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Situation Pronouns in Determiner Phrases

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Abstract It is commonly argued that natural language has the expressive power of quantifying over intensional entities, such as times, worlds, or situations. A standard way of modelling this assumes that there are unpronounced but syntactically represented variables of the corresponding type. Not all that much as has been said, however, about the exact syntactic location of these variables. Furthermore, recent work has highlighted a number of problems that arise because the interpretive options for situation pronouns seem to be subject to various restrictions. This paper is primarily concerned with situation pronouns inside of determiner phrases (DPs), arguing that they are introduced as arguments of (certain) determiners. Verbal predicates, on the other hand, are assumed to not combine with a situation pronoun. The various restrictions on their interpretation are shown to fall out from the semantic system that is developed based on that view. Further support for such an account come from situation semantic analyses of donkey sentences as well as data on the temporal interpretation of nominal predicates. Its ability to account for this full range of data in a unified manner is shown to set it apart from previous proposals. The paper closes with an outlook on further extensions, including an account of quantifier domain restriction based on situation pronouns.

Keywords Intensionality · Situation Semantics · Transparent interpretations · Determiners · Quantifiers

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1 Introduction

It is commonly argued that natural language has the expressive power of quantifying over intensional entities, such as times, worlds, or situations. A standard way of modelling this assumes that there are syntactically represented variables of the corresponding type, which happen to be unpronounced. Not all that much as has been said, however, about the exact syntactic location of such variables. This paper is concerned with situation pronouns inside of determiner phrases (DPs) and argues that they are introduced as arguments of (certain) determiners. Support for this position comes from the by now well-known restrictions on transparent interpretations (Percus, 2000; Keshet, 2008a), the situation semantic treatment of donkey sentences (Berman, 1987; Heim, 1990; Elbourne, 2005), as well as data on the temporal interpretation of DPs (Kusumoto, 2005).

I begin by reviewing the general motivations for representing situation pronouns syntactically, which crucially involve the 'intensional independence' of certain types of DPs, as exhibited in transparent intepretations (section 2). The various restrictions on these interpretations discussed in recent work (Percus, 2000; Keshet, 2008a, 2010) are laid out in detail as well. Section 3 makes the case for representing situation pronouns inside of DPs as arguments of determiners. First, the semantic system based on this assumption is laid out. I then show that the restrictions from Percus (2000) and Keshet (2008a) follow automatically in this system, unlike in previous accounts, and provide a detailed comparison of the results of the present system with those of Keshet (2010). Section 3.5 provides further support for introducing situation pronouns at the level of the DP, based on consideration of phenomena involving situation semantic accounts of donkey anaphora and the temporal interpretation of DPs. Section 3 concludes with an overall evaluation of the proposal. As (Keshet, 2011b) put forth a new variant of a scope-based account of transparent interpretations, section 4 compares Keshet's (2011b) Split Intensionality account with the present proposal, arguing that the full range of data considered here favors the latter. Section 5 closes by taking stock and raising various open issues and possible extensions of the theory, including an account of quantifier domain restriction based on situation pronouns and other possible locations in which situation pronouns may be needed.

2 Background: Syntactically Represented Situation Pronouns

There are two main lines of argument in the literature in support of the notion of syntactically represented variables for worlds and times (or situations). One stems from general arguments about the expressive power of natural language as far as modal and temporal reference are concerned. The second concerns what I will call the intensional status of DPs, i.e., the issue of whether a nominal predicate is interpreted relative to the same world (or time or situation) as the other predicates in its clause or not. Since my focus in this paper will be on situation pronouns inside of DPs, I will only review the former very briefly, and pay closer attention to the latter. (But see section 5 for more general issues that arise based on the present proposal.)

2.1 Expressive Power Arguments

Early work in temporal and modal logic, e.g., by Kripke and Prior, as well as in formal semantics for natural language (Montague, 1974) treated times and worlds differently from individual variables. In particular, modal and temporal operators were seen as merely shifting the appropriate evaluation index on the interpretation function, while individuals could be quantified over in the object language. However, as was first shown for tense (Kamp, 1971; Vlach, 1973; Benthem, 1977), and later generalized to worlds (Cresswell, 1990) and situations (Kratzer, 2007), there are examples which show that natural language has the expressive power of quantification over worlds and times (or situations) in the object language:

(1) There will be times such that all persons now alive will be happy at the first or miserable at the second.

(Cresswell, 1990, p. 20)

(2) If it might have been that everyone actually rich was poor then the economy would have been in bad shape.

(Cresswell, 1990, p. 38)

(3) If, whenever it snowed, it had snowed much more than it actually did, the town plow would have removed the snow for us.

(Kratzer, 2007, ex. (23))

Roughly speaking, what these examples show is that even in the context of an intensional operator, we are able to make reference to times, worlds, or situations introduced at the level of a higher clause. For example, in (3), "we have to be able to consider for each actual snowfall s a set of counterfactual alternatives and compare the amount of snow in each of them to the actual amount of snow in s. This means that we have to be able to 'go back' to the actual snowfall situations after considering corresponding counterfactual situations." (Kratzer, 2007). Since the effect can be iterated at will, its analysis requires the expressive power equivalent to that of quantifying over the relevant entities in the object language. Technically, this can be implemented either by representing variables of the right kind in the syntax and allowing intensional operators to bind them quantificationally, or by allowing infinite sequences of evaluation indices (Cresswell, 1990). If we take the former route, the question remains, however, where in the structure the relevant variables appear. The next sections address this issue for one class of situation pronouns, namely those inside of DPs, after reviewing what is known about their intepretive options in intensional contexts in some more detail.

2.2 The Intensional Independence of DPs

Since early on in work on intensional semantics of natural language, it has been noted that DPs in intensional contexts can be interpreted relative to worlds and times (or situations) other than those with respect to which the rest of the clause they appear in

is evaluated (Fodor, 1970; Enç, 1981; Bäuerle, 1983).[1,2] Furthermore, Fodor already argued that this possibility cannot (or not solely) be due to these DPs taking higher scope than the embedding modal operator at the level of logical form, as there are interpretations that would require one scope position to appropriately capture the quantificational scope of a DP, and another to interpret it in the appropriate world. One type of example where such an interpretation arises and which Fodor considered is represented by (4).

(4) Mary wants to buy a hat just like mine.

Fodor points out that sentences like (4) can be true in a scenario where Mary has not yet picked out a specific hat she wants to buy, but knows what kind of hat she wants to buy, which happens to be the kind of hat that I have. Making the standard assumption that attitude verbs like *want* (as well as modals) involve quantification over possible worlds, this means that, on the one hand, *a hat just like mine* cannot have wide scope with respect to *want*, since it is not the case that there is some particular hat that she wants; on the other hand, *a hat just like mine* has to be interpreted relative to the actual world, and not relative to Mary's 'desire-worlds', since the the type of hat she wants matches my hat in the actual world. Thus, the latter effect cannot be brought about by scoping the DP above the attitude verb.[3]

A similar issue arises with so-called scope paradoxes in conditionals (von Stechow, 1984; Abusch, 1994; Percus, 2000; Keshet, 2008a), e.g., in (6):

(5) If every semanticist owned a villa in Tuscany, what a joy the world would be.
(Percus, 2000)

(6) If everyone in this room were outside, the room would be empty.
(Keshet, 2008a)

Assuming the first sentence is uttered by a semanticist, we are inclined to understand this to be a claim about actual semanticists, since the speaker likely is expressing his excitement about the hypothetical prospect of owning a villa in Tuscany. The second example makes the same point, perhaps even more forcefully. The quantificational DP *everyone in this room* cannot be interpreted in the same world as the predicate in the *if*-clause (*be outside*), since the two are incompatible. But it also can't be interpreted with scope over the *if*-clause, because that (in addition to raising syntactic worries) would yield the incorrect reading that for each individual person actually in this room it holds that if this person were outside, the room would be empty. These types of examples thus seem to be cases where a DP (that remains within its original clause at LF) is interpreted relative to a possible world that is different from the possible world with respect to which the main predicate of its clause is evaluated.

[1] What follows is by no means a comprehensive overview of the examples in the literature. See Keshet (2008a) for a recent review of the relevant evidence.

[2] As it will be crucial for the discussions to come to distinguish clearly between DPs and NPs, I will refrain from using the spelled out label 'noun phrase' in the text to avoid potential confusion of the two levels whenever possible. Of course, many of the original works discussed here predated the notion of determiner phrases and thus didn't use this terminology.

[3] Note that in recent work, Schwager (2010) challenges the force of this particular type of example, but she acknowledges that her argument does not extend to other examples (such as the one in (5) and (6)). I see no need to settle the issue here, given the examples about to be discussed, and mainly mention Fodor's example because of its pivotal role in the history of investigating the phenomenon.

While the above examples would traditionally be seen as involving the possible world parameter of the relevant predicates, similar effects arise with respect to the temporal interpretation of DPs relative to the tense of a sentence as well, as illustrated by the following types of example:[4]

(7) Every congressman who remembers a president will be at the party.[5]
(Cooper, 1978)

(8) a. Every fugitive is now in jail.
b. John will meet every hostage at the president's party.
(Enç, 1986)

(9) a. Between 1990 and 1995, John always took a woman his same weight to the world series.
b. When everyone in this room was outside, it was empty.
(Keshet, 2008a)

About (7), Cooper notes:

> "I believe that this sentence could be said now about a time in the future after the presidency has been abolished. The sentence might indicate plans for a future reunion of elderly congressmen who remember the days when there were presidents."
>
> (Cooper, 1978, p. 153)

Similarly, in (8a), the relevant people which are said to be in jail are no longer fugitives at the present time (given the present tense on the verbal predicate). Nonetheless, the sentence has a coherent interpretation. Again, the basic effect we observe is that the predicate in the DP is evaluated at a different time than the predicate of its clause. Finally, the temporal examples in (9) mirror the effects seen in the modal domain based on (4) and (6).

The standard solution for capturing the intensional independence of nominal predicates is to assume that all predicates contain an unpronounced, but syntactically represented, possible world (or situation) pronoun, which saturates the world (or situation) argument of the predicate (Percus, 2000; von Fintel and Heim, 2007). As the analysis to be spelled out here will be cast in a situation semantics, I will assume that what we are dealing with are situation (rather than world) pronouns, which saturate the situation argument of the nominal predicate. Since situations have a temporal dimension as well, these pronouns will also be responsible for the parallel effects in the temporal domain. Situation pronouns can be bound by different λ-abstractors (following Heim and Kratzer, 1998, in representing these in the structure), which has the desired effect of (partially) disentangling quantificational scope of a DP from the intensional status of its nominal predicate, as can be seen in the sketch of the relevant LFs for (5) and the corresponding truth conditions, adapted from Percus (2000):[6]

[4] For a recent and detailed presentation of parallel effects for times and worlds, see Keshet (2008a).

[5] Note that this example involves a relative clause, which might allow for an analysis where the present tense in the relative clause shifts it to the situation that the entire sentence is evaluated in, as was pointed out to me by Ezra Keshet.

[6] Here and below I follow the convention of using the subscript '0' on world and situation pronouns to indicate that their value is the world or situation that the entire sentence is evaluated in. Note that the system I propose below does not posit λ-abstractors over situations in the object language.

(5) If every semanticist owned a villa in Tuscany, what a joy the world would be.

(10) a. **transparent interpretation of *every semanticist***
$\underline{\lambda s_0}[_{IP1} \ldots$ if $[_{IP2} \lambda s_1 [_{IP3} \ldots$ every semanticist $\ldots \underline{s_0} \ldots$
owned a villa in Tuscany $\ldots s_1 \ldots] \ldots$ what a joy $\ldots]]$

b. **opaque interpretation of *every semanticist***
$\lambda s_0 [_{IP1} \ldots$ if $[_{IP2} \underline{\lambda s_1} [_{IP3} \ldots$ every semanticist $\ldots \underline{s_1} \ldots$
owned a villa in Tuscany $\ldots s_1 \ldots] \ldots$ what a joy $\ldots]$
(adapted from Percus, 2000)

(11) For any situation s, (5′) is true in s iff for every accessible situation s' such that every semanticist in s/s' owns a villa in s', the world is a joy in s'.

Depending on the indexing on the pronoun associated with the DP, *every semanticist* will be interpreted relative to the situation of evaluation for the entire sentence or relative to the counterfactual situation (where the relevant individuals own Tuscan villas). Other examples involving different types of expressions introducing quantification over situations can be captured along similar lines. I will adopt the convention of referring to cases where the situation pronoun in a DP in the scope of an intensional operator is interpreted relative to a situation introduced in a higher clause as *transparent* interpretations. Cases where it is bound by an intensional operator will be referred to as *opaque* interpretations.[7] While the latter necessarily involve narrow quantificational scope of the DP in question relative to the quantifier over situations, the former allow for either narrow or wide quantificational scope (the second option corresponding to what is often called *de re*), which yields the three interpretive options standardly assumed in the literature following Fodor (1970) (e.g. von Fintel and Heim, 2007; Percus, 2000; Keshet, 2008a).

In closing this background section, I'd like to make explicit an important terminological and conceptual distinction, as it is crucial for much of what is to come, namely that between semantic situation arguments and syntactically represented situation pronouns.[8] While my analysis will assume that all predicates have a semantic situation argument (i.e., that the descriptions of the functions they denote include a λs at some point), these do not necessarily get saturated by syntactically represented situation pronouns.[9] The term 'situation pronoun' will be reserved for syntactically represented situation pronouns.

[7] Following Percus and others. Note that Keshet instead uses the terms *de re* and *de dicto* in his work.

[8] As far as I can tell, there is no widely accepted standard terminology in the situation semantic literature for these notions (Barwise and Perry, 1983; Cooper, 1993, 1995; Kratzer, 2007). The term 'resource situation' sometimes is used to refer to situation argument inside of DPs, but sometimes also to refer to a contextually salient situation that can serve as the value assigned to the situation pronoun by the assignment function.

[9] In fact, they never get saturated by a situation pronoun directly inside of NPs, as these are introduced as complements of determiners.

