

## SITUATION VARIABLES AND LICENSING BY MODIFICATION IN OPAQUE DEMONSTRATIVES\*

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### Abstract

Postnominal modifiers license unexpected opaque readings of demonstrative descriptions. This paper presents a unified analysis of ordinary demonstrative descriptions and the special construction consisting of an opaque demonstrative description with a postnominal modifier. The analysis is based on two independently necessary components: a modal constraint associated with demonstrative determiners and the modal independence of postnominal modifiers. Far from being a peripheral construction, opaque demonstratives ultimately allow us to probe the interaction of nominal constituents with modality.

### 1 Introduction

Ordinary demonstrative descriptions are quintessential examples of purely extensional noun phrases. For example, (1) below can only be understood as a claim that George W. Bush might have been a Democrat. Unlike (2), sentence (1) cannot be interpreted as a claim that a Democrat might have won the last US presidential election. That is, the demonstrative subject of (1) cannot take narrow scope under the modal.

- (1) [pointing at George W. Bush] That president of the US might have been a Democrat.  
(2) The president of the US might have been a Democrat.

Given familiar examples such as (1), it is surprising to encounter (3) below, in which the demonstrative *those employees who were least productive* takes narrow scope under the modal.

- (3) Those employees who were the least productive might have been different people.

We know that the demonstrative in (3) takes narrow scope under *might* (in other words, the description has an *opaque* or *intensional* interpretation) because (3) is coherent. Sentence (4), by contrast, expresses only the incoherent or at best false proposition that certain individuals might have been different individuals.

- (4) #Those least productive employees might have been different people.

The surprising opaque interpretation in (3) thus appears to require a postnominal modifier. The opaque interpretation also seems to require a distal demonstrative determiner (*that* or *those*), since proximal demonstratives are unacceptable in this construction:

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\*This paper has benefited from insightful comments from numerous linguists, especially Donka Farkas, Bill Ladusaw, Jim McCloskey, Michela Ippolito, Angelika Kratzer, and the audience at Sinn und Bedeutung 11. The research leading to this paper was supported in part by an NSF Graduate Research Fellowship. Any remaining mistakes are mine.

- (5) That employee who was least productive might have been someone else.
- (6) #These employees who were least productive might have been different people.
- (7) #This employee who was least productive might have been someone else.

Note that proximal demonstratives may resist opaque interpretations simply because they require the referent to be close to the speaker, which is incompatible with variation across worlds. I will therefore concentrate on distal demonstratives.

The pattern in (1)–(4) raises two questions: is the demonstrative determiner in the special opaque demonstrative in (3) the same lexical item found in other demonstrative descriptions? And how is the opaque interpretation in (3) licensed by a postnominal modifier? I will argue that a unified analysis of demonstrative determiners is indeed possible and that such an analysis sheds light on the interactions among intensional operators, determiners and nominal modifiers. The analysis that I propose has two components. In section 2, I argue that demonstrative determiners require their NP complements to be interpreted relative to free situation variables. In the second half of the paper, I argue that nominal modifiers license opaque readings of demonstratives by introducing new situation variables that mediate between the constraint imposed by the demonstrative determiner and the kind of covariation necessary for an opaque interpretation.

## 2 Unmodified demonstratives and modality

Demonstratives have traditionally been assumed to be scopally inert, taking widest scope only. The classic observation supporting this view, due to Kaplan (1989), is that (8) is judged to be true, showing that the definite description may take narrow scope under the modal *would*, while (9) is judged false, showing that the demonstrative description takes widest scope.

- (8) [pointing at John throughout] If John and Mary switched places, the person I would be pointing at would be a woman.
- (9) [pointing at John throughout] If John and Mary switched places, that person I'm pointing at would be a woman.

The descriptions under consideration here differ in their uses as well as the choice of determiner. The demonstrative description in (9) is used deictically, to refer to an entity in the context of utterance, while the definite description in (8) is used to refer to the unique entity satisfying the descriptive content, an entity that may or may not be present in the context of utterance.<sup>1</sup> The classic direct reference account of demonstrative meaning (Kaplan 1989) is built around deictic uses of demonstratives, and takes demonstratives to be scopally inert in virtue of their reference being determined by the context of utterance. The referent of a definite description, by contrast, is determined by the compositional semantics and may covary with a bound variable.

More recent research has shown that demonstratives with non-deictic interpretations can take narrow scope under some circumstances. For example, the anaphoric demonstrative in (10) below covaries with an antecedent that takes narrow scope under an intensional operator.<sup>2</sup> Note that if the context supports a deictic interpretation, as in (11), or an anaphoric interpretation with a wide-scope antecedent, as in (12), the demonstrative takes widest scope only.

<sup>1</sup>I have used a subjunctive modifier in (8) to bring out the relevant reading. Note that the definite article but not the demonstrative determiner is compatible with the modifier *that I would be pointing at*; this further supports the view that demonstrative descriptions cannot take narrow scope under intensional operators.

<sup>2</sup>See Roberts (2002) and Wolter (2006b) for discussion of the scopal possibilities of anaphoric demonstratives.

- (10) Mary believes a unicorn is in her garden. She thinks *that unicorn* is ruining her lawn.
- (11) [Fido is running around the room.] Mary believes that there is a dog in her garden. She thinks that *that dog* [pointing at Fido] ruined her lawn.
- (12) There is a unicorn in Mary’s garden. Mary believes *that unicorn* is ruining her lawn.

