratzer's account, these choice functions are provided by the context. Since they pick out one particular individual, they effectively are scopeless. Therefore, such an indefinite can seem to outscope elements in the sentence (such as the conditional modal) which actually outscope them.

Given this analysis, let's take the scenario one step further. Imagine that I tell my aunt Edna about my bet. Being hard of hearing, Aunt Edna thinks that I placed a bet on a *hog* rather than a *dog*. (54-a) is a good way of describing this extended

scenario, while (54-b) is not – even though I placed a bet on only one animal.

(54) a. Aunt Edna thinks that if some hog wins, I'll be rich.

b. #Aunt Edna thinks that if only one hog wins, I'll be rich. (# under the reading: Aunt Edna thinks that only one hog is such that if that hog wins, I'll be rich.)

I propose to capture this with a choice function that is parameterized for situations:

(55) Aunt Edna thinks that if f_s(hog) wins, I'll be rich.

For example, f_s might have the following denotation (which, I should note, depends on the evaluation situation):

(56) $[\![f_s]\!]^s = \lambda P_{et}$. ιP that I bet on in s

And in this case, (55) would have the following meaning (factoring out times for perspicuity):

(57) In all of Aunt Edna's thought worlds w, if the hog in w that I bet on in w wins, I'll be rich.

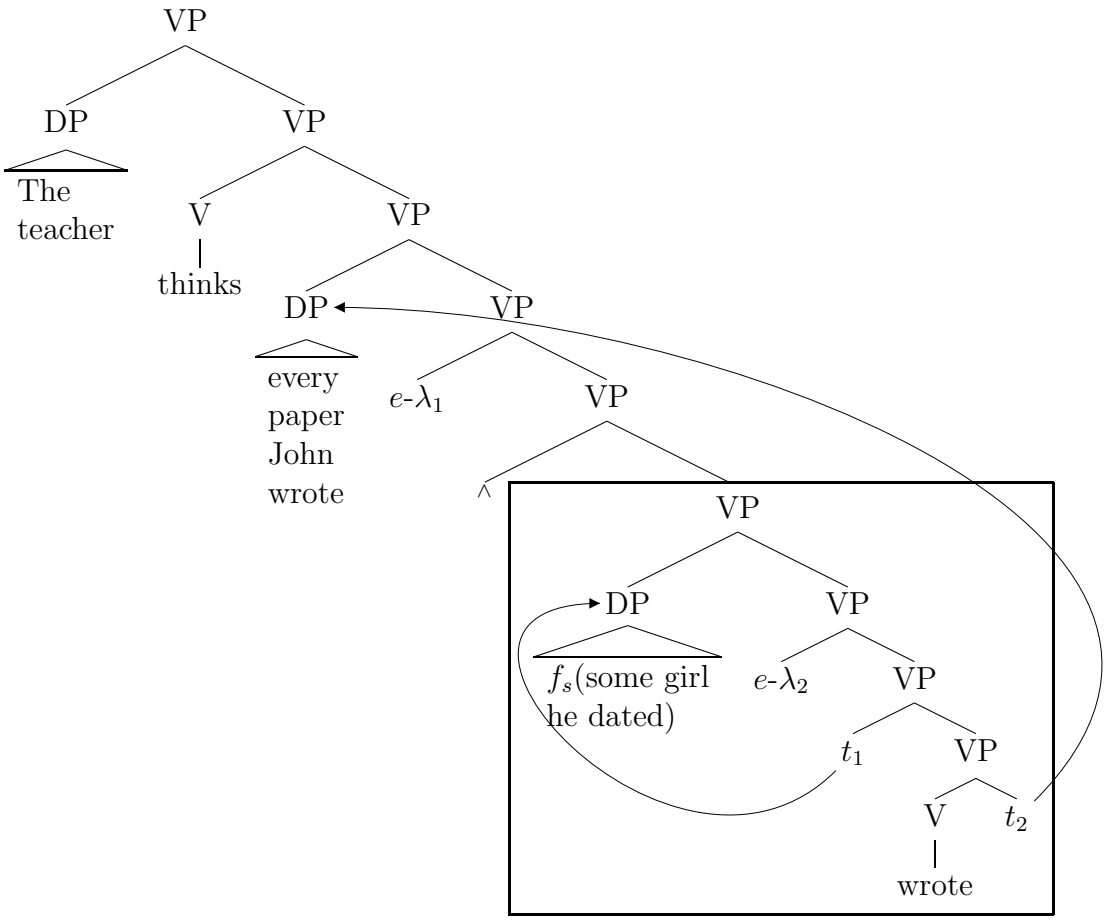
Under this analysis, Edna might not have one particular hog in mind that wins the race in each of her thought worlds. And yet, *some hog* still has exceptional scope properties, for it seems to outscope the conditional modal: in each world w, there is only one hog under discussion. The analysis is further supported by the fact that the DP *only one hog*, which does not have the choice function option, cannot have this reading.