2.3 Restrictions on Situation Pronouns

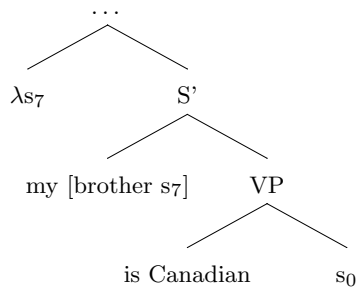
2.3.1 Generalization X (Percus, 2000)

While the expressive power gained by representing situation pronouns in the syntactic structure allows us to capture transparent interpretations, the standard implementation of this turns out to introduce a problem of overgeneration, as was first discussed in detail by Percus (2000) In particular, if we assume that all predicates come with a syntactically represented situation pronoun, we expect - barring further assumptions - transparent interpretations to be available for all predicates. This expectation is not borne out, however, as Percus shows in great detail.

A case in point are the situation pronouns introduced with verbal predicates. Percus provides the example in (12a) and considers the LF in (12b).

(12) a. Mary thinks that my brother is Canadian.

b. *



On the given indexing of the pronouns, "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 actuality, and even when Mary mistakenly thinks that he is not Canadian." (Percus, 2000, p. 200) However, in such a situation we clearly judge the sentence to be false, which shows that the indexing in the LF in (12b) is not available. Percus concludes that there is a general constraint on the interpretation of situation pronouns introduced with verbal predicates, which he labels 'Generalization X':[10]

(13) *Generalization X:*
The situation pronoun that a verb selects for must be coindexed with the nearest λ above it.

(Percus, 2000, p. 201)

While this generalization adequately captures a restriction on the interpretation of situation pronouns, it remains at a purely descriptive level (though Percus does consider

[10] Percus also makes a parallel point for adverbs, based on parallel data, which won't play a central role in my discussion:

(i) *Generalization Y:*
The situation pronoun that an adverbial quantifier selects for must be coindexed with the nearest λ above it.

(Percus, 2000, p. 204)

possible lines of argument for an explanation of why it might exist). Accounting for it constitutes a challenge for an intensional semantic theory of natural language.

2.3.2 Generalization Z and the Intersective Predicate Generalization

Building on Percus's insights, Keshet (2008a, 2010) argues for a further restriction on the interpretation of situation pronouns, which concerns the distinction between weak and strong DPs. As is standard, weak DPs are understood to be precisely those that can appear in existential *there* constructions, following Milsark (1977). A note on terminology: in the literature, sometimes the relevant determiners are called weak, and sometimes the entire DPs are. I will adopt the convention of calling a determiner weak if it can appear in a weak DP. The existential *there*-construction will be used as a test case to ensure that a given token of a DP containing a weak determiner is indeed weak. In other contexts, it is possible that there are homophonous variants of these DPs that receive a strong interpretations.

The starting point for this line of thought comes from Musan (1995), who showed that not all DPs display temporal independence (contra Enç, 1986):

(14) a. Every fugitive is in jail.
b. #There is a fugitive in jail. (Musan, 1995; Kusumoto, 2005)

(15) 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.
(Keshet, 2008a, adapted from Musan)

The contrast observed in both of these pairs of examples is that while the (a)-sentences have a perfectly reasonable interpretation, which comes about by interpreting the nominal predicate at a time different from that of the verbal predicate in its clause, the existential *there* variants in (b) have no sensible interpretation. (14b) is contradictory, and the continuation in (15b) only has the implausible interpretation that the relevant individuals were U.S. Senators while attending Harvard in 1964.

Keshet (2008a, 2010) furthermore showed that this effect, too, is paralleled in the domain of possible worlds (or situations):

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

(17) a. Mary thinks three professors are (still) in college.
b. #Mary thinks {there's/ there are} three professors still in college.
(both examples from Keshet, 2008a, p. 48)

Both (16b) and (17b) are odd in that they can only be understood as attributing inconsistent (or implausible) beliefs to Mary, unlike their counterparts in the (a)-sentences. This shows that the predicates of weak DPs have to be interpreted relative to the same situation as the verbal predicate in their clause, i.e., in Mary's 'thought-worlds' in the present sentences. Keshet proposes to add a further generalization based on these findings:

(18) *Generalization Z:*
The situation pronoun selected for by a noun in a weak NP must be coindexed with the nearest λ above it. (Keshet, 2008a, p. 126)

Following Milsark (1974), the interpretation of the existential *there*-construction can be seen as involving intersection of the two predicates and existential closure over the resulting property (see Keshet, 2010, for details and a modern implementation of Milsark's idea). Adopting Landman's (2004) proposal that weak DPs in general denote predicates, Keshet (2010) argues that Generalization Z is a special case of a more general constraint that requires any two predicates that are interpreted intersectively to be evaluated relative to the same world and time (or situation):[11]

(19) *Intersective Predicate Generalization (IPG):*
Two predicates interpreted intersectively may not be evaluated at different times or worlds from one another.

(Keshet, 2010)

Keshet (2008a, 2010) presents evidence for this with examples involving nouns and their modifiers, the *have*-construction, and depictives. Take the following examples of the first case as a brief illustration:

(20) a. #In 1964, every U.S. Senator at Harvard got straight A's.
b. #Mary thinks the married bachelor is confused.

(Keshet, 2010)

In (20a), the noun *U.S. Senator* and the prepositional phrase *at Harvard* are interpreted intersectively, and the sentence only has a reading where the relevant individuals were senators and at Harvard at the same time. Similarly, the adjectival modifier *married* and the noun *bachelor* are interpreted intersectively, and (20b) can only be interpreted as attributing inconsistent beliefs to Mary.

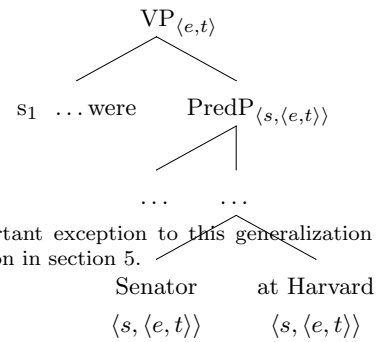
Like Generalization X, the restriction captured by the IPG is not built into the intensional semantic system standardly considered in this context. In particular, assuming Keshet's (2008a) Free Situation Pronoun Hypothesis in (21),

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

(Keshet, 2010)

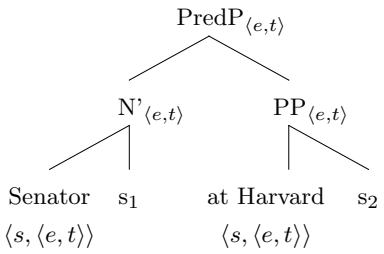
two types of structures are in principle possible for a noun-modifier configuration:

(22)



[11] Note that relative clauses constitute an important exception to this generalization (as Keshet points out as well). See the related discussion in section 5.

(23)



(adapted from Keshet, 2010)

In (22), the situation pronoun is introduced higher up in the tree, outside of the PredP (Keshet's label), e.g., with the copula, on Keshet's analysis. (23), on the other hand, contains two situation pronouns, one with each predicate in the NP. But if the structure in (23) is a real possibility, then additional constraints will be needed to ensure the IPG, i.e., to exclude the possibility that the two situation pronouns in (23) are bound by different λ-abstractors.

To summarize the challenge faced by the data considered so far: in order to capture transparent interpretations of DPs, we need to assume situation pronouns that are syntactically represented in the structure and which can be bound and quantified over. However, assuming that all predicates that have a semantic situation argument take such a situation pronoun as a complement leads to a problem of overgeneration, as the situation pronouns of verbs and weak DPs need to be bound by the closest λ-abstractor (Generalizations X and Z, Percus, 2000; Keshet, 2010). Furthermore, intersectively interpreted predicates have to be interpreted relative to the same situation (IPG, Keshet, 2008a, 2010). My analysis, which is based on the idea that situation pronouns only occur in special places in the syntactic structure, and are not introduced with every predicate, is spelled out in the following section.

3 Situation Pronouns as Arguments of Determiners

The strategy behind the proposal to be spelled out is based on the idea that while all predicates come with a semantic situation argument, syntactically represented situation pronouns only occur in a limited number of locations. In particular, the only place where their presence is motivated, based on the data to be considered here, will be inside of strong DPs (see section 5 for discussion of further candidate locations for situation pronouns).[12] I develop a semantic system that takes this idea as a starting place, which is introduced in the next subsection. In considering the implications of this setup, I will also introduce situation binders as proposed by Büring (2003). With these details in place, I will then show that the restrictions for transparent interpretations discussed above fall out from the system automatically, without requiring any further constraints. This result is then compared to the proposal by Keshet (2010). Finally, I consider two further arguments for introducing situation pronouns in DPs as arguments of determiners, which involve data concerning the temporal interpretation of nominal

[12] Note that a very similar approach has been proposed by Keshet (2008b), though Keshet's following work (e.g. Keshet, 2010,?, 2011b) has explored alternative solutions and abandoned this exact line of thinking.

predicates (Kusumoto, 2005) and situation semantic accounts of donkey sentences. I wrap up this section with some further thoughts on the relation of the present account to Keshet's (2010) as well as an evaluation of possible independent justifications for the assumptions central to my proposal, which is crucial for assessing the extent of its explanatory contribution.

3.1 Introducing the Semantic System

3.1.1 Basic Assumptions

I will use a possibilistic situation semantics based on Kratzer (1989), which makes the following assumptions: The meaning of a sentence is a proposition, understood as a set of possible situations (or its characteristic function). Situations are seen as particulars (unlike in other situation semantic frameworks, e.g., Barwise and Perry, 1983), and are parts of worlds. Worlds are maximal situations, i.e., situations that are not a proper part of any other situation. I will refer to the world that a given situation s is part of as w_s. Any situation, as well as any individual, can only be part of one world. This means that we need the notion of counterparts in the sense of Lewis (1986) in order to talk about 'corresponding' individuals (or situations) across different possible worlds. Since counterparts do not play a central role for the discussions to come, I will mostly ignore this complication.[13] The situations that are part of a world form a mereological part structure, i.e., we can form the mereological sum of any two situations that belong to the same world. The corresponding part relation will be expressed by $\leq$ (where '$s \leq s'$' is to be read as 's is a part of s'').[14]

To compose the meanings of complex expressions from the meanings of their parts, I will assume a system of direct interpretation with rules that are more or less standard, namely the following (adapted with slight changes from Heim and Kratzer, 1998; von Fintel and Heim, 2007):

(24) a. **Functional Application (FA)**
If α is a branching node and β, γ the set of its daughters, then, for any context c and any assignment g, α is in the domain of $[\![\ ]\!]^{c,g}$ if both β and γ are, and $[\![\beta]\!]^{c,g}$ is a function whose domain contains $[\![\gamma]\!]^{c,g}$. In that case, $[\![\alpha]\!]^{c,g} = [\![\beta]\!]^{c,g}\ ([\![\gamma]\!]^{c,g})$.

b. **Predicate Modification (PM)**
If α is a branching node and β, γ the set of its daughters, then, for any context c and any assignment g, α is in the domain of $[\![\ ]\!]^{c,g}$ if both β and γ are, and $[\![\beta]\!]^{c,g}$ and $[\![\gamma]\!]^{c,g}$ are of type $\langle e, \langle s, t\rangle\rangle$. In that case, $[\![\alpha]\!]^{c,g} = \lambda x.\lambda s.\ [\![\beta]\!]^{c,g}(x)(s)\ \&\ [\![\gamma]\!]^{c,g}(x)(s)$

c. **Pronouns and Traces**
If α is a pronoun or a trace, g is a variable assignment, and $i \in \mathrm{dom}(g)$, then $[\![\alpha_i]\!]^{c,g} = \mathrm{g(i)}$.

[13] For further details on the ontological commitments one has to make in this type of system, see Kratzer (1989).

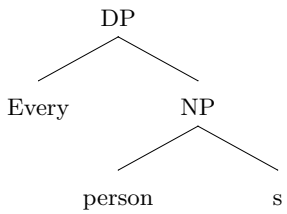
[14] '$\leq$' can be defined in terms of the mereological sum operation: $s \leq s'$ iff $s + s' = s'$. Importantly, however, the part relation is restricted in that it only can hold between worldmate situations.

d. **Predicate Abstraction**
For all indices i and assignments g, $[\![\lambda_i\ \alpha]\!]^g = \lambda x.[\![\alpha]\!]^{g^{x/i}}$

3.1.2 Introducing Situation Pronouns as Arguments of Determiners

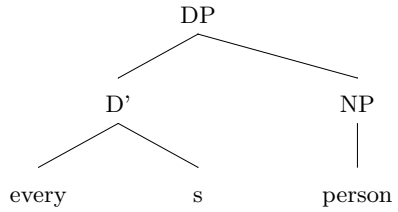
The arguments for situation pronouns inside of DPs based on transparent interpretations only require that there be a situation pronoun somewhere inside of the DP. One important question is where exactly in the structure this pronoun actually appears. While some authors, such as Percus (2000), remain neutral in this regard, others have made more specific assumptions. Kratzer (2004), von Fintel and Heim (2007), and Keshet (2010)[15] for example, assume that situation pronouns appear inside of the NP, so that determiners combine with an object of type $\langle et \rangle$:

(25)



To the extent that assumptions are made in this respect at all, this structure seems to be the default in the literature, as far as I can tell. It is perfectly conceivable as well, however, that the situation pronoun is introduced with the determiner.[16] This is the option chosen by Büring (2004).[17]

(26)



Is there any reason to prefer one version over the other? In what follows, I'd like to argue that there is. To begin with, I will show that the restrictions on transparent interpretations discussed above fall out for free once we adopt the second option (26).

Before moving on to the details of the semantic system, it is worth considering a possible third alternative.[18] On a general level, the main point of the arguments to be considered will be that NPs should not contain a situation pronoun of their own, because there is lack of evidence for intensional independence at the level of the NP

[15] See, in particular, Keshet (2010), who argues for the Extensional Type Hypothesis in (53), discussed in section 3.6.1.

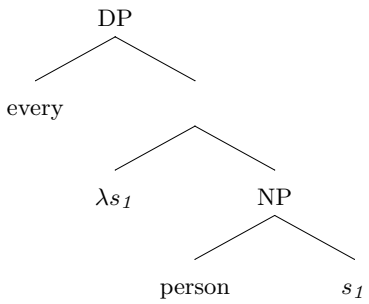
[16] Note that while I will assume the situation pronoun to be the determiner's first argument, I don't currently see any reason that rules out other orders of arguments. What matters is that the situation pronoun is an argument of the determiner.