We also find demonstrative descriptions taking narrow scope when their interpretation depends on a bridging inference, as in (13) below.

- (13) If Mary had received a reading list with sections labeled “On Reserve” and “In Bookstore,” she would have gone to the library and read *those books* first.

In this discourse, the interpretation of *those books* depends on an inference linking a set of books to the titles in the “On Reserve” section of Mary’s hypothetical list, and the referent of the demonstrative contrasts with the set of books whose titles are listed in the “In Bookstore” section. Bridging demonstratives in general happen to be licensed by explicit contrast (Wolter 2006a). For example, the demonstrative is acceptable in the contrastive context in (15) but unacceptable in (14).

- (14) A car drove by. The/\*That horn was honking.
- (15) A car drove by. The horn was honking. Then another car drove by. *That horn* was honking even louder.

So far we have seen demonstrative descriptions taking narrow scope under intensional operators in relatively special circumstances—when there is a narrow-scope antecedent or a bridging inference in an explicitly contrastive context. Some researchers have also presented examples suggesting that demonstrative descriptions can take narrow scope freely, even in deictic use. The strongest supporter of this view is King (2001); let’s consider his central evidence.

The example in (16) requires some back story. Suppose that Sherry, who works for Chanticleer toy company, believes that Alan has been elected CEO of Chanticleer. Sherry also believes that Alan dislikes her, and she’s unhappy about having him as her boss. Someone asks why Sherry is acting upset, and the speaker points at Alan and says:

- (16) Sherry believes that that man who was just elected CEO of Chanticleer hates her.

King observes that (16) is taken as an explanation of Sherry’s behavior. Suppose that the demonstrative is interpreted with wide scope. The sentence would then only entail that Sherry believes that Alan hates her. It would not make a claim about whether Sherry believes that Alan has been elected CEO. But Sherry has believed for some time that Alan hates her; this belief alone does not explain why she is upset at the time of utterance. King therefore concludes that the wide-scope interpretation of the demonstrative in (16) is not viable.

It is true that in order to understand why Sherry is upset, we need to know two of Sherry’s beliefs: that Alan hates her and that Alan has been elected CEO. (From this we can infer that Sherry expects Alan to make her life miserable once he is in his new position.) If the demonstrative description in (16) takes wide scope, the sentence entails that Sherry believes that Alan hates her and that the *speaker* believes that Alan has been elected CEO—not quite the right information. But it is a short step from this information to the information that we are after. Assuming that the speaker is making a contribution that is relevant to the purpose of the conversation (finding out why Sherry is upset), we can conclude that the backgrounded proposition

that Alan has been elected CEO is relevant information. And in general, speakers don't use idiosyncratic descriptions, but rather try to choose descriptions that are shared by addressees and/or attitude holders; here we have no reason to think that Sherry's and the speaker's beliefs diverge, so it is fairly safe to conclude that Sherry also believes that Alan has been elected CEO. In short, although the interpretation of (16) in which the demonstrative takes wide scope does not entail the information that accounts for Sherry's behavior, the explanation of Sherry's behavior can be derived straightforwardly as a conversational implicature. Furthermore, this implicature can be cancelled, as shown by the fact that the speaker can continue as follows:

- (17) Sherry believes that that man who was just elected CEO of Chanticleer hates her. Actually, Sherry doesn't think that Alan has been elected CEO. She's just generally fed up with him.

So far we have seen that it is possible to assume that the demonstrative in (16) has widest scope. The speaker's commitments on uttering the sentence show that the demonstrative *must* have widest scope. Example (16) is only felicitous if the speaker believes that Alan has been elected CEO. In (18) below, the speaker publicly commits to the proposition that Alan hasn't been elected CEO, and the subsequent use of the demonstrative description in question is unacceptable. Example (19) shows that the speaker cannot use the demonstrative description and then clarify later that he or she does not accept its content. This shows that the speaker's commitment to the content of this demonstrative description is part of its conventional meaning and does not arise as a conversational implicature.

- (18) #Alan hasn't been elected CEO of Chanticleer, but Sherry believes that that man who has been elected CEO of Chanticleer [pointing at Alan] hates her.
- (19) #Sherry believes that that man who has been elected CEO of Chanticleer [pointing at Alan] hates her, although in fact Alan hasn't been elected CEO of Chanticleer.

The examples below, also due to King (2001) suggest a narrow-scope analysis of demonstrative descriptions for a different reason.

- (20) a. Ed [pointing at a jewel]: It isn't a diamond; but it is valuable.  
b. Liz [pointing at the jewel]: Ed said that that diamond is very valuable.
- (21) a. Donnie [pointing at a transvestite]: That woman is beautiful.  
b. Jeff [pointing at the transvestite]: Donnie said that that woman is beautiful. (King 2001: 113–115)

In (20-b), the speaker but not the attitude holder ascribes to the content of the embedded description *that diamond*, and King argues that the sentence is intuitively false. In (21-b), the attitude holder but not the speaker ascribes to the content of the embedded description *that woman*, and King argues that the sentence is intuitively true. These intuitions point in the opposite direction from the speaker commitments in (16)—if the truth of the sentence depends on whether the attitude holder rather than the speaker ascribes to the content of the description, then the description has narrow scope under the attitude predicate.