Towards a Solution

This theory of indefinites allows for an alternative analysis of the Bäuerle sentences. Under this theory, (51) could receive the desired interpretation in a structure like

(58), as long as the choice function f_s picks out the girl who John dated in s. Then, this DP could receive a *de dicto* interpretation by being under the ^ beneath the verb *thinks*, while still appearing to outscope the *de re* DP *every paper that John wrote*, due to fact that it picks out a single individual.

(58)



One prediction of this analysis is that if you changed the *de dicto* DP in such a sentence to a DP which does not have exceptional scope properties, the ostensible paradox would disappear. And indeed, if you change the DP to *only one girl*, the sentence sounds odd, as shown in (59). In order to do so, though, you must change the scenario a little. Imagine that John's teacher is suspicious about just one of John's papers. She thinks that John dated several girls, but perhaps he only got one of them to cheat for him. Under this scenario, the sentence in (59-b) sounds odd, as predicted – since the *de dicto* DP *only one girl* must outscope the *de re* DP *a paper that John wrote*. However, if you change the DP describing the paper to one that is compatible

with a *de dicto* reading, such as in (60), the sentence is acceptable.

(59) #The teacher thinks that only one girl John dated wrote a paper that John wrote.

(60) The teacher thinks that only one girl John dated wrote a paper that John turned in.

Additionally, if you changed the *de dicto* DP from an indefinite to a definite quantifier, the problematic reading should also no longer be available. Although the judgments are somewhat difficult, this prediction seems to be true, too. For instance, if you change *some girl John dated* to *each girl John dated*, this DP must be *de re*, as shown by the acceptability of the two continuations in (61). The continuation in (61-a) forces the DP to be *de re*, since the teacher is unaware that the girls in question dated John. No scope paradox arises in this scenario, since both DPs are *de re*. The continuation in (61-b), however, forces the DP *each girl John dated* to be *de dicto* since no such girls actually exist. The reading forced by this continuation would have caused a scope paradox, since the *de dicto* DP *each girl John dated* outscopes the *de re* DP *a paper that John wrote*. However, this reading is not available for (61), as shown by the unacceptability of (61-b). Compare (61) to (62), where the DP *a paper that John turned in* is *de dicto*. In this case, either continuation is fine.

(61) The teacher thinks that each girl John dated wrote a paper that John wrote.

a. But the teacher doesn't know any of them dated John.

b. #But John has never actually dated anyone.

(62) The teacher thinks that each girl John dated wrote a paper that John turned in.

a. But the teacher doesn't know any of them dated John.

b. But John has never actually dated anyone.

Of course, this is not a complete proposal, but it is at least suggestive of an alternative explanation for Bäuerle's paradox, under which the sentences in question do not, in fact, present a scope paradox.

5.4.4 Finite Clauses

One problem for the scope theory not mentioned in Chapter 1 is due to May (1977), who points out that DPs inside finite clauses cannot scope outside these clauses.[6] For instance, in (63-a), the DP *every rally in John's district* can scope above *some politician*, yielding a reading where a different politician will speak at each rally. However, this reading – and hence, presumably, this scoping – is unavailable in (63-b). Based on such data, May calls into question whether a DP like *everyone in this room* in (64) could move to the position it holds in (64-a), as it must in the traditional scope theory in order to receive a *de re* reading. However, this problem does not arise in the split intensionality system, since the DP may be *de re* while still within the finite clause, as shown in (64-b), as long as it scopes above the ^.