[17] Note that Büring introduces the situation pronoun as an index on the determiner, rather than in a separate node of its own.

[18] Thanks to Angelika Kratzer (p.c.) for pointing this out to me. See also Keshet (2010, section 3.8.3) for related discussion.

proper, and because determiners need to combine with complements of an intensional type, e.g. $\langle e, \langle s, t\rangle\rangle$ or $\langle s, \langle e, t\rangle\rangle$. It is, in principle, perfectly compatible with these observations that a situation pronoun be present in the NP itself. In particular, in a system that includes λ-abstractors over situations in the syntactic structure, the meaning of the NP could be turned into a property by (obligatorily) introducing such a λ-abstractor above the NP (perhaps its introduction could be attributed to the determiner):

(27)



However, this option runs into a number of problems given the data we will be considering. We presumably would want to exclude the possibility of vacuous binding by the λ-abstractor introduced above the NP. That means that the situation pronoun in (27) has to be bound locally, and cannot remain free or be bound by a higher λ-abstractor. But that is, of course, exactly what is needed in order for this pronoun to make transparent interpretations possible. The same independence is also needed for an extension of the account to domain restriction (see section 5). Finally, an important argument in favor of introducing situation pronouns with the determiner will be that it provides us with a straightforward way of distinguishing strong and weak determiners. Again, assuming a situation pronoun inside of the NP does not seem to provide us with the same means.

So while the two arguments presented here do not by themselves completely rule out the possibility of structures like (27), I conclude that once we take into consideration the bigger picture of what situation pronouns can and should do for us, the case for the structure in (26), where situation pronouns are introduced with the determiner, is very strong.[19]

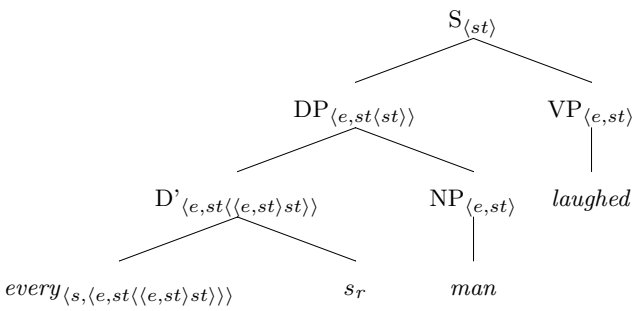
3.2 The Semantic System beyond DPs: Situation Binding

I will now introduce the semantic system that incorporates DP-meanings of the type suggested in the last section, i.e., with determiners that take situation pronouns as an argument. Note that for the purposes of the present article, the main concern are

[19] An anonymous reviewer points out a fourth possibility, an extension of the structure in (27) where there are two situation pronouns in a DP: one introduced with the NP, which is obligatorily bound locally, and one with the determiner. As the reviewer notes, it would be hard or perhaps impossible to distinguish it from the present account. See Keshet (2010, section 3.8.3) for some possible motivations for such a view. Note that if such an extension is indeed warranted, it would be a straightforward extension of the present account, which would furthermore not affect the issues relating to the possibly non-bound situation pronouns introduced with determiners that are discussed here.

syntactically represented situation pronouns inside of DPs, and I will thus ignore, for the most part, situation pronouns in other places. In particular there may be good reason to think of Austinian topic situations as syntactically represented (Kratzer, 2007; Schwarz, 2009), but I leave the detailed argumentation for this to another occasion (see section 5 for some further discussion of other locations for situation pronouns). For the present discussion, I will simply assume that when one asserts a proposition, this is interpreted as making a claim about some particular situation, which I will refer to as the topic situation (Barwise and Etchemendy, 1987; Kratzer, 2007). In the structures discussed below, this will correspond to the situation associated with the λ-abstractor over situations at the level of the entire sentence. The basic structure of a simple quantificational sentence will be as follows:

(28)



To aide readability, I will use s_r for situation pronouns in DPs (with 'r' alluding to the notion of 'resource situations'), but there is no special status attached to this. It should be considered as a notational variant of standard indexed variables (I'll assume that r can receive a value via the assignment function g or be bound, just like regular indices represented by the natural numbers).

The lexical entries for nouns and verbs will be fairly standard, with denotations of type $\langle e, \langle s, t\rangle\rangle$ (29, 30). The full meaning of quantificational determiners gets somewhat complex once we take all issues into consideration (see (43) in section 3.5). For ease of presentation, I will allow myself to work with oversimplified entries, such as the one in (31) for *every* when this causes no harm for the point under consideration.[20]

(29) $[\![\textit{laugh}]\!] = \lambda x \in D_e.\lambda s \in D_s.\ \text{laugh}(x)(s)$

(30) $[\![\textit{man}]\!] = \lambda x \in D_e.\lambda s \in D_s.\ \text{man}(x)(s)$

(31) $[\![\textit{every}]\!] =$
$\lambda s_r \in D_s.\lambda P \in D_{\langle e,st\rangle}.\lambda Q \in D_{\langle e,st\rangle}.\lambda s \in D_s.\ \forall x\ [P(x)(s_r) \rightarrow Q(x)(s)]$

Crucially, this entry for *every* allows the nominal restrictor phrase of the quantifier to be evaluated with respect to a situation different from the one in which the nuclear scope is evaluated. To compute the meaning of (28), we simply need to combine the meanings of all the pairs of sister nodes via functional application, which will yield the following proposition:

[20] Here and in the following, I will adopt the convention of omitting the superscripts c and g on the interpretation function when the expressions that are being evaluated by it are not sensitive to them. I also will omit the explicit representation of types of variables when the type of the variable is clear from the context. The notation I use for predicates, such as 'laugh$(x)(s)$', is to be understood as a short form for 'x laughs in s'.

(32) $[\![(28)]\!]^g = \lambda s.\ \forall x[\text{man}(x)(g(r)) \rightarrow \text{laugh}(x)(s)]$

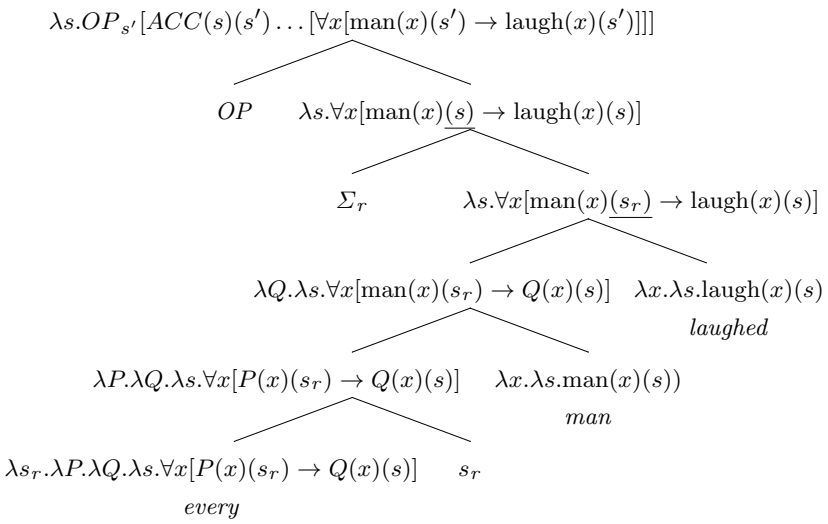
Since the variable introduced by the situation pronoun on *every*, s_r, remains free in the structure in (28), it receives a value via the assignment function g. Assuming the contextually supplied situation is part of the actual world, this will render a transparent interpretation in cases where the structure in (28) is embedded under an intensional operator.

In order to capture opaque interpretations, the situation pronoun introduced with the determiner needs to be bound by whatever the embedding intensional operator is. For this purpose, I introduce a binding operator Σ (adapted from Büring, 2004) in the syntax (33), which is adjoined below the intensional operator. The computation of the meaning of such a structure, based on the current working versions of the lexical entries, is illustrated in (34).[21]

(33) $[\![\Sigma_n\ \text{XP}]\!]^g = \lambda s.[\![\text{XP}]\!]^{g[s_n \rightarrow s]}(s)$

Variant of Büring (2004), for XPs of type $\langle s, t\rangle$

(34)



Note that once we have Σ in our system, there is another way to derive transparent interpretations, namely by letting the situation pronoun be bound by a Σ adjoined at the top of the sentence, which would result in the situation pronoun on the determiner being identified with the topic situation (the situation relative to which the main predicate of the matrix sentence is interpreted):

(35) $\ldots \Sigma_r\ [\ldots OP\ [_{VP} \ldots [[D\ s_r]\ NP] \ldots]]$

This option turns out to be particularly relevant when considering an extension of the present account to capturing domain restriction effects using situation pronouns.

[21] *OP* stands for an intensional operator, such as a modal or an attitude verb. Assuming such operators to involve quantification over situations, their meanings will generally fit the following schema: $\lambda p.\lambda s.OP_s{}'[ACC(s)(s') \ldots p(s') \ldots]$ (where $OP_s{}'$ should be seen as equivalent to $\forall x$ in standing in for a quantifier and the variable it quantifies over, and 'ACC' stands for a suitable accessibility relation).

The difference between transparent and opaque interpretations can be illustrated schematically as in (36):

(36) a. $(\Sigma_r) \ldots\ [\ldots OP\ [_{VP} \ldots [[D\ s_r]\ NP] \ldots]]$ (**transparent**)
b. $\ldots OP\ [\Sigma_r\ [_{VP} \ldots [[D\ s_r]\ NP] \ldots]]$ (**opaque**)

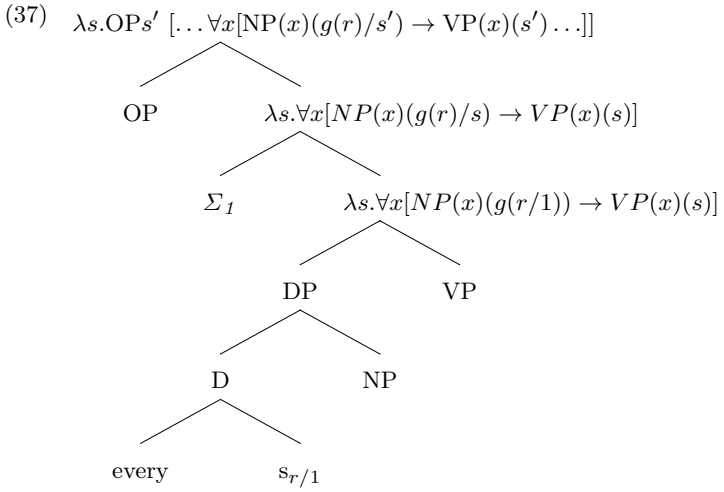
3.3 Accounting for the Restrictions

Now that we have seen how transparent and opaque interpretations come about in our system, let us return to the restrictions on transparent interpretations observed by Percus (2000) and Keshet (2008a). Percus's Generalization X for verbs, repeated below for convenience, captured the fact that verbal predicates cannot receive transparent interpretations:

(13) *Generalization X:*
The situation pronoun that a verb selects for must be coindexed with the nearest λ above it.

(Percus, 2000, p. 201)

This generalization falls out automatically from the way we have set up our semantic system, because verbs do not combine with a syntactically represented situation pronoun in the first place. Since that is the only way a transparent interpretation can arise, it follows that verbal predicates do not have such an interpretation, but rather are 'interpreted relative to the λ-abstractor over situations for the clause they appear in.' In fact, since we do not represent these λ-abstractors in the structure, the semantic situation argument of the verbal predicate simply is bound by the λ-abstractor over situations that is introduced in its lexical entry. The following tree illustrates the situation schematically:

(37)


While the situation pronoun introduced with *every* can either receive a value via the assignment function or be bound by an intensional operator (via Σ), the semantic

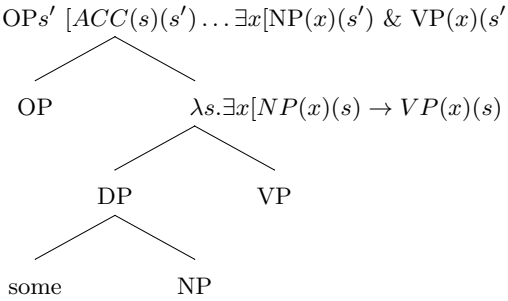
situation argument on the verb inevitably winds up getting bound by the intensional operator.[22,23]

Keshet's (2008a) Generalization Z about weak DPs, again repeated below, can also be captured straightforwardly in our system, in at least two ways.

(18) *Generalization Z:*
The situation pronoun selected for by a noun in a weak NP must be coindexed with the nearest λ above it. (Keshet, 2008a, p. 126)

First, we can simply assume that only the determiners of strong DPs take a situation pronoun as their argument. The schematic illustration below shows that DPs that don't contain a situation pronoun will automatically be interpreted relative to the same situation as the verbal predicate, and thus yield opaque interpretations in the context of an intensional operator:

(38)



Alternatively we can follow Landman (2004) and Keshet (2010) in assuming that weak DPs simply denote predicates, which don't introduce a situation pronoun of their own in my system. Existential quantification then will be introduced via existential closure.

Of course, DPs headed by *some* do not have to receive a weak interpretation, since they can have transparent interpretations in contexts that do not disallow strong DPs. For these, we can simply assume a variant of *some* that does take a situation pronoun argument. The main point here is that since we make the presence of situation pronouns in DPs dependent on the determiner (or the presence of a covert existential closure operator that turns the predicate into a quantifier), different types of determiners can vary with respect to whether or not they combine with such a pronoun. Plenty more needs to be said about the difference between strong and weak DPs, of course. For present purposes, I restrict myself to the point that the differences between them concerning intensional independence can be captured straightforwardly in the sytem advanced here (see section 5 for some further discussion of related issues).

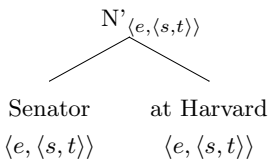
Keshet's (2008a) Intersective Predicate Generalization, which states that any two intersectively interpreted predicates have to be evaluated relative to the same situation (or the same time and world) also follows from the way the semantic system is set up:

[22] Note that the same result will obtain in case of a simple type e subject, such as a proper name or a pronoun, though in that case, the λs heading the proposition denoted by the embedded clause will be the one introduced by the lexical entry for the verb, since the verb (or verb phrase) (of type $\langle e, \langle s, t\rangle\rangle$) will take the type e expression as its argument.