I differ from King with regard to the nature of these judgments. Example (20-b) seems misleading rather than false; note that in the given context, there is no reason for the speaker to use a description that Ed does not ascribe to, and so the default inference from this sentence is that Ed believes that the demonstratum is a diamond. Perhaps it is this inference, rather than the truth conditions of the sentence itself, that makes (20-b) infelicitous. In fact, if there is an indepen-

dent reason to use the description *diamond*, and Ed's beliefs about the nature of the object are irrelevant, then the sentence becomes more acceptable, and intuitively true:

- (22) a. Liz [pointing at a jewel]: Look at that diamond!  
b. Ed: That isn't a diamond; but it is valuable. [Ed leaves. Jed enters.]  
c. Jed: That diamond doesn't look very impressive.  
d. Liz: Well, Ed believes that that diamond is very valuable.

Sentence (21-b), meanwhile, strikes me as ironic at best. Intuitively speaking, the speaker is playing along with Donnie's belief that the transvestite is a woman, perhaps to make fun of Donnie<sup>3</sup>. These examples, then, are not conclusive counterexamples to the claim that demonstrative descriptions are normally scopally inert. What they show us again is that pragmatic principles affect the choice of descriptions in attitude ascriptions, and that this can obscure the scopal relations between descriptions and attitude predicates.

The existence of anaphoric and bridging demonstratives that take narrow scope under intensional operators poses a serious problem for the classic direct reference treatment of demonstratives, which predicts that demonstratives will always take widest scope only. On the other hand, the data we have just considered suggest that the scopal possibilities of demonstrative descriptions are more restricted than the scopal possibilities of definite descriptions: only certain kinds of contexts allow demonstratives to take narrow scope under intensional operators. The semantics of the demonstrative determiner, then, should prevent opaque interpretations in general, but leave room for opaque interpretations in some special circumstances.

In what follows I will assume that every predicate has a situation argument. A noun phrase has an opaque interpretation, that is, takes narrow scope under an intensional operator, when its situation argument covaries with a situation variable that is bound by an intensional operator. Otherwise, a noun phrase has a transparent interpretation, that is, takes widest scope over any intensional operators.

One thing shared by the special circumstances supporting opaque demonstratives that we have seen so far is that they support an indirect relation between the descriptive content of a demonstrative noun phrase and a world or situation variable that is bound by an intensional operator. An anaphoric opaque demonstrative covaries with its antecedent, which in turn covaries with a bound situation variable. In a bridging context, explicit contrast establishes contrasting subparts of the value of a bound situation variable; the demonstrative description covaries in turn with one of these sub-situations. This suggests that demonstrative descriptions are subject to a constraint that prevents interpretation relative to a bound situation variable, but which allows an indirect covariation relation to be established between the modal parameter of a demonstrative description and a bound situation variable. An informal version of a suitable constraint is given in (23).

- (23) *Constraint on demonstrative descriptions (version 1)*: The situation variable associated with the NP complement of a demonstrative determiner is free.

### 3 Licensing by modification

In section 1, we considered a third case in which demonstrative descriptions can take narrow scope under intensional operators: a special construction containing a postnominal modifier.

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<sup>3</sup>This sort of example might be treatable as a case of partial quotation. See Recanati (2000) for arguments that partial quotation is more widespread than is generally recognized.

In this section I show that opaque interpretations of demonstrative descriptions are structurally licensed by all restrictive postnominal modifiers, and not by any other structures. To bring out the opaque reading, or lack of an opaque reading, of the demonstrative descriptions, I construct sentences which are false or contradictory on the transparent reading of the relevant description, and true or plausible on the opaque reading. For example, the transparent reading of *that person who discovered fire* in (24) results in the probably contradictory (or at least metaphysically questionable) proposition that a particular person might have been somebody else, while the opaque reading results in the perfectly plausible proposition that someone other than the actual discoverer of fire might have discovered fire. Since (24) has the sensible interpretation, we can conclude that the demonstrative in subject position allows an opaque reading. The unmodified demonstrative in (25), by contrast, has only the implausible or contradictory reading, showing that unmodified demonstratives, as expected, have only a transparent interpretation.

(24) That person who discovered fire might have been someone else.

(25) #That discoverer of fire might have been someone else.

This test shows that nonrestrictive relative clauses do not license opaque interpretations of demonstrative descriptions. Examples (26) and (27) below have only the implausible reading arising from the transparent interpretation of the subject.

(26) #That prehistoric individual, who discovered fire, might have been someone else.

(27) #That presidential candidate, who won the election, might have been someone else.

Complements of N also do not license opaque readings of demonstratives, since (28) and (29) are equally unacceptable:

(28) #That discoverer of fire might have been someone else.

(29) #That winner of the election might have been someone else.

On the other hand, amount relatives and relatives abstracting over kinds license opaque interpretations. Examples (30)–(32) below have the sensible reading arising from the opaque interpretation of the subject.

(30) Those candidates that there were on the ballot could have been different people.

(31) Those candidates that there were on the ballot could have been more numerous.

(32) If technology had advanced more quickly, those telephones that there were in my grandmother's time might have been wireless.

PPs and postnominal APs also license opaque readings of demonstratives, as shown by the acceptability of (33)–(37):

(33) That person at the top of the list could have been someone else.

(34) That runner in last place could have been someone else.

(35) Given the run-down state of the equipment, that person responsible for the disaster could easily have been someone else.

(36) That person responsible could have been someone else.

(37) If the cloud cover had been different, those stars visible could have been different stars.

Prenominal adjectives do not license opaque interpretations. As a result, (38)–(39) are unacceptable.

(38) #Those helpful tour guides could have been different people.

(39) #Those eligible job applicants could have been different people.