(63) (= von Fintel and Heim (2008) (170))

a. Some politician will address every rally in John's district.

b. Some politician thinks that he will address every rally in John's district.

(64) Mary thinks that everyone in this room is outside.

a. [everyone in this room]$_x$ [Mary thinks that x is outside]

b. Mary thinks that [[everyone in this room]$_x$ [^ x is outside]]

Even under the split intensionality theory, though, if May is correct and a finite clause is an island for DP movement, a DP inside a finite clause is predicted not to be able to scope above a higher intensional operator. As discussed in section 5.1.1, this is true:

[6] Wilder (1997) later refutes the strongest form of this claim. However, it still seems that the subject of a finite clause cannot scope out of that clause.

(65) #Mary thinks that she reported that all five people in this room were in this room, but she thinks there are ten people here.

(66) Mary reported that all five people in this room were in this room, but she thinks there are ten people here.

Imagine that Mary was supposed to report who is in this room to her boss. She thinks that ten people are in the room, but she only reported five of them. It just so happens, though, that in reality only the five she reported are actually in the room. Under this scenario, (66) sounds fine, but (65), where the DP *all five people in this room* is doubly embedded, sounds odd. Under the split intensionality theory, this is predicted, since this DP may raise to become *de re* in (66) without raising out of the finite clause under *reported*, but in order to be *de re* (relative to *thinks*) in (65), the DP would have to raise out of the finite clause island.[7]

5.4.5 Summary

As we have seen, in each case where the original scope theory suffered from paradoxes, the new theory makes the correct predictions. The situation pronoun theory was proposed as a solution to these very problems, so if another theory can explain them as well, it is worth comparing this new theory to the situation pronoun theory.

[7]Interestingly enough, this ties in with ACD facts (Sag 1976) involving the subjects of finite clauses:

(i) Mary wants to report everyone that Bill does.
  a. ... Bill reports.
  b. ... Bill wants to report.

(ii) Mary thinks that she reported everyone that Jill did/*does.
  a. ... Jill reported.
  b. #... Jill thinks she reported.

In (i), where the DP with an elided phrase is not inside a finite clause, the ellipsis can refer to the entire clause, as shown. However, in (ii), where the DP is inside a finite clause, the ellipsis can only refer to the inner clause, presumably because the DP may not raise to the top of the sentence.

5.5 Definite Descriptions

One remaining problem for the split intensionality theory is definite descriptions. As shown in Chapter 1, certain definite descriptions can have readings that are not linked to any tense or world present in the sentence:

(67) When I last visited my friend, he had two children: a six-year-old and a ten-year-old. The six-year-old graduated from med school two years ago.

The split intensionality theory has no way of explaining this reading. Similarly, adding context can greatly improve the acceptability of a sentence involving a definite description that sounds odd out of the blue:

(68) #The teacher thinks that John should be punished because he didn't write the papers he wrote.

(69) John wrote some amazing papers over the course of last semester. They made me laugh and they made me cry. They were so good, in fact, that his teacher didn't believe he wrote them. She thinks that John should be punished because he didn't write those papers he wrote.

I currently have no reply beyond pointing out that definite descriptions do have odd properties, as pointed out, for instance, by Donnellan (1966).

5.6 Conclusion

The paradoxes that the traditional scope theory suffers from make it clear that this theory cannot be correct as it stands. Clearly, an alternative theory is needed. However, adding situation pronouns to the syntax of natural language increases the power of the system, as evidenced by the many new readings that are predicted under the situation pronoun account. Furthermore, a good number of these readings are not actually available. The split intensionality theory, on the other hand, is a more mod-

est change to the traditional scope theory. This new approach solves the problems raised for the traditional theory without increasing the power of the system as much as the situation pronoun account does.

Much remains to be worked out in the new system. For instance, the account given of Bäuerle's paradox could be fleshed out and investigated further, and an account for the readings available for definite descriptions is needed. Also, more research is needed to explore the predictions that the new theory makes concerning the connection between intensionality and other scopal phenomena, such as binding theory, scope economy, and e-type anaphora. However, since this new account is inherently more constrained, it seems prudent to research the split intensionality system as a replacement for the traditional scope theory before proposing the more powerful situation pronoun account, which already requires several further constraints to rein in its overgenerating predictions.

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