[23] A parallel story can be told about Percus's (2000) Generalization Y about adverbs, although I cannot discuss this in detail here.

Predicates do not introduce situation pronouns (they're type $\langle e, st\rangle$). Thus, whenever two predicates are combined intersectively, this is done by combining two expressions of type $\langle e, \langle s, t\rangle\rangle$.

(39)



The two predicates *Senator* and *at Harvard* will then automatically be evaluated relative to the same situation - which situation will depend on the determiner and the interpretation of its situation pronoun (if it introduces one).

3.4 Comparison with Keshet's Situation Economy Account (Part I)

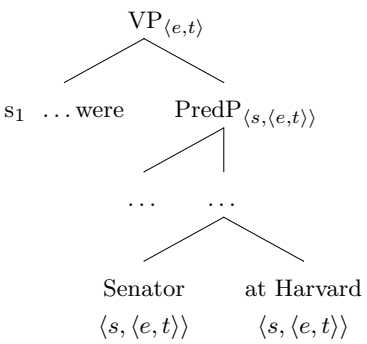
In his dissertation and following work, Ezra Keshet has pursued a Situation Economy account for the restrictions on transparent interpretations Keshet (2008a, 2010). The account, presented in Keshet (2008a, Chapter 3) and elaborated in Keshet (2010), is based on a specific construal of a notion of *situation economy*, which prefers structures that contain fewer situation pronouns over comparable ones that contain more (see Keshet, 2010, for detailed discussion of what structures count as comparable).

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

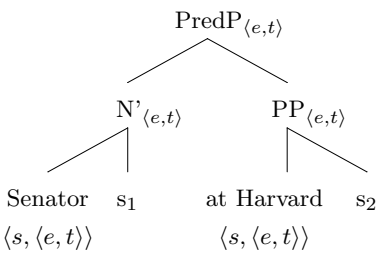
(Keshet, 2010)

It accounts for Generalization Z and the IPG in a unified manner by assuming that the existential *there*-construction also involves two predicates being interpreted intersectively. This move is in part made possible by assuming that weak NPs are not quantificational at all, but rather just denote properties (following Landman, 2004).[24] What needs to be achieved, then, to account for the phenomena discussed here in terms of Generalization Z and the IPG, amounts to choosing (22) over (23). Situation Economy does just that.

(22)



(23)



[24] As noted above, this perspective is compatible with my proposal as well.

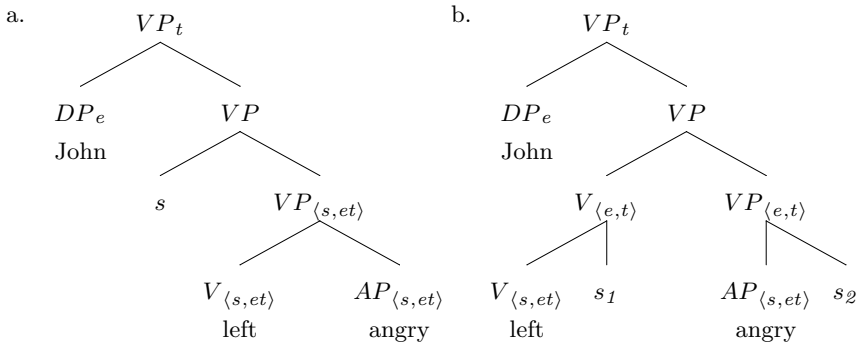
(adapted from Keshet, 2010)

With respect to Generalization Z and the IPG, Situation Economy and the present proposal are thus on par in terms of the adequacy of their predictions.

Turning to Generalization X, however, the capacity of the present proposal to capture it puts it at a clear advantage.[25] The analysis in Keshet (2010) assumes that all predicates, including verbs, nouns, adjectives and prepositions, are of type $\langle s, \langle e, t\rangle\rangle$, and that verbs obligatorily combine with a situation pronoun which ends up being bound at the top of the clause (Keshet, 2010, p. 12). The latter point is simply a stipulative implementation of Percus's (2000) Generalization X (as Keshet himself acknowledges). On the present proposal, on the other hand, Generalization X falls out from the way the system is set up.

Part of Keshet's motivation to make all predicates type $\langle s, \langle e, t\rangle\rangle$, in addition to general considerations of uniformity, seems to come from his treatment of depictives, which he argues to be yet another instantiation of the IPG: the adverb and the verb have to be interpreted relative to the same situation and are assumed to combine via via Predicate Modification, which means they both have to be of the same type (either $\langle e, t\rangle$ or $\langle s, et\rangle$, assuming both can be handled by appropriate variants of Predicate Modification). With these assumptions, situation economy can account for the fact that the two expressions have to be interpreted relative to the same situation by ruling out the structure in (41b), which would incorrectly predict intensional indpendence of the verb and the adverb.

(41) John left angry.



(Keshet, 2010, p. 4)

But assuming verbs to be of type $\langle s, et\rangle$ requires the introduction of a situation pronoun to allow for further composition with the type e subject, and thus introduces the need for stipulating that the situation pronoun be immediately bound of again by a λ-abstractor after the subject has been taken as an argument.

On the present account, on the other hand, all predicates are assumed to be of type $\langle e, st\rangle$, and a subject of type e as in (41) can be taken as an argument of a verb like *left* directly. Furthermore, integrating Keshet's account of depictives as a special case of

[25] Thanks to an anonymous reviewer for suggesting a more detailed discussion of this point along the lines of what follows. See also section 3.6.1 for further comparison of the accounts.

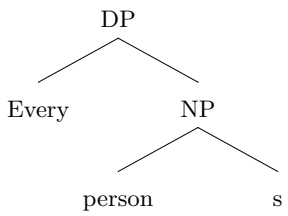
the IPG is straightforward on this approach. If both *angry* and *left* are of type $\langle e, st\rangle$, they can combine via Predicate Modification, and the alternative structure in (41b) is not possible to begin with, since the type of the predicates calls for an individual as the first argument.

As far as the restrictions on transparent interpretations are concerned, then, I conclude that the present proposal has broader empirical coverage than Keshet's (2010) Situation Economy. After presenting further support for introducing situation pronouns with determiners in section 3.5, I will provide additional arguments along these lines, while acknowledging that the general spirit of the situation economy approach is not at all incompatible with my proposal.

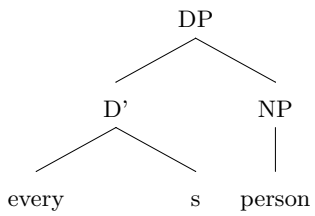
3.5 Further Support for Introducing Situation Pronouns with Determiners

We saw above that introducing situation pronouns as arguments of determiners (as in (26)), rather than inside of the NP proper (as in (25)), has the advantage of automatically accounting for the various restrictions on transparent interpretations discussed in the recent literature.

(25)



(26)



Based on proposals for dealing with other interesting and important phenomena in a situation semantic framework (or related approaches restricted to the temporal dimension), I'd like to present two further points in support of choosing the option in (26). The first is based on the fact that quantification in a situation semantics requires some notion of minimality for the situations quantified over in the restrictor of the quantifier, e.g., for the analysis of donkey sentences. The second concerns an argument about the truth conditions of sentences involving temporally independent interpretations of quantificational DPs (as in (8a)), due to Kusumoto (2005).

The main thrust of both points is to show that the proposal developed here can be straightforwardly extended to incorporate the analysis of these phenomena, thus allowing for a unified analysis of a substantial range of complex phenomena that haven't been viewed together before. In the case of donkey sentences, there is furthermore a direct argument against introducing situation pronouns as arguments of NPs, as a compositional implementation of a situation semantic analysis that includes situation pronouns can only be achieved by letting determiners take NP-arguments of an intensional type. As for the Kusumoto data, the point is slightly weaker, but still informative for the overall picture: while the relevant data on the temporal interpretation of noun phrases ultimately do not exclude the possibility of introducing situation pronouns as arguments of NPs, any account striving to be consistent both with these data AND the restrictions on transparent interpretations discussed above will have to go with the alternative option of introducing situation pronouns with determiners.

3.5.1 Situation Semantic Accounts of Donkey Sentences and the Location of Situation Pronouns

The first point I want to consider concerns situation semantic analyses of donkey sentences. The argument is that if we assume situation pronouns inside of DPs, then a compositional situation semantic analysis of donkey sentences can only be achieved by introducing these pronouns as arguments of determiners. Note that I do not see the argument as exclusively dependent on the need for (or success of) situation semantic accounts for donkey sentences with pronouns, as parallel data with full definite descriptions provide a motivation of their own for such an analysis (Schwarz, 2009). In particular, what Schwarz (2009) calls the 'weak article-definites', which are argued to be based on uniqueness, receive a natural treatment in a situation semantics, which automatically includes an account of their donkey anaphoric uses within the type of proposal considered here (for details, see Schwarz, 2009, Chapter 4).

To spell out the argument, we again have to look more closely at the semantics of determiners within a situation semantics. For a number of reasons, quantificational determiners are commonly argued to involve quantification over both individuals and situations. But they can't just be seen as quantifying over any situations that contain the individuals and properties introduced in the restrictor. Rather, it is standard to assume, at least since Berman (1987), that they quantify over situations that are, in some sense, minimal. For example, situation semantic accounts provide truth conditions for donkey sentences such as (42a) along the lines of (42b) (Berman, 1987; Heim, 1990; Elbourne, 2005).

(42) a. Every farmer who owns a donkey beats it.

b. For any situation s, (42a) is true in s iff
for every individual x and every situation $s' \leq s$
such that s' is a minimal situation
such that there is a donkey y and x is a farmer who owns y in s'
there is a situation s'' such that $s' \leq s'' \leq s$ and x beats the unique donkey in s''

While I take the appropriate notion of minimality to be that of *exemplification* (Kratzer, 2007), the crucial point for the current discussion is that any relevant notion of minimality will express a relation between propositions (i.e., sets of situations or their characteristic functions) and situations. In order to derive an interpretation of quantificational sentences along the lines of (42b) compositionally, denotations of quantificational determiners will have to be able to access a proposition derived from the property denoted by the restrictor. A meaning for *every* that is appropriate for donkey sentences is provided in (43), which includes (something like) the underlined condition in its restrictor:

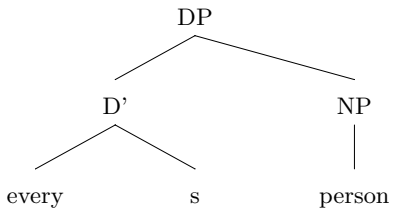
(43) $[\![\text{every}]\!] =$
$\lambda s_r.\lambda P_{\langle e,st\rangle}\lambda Q_{\langle e,st\rangle}.\lambda s.\ \forall x \forall s_1\ [[s_1 \leq \mathbf{s}_r\ \&\ \underline{EX(P(x))(s_1)}] \rightarrow \exists s_2[s_1 \leq s_2 \leq s\ \&\ Q(x)(s_2)]]$

Assuming EX to express an appropriate notion of minimality (e.g., where '$EX(S)(s)$' is to be read as 's exemplifies the proposition S'), this will provide the desired effect, as $P(x)$ will give us a proposition derived from the property P (of type $\langle e, \langle s, t\rangle\rangle$), given the individual argument x.

In order to implement this in a compositional manner, it is crucial that the argument that a quantificational determiner like *every* takes is a property (i.e., of type $\langle e, st\rangle$), rather than having an extensional type $\langle e, t\rangle$. If we introduce a situation pronoun inside of the NP, however, as in the structure in (25), all that the determiner can derive is a set of individuals (i.e., its complement will be of type $\langle e, t\rangle$), which does not allow us to access a proposition based on the meaning of the restrictor.[26]

If we assume situation pronouns to be introduced at the level of the DP, as in (26), on the other hand, the restrictor argument of the quantificational determiner will be a property (of type $\langle e, st\rangle$). Such an account thus is compatible with a situation semantic analysis of donkey sentences. Any compositional situation semantic account that assumes situation pronouns inside of DPs - something that earlier accounts mostly didn't bother taking into consideration[27] - AND that introduces quantification over 'minimal' situations in the meanings of quantificational determiners (and does so in a compositional manner) therefore will have to adopt (a version of) the structure in (26) - repeated here for convenience -, i.e., locate situation pronouns at the level of the DP.[28]

(26)



3.5.2 The Temporal Independence of DPs

Kusumoto (2005) has argued (contra Enç, 1986) against the presence of temporal pronouns inside of NPs. Such an argument would seem to have the potential of lending further support to the case made here against introducing situation pronouns inside of NPs (assuming that the latter encompass the function of temporal pronouns). I will briefly review her argument and highlight the compatibility of my proposal with hers. However, it turns out that the temporal data on their own may not suffice to make the case against situation pronouns in NPs. Nonetheless, the present proposal is supported by these considerations in that it can account both for Kusumoto's temporal data as well as the restrictions on transparent interpretations, while alternative approaches to the temporal data run into familiar problems with the latter.

Based on examples such as (8a), repeated below, Enç (1986) argued that the NP contains a temporal pronoun whose value is contextually supplied (i.e., the temporal analogue of the structure in (25) with a situation pronoun). However, Kusumoto (2005) argues that the truth conditions based on such an analysis are insufficient in that they

[26] Heim (1990) proposes a parallel analysis that does assume situation pronouns as arguments of nouns (and, more generally, predicates), but her account is non-compositional in that it has to rely on a syncategorematic rule in order to allow a quantifier to access the situation pronoun inside of the arguments of the quantifier. See Elbourne (2005, pp. 57-58) for discussion.

[27] Though note that Elbourne has an alternative proposal using an operator that ensures interpretation of a predicate relative to the actual world / situation (Elbourne, 2005, p. 103).

[28] Again, of course, excluding the option that there is a situation pronoun in the NP that gets immediately bound (see above).

make false predictions for certain scenarios. She assumes the LF in (44a) to represent Enc's proposal, where PRES is the temporal operator (an existential quantifier over times), pres_2 a temporal pronoun, and t^* an indexical referring to the speech time s^*.