The bare postnominal adjectives in (36) and (37) above have a stage-level interpretation (they denote temporary properties), while the prenominal adjectives in (38) and (39) are most naturally interpreted as individual-level (denoting permanent or inherent properties). One might wonder whether the licensing ability of the postnominal adjectives is due to the stage-level interpretation rather than the postnominal position. This can easily be tested, because as Larson (1998) has observed, adjectives like *responsible* allow a stage-level interpretation in both prenominal and postnominal position. That is, *the person responsible* can only refer to someone who is responsible for some event, while *the responsible person* can refer either to an individual who is responsible for some event or an individual who has a responsible character.<sup>4</sup>

Larson (1998) also observes that prenominal adjectives tend to have a stage-level interpretation when they are farther away from the head noun. The stage-level interpretation is particularly clear when the individual-level interpretation is excluded by another adjective. For example, in (40) below the individual-level interpretation of *responsible* is incompatible with *irresponsible*.

(40) the responsible irresponsible person

If we use Larson's technique for forcing a prenominal adjective to take a stage-level interpretation, we find that it still does not license an opaque interpretation of a demonstrative description:

(41) #Those responsible irresponsible employees could have been different people.

(42) #Those visible invisible stars could have been different stars.

Postnominal superlatives license opaque interpretations and prenominal superlatives do not. Example (43) below, which contains a postnominal superlative, is acceptable, while the sentence with the corresponding prenominal superlative in (44) is not:

(43) That member of the committee who is youngest might have been someone else.

(44) #That youngest member of the committee might have been someone else.

Infinitival relatives that depend on prenominal superlatives or ordinals do not license opaque interpretations, while independent infinitival relatives do. Therefore, (45) is unacceptable, in contrast with (46):

(45) #That first hominid to discover fire could have been someone else.

(46) Those soldiers to be sent elsewhere could have been different people.

Finally, participial reduced relatives license opaque interpretations, as shown by the acceptability of (47) and (48):

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<sup>4</sup>Some speakers (including Bolinger (1967)) accept only the individual-level interpretation of prenominal adjectives. For those speakers, it will not be possible to tease apart the position and interpretation of these adjectives.

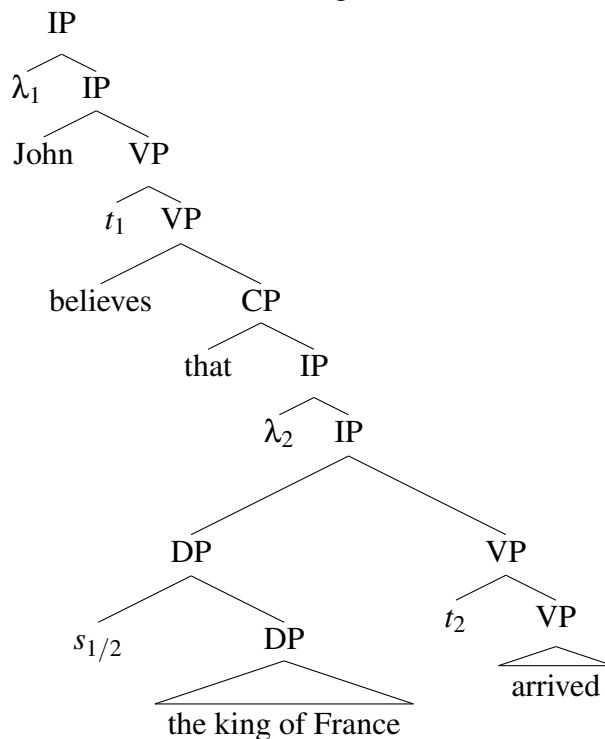
- (47) Those students writing a term paper could have been the other half of the class.  
 (48) Those articles read by the students could have been different papers.

The descriptive generalization, then, is that opaque readings of demonstrative descriptions are licensed by restrictive postnominal modifiers. This is a class of structures that cannot be defined semantically: it includes postnominal adjectives that are semantically equivalent to prenominal adjectives. To account for this pattern, we therefore need an analysis in which scopal relations between intensional operators and descriptions are reflected in the syntactic structure.

#### 4 Structural constraints on situation variables

To set the scene for the structural licensing of opaque demonstratives, I adopt Percus' (2000) account of structural conditions on situation variables, in which the situation variables saturating the situation arguments of predicates are realized in the syntax at LF. The situation variables associated with main predicates get special treatment: a situation "pronoun" adjoined to VP moves to adjoin to IP and is interpreted as an abstraction operator. The situation argument of the main predicate is bound by this operator. As a result, the main predicate has local scope. The situation arguments of other predicates are saturated by adjoined situation "pronouns" that may be either free or accidentally bound by a c-commanding operator. This results in other predicates having free scope.<sup>5</sup> In (49), for example, the situation variable originating as an adjunct to *arrived* moves to adjoin to the lower IP, where it is interpreted as an abstraction operator; the situation variable that is abstracted over is then bound by the intensional operator introduced by *believe*. The situation variable associated with *king of France*, by contrast, is unconstrained, and can covary with either of the two other situation parameters in the sentence, allowing *the king of France* to take either wide or narrow scope with respect to *believe*.

- (49) John believes that the king of France arrived.



<sup>5</sup>See Farkas (1997) for empirical arguments that the modal parameter of main predicates has local scope, and that the scope of the modal parameter of nominal predicates is free.



(50)  $\lambda s. \forall s' \in \text{Dox}_{\text{John}}(s, s'). \text{arrived}(\iota x. \text{king-of-France}(x)(s))(s')$

(51)  $\lambda s. \forall s' \in \text{Dox}_{\text{John}}(s, s'). \text{arrived}(\iota x. \text{king-of-France}(x)(s'))(s')$

To give demonstrative determiners access to the situation arguments of their nominal complements, I modify Percus' (2000) framework slightly and assume that a definite or demonstrative determiner bears a numerical index. This index is interpreted as a situation variable that saturates the situation argument of the nominal complement. The lexical entries in (52) and (53) below show the implementation of the modal constraint on demonstrative determiners in this system, combined with a uniqueness-based analysis of definiteness.

(52)  $\llbracket \text{the}_n \rrbracket: \lambda \mathcal{P}_{\langle s, et \rangle} : \mathcal{P}(s_n)$  is a singleton set.  
If defined, denotes  $\iota x. \mathcal{P}(x)(s_n)$

(53)  $\llbracket \text{that}_n \rrbracket: \lambda \mathcal{P}_{\langle s, et \rangle} : \mathcal{P}(s_n)$  is a singleton set and  $s_n$  is free.  
If defined, denotes  $\iota x. \mathcal{P}(x)(s_n)$

In proposing these lexical entries, I am making two claims: that the semantics of definiteness includes a uniqueness condition, and that a demonstrative determiner constrains the modal parameter of its nominal complement. I am not claiming that these lexical entries capture every aspect of the lexical semantics of definite and demonstrative determiners; one might, for example, enrich both lexical entries with a familiarity condition, or elaborate the demonstrative meaning to reflect the proximal/distal distinction.<sup>6</sup>

I assume that the situation argument of an intersective prenominal modifier depends on the situation argument of the head noun. Combining a nominal with a demonstrative determiner results in the saturation of the nominal's situation argument with a free situation variable. For example, (54) below is felicitous just in case the situation parameter associated with the content of the demonstrative description is not the same variable that is bound by the intensional operator. The felicitous interpretation of (54) is shown in (55).

(54) That responsible person might quit.

(55)  $\lambda s. \exists s' \in R(s, s'). \text{quit}(\iota x. \text{person}(x)(s'')) \wedge \text{responsible}(x)(s'')(s')$

In contrast with the “modally dependent” prenominal modifiers, Dayal (1998, 2004) has argued, primarily on the basis of “subtriggered” free-choice *any*, that the situation variable associated with a postnominal modifier may be independent of the situation variable associated with the head noun. If postnominal modifiers are in general “modally independent” from nouns, as well as from the main predicate, it would not be that surprising for a postnominal modifier to introduce a new situation variable. And if a postnominal modifier introduces just the right situation variable, it will mediate between the constraint imposed by the demonstrative determiner and the covariation necessary for an opaque reading.

How does the situation variable associated with a postnominal modifier escape being saturated by the determiner? There are two possibilities to consider. Possibility A is that postnominal modifiers have enough structure to constitute a separate binding domain. Possibility B is that postnominal modifiers may be attached unexpectedly high and thus fall outside of the command domain of the determiner.

Possibility A is initially appealing because it allows us to maintain a standard syntax of postnominal modifiers as NP adjuncts. Furthermore, Sadler and Arnold (1994) argue that post-

<sup>6</sup>But see Wolter (2006b) for an analysis of *that* as unmarked for proximity.

nominal adjectives have more structure than prenominal adjectives. Because bare postnominal adjectives are the smallest postnominal modifiers, a successful argument that they have more structure than prenominal modifiers lends plausibility to the idea that postnominal modifiers in general, but not prenominal modifiers, contain enough structure to constitute a separate binding domain for situation variables.

However, Possibility A also faces two challenges. The first challenge is to account for the interpretation of prenominal/postnominal bare adjective pairs which differ only in their ability to license opaque readings of demonstratives. If we assume that the postnominal version of the adjective in fact has more functional structure than the prenominal version, we must be very careful to make sure that nothing else about the interpretation is changed. The second challenge is to maintain the account of why infinitival relatives that depend on prenominal superlatives do not license the construction. It is hard to imagine how a bare adjective might have enough structure to constitute a separate binding domain while an infinitival relative clause did not.

These challenges suggest that we should instead pursue possibility B and assume that a postnominal modifier may escape the binding domain of a demonstrative determiner by virtue of a high attachment site. I will assume that postnominal modifiers may adjoin to DP and that DP-adjuncts are not c-commanded by  $D^0$ . The difficulty of this approach is that there simply aren't any independent syntactic tests for the height of attachment of a right adjunct.<sup>7</sup> Nor are there independent semantic arguments for height of attachment, since the debate between Partee (1975) and Bach and Cooper (1978) has demonstrated that the standard interpretation of restrictive relative clauses can be derived compositionally regardless of how high the relative clause is attached. On the other hand, this difficulty is also a source of freedom. It appears that a coherent account of postnominal modifiers does not depend on their position. So why not make the most of the tools at hand and admit both NP and DP adjuncts into the picture?

To complete the analysis, we need to determine how DP adjuncts compose with the DPs that they are adjoined to. Blind functional application clearly won't do. As it happens, the literature supplies two possible strategies. The first strategy for composing DPs with DP-adjoined modifiers relies on the semantics developed by Dayal (1995) and Bhatt (2003) for Indo-Aryan correlative constructions, such as the Hindi example shown below.