(8a) Every fugitive is in jail.

(44) a. $[_{TP} t^*$ PRESλ_2 pres_2 $[_{VP}[_{NP}$ Every $[\underline{t_3 \text{ fugitive }}]]$ be in jail$]]$

b. $[\![(44a)]\!]^{g,c}(w) = 1$ iff there is a time t' overlapping s^* such that for every (contextually salient) individual x such that $\underline{x \text{ is a fugitive at } g_c(3)}$ in w, x is in jail at t' in w.

(Kusumoto, 2005, p. 342, underlining added for emphasis, FS)

Crucially, on this view the noun *fugitive* combines with a temporal pronoun t_3, which receives a value via the assignment function. Kusumoto provides the following scenario to illustrate the insufficiency of these truth conditions:

> Suppose that there is a group of five people who were fugitives at different times in the past but are currently in jail. Under this scenario the sentence can still be truthfully uttered. If the time argument of a noun is represented as a free time variable whose value is contextually determined, the value assigned cannot vary from one fugitive to another.
>
> (Kusumoto, 2005, p. 342)

The conclusion Kusumoto draws from this is that there are no temporal pronouns inside of NPs. It is worth making explicit a crucial assumption about what it means for x to be a fugitive in s, namely that in order for *fugitive*$(x)(s)$ to hold, x has to be a fugitive *throughout* s.[29] While I'm not aware of any discussion of this particular issue in the literature, there is at least one argument in support of this assumption that Roger Schwarzschild has made in lecture notes. As we saw in the discussion of the IPG above, nouns and their modifiers have to be interpreted relative to the same situation. While it may seem that to bring this about, it suffices to ensure that there is only one situation pronoun for the entire NP (as in the structure in (22) above), the present assumption is actually necessary as well. Otherwise, an NP such as *Senator at Harvard* could hold of an individual x in a situation s if x was a senator and at Harvard at different times, as long as the temporal extension of s is sufficient in size. But assuming that the predicate has to hold throughout the entire situation, e.g., that Senator$(x)(s)$ holds only if x is a senator throughout s, will indeed ensure the co-temporal interpretation of nouns and their modifiers. Adopting this assumption, can we see the scenario at hand as an argument against time (or situation) pronouns inside of the NP proper? Before trying to answer this, let me review Kusumoto's proposal for analyzing (8a) and show how it can be incorporated into the account pursued here.

Kusumoto's analysis, following Musan (1995), is to assume that quantifiers like *every* introduce existential quantification over the temporal argument of their restrictor predicate, as in (45), which yields the truth conditions in (46) for (8a).

(45) $[\![every]\!]^g =$
$\lambda P \in D_{\langle e,\langle i,\langle st\rangle\rangle\rangle}.[\lambda Q \in D_{\langle e,\langle i,\langle st\rangle\rangle\rangle}.[\lambda t \in D_i[\lambda w \in D_s[$for every individual x such that there is a time t' such that $P(x)(t')(w) = 1, Q(x)(t)(w) = 1]]]]$

[29] Thanks to Sigrid Beck (p.c.) for pointing out the importance of this assumption, and to Roger Schwarzschild (p.c.) for sharing his lecture notes in which he makes the argument presented in what follows.

(46) a. $[_{TP} t^*$ PRES λ_2 pres_2 $[_{VP}$ Every fugitive be in jail]]

b. $[\![(46a)]\!]^{g,c}(w) = 1$ iff there is a time t' overlapping s^* such that for every (contextually salient) individual x such that there is a time t'' such that x is a fugitive at t'' in w, x is in jail at t' in w.

(Kusumoto, 2005, p. 343)

These truth conditions correctly predict (8a) to be true in Kusumoto's scenario, as they simply require that for each of the people quantified over, there is some time at which they were fugitives.

While Kusumoto's solution makes do without a temporal (or situation) pronoun inside of the NP, it is perfectly possible to introduce one with the determiner in an extension of Kusumoto's proposal. This pronoun can serve to restrict the existential quantification over times that binds the semantic situation argument of the NP predicate. A situation semantic version of this analysis would look as follows:

(47) $[\![every]\!]^g = \lambda s'.\lambda P.\lambda Q.\lambda s\ \forall x[\exists s''[s'' \leq s'\ \&\ P(x)(s'')] \rightarrow Q(x)(s)]$

(48) $[\![(46a)]\!]^{g,c} = \lambda s.\ \forall x[\exists s''[s'' \leq g(1)\ \&\ \text{fugitive}(x)(s'')] \rightarrow \text{in-jail}(x)(s)]$

The first argument of *every* here would be a syntactically represented situation pronoun, which will be assigned some particular situation as a value by the assignment function. This situation could be located in the past, and the existential quantification over parts of it will provide the correct truth conditions for Kusumoto's scenario, while at the same time making use of a contextually supplied situation that provides the broader situational frame inside of which these people were fugitives (if possibly at different times inside of that frame). The presence of the situation pronoun is crucial for capturing the intuitively present domain restriction effect - we are not universally quantifying over all individuals that were (or are or will be) fugitives at some point in time (see section 5 for a sketch of an extentsion of the account to cover domain restriction based on situation pronouns more generally, and Schwarz (2011) for a more complete picture). Mere existential quantification over the situation argument of the restrictor predicate, as Musan and Kusumoto propose for the temporal argument, would not be of much help in this respect.

Note that the denotation of *every* in (47) is a (slightly simplified) variant of the *every* needed for donkey sentences above, as (47) is equivalent to (49) (by laws of quantifier movement in predicate logic):

(49) $[\![every]\!]^g = \lambda s'.\lambda P.\lambda Q.\lambda s\ \forall x\underline{\forall s''}[[s'' \leq s'\ \&\ P(x)(s'')] \rightarrow Q(x)(s)]$

Thus, we have arrived at a unified proposal for transparent interpretations, donkey sentences, and the temporal interpretation of nominal predicates in sentences like (8a). Furthermore, it would seem like Kusumoto's scenario has provided us with an additional argument against situation pronouns in NPs. If a determiner introduces quantification over situations relative to which the NP is evaluated, such a determiner would seem to have to take an NP of an intensional type ($\langle e, st\rangle$ or $\langle s, et\rangle$) as its argument. Since the presence of a situation pronoun inside of the NP would saturate the situation argument, we would end up with an extensional type ($\langle e, t\rangle$) otherwise.[30]

[30] Again barring, of course, the possibility that there is a situation pronoun that gets bound immediately by a λ-abstractor inside of the NP, which we put aside above.

However, there's a possible alternative analysis of the Kusumoto data that undermines this conclusion, as was pointed out by two anonymous reviewers. The crucial step (proposed by Kusumoto) in dealing with a scenario where we are talking about individuals that are fugitives at different times was to introduce existential quantification over situations relative to which the NP gets evaluated. But couldn't it be, the alternative analysis suggests, that the existential quantification is introduced in the meaning of the noun itself?[31]

(50) $[\![fugitive]\!] = \lambda s.\lambda x.\exists s'[s' \leq s \ \&\ \text{fugitive}(x)(s')]$

Such denotations for nouns could then combine with a situation pronoun in the NP, and lead to exactly the same result as above. In order to account for sentences such as (8a), *fugitive* then would have to take a situation pronoun (with an appropriate contextually salient situation as its value) as its argument, so that it can be evaluated with respect to a different situation than the main predicate.

Kusumoto's scenario alone thus does not, after all, provide an argument against introducing situation pronouns inside of NPs. But while the alternative analysis certainly works for the scenario at hand, it fares less well once we consider the broader picture. First of all, we lose the account of Generalization Z and the IPG above, since situation pronouns as arguments of nouns (as well as possible modifiers) were precisely what gave rise to the issue of having to restrict the interpretations of these pronouns. One advantage of introducing situation pronouns as arguments of determiners was that the presence of a situation pronoun (and the corresponding interpretive options) can be contingent on the determiner, and that (intersective) modifiers and nouns had to be interpreted relative to the same situation. Secondly, this account would no longer be compatible with the analysis of donkey sentences from the previous section.[32]

We can also consider another variant of this alternative proposal, which considers existential quantification over situations as part of the noun, but introduces situation pronouns with the determiner, as on the present proposal.[33] At first glance, this would seem to resolve the incompatibility with Generalization Z and the IPG, as well as with the analysis of donkey sentences, since now the NP meanings that a determiner takes would be of type $\langle s, et\rangle$. However, another issue arises, once we consider what happens with the interpretation of modifiers, such as adjectives. Do those introduce their own existential quantification as well? They better not: as was discussed above, modifiers and nouns generally receive co-temporal interpretations, and independent existential quantification over subsituations would undermine this, as illustrated in (51):

(51) $[\![senator\ at\ Harvard]\!] =$
$\lambda s.\lambda x.\exists s'[s' \leq s \ \&\ \text{senator}(x)(s')] \ \&\ \exists s''[s'' \leq s \ \&\ \text{at Harvard}(x)(s'')]$

The existentially quantified situations s' and s'' could be non-overlapping on this analysis, which is inconsistent with the the IPG.

[31] For consideration (and refutation) of a parallel proposal in the realm of verbal tense, which gives rise to other issues, see Kusumoto (1999, pp. 37-38).

[32] Note that the slightly more complex entry for *every* in (43) requires the quantifier over situations to bind a situation variable in the consequent of the conditional statement, which would not be possible if it were introduced as part of the denotation of the noun.

[33] Not introducing a situation pronoun at all is not a live option, both because of the transparent interpretations above and because the noun in (8a) has to be interpreted relative to a time different from that of the main predicate.

Perhaps only nouns introduce existential quantification over subsituations, then? This, too, leads to various troubles. First, with respect to adjectival modifiers, we now make the odd prediction that the predicate expressed by the noun should hold at some part of the situation relative to which the entire NP is interpreted, whereas the modifier should hold throughout the entire situation. We should thus be able to say things like (52) (while assuming that John had a normal College career):

(52) During those 4 years, John was a senior attending Harvard.

Assuming that John will have been a senior during part of those 4 years (his 4th year) and that he attended Harvard for the entire for years, we'd expect this sentence to be true. But intuitively, it is of course false in such a scenario. Moreover, we'd expect corresponding assymetries between the interpretation of (52) and variants where the noun and modifier roles have been swapped (e.g., *a Harvard student in his senior year*), which also seems clearly wrong.

Let me sum up: Despite initial appearances, Kusumoto's scenario does not on its own provide an argument against introducing situation pronouns as arguments of NPs, as it can just as well be dealt with by introducing existential quantification over situations inside of the denotation of nouns. However, the latter approach cannot be extended to cover data from other realms considered here, in particular the restrictions on transparent interpretations and the analysis of donkey anaphora. The strength of the current account, which introduces situation pronouns as arguments of determiners, is that it allows for a unified picture in the analysis of transparent interpretations and their restrictions, donkey sentences, and the temporal interpretation of noun phrases. While other accounts for the latter phenomena may be, at least to some extent, on par with the present account within the limited domain of one of these phenomena, they cannot be extended to cover all three phenomena.

3.6 Overall Evaluation

3.6.1 Comparison with Situation Economy, Part II

When we consider the broader range of data above, namely donkey sentences and Kusumoto's data from the temporal domain, Situation Economy faces additional issues. Keshet (2010) advances the Extensional Type Hypothesis in (53), which he assumes requires all quantificational determiners to combine with expressions of type $\langle e, t\rangle$:[34]

(53) *Extensional Type Hypothesis* (informal):
If a lexical item is definable without reference to worlds and times, it cannot take a situation argument.

(Keshet, 2010)

Given the general set of assumptions assumtions under which Keshet (2010) operates (including the need for situation pronouns and an intensional property denotation for predictes), this forces NPs that are arguments of strong determiners to contain a situation pronoun. However, as I argued in detail in the previous section, based on a compositional analysis of donkey sentences that incorporates situation pronouns and

[34] See Keshet (2010, ex. (99)) for a formal version of this hypothesis.

on considerations of the temporal data from Kusumoto (2005) seen in combination with the restrictions on transparent interpretations, we need determiners to combine with properties, i.e., expressions of type $\langle e, \langle s, t\rangle\rangle$, in order to quantify over situations relative to the nominal predicate and to state the minimality condition required for donkey sentences. Therefore, a Situation Economy account that assumes quantifiers to take arguments of type $\langle e, t\rangle$ is incompatible with accounts for these phenomena (or at least with situation semantic accounts along the lines sketched here). The analysis I spelled out above, on the other hand, accounts for Generalization X (in addition to Generalization Y and the IPG) and is compatible with analyses of donkey sentences and Kusumoto's temporal data. It thus has better empirical coverage than Situation Economy.

As Ezra Keshet (p.c.) has pointed out, however, it is perfectly possible to take an alternative view of Situation Economy and the ETH: rather than rejecting them altogether, we could simply see the arguments brought forth in section 3.5 as evidence that quantificational determiners indeed need to make reference to the situations relative to which their arguments are being evaluated, and thus do need to take type $\langle e, st\rangle$ rather than type $\langle e, t\rangle$ arguments. In fact, he furthmore points out, this new version of a Situation Economy account now basically captures Generalization X,[35] since both the restrictor and the nuclear scope of the quantifier have to have an intensional type, which rules out the possibility of a situation pronoun saturating the relevant argument position of the verb. I am entirely sympathetic to such a view, although I would note that while this is an extension of a Situation Economy approach in spirit, it ends up diverging substantially from the original version of the account put forward in Keshet (2010). Nonetheless, it will be very much worthwhile considering what can be gained by importing the core principles of the Situation Economy approach to the present analysis. I leave further elaboration of this possibility for further research.

3.6.2 Explanatory Adequacy

While I have argued that the proposal spelled out here has the merit of having substantial empirical coverage - providing a unified perspective on data on transparent interpretations, donkey sentences, and the temporal interpretation of noun phrases -, and arguably more so than any existing account, one potential weakness that has been noted (in particular by Ezra Keshet, p.c.) is that the assumptions the account makes come with a certain amount of stipulativity and a corresponding lack of explanatory adequacy. There are a number of possible lines of defense against such criticism, which I will briefly explore in this section. First, one could provide independent motivations for the crucial assumptions of the proposal. Second, one could consider general principles that might support the assumptions. Finally, one could try to argue that the price of making some stipulation(s) has such a high pay-off in terms of the phenomena covered that it is ultimately justified. I would like to propose some possible motivations of the first two kinds, but unfortunately am not currently in a position to provide a full justification in these terms. I thus will at least partly appeal to the notion that the amount of empirical coverage that the account provides makes it viable enough to merit further efforts to seek a fuller justification of the central assumptions in order to ultimately achieve a more satisfactory level of explanatory adequacy.

[35] I say 'basically', because the point only can be made for quantifiers, and not for, say, proper names or definite descriptions (conceived of as denoting individuals).

Strong vs. Weak Determiners The first assumption is that strong, but not weak determiners take a situation pronoun argument. It is crucial for capturing Generalization Z and the IPG, which essentially say that only strong DPs can have transparent interpretations. Since determiners that can appear in weak DPs allow transparent interpretations of their NP-predicate in contexts that don't require a weak DP, I have to assume that these determiners are ambiguous,[36] and can head both weak and strong DPs. In my account, this difference is reflected in whether or not they take a situation pronoun as an argument. This gives rise to the question of why the property of being a weak DP coincides with not having a situation pronoun.[37]

There are several levels on which one can approach this issue from the perspective of the present account. First, it is, in principle, an open question whether the presence or absence of a situation pronoun alone is taken to be a sufficient characterization of the difference between weak and strong DPs. Additional aspects, such as the presuppositionality of the determiner in question might well be in play. The lack of transparent interpretations for weak DPs then could be accounted for by making it a necessary, rather than a sufficient condition that a DP in, say, the existential *there*-construction cannot contain a situation pronoun. Perhaps this could indeed be tied to the required lack of presuppositionality of DPs in this context.

Another possible approach (not necessarily incompatible with the first), already discussed above, would be to follow Landman (2004), as suggested by Keshet (2010), and assume that weak NPs neither have quantificational force of their own nor contain a determiner to form a DP, but rather have a predicative meaning. The *some* in *There are some cookies on the table* then would be what Landman calls an adjectival determiner. When *some* occurs in a strong DP, an existential determiner quantifier is introduced covertly to create a standard quantificational DP (Keshet, 2010; Landman, 2004). The presence of a situation pronoun then could be tied to the presence of a determiner quantifier. A further hypothesis worth exploring in this regard would be to consider Matthewson's (2001) proposal that all quantificational noun phrases contain a possibly covert definite determiner. From this perspective, the presence of a situation pronoun in such DPs could be linked to the definite determiner, which in turn could be crucial for the presuppositionality of the DP.

Finally, yet another potential point of support for the assumption under discussion arises if we connect the presence of situation pronouns to domain restriction phenomena, as argued in section 5 and more extensively in Schwarz (2011).

In reviewing these potential motivations, I by no means claim to have reached any final state of having independently established that only strong determiners combine with a situation pronoun. But I hope to at least have convinced the reader that there is a range of broader considerations that might bear on the issue and that have the potential to bolster the case for this assumption.

The Type of Predicates The type of predicates assumed in my system is $\langle e, st\rangle$. There are two important pieces packaged within this: first, that predicates have an intensional type, i.e., contain an s in their type; and second, that the individual argument comes first.

The first part ties in directly with the idea that situation pronouns are arguments of determiners. Noun phrases that already contain a situation pronoun presumably will

[36] With possible exceptions, see the discussion of *any* below

[37] Thanks to Sigrid Beck (p.c.) for raising this issue in exactly these terms, as well as to Ezra Keshet for pressing me to say more in this regard.

simply be of type $\langle e, t\rangle$ (unless you abstract over it again immediately, in which case why bother?). But a compositional, situation semantic analysis of donkey sentences (and to a more limited extent, temporal interpretations of noun phrases) was shown to require determiners to take intensional properties as their argument. Assuming we want to include situations pronouns at all inside of DPs, then they have to be introduced at the level of the determiner if the NP needs to denote a property.

The scond part consists of the issue of whether the type of predicates should be $\langle e, st\rangle$ or $\langle s, et\rangle$. Going with the former allowed us to have a system where it is impossible for verbal predicates to combine with a situation pronoun directly, since their first predicate has to be of type e, thus accounting for Generalization X. But again, there is a question of why exactly this should be so. The only argument I can think of at the moment is a theory-internal appeal to parsimony. If we allowed a verbal predicate to have the type $\langle s, et\rangle$, then in order for a simple type e argument to combine with it, there would have to be a situation pronoun first to saturate the s-argument. But since the clause as a whole would have to be of type $\langle st\rangle$ for overall consistency (determiners that take properties as arguments could only sensibly return propositions), we would need a tool that turns something of type t into type $\langle st\rangle$, i.e., a λ-abstractor over situations. Clauses with type e arguments thus would require a different structure and an additional ingredient compared to ones with quantificational arguments if we allowed predicates to be of type $\langle s, et\rangle$. This complication doesn't arise, of course, if we instead assume them to be of type $\langle e, st\rangle$. This is by no means a knock-down argument, but it also shouldn't be discarded all to hastily, I would think.

In summary, I hope to have convinced the reader that the central assumptions of my proposal are at least in part supported by independent considerations, and that there are reasonable prospects for fleshing out further points of support. To the extent that the proposed account allows for an analysis of a range of phenomena that previously have not been seen as related based on a small number of assumptions, we might also want to appeal to a sense of explanation discussed by von Stechow (1984): "If a number of highly complex and apparently unrelated facts are reducible to a few simple principles, then these principles explain these facts." (von Stechow, 1984, p. 184) While a deeper level of explanation may ultimately be desirable, I submit that this perspective puts my proposal beyond the level of simple stipulation.

3.7 Summary

I have laid out an intensional semantic system based on the idea that syntactically represented situation pronouns are only present in a few dedicated places. Focusing on DPs, I argued that they are introduced by (certain) determiners. The resulting system captures the standard data on transparent interpretations and furthermore accounts for the restrictions on their availability discussed by Percus (2000) and Keshet (2008a). The notion that situation pronouns are introduced at the level of the determiner was further supported by considering a broader range of data, namely from temporal semantics and the literature on donkey sentences.

4 The Need for Situation Pronouns Revisited: Keshet (2011b)

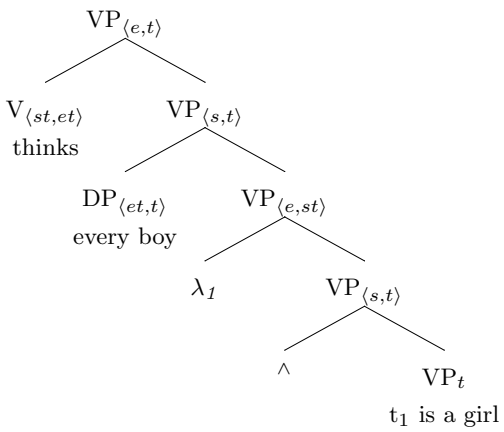
Keshet (2008a) himself sees various shortcomings with the Situation Economy account, and develops an alternative approach that constitutes an interesting and novel scope-based analysis of transparent interpretations (Keshet, 2008a, Chapter 5), which is further developed in Keshet (2011b). As in previous scope accounts (e.g. Ladusaw, 1977; Ogihara, 1992, 1996; Stowell, 1993), there are no syntactically represented situation (or world or time) pronouns, which contrasts with the arguments for such pronouns (or equally powerful devices) reviewed in section 2. Which situation a predicate is interpreted in is determined by means of a situation parameter on the interpretation function. Modal and temporal operators shift this parameter, and thereby affect the situation (or world or time) of evaluation of the predicates contained in their complement. The crucial twist in Keshet's split intensionality variant of the account is that he allows quantificational scope and intensional status of a DP to be minimally independent from one another. This is made possible by factoring out the intensional operator '$\wedge$' from modals and attitude verbs into a node of its own. The semantic effect of the '$\wedge$' symbol is precisely to abstract over the world parameter, as specified in the rule of Intensional Abstraction:

(54) **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 $\wedge$ operator, then, for any situation s and variable assignment g, $[\![\alpha]\!]^{s,g} = \lambda s' \in D_s.[\![\gamma]\!]^{s',g}$. (Keshet, 2011b)

The distribution of $\wedge$ is unrestrained by the syntax, but it will only yield interpretable structures if inserted right underneath operators that take intensions as their arguments.

Crucially, DPs are able to take scope above this intensional abstractor but below the modal, as indicated in the following schematic tree:

(55) a. (Keshet, 2011b)



b. $[\![\text{think}]\!]^w(\lambda w'.\forall x[[\![\text{boy}]\!]^w(x) \rightarrow [\![\text{is a girl}]\!]^{w'}(x)])$

This allows the quantifier *every boy* to take quantificational scope under the attitude verb, while being interpreted relative to the situation of evaluation for the embedding clause, thereby making room for (narrow scope) transparent interpretations. Note that

the apparent type-clash between the DP and the VP can be dealt with by using Büring's (2005) Combine rule (Keshet, 2011b).

Remarkably, this system thus can capture the basic phenomena relating to transparent interpretations without positing syntactically represented situation pronouns. However, note that it still ties together quantificational scope and transparent interpretations rather tightly, a point that I will return to shortly. But first, let us compare how this account fares in light of the restrictions on transparent interpretations in comparison to the proposal I advanced.

Generalization X, which excludes transparent interpretations of verbs, follows in this system. Transparent interpretations are tied to quantifier movement, and verbs and verbal predicates do not undergo this type of movement. As for Generalization Z and the Intersective Predicate Generalization, the account has the potential to explain these as well (though Keshet does not discuss this in detail in this context): assuming weak NPs are not quantificational at all, but rather denote properties (following Landman, 2004, as discussed above), they cannot undergo QR, either, and thus cannot escape the intensional abstractor.[38] In this respect, the account likely is on par with the present proposal, then.

We should also include donkey sentences and Kusumoto's temporal data in our considerations. The split intensionality account faces similar difficulties as the Situation Economy account. Determiners once again are assumed to take expressions of type $\langle e, t\rangle$ as their complements, but I argued in section 3.5 that they need to combine with properties (type $\langle e, st\rangle$) if a compositional situation semantic analysis of donkey sentences and an analysis of Kusumoto's data that is consistent with the restrictions on transparent interpretations is to be incorporated.

Furthermore, it turns out that, possible modifications of the split intensionality account where determiners take such intensional properties as arguments seem to lead to a dead-end of one kind or another. Restricting our attention to possibilities where the first argument of the determiner is a property (type $\langle e, st\rangle$), we have the following options:

(56)
a. $\langle\langle e, st\rangle, \langle et, t\rangle\rangle$
b. $\langle\langle e, st\rangle, \langle et, st\rangle\rangle$
c. $\langle\langle e, st\rangle, \langle\langle e, st\rangle, t\rangle\rangle$
d. $\langle\langle e, st\rangle, \langle\langle e, st\rangle, st\rangle\rangle$

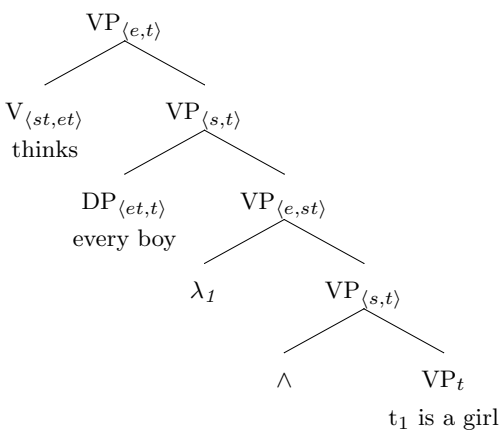
Let us first consider (56c) and (56d), where the second argument of the determiner is of type $\langle e, st\rangle$. In (55a), these types would work out fine, since *every boy* could simply take the VP as its argument. However, this is only so because we're considering the *de re* interpretation where $^\wedge$ intervenes between the quantifier and the VP. *De dicto* interpretations, on the other hand, would not work out: a quantifier of type $\langle\langle e, st\rangle, st\rangle$ (or $\langle\langle e, st\rangle, t\rangle$) cannot combine with the VP of type $\langle e, t\rangle$ (not even with Büring's Combine rule). So a variant of the Split Intensionality account where the second argument of the determiner quantifier is intensional no longer can capture *de dicto* readings. Note that making the VP type $\langle e, st\rangle$ is not an option either, since the account of non-local interpretations of DPs in Split Intensionality is based on the very idea that $^\wedge$ is the tool that introduces abstraction over situations for VPs. There would be no need for this tool (and its explanatory role in the account would be lost) if the VP were already intensional.

[38] Note that this would seem to be a necessary assumption for Split Intensionality, whereas it remains an optional route on my proposal.

There are two possible types left to consider, namely (56a) and (56b). The second of these also turns out to be a non-starter. In (55a), the DP *every boy* would then be of type $\langle et, st\rangle$. Using Büring's (2005) Combine rule, we might be able to combine it with its complement (of type $\langle e, st\rangle$). However, we'd now have two abstractions over situations, one introduced in the meaning of *every*, and one by $^\wedge$. No matter what we did with them, the result wouldn't be what we want it to be: if both of them are retained, then we end up with a relation between situations, rather than a proposition. If only one is kept, or they are both identified with one another, then we have undone the work that movement does in the Split Intensionality account to create transparent interpretations.

We're left, then, with option (56a), i.e., type $\langle\langle e, st\rangle, \langle et, t\rangle\rangle$ for quantifiers like *every*. As far as (55a) is concerned, things would seem to work out fine (again assuming Büring's Combine rule to put together the meanings of the DP and the VP):

(55a′) a.



b. $[\![\text{think}]\!]^s(\lambda s'.\forall x[[\![\text{boy}]\!]^s(x) \rightarrow [\![\text{is a girl}]\!]^{s'}(x)])$

With the simplest possible meaning for *every* given the setup, this obviously is not going to be of help for Enç's examples, such as:

(8a) Every fugitive is in jail.