- (56) jo laRkii khaRii hai, vo lambii hai  
 which girl standing is DEM tall is  
 'The girl who is standing is tall.' (Dayal 1995: ex. (1))

In correlative constructions like this, a relative clause is adjoined to IP, and (intuitively speaking) modifies a demonstrative DP in the main clause. Dayal's and Bhatt's analyses of this construction differ in details, but their proposals share several main ideas. The relative clause is type-shifted from a predicative to a referring or quantificational interpretation. The demonstrative DP is interpreted as anaphoric to the typeshifted modifier (or as a bound variable). The anaphoric relation results in an interpretation that has the same entailments as a sentence containing an

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<sup>7</sup>It's tempting to think that constructions appearing to consist of a pronoun with a postnominal modifier, such as the ones illustrated below, show that postnominal modifiers must be able to adjoin to DP, in that pronouns have been argued to be intransitive Ds.

- (i) Those interested in linguistics should read *The Language Instinct*.
- (ii) Someone with green hair knocked on the door.
- (iii) Many who were prepared for the test left early.

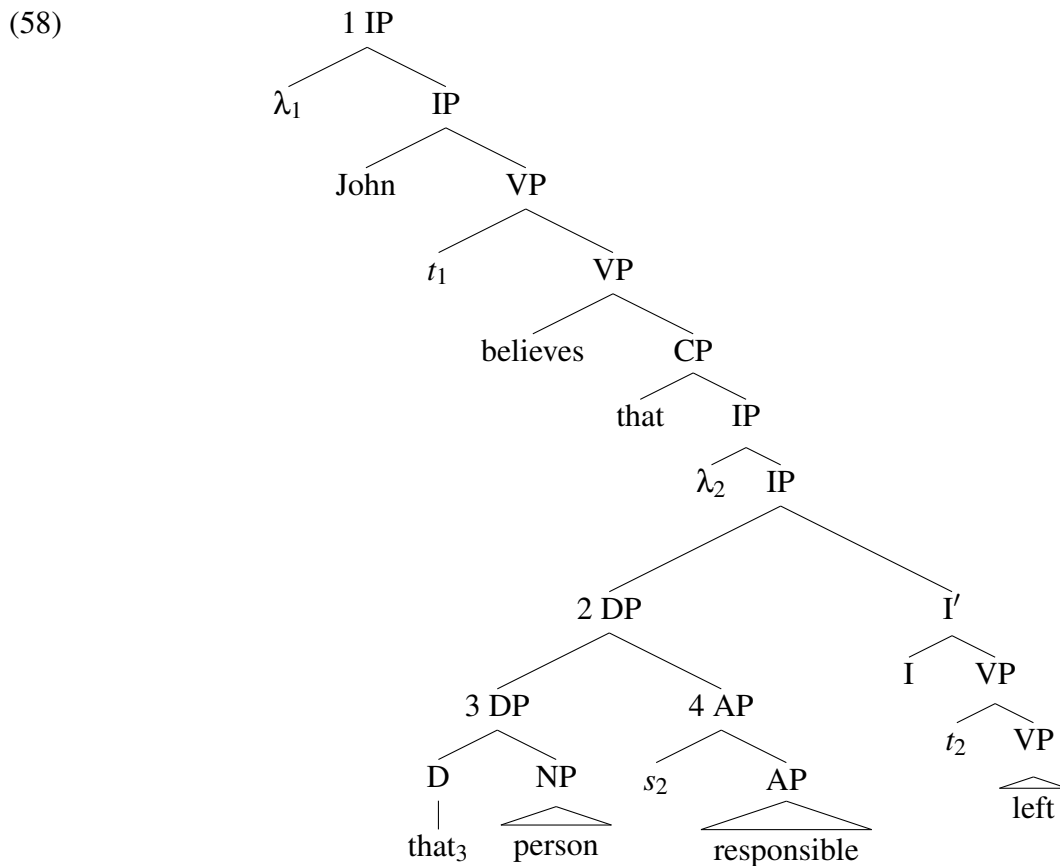
However, it is also possible to analyze these constructions as involving an NP projection headed by a null noun, so they do not constitute conclusive evidence for the view that postnominal modifiers may adjoin to DP.

ordinary restrictive relative clause interpreted via predicate modification.

Treating opaque demonstrative descriptions along the lines of this analysis of correlative constructions means making the following assumptions: postnominal modifiers in opaque demonstratives are adjoined to DP and typeshifted to a referential or quantificational type, and the demonstrative DP proper is backwards anaphoric to the adjoined modifier. The initial appeal of this approach is that it suggests that the special mode of composition proposed for correlative constructions is not limited to the special syntax of Indo-Aryan correlatives, setting the stage for further research on the crosslinguistic semantics of syntactically productive correlative constructions and their syntactically frozen counterparts in European languages.

An attempt at an analysis of opaque demonstratives along these lines is shown below.

(57) John believes that that person responsible left.



- a.  $\llbracket 3 \rrbracket = \lambda y. \iota x. \text{person}(x)(s_3) \wedge x = y$  (presupposition:  $s_3$  is free)
- b.  $\llbracket 4 \rrbracket$  via *iota* =  $\iota z. \text{responsible}(z)(s_2)$
- c.  $\llbracket 2 \rrbracket = \iota x. \text{person}(x)(s_3) \wedge x = \iota z. \text{responsible}(z)(s_2)$
- d.  $\llbracket 1 \rrbracket = \lambda s. \forall s' \in \text{Dox}_j(s, s'). \text{left}(\iota x. \text{person}(x)(s_3) \wedge x = \iota z. \text{responsible}(z)(s'))(s')$

The interpretation of (58) entails that the referent of the demonstrative *that person responsible* is a unique responsible person, and it allows *responsible* to be dependent on the situation variable bound by *believe*, giving the opaque interpretation, while the situation variable in the syntactic scope of the demonstrative determiner is free. However, on closer inspection, this application of the correlative strategy creates problems having to do with uniqueness. Consider (59) below.