Here, there is no relevant operator relative to which *every fugitive* could take scope in order to be evaluated at the intended and contextually salient time of evaluation for *fugitive*. (see also the related discussion of definites in Keshet, 2011b, Section 4.2) However, Kusumoto showed us that - contra to Enç's claim - there is a way of dealing with these interpretations without introducing a temporal (or situation) pronoun inside of the NP, namely by introducing existential quantification over times for the evaluation of the restrictor (following Musan's work). Adapting that proposal to the present types we'd have something like the following denotation for *every*:

(45′) $[\![every]\!]^{g,s} =$
$\lambda P \in D_{\langle e,\langle st\rangle\rangle}.[\lambda Q \in D_{\langle e,t\rangle}.[\forall x[\exists s' P(x)(s') = 1 \rightarrow Q(x) = 1]]]$[39]

[39] The VP predicate represented here by Q would presumably contain an occurence of s, the situation of evaluation supplied with the interpretation function.

For the Enç and Kusumoto cases, we'd get something equivalent to Kusumoto's analysis, then. My analysis is slightly different, in that it explicitly introduces domain restriction via the situation pronoun (whose value the times being quantified over have to be part of). I take this to be an improvement (see also the discussion of domain restriction in section 5), but the contrast here is subtle.

More serious trouble arises once we consider donkey sentences. Since the second argument of *every* on the possible variant of the Split Intensionality account has to be of type $\langle e, t\rangle$, the nuclear scope in a donkey sentence can only be interpreted relative to the overall situation of evaluation. However, the crucial step in situation semantic analyses of donkey sentences is that we look at minimal extensions of the restrictor situations in order to ensure uniqueness of the donkey pronoun (understood as a uniqueness based definite):

(42) a. Every farmer who owns a donkey beats it.

b. For any situation s, (42a) is true in s iff
for every individual x and every situation $s' \leq s$
such that s' is a minimal situation
such that there is a donkey y and x is a farmer who owns y in s'
there is a situation s'' such that $s' \leq s'' \leq s$ and
x **beats the unique donkey in s''** (cf. **unique donkey in s**)

With the meaning in (45′), we are unable to achieve such an interpretation, as we are stuck with evaluating 'the unique donkey' relative to s, meaning that the entire sentence would be predicted to only be felicitous in contexts where there is a unique donkey. In this regard, the proposal advanced above thus clearly fairs better in light of a broader range of data.

In addition to this issue, I would also like to briefly reiterate some of the points that have been brought forth against scope based accounts, and which Split Intensionality cannot deal with adquately. Many of these go back to Bäuerle (1983), with variations and additions in later works. It also is worth noting that the general expressive power arguments (see section 2) of course continue to provide strong evidence for representing situation pronouns in the structure (though there the point is not specific to DPs).

The central prediction of any scope based account is, of course, that there be an intimate connection between quantificational scope and intensional status. Split Intensionality loosens that connection ever so slightly, allowing DPs to escape the intensional abstractor of whatever intensional operator immediately embeds them. This leaves plenty of predictions about structural constraints on transparent interpretations, which Split Intensionality take as as a virtue: Keshet (2011b) provides examples that aim to show that syntactic restrictions on movement, e.g., involving islands and polarity items, do restrict transparent interpretations. The argument has to be, of course, that none of the relevant configurations allow for transparent interpretations. To refute this, a single counter-example (which can't be explained in any other way, as may very well be the case for some of the relevant cases [40]) thus is in principle enough. The literature contains numerous such counter-examples.

[40] Keshet (2011a) argues the probably most well-known example (about a woman from Stuttgart loving every VFB player) to be analyzable in terms of choice functions, i.e., without using scope. But since the examples discussed here don't involve indefinites, this doesn't seem to be a viable option for these cases.

To begin with, Bäuerle (1983) provided numerous examples with multiple embedding operators, none of which display the pattern predicted by Split Intensionality. For example, (57) argues that *every employee* can be transparent relative to the attitude verb *believe*, while still yielding an interpretation of *employee* at the time introduced by the past tense.

(57) a. Peter believes that every employee was at the party.

b. 'Peter believes of every employee at the time (of the party) x that it was the case that x is at the party.'

(My translation of ex. (14), Bäuerle, 1983)

To illustrate the type of context requiring such a reading, imagine that Peter is a doorman at a company where both regular employees and freelance contractors work, with frequent turn-over and shifts in status of individuals, so that Peter cannot possibly keep track of people's status. Now the police is investigating a theft from a room that only employees have access to, which occurred during last year's company party. They show Peter pictures of lots of people, with him indicating for each of them whether he thinks they were at the party at the time of the theft. Assuming he indicates for all individuals that actually (but largely unbeknownst to him) were employees at the time of the party, we can describe the situation (and the puzzle behind the crime!) using (57).

But on a scope based account (including Split Intensionality), escaping the intensional abstractor introduced for the complement of *believe* will also result in escaping the past tense operator. At first sight, one might think that the account put forward in this paper, were situations are used to encode both modal and temporal dimensions, faces problems with this divergence in temporal and modal status as well (a view that was suggested by Ezra Keshet, p.c.). However, it is perfectly possible to capture the effect of temporal operators as restricting the set of situations expressed by a clause to ones falling within a certain time window (here, one in the past), which is compatible with an independent restriction that the situation be part of the actual world to render a transparent interpretation. While the details go beyond the limits of the present paper, I see no principled problem for handling temporal and modal restrictions separately in a situation semantics, and I would guess that this is independently needed for other phenomena as well.

Elbourne (2005, p. 105-107) provides further examples of transparent interpretations that can't be accounted for in terms of scope. While some of these can be dealt with in alternative ways (e.g., by appealing to special mechanisms for wide-scope indefinites), others cannot. Here are some variations that illustrate that ('globally') transparent interpretations are available for quantifiers taking scope under an intensional operator embedded inside of another one.

(58) *Context:* Mary mistakenly thinks that the bottles filled with a clear liquid contain vodka; they actually contain water.
Mary {thinks / must think} that if most bottles with water in them are half-empty, people at the party {must be /are} drunk.

(59) *Context:* Mary sees a group of people drinking clear liquid that came from the aforementioned bottles.

Mary thinks that most people with water in their glass are certain to be drunk (by the time they empty their glass).[41]

Most bottles with water in them here can be perfectly well interpreted relative to the actual world, rather than either the worlds quantified over in the *if*-clause or the attitude verb *think*, while taking narrow quantificational scope. But this is predicted to be impossible on the Split Intensionality account. Parallel considerations apply to *most people with water in their glass* relative to *think* and *be certain* in (59): Mary might think it possible that a small number of these people can stomach a glass full of Vodka, but she need not have any conviction as to which, if any. But then *most* has to take scope under *certain*.

Yet another interesting test case are negative quantifiers as arguments of modal verbs that only display readings with the modal scoping over negation, such as *should* (for recent discussion, see Iatridou and Sichel, 2008, to appear):

(60) No student should leave (= All should stay; Not: All can stay)
(Iatridou and Sichel, 2008)

The way in which the scoping is derived is far from trivial, but for current purposes, it suffices to acknowledge that *should* has to take scope over *no student* here. If we can come up with a context that forces a transparent interpretation of the noun phrase in the quantifier and the sentence is acceptable in this context, this could not be derived by letting the DP take scope at the very top of its clause. Take the slight variant in (61a), and embed it in a larger context, as in (61b).

(61) a. No minority student should be admitted.
b. The admissions committee's decision that no minority student should be admitted was in compliance with university regulations, since it was based solely on merit criteria and minority status information was in fact unavailable to the committee.

The negative quantifier has to scope below the modal here, yet the noun phrase *minority student* has to be interpreted relative to the situation of evaluation of the entire sentence. Once again, scope and intensional status come apart, in a way that is not compatible with Split Intensionality (or any other scope theory).

Keshet (2011b) provides numerous examples involving islands and other scope facts where transparent interpretations are not available, which he takes as evidence in favor of a scopal account. A theory that completely disentangles scope and transparent interpretations (at least in one direction, allowing narrow scope transparent interpretations) thus has to account for those in a different way. While I can't go into the particular details of why his examples don't seem to have a transparent reading, it is useful to consider further examples involving some of the same constructions that - to my ear - DO seem to allow such interpretations.[42] Two of the cases he considers are *because*-clauses and NP-complements. Here are some parallel examples that I think allow for a transparent interpretation:

[41] Modelled on Elbourne's (2005) example (53) (p. 106), but avoiding the use of an indefinite and a relative clause for the reasons mentioned above.

[42] Ezra Keshet, p.c., informs me that his judgments here are the same as for his parallel examples. The final word on their status may have to await a more thorough empirical evaluation.

(62) *Because*-clauses:
Context: The teacher thinks the glasses A, B, and C, which contained a clear liquid, were filled with vodka (they actually contained water).

a. The teacher thinks John should be punished because he drank glasses A, B, and C.

b. The teacher thinks John should be punished because he drank every glass with water in it.

(63) NP complements

a. Mary thinks that Bill's suggestion that Sue's husband is married is based on shaky evidence.

b. Mary thinks that Bill's suggestion that most bachelors are not married yet is based on shaky evidence.

As far as I can tell, (62b) can perfectly well be a reasonable description of a scenario where the teacher thinks the reason for punishment is his (incorrect) assumption that vodka has been consumed. And the sentences in (63) can be used to talk about situations where (unlike the speaker) Mary and Bill have incomplete or incorrect information about the marital status of certain individuals, thus attributing perfectly reasonable beliefs and suggestions to them (i.e., non-contradictory and non-tautological ones, respectively). For (a), for example, they might be talking about Fred, whom the speaker (but not Mary and Bill) knows to be married to Sue. For (b), they might be talking about a group of individuals at a party who actually, but unbeknownst to them, happen to be bachelors.

Another important type of example involves negative polarity items:[43]

(64) a. My mother doesn't think that I managed to pass any class that I passed.

b. #My mother thinks I managed not to fail any class that I failed.

(Keshet, 2011b, ex. (22), p .261)

The existence of a transparent reading for *any class that I passed* in the first example can be accounted for as long as we allow for quantifier raising to a position above *think* but below negation, so this doesn't distinguish the accounts at hand. Split Intensionality explains the absence of a transparent interpretation in (64b) because *any class that I failed* would have to illicitly move out of the scope of negation in order to adjoin above the intensional abstractor of *think*. A situation pronoun account, on the other hand, would seem to predict that a transparent intepretation should be possible. However, this assumes that *any* indeed does introduce a situation pronoun. But not all determiners do: only strong ones do. While we have taken for granted that weak determiners, i.e., determiners that can appear in the existential *there*-construction, may have strong counterparts of one sort or another, there's no need to assume that this in fact does hold for every weak determiner. Examples like (64b) can then be seen as evidence that *any* does NOT introduce a situation pronoun, i.e., that it is always weak. Then the only way for *any* to achieve a transparent interpretation would be via scope, which is of course not ruled out on the situation pronoun account (but is blocked for the reasons cited by Keshet in (64b)). More needs to be said, but for the

[43] Keshet also discusses positive polarity items, but the data he presents can be accounted for by any account that allows quantifier raising,and thus doesn't support any particular theory, as far as I can tell.

moment, it suffices to note that the *any* examples at hand do not necessarily present an insurmountable problem for the situation pronoun account.

I conclude from this discussion that the lack of transparent interpretations in the cases discussed by Keshet (2011b) is not due to the nature of the constructions and the various syntactic constraints on movement, but to extraneous factors.

The overall evidence, including the original expressive power arguments and the distribution of transparent interpretations, thus favors a situation pronoun account over Split Intensionality. Tying transparent interpretations to scope, even in the looser way that Split Intensionality implements this, seems undesirable. Furthermore, data involving donkey anaphora also favor a situation pronoun account over Split Intensionality. A final point in the same direction, which will be touched on in the section 5, is that the situation pronoun account automatically incorporates a promising theory of domain restriction, which, if correct, lends additional support to this account.

5 Conclusion and Further Issues

5.1 Taking Stock

This paper has argued that syntactically represented situation pronouns in DPs are introduced as arguments of (certain) determiners. The resulting semantic system provides a unified account of transparent interpretations (including their distributional restrictions), donkey sentences, and the temporal interpretation of nominal predicates. It avoids the need for a binding theory for situation pronouns and the notion of situation economy (Percus, 2000; Keshet, 2008a, 2010) while yielding broader empirical coverage than previous approaches. It also makes better predictions than Keshet's (2011b) Split Intensionality theory in that it does not tie intensional status and scope together. And unlike that theory, it is compatible with situation semantic accounts of donkey anaphora.

Inevitably, various issues remain to be investigated more closely in order to evaluate the merits of this proposal more comprehensively. I turn to some of these in the remainder of this section.

5.2 Quantifier Domain Restriction

One important consequence of any theory that assumes situation pronouns inside of DPs is that we inevitably wind up with fairly constrained predictions about domain restriction effects with quantifiers. It is well worth exploring, then, whether these predictions match what is known from the extensive literature on quantifier domain restriction and how these relate to other theoretical proposals in this area. Schwarz (2009) and Schwarz (2011) argue that the predictions are indeed right on target and in some regards superior to those of the main competitor based on so-called C-variables. In any case, the prospect of having just one theoretical tool do some heavy lifting in two important areas that up until now have not really been considered together seems enticing enough to pursue the issue in greater depth. Here is a sketch of the basic picture of how situation pronouns will have effects on domain restriction.

Generally speaking, a given quantificational DP will only quantify over individuals in the situation introduced by the situation pronoun, relative to which the nominal

predicate is evaluated. There are three configurational options in the present system: the pronoun can be locally bound (in embedding contexts), it can be identified with the topic situation, or it can receive a contextual value via the assignment function. We have discussed the first option to account for opaque readings. It can also be extended to cases where a domain restriction variable is quantificationally bound, receiving a covarying interpretation (see Schwarz, 2009, 2011, for details). When it is identified with the topic situation, the result corresponds to a global mechanism of domain restriction at the level of the entire sentence. While this may be the right analysis for many cases, it has long been known that we need more flexibility than that to account for cases where several quantifiers within one sentence have to be interpreted relative to distinct domains. The example in (65), due to Soames (1986) (who provides it as a variation of an example by Barwise and Perry (1983)), is a case in point.

(65) Everyone is asleep and is being monitored by a research assistant.