(59) Those students who are interested in event semantics might take the semantics seminar.

Applying the correlative mode of composition blindly, we interpret *who are interested in event semantics* as a definite description denoting the maximal group of individuals who are interested in event semantics and take *those students* to be anaphoric to the derived definite description. This predicts that all of the individuals interested in event semantics are students—otherwise an anaphoric link cannot be established. But (59) is consistent with a scenario in which there are also some professors who are interested in event semantics. Intuitively, the sentence entails that the set of students being referred to are the maximal set of students who are interested in event semantics, but not that this exhausts the set of individuals interested in event semantics.

Perhaps the problem could be avoided by assuming that the postnominal modifier in an opaque demonstrative is interpreted as an *indefinite* description—more precisely, as an unmarked indefinite that carries no uniqueness, nonuniqueness, familiarity or novelty conditions.<sup>8</sup> Partee’s (1986) *lower* typeshift will have this effect (alternatively, the modifier could be shifted to a generalized quantifier via *A*). The typeshifted relative clause in (59) then need not refer to the maximal set of individuals who are interested in event semantics. It need only introduce a plural individual that can serve as the antecedent for *those students*.

But this only introduces the opposite problem. If the postnominal modifier is interpreted as an indefinite description, it can refer to a proper subset of the individuals satisfying its content, resulting in a weaker uniqueness implication than we actually observe. For example, the indefinite analysis predicts (60) below to be felicitous, just like (61), but it is not.

(60) That person responsible for the disaster might quit. He might apply for unemployment assistance. #Another person responsible for the disaster might be promoted.

(61) A person responsible for the disaster might quit. That person/He might apply for unemployment assistance. Another person responsible for the disaster might be promoted.

Because the correlative mode of interpretation introduces more problems than it solves here, let’s consider the second possible strategy, which relies on Bach and Cooper’s (1978) semantics for high-adjoined relative clauses. Bach and Cooper argue that noun phrases (i.e. DPs) can optionally take an extra property argument, which is saturated by the denotation of a high-adjoined relative clause and intersected with the property contributed by the content of the noun phrase. This strategy is illustrated below.

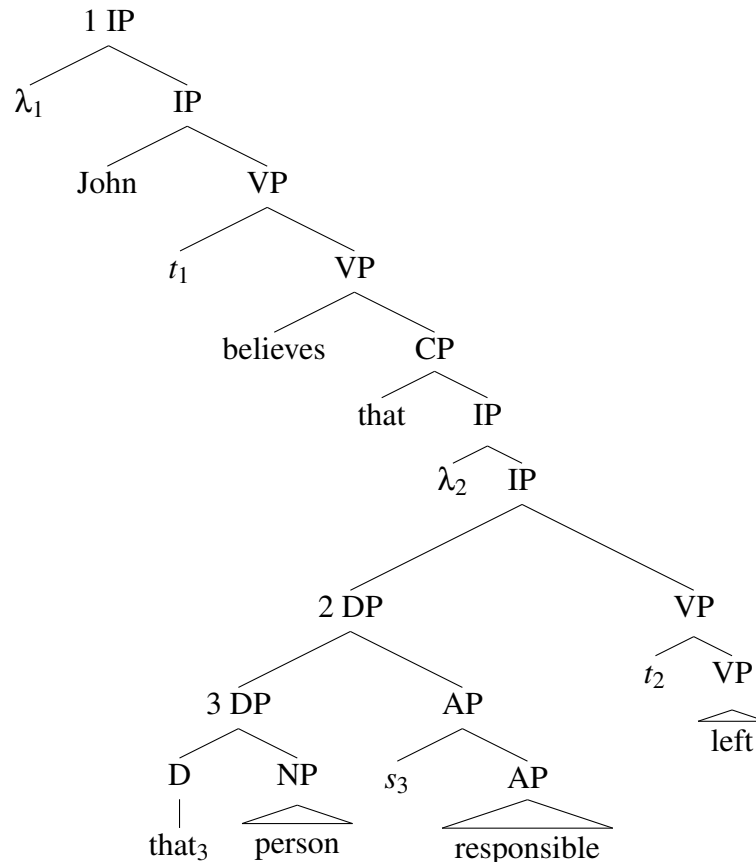
- (62)  $[_{NP2} [_{NP1} \text{Every man}] [_{S'} \text{who loves Mary}]]$   
 a.  $[[NP\ 1]] = \lambda R \lambda P [(\forall x)[\text{man}(x) \wedge R(x)] \rightarrow P(x)]$   
 b.  $[[S']] = \lambda z [\text{love}(z, m)]$   
 c.  $[[NP\ 2]] = \lambda P [(\forall x)[\text{man}(x) \wedge \text{love}(x, m)] \rightarrow P(x)]$

Because Bach and Cooper assume that this special interpretive strategy can be used whenever it is needed—it can be applied multiple times to accommodate stacked relatives, for example—it amounts to an optional typeshifting operation, converting a generalized quantifier (type  $\langle et, t \rangle$ ) into a function of type  $\langle et, \langle et, t \rangle \rangle$ . In order to apply this strategy, I use a variation which converts an expression of type  $\langle e \rangle$  to type  $\langle et, e \rangle$ . The intuition is the same: the operation adds a property argument. The Bach and Cooper strategy avoids the uniqueness problems that the correlative strategy faces because the postnominal modifier is not treated as a referential phrase, so we don’t need to worry about its uniqueness or nonuniqueness implications. The application of the Bach and Cooper-style strategy to an opaque demonstrative is shown below.