As Kratzer (2007) discusses (in response to Soames' criticism of situation semantic accounts of domain restriction that only make use of (the equivalent of our) topic situations), this sentence requires us to interpret the situation pronoun on the quantifier *everyone* relative to a contextually supplied situation to prevent the implausible interpretation that the research assistants doing the monitoring are asleep as well. The interpretation of (65), assuming a simplified meaning for *every*, would then be as follows:

(66) a. [[[*every* s_r]*one*][[*is asleep*][*and being monitored by an RA*]]]

b. $[\![(66a)]\!]^g = \lambda s.\ [\forall x[\text{person}(x)(g(r)) \rightarrow$
$[\text{asleep}(x)(s)\ \&\ \exists y\ [\text{RA}(y)(s)\ \&\ \text{monitoring}(y)(x)(s)]]]]$

(adapted to our system from Kratzer, 2007)

Crucially, the situation pronoun that comes with *everyone* is assigned a value by the assignment function here, i.e., it is interpreted relative to a contextually supplied situation, namely one that contains all and only the research subjects at hand.

Note that unlike on standard accounts of transparent interpretations based on world pronouns, the situation pronouns in the present proposal thus have exactly the same set of interpretative options as other pronouns. In particular, they can be bound or be interpreted contextually via the assignment function. This property is appealing conceptually. If we assume things like covert pronouns for intensional entities, it seems desirable to make these as similar as possible to overt pronouns that are used in the individual domain.

The claim that weak DPs do not contain a situation pronoun gives rise to an interesting prediction in connection with domain restriction, namely that these DPs are expected to be more limited in terms of their domain restriction options. In particular, DPs without a situation pronoun give rise to the equivalent of locally bound interpretations of such a pronoun. In simple declarative sentences without a modal, this means that they have to be interpreted relative to the topic situation; in embedded contexts, we get an opaque interpretation. This was exactly what was needed to account for the lack of transparent interpretations, of course. One of the novel features of the present account is that it links this to the availability of certain domain restriction options.This does not mean that there are no domain restriction effects with them whatsoever. The prediction simply is that they cannot be interpreted relative to a contextually salient

situation (distinct from the topic situation). Testing this prediction empirically is no small feat, but but I offer the following as a first piece of supporting evidence:

(67) *Context:* I tell you that I'm teaching a semantics class and that I advertised a university wide talk by a famous person from the field last Friday. I also tell you that I was hopeful that many of the students from my class would show up, so I was excited to see who was there.

You: So what did you see when you checked who's in the audience?

Me: Well,

a. there were exactly three students in attendance.
(# ... in addition to 2 others from other classes)

b. exactly three students were in attendance.
(✓ ... in addition to 2 others from other classes)

c. there was not a single student to be found.
(# ... though plenty of other people's students had shown up)

d. not a single student was to be found.
(✓ ... though plenty of other people's students had shown up)

First, consider a scenario where a total of five students are in the audience, three of which are in my class. I believe that I could have spoken truthfully by uttering (67-b), but not by uttering (67-a). If the topic situation is determined by the question (as has been argued by Schwarz, 2009, following a suggestion by Angelika Kratzer), this is as expected. The weak DP in (67-a) has to be interpreted relative to the situation containing everybody in the room, which makes its sentence false, since there are 5 students in the room. The availability of a strong, quantificational interpretation of the DP in (67-b), on the other hand, makes it possible to evaluate the nominal predicate relative to the contextually salient situation of students in my class, and under that interpretation, the sentence is true. If we change the scenario minimally so that none of my students (but several other students) showed up, the same contrast seems to be present for (67-c) and (67-d). While the issue warrants further investigation, this example thus at least provides a first piece of evidence supporting the prediction under consideration.

5.3 Other Candidate Locations for Situation Pronouns

The focus of this article has been on situation pronouns inside of DPs. On a more general level, the approach I took was that rather than having the semantic situation argument of every predicate be saturated by a syntactically represented situation pronoun, we should only introduce situation pronouns where we have empirical evidence for them. This raises the question, of course, in what other places we find such evidence. One possibility that I already mentioned concerned Austinian topic situations, which, if we choose to represent them syntactically, would be introduced at the top of the clause.

Another, though at least potentially related, location where situation pronoun seem to be needed is inside of relative clauses. In the temporal domain, it has been argued that the tense in a relative clause does not have to be interpreted relative to the tense in the matrix clause, even when the DP containing it has to take scope below the matrix

verb (which rules out a scope account, as shown by Kusumoto, 2005). The following example is an illustration of this so-called later-than matrix interpretation:[44]

(68) Hillary married a man that became president.

Kusumoto (2005)

The fact is, of course, that Bill only became president after he married Hillary, which means that the past tense on *became* has to be interpreted relative to the time of utterance, rather than relative to the time introduced by the past tense on *married*. This suggests that there is a time (or situation) pronoun in the relative clause that can pick out the utterance time (or situation), even when ocurring in the scope of a temporal operator (the matrix tense).

One set of data that suggests that relative clauses have special properties with respect to their intensional status as well is the following. Note that prenominal modifiers and relative clauses that - on their simplest analysis - should be equivalent to them differ in terms of their behavior in intensional contexts such as the one created by *fake*:

(69) a. A fake American philosopher was at the conference.
b. A fake philosopher that is American was at the conference.

Only (69a) is compatible with a scenario in which the person in question is a real philosopher that pretends to be American. While I'm not in a position to present a full analysis of this example, assuming a situation pronoun in the relative clause at least leads us to expect that the attested interpretation is possible, namely by interpreting that situation pronoun transparently.

Yet another construction that might call for a situation pronoun is that of comparatives. It has long been known that there are ambiguities involving the intensional status of predicates in comparatives, as in the following famous example by Russell:

(70) I thought your yacht was larger than it was.

For the sensible interpretation of this sentence on which I am not holding incoherent beliefs, the predicate in the *than*-clause has to be interpreted relative to the actual world, whereas the predicate in the main clause has to be interpreted relative to the *thought*-worlds. Based on this and similar examples with counterfactuals, von Stechow (1984) already argued that to account for the full range of data, we have to allow for transparent interpretations of predicates in the *than*-clause (to allow for an interpretation of the predicate relative to the actual world even though it remains in the scope of the intensional operator at LF). Of course, that is exactly what situation pronouns are good for. Given that at least one popular family of analyses sees comparatives as quantifiers over degrees, this may be yet another case where a quantifier introduces a situation pronoun.[45]

Once more, I have to leave further exploration of these issues to future research. There may well be other locations where we find evidence for situation pronouns beyond

[44] This example alone doesn't rule out a scopal account. See Kusumoto (2005) for detailed discussion of variants that do.

[45] This is not to say that other analyses of comparatives aren't compatible with introducing situation pronouns. In fact, I assume that definite determiners, which I take not to be quantificational, also take a situation pronoun argument, so there's no perfect correlation between the presence of situation pronouns and *bona fide* quantificational expressions.

the ones mentioned here. But based on the present account, it should at least be relatively clear what the research agenda for identifying such locations should look like.

References

Abusch, Dorit. 1994. The scope of indefinites. *Natural Language Semantics* 2(2):83–136.

Barwise, J. and J. Etchemendy. 1987. *The Liar. An Essay in Truth and Circularity*. Oxford: Oxford University Press.

Barwise, J. and J. Perry. 1983. *Situations and Attitudes*. Cambridge/Mass.: The MIT Press.

Bäuerle, Rainer. 1983. Pragmatisch-Semantische Aspekte der NP-Interpretation. In M. Faust; R. Harweg; W. Lehfeldt; and G. Wienold, eds., *Allgemeine Sprachwissenschaft, Sprachtypologie, und Textlinguistik: Festschrift für Peter Hartmann*, 121–131. Tübingen: Narr.

Benthem, J. F. A. K. van. 1977. Tense logic and standard logic. *Logique et Analyse* 80:395–437.

Berman, S. 1987. Situation-based semantics for adverbs of quantification. In J. Blevins and A. Vainikka, eds., *UMOP 12*. Amherst: GLSA.

Büring, Daniel. 2003. On d-trees, beans, and b-accents. *Linguistics and Philosophy* 26(5):511–546.

Büring, Daniel. 2004. Crossover situations. *Natural Language Semantics* 12(1):23–62.

Büring, Daniel. 2005. *Binding Theory*. Cambridge: Cambridge University Press.

Cooper, Robin. 1978. Variable binding and relative clauses. In F. Guenthner and S. J. Schmidt, eds., *Formal Semantics and Pragmatics for Natural Language*, 131–169. Dordrecht: Reidel.

Cooper, Robin. 1993. Generalized quantifiers and resource situations. In Peter Aczel; Robin Cooper; Yasushiro Katagiri; John Perry; Kuniaki Mukai; David Israel; and Stanley Peters, eds., *Situation Theory and its Applications*, 191–212. CSLI Publications.

Cooper, Robin. 1995. The role of situations in generalized quantifiers. In Shalom Lappin, ed., *Handbook of Contemporary Semantic Theory*. Blackwell.

Cresswell, M. J. 1990. *Entities and Indices*. Dordrecht: Kluwer.

Elbourne, Paul. 2005. *Situations and Individuals*. Cambridge, MA: MIT Press.

Enç, Mürvet. 1981. *Tense without Scope: An Analysis of Nouns as Indexicals*. Ph.D. thesis, University of Wisconsin-Madison.

Enç, Mürvet. 1986. Toward a referential analysis of temporal expressions. *Linguistics and Philosophy* 9:405–426.

von Fintel, Kai and Irene Heim. 2007. Intensional semantics. Lecture Notes.

Fodor, Janet D. 1970. *The linguistic description of opaque contents*. Ph.D. thesis, Massachusetts Institute of Technology.

Heim, Irene. 1990. E-type pronouns and donkey anaphora. *Linguistics and Philosophy* 13(2):137–178.

Heim, Irene and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Malden and Oxford: Blackwell.

Iatridou, S. and I. Sichel. 2008. Negative dps and scope diminishment: Some basic patterns. In A. Schardl; M. Walkow; and M. Badurrahman, eds., *Proceedings of NELS 38*, 337–350. University of Massachusetts Amherst, GLSA.

Iatridou, S. and I. Sichel. to appear. Negative dps and scope diminishment: Some basic patterns. *Linguistic Inquiry* .

Kamp, Hans. 1971. Formal properties of 'now'. *Theoria* 37:227–273.

Keshet, Ezra. 2008a. *Good Intensions: Paving Two Roads to a Theory of Good Intensions: Paving Two Roads to a Theory of the De re /De dicto Distinction*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA.

Keshet, Ezra. 2008b. Only the strong: Restricting situation variables. In T. Friedman and S. Ito, eds., *Proceedings of SALT XVIII*, 483–495. Ithaca, NY: Cornell University.

Keshet, Ezra. 2010. Situation economy. *Natural Language Semantics* 18.

Keshet, Ezra. 2011a. Possible worlds and wide scope indefinites: A reply to bäuerle 1983. *Linguistic Inquiry* 41(4):692–701. doi:\bibinfo{doi}{10.1162/LING_a_00019}. URL `http://dx.doi.org/10.1162/LING_a_00019`.

Keshet, Ezra. 2011b. Split intensionality: a new scope theory of de re and de dicto. *Linguistics and Philosophy* doi:\bibinfo{doi}{10.1007/s10988-011-9081-x}. URL `http://www.springerlink.com/content/d584131779263716/`.

Kratzer, Angelika. 1989. An investigation of the lumps of thought. *Linguistics and Philosophy* 12(5):607–653.

Kratzer, Angelika. 2004. Covert quantifier restrictions in natural languages. talk given at Palazzo Feltrinelli in Gargnano June 11, 2004.

Kratzer, Angelika. 2007. Situations in natural language semantics. In Edward N. Zalta, ed., *Stanford Encyclopedia of Philosophy*. Stanford: CSLI.

Kusumoto, Kiyomi. 1999. *Tense in Embedded Contexts*. Ph.D. thesis, University of Massachusetts Amherst, Amherst, MA.

Kusumoto, Kiyomi. 2005. On the quantification over times in natural language. *Natural Language Semantics* 13(4):317–357.

Ladusaw, W. 1977. Some problems with tense in ptq. *Texas Linguistic Forum* 6:89–102.

Landman, Fred. 2004. *Indefinites and the Type of Sets*. Oxford: Blackwell Publishers.

Lewis, David. 1986. *On the Plurality of Worlds*. Blackwell.

Matthewson, Lisa. 2001. Quantification and the nature of crosslinguistic variation. *Natural Language Semantics* 9(1):145–189.

Milsark, G. 1974. *Existential sentences in English*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA.

Milsark, G. 1977. Towards the explanation of certain peculiarities of existential sentences in english. *Linguistic Analysis* 3:1–29.

Montague, R. 1974. *Formal Philosophy. Selected Papers by Richard Montague*. R. H. Thomason (ed.). New Haven: Yale University Press.

Musan, Renate. 1995. *On the Temporal Interpretation of Noun Phrases*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge.

Ogihara, T. 1992. *Temporal Reference in English and Japanese*. Bloomington, IN: Indiana University Linguistics Club.

Ogihara, T. 1996. *Tense, Attitudes, and Scope*. Dordrecht: Kluwer.

Percus, Orin. 2000. Constraints on some other variables in syntax. *Natural Language Semantics* 8(3):173–229.

Schwager, Magdalena. 2010. Speaking of qualities. In *Proceedings of SALT IX*. Ithaca, NY: CLC Publications.

Schwarz, Florian. 2009. *Two Types of Definites in Natural Language*. Ph.D. thesis, University of Massachusetts Amherst, Amherst, MA.

Schwarz, Florian. 2011. Situation pronouns and domain restriction. Ms.

Soames, Scott. 1986. Incomplete definite descriptions. *Notre Dame Journal of Formal Logic* 27:349–375.

von Stechow, Arnim. 1984. Structured propositions and essential indexicals. In Fred Landman and Frank Feldman, eds., *Varieties of Formal Semantics. Proceedings of the 4th Amsterdam Colloquium*, 385–404. Foris Publications.

Stowell, Tim. 1993. Syntax of tense. Ms., UCLA.

Vlach, Frank. 1973. *'Now' and 'Then': A Formal Study in the Logic of Tense Anaphora*. Ph.D. thesis, UCLA.