<sup>8</sup>See Hawkins (1991) and Farkas (2002, 2005) for arguments that some indefinite descriptions in English are unmarked in this sense.

(63) John believes that that person responsible left.

(64)



- a.  $\llbracket 3 \rrbracket = \lambda x. \text{person}(x)(s_3)$  (presupposition:  $s_3$  is free)
- b.  $\text{Bach-Cooper}(\llbracket 3 \rrbracket) = \lambda R. \lambda x. \text{person}(x)(s_3) \wedge R(x)$
- c.  $\llbracket 2 \rrbracket = \lambda x. \text{person}(x)(s_3) \wedge \text{responsible}(x)(s_3)$
- d.  $\llbracket 1 \rrbracket = \lambda s. \forall s' \in \text{Dox}_j(s, s'). \text{left}(\lambda x. \text{person}(x)(s_3) \wedge \text{responsible}(x)(s_3))(s')$

Here, the postnominal modifier *responsible* introduces the situation variable  $s_3$  and the demonstrative itself is interpreted relative to  $s_3$ . The requirement imposed by the determiner is satisfied because  $s_3$  is free. Does this tree give us the desired opaque interpretation? It will do so only if we can assume that  $s_3$  covaries with the situation variable that is bound by the operator introduced by *believe*. Nothing in the tree itself guarantees that  $s_3$  and the bound situation variable covary. However, when we consider how the value of  $s_3$  is constrained by pragmatic factors, we find that some fairly commonsense considerations give us the desired result.

Because  $s_3$  is free, its value is set by a contextually given assignment function. In principle, we might imagine this value being many improbable things, but in practice, the values of free variables are relatively constrained. Two constraints in particular are relevant here. First, the value of  $s_3$  should be a subpart of some salient situation. It is easy to see how this constraint applies to new individual variables. Suppose (65) is uttered out of the blue:

(65) A goat walked in.

We naturally assume that the individual variable introduced by the indefinite *a goat* has a value that exists in a salient situation, in this case, the evaluation situation. What I'm suggesting, then, is that new (free) situation variables must be grounded in existing situations in the same way that new individual variables are. Returning to (64), we see that one relevant salient situation variable is the situation variable bound by the intensional operator. So this pragmatic constraint

ensures that on one interpretation of the sentence,  $s_3$  is a subpart of the bound situation variable. Because the constraint imposed by the demonstrative determiner requires  $s_3$  and the bound situation variable to be distinct,  $s_3$  must be a *proper* subpart of the bound situation variable.

The second pragmatic constraint is simply that the value of a new situation variable be identifiable by the interpreter. In interpreting (64), the interpreter must construct a value for  $s_3$  that is a proper subpart of the bound situation variable. So far so good, but which subpart? I assume that situations, like discourse referents, cannot be invented out of whole cloth, and if (64) is uttered out of the blue, the context will not supply a situation variable whose value has previously been made salient. This leaves just one option, which is to construct a new situation on the basis of the semantic value of some constituent of (64). Suppose, then, that  $s_3$  is constructed from the semantic value of the modifier it is adjoined to. In other words,  $s_3$  is the minimal proper subpart of the value of the bound situation variable corresponding to the (entire) denotation of the predicate *responsible*. This value of  $s_3$  is the most plausible value to construct for the variable in the circumstances, and it is also the value will give us the correct interpretation of (64). Because  $s_3$  covaries with the bound situation variable  $s'$ , it gives us an opaque reading of the demonstrative description; because it is free, the demonstrative determiner is licensed; because  $s_3$  contains all of the responsible individuals in the situation associated with the VP, the demonstrative description has the correct uniqueness implications.

This completes the analysis. The solution to the licensing puzzle we began with relies on a modal constraint that arguably applies to demonstratives in general, the assumption that postnominal modifiers are modally independent, and some simple pragmatic constraints on free situation variables. Opaque demonstratives licensed by postnominal modifiers may appear exceptional at first glance, but when we understand what assumptions are necessary to account for the interactions among determiners, modifiers and modality, the apparently exceptional construction turns out to be just what we expect to find.

## 5 Where we have come and what is next

We have seen that, contrary to the predictions of the direct reference theory of demonstratives, opaque interpretations of demonstratives are possible in some circumstances. However, opaque demonstratives are not found just anywhere: they must be supported by an appropriate context or licensed by a postnominal modifier. The distribution of opaque demonstratives led us to the view that demonstrative determiners require their nominal complements to be interpreted relative to free situation variables. I argued that in some contexts, there are available free situation variables that covary with bound situation variables, and that postnominal modifiers may introduce new free situation variables of this kind. In this analysis, opaque demonstratives licensed by postnominal modifiers are not examples of an exceptional construction. They are exactly what we expect to find once we make the right assumptions about demonstrative determiners and nominal modifiers. The investigation of opaque demonstratives thus sets the stage for further work on the interaction of determiners and modality; on the interaction of nominal modifiers with determiners; and on the crosslinguistic interpretation of demonstrative descriptions with and without postnominal modifiers.

## References

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