How to point at discourse referents: On anaphoric uses of complex demonstratives[1]

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Abstract. The topic of this paper is an unexpected contrast between complex demonstratives and definite descriptions on their respective anaphoric or bound uses: While it is entirely natural to pick up two discourse referents introduced by indefinites in the preceding sentence via definite descriptions, picking them up via complex demonstratives leads to infelicity. If only one of the two discourse referents is picked up by a complex demonstrative, while the other is either not picked up at all, or by a definite description, in contrast, the resulting mini-text is again felicitous. Finally, two complex demonstratives can co-occur in a sentence if their use is accompanied by a pointing gesture in the direction of a perceptually salient individual. I will show that this pattern can be accounted for if complex demonstratives not only on their deictic, but also on their anaphoric or bound uses are assumed to be accompanied by (abstract or concrete) demonstrations (Bühler, 1934; Roberts, 2002) that may not have overlapping trajectories.

Keywords: demonstratives, definite descriptions, co-reference, binding, pointing.

1. Introduction

The topic of this paper is an unexpected contrast between complex demonstratives and definite descriptions on their respective anaphoric or bound uses: While it is entirely natural to pick up two discourse referents introduced by indefinites in the preceding sentence via definite descriptions ((1a)), picking them up via complex demonstratives leads to infelicity ((1b) and (1c)). If only one of the two discourse referents is picked up by a complex demonstrative, while the other is either not picked up at all ((2a) and (2b)), or by a definite description ((2c) and (2d)), in contrast, the resulting text segment is again felicitous. Finally, consider the sentences in (3a) and (3b), where the use of the respective complex demonstrative is accompanied by a pointing gesture in the direction of a perceptually salient individual. The felicity of both (3a) and (3b) shows that the infelicity of (1b) and (1c) is neither due to a general constraint against the occurrence of more than one demonstrative in a sentence, nor a constraint that prevents demonstratives with contrasting NPs from co-occurring. Note that capitals indicate focal stress.

(1)   a. Last night, a dog chased a cat in front of my house. Fortunately, [the CAT] was pretty fast, while [the DOG] was rather slow.
b. Last night, a dog chased a cat in front of my house. [??][that CAT] was pretty fast, while [that DOG] was rather slow.
c. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that DOG] was pretty slow, while [that CAT] was pretty fast.

(2)   a. Last night, a dog chased a cat in front of my house. Fortunately, [that CAT] was
       pretty fast.
       b. Last night, a dog chased a cat in front of my house. Fortunately, [that DOG] was
       pretty slow.
       c. Last night, a dog chased a cat in front of my house. Fortunately, [that CAT] was
       pretty fast, while [the DOG] was rather slow
       d. Last night, a dog chased a cat in front of my house. Fortunately, [that DOG] was
       rather slow, while [the CAT] was pretty fast.

(3)   a. [THAT dog] is smarter than [THAT dog].
       b. [That DOG] is smart, but [that CAT] is rather stupid.

The pattern exemplified by the sentences in (1)-(3) is entirely unexpected on the accounts of
King (2001) and Elbourne (2008) (see also Nowak, 2014), who both predict complex
demonstratives to be essentially equivalent to definite descriptions on all uses except the
deictic ones. I will therefore show that the pattern in (1)-(3) gives us a clue regarding the
correct analysis of complex demonstratives and what sets them apart from definite
descriptions: It provides an indirect argument for the assumption that complex
demonstratives not only on their deictic, but also on their anaphoric or bound uses involve
(abstract) *demonstrations* (Bühler, 1934; Roberts, 2002). Crucially, I will argue that the more
restricted behavior of anaphoric or bound complex demonstratives as opposed to both
anaphoric or bound definite descriptions and deictically used complex demonstratives can
naturally be accounted for via the following assumption: Demonstrations may not have
overlapping paths.

The paper is structured as follows. In Section 2 I give a brief overview over previous analyses
of complex demonstratives. Section 3 discusses the pattern to be accounted for in more detail
and shows why none of the previous analyses can account for it. In Section 4 I present my
own analysis. Section 5 is the conclusion.

2. Previous analyses of complex demonstratives

2.1 Complex demonstratives as directly referential terms

In formal semantics and philosophy of language, there has for a long time been a focus on
deictic uses of complex demonstratives, i.e. on uses where they refer to a contextually salient
individual and where their utterance is accompanied by a pointing gesture in the direction of
that individual, as in (4), which is assumed to be uttered in the presence of a dog pointed at
by the speaker.

(4)   That dog is really smart!

Kaplan (1989) assumes both simplex demonstratives such as *this* and *that* occurring on their
own and complex demonstratives to be directly referential terms whose reference is fixed in
the utterance situation by the speaker's demonstration (which can, but need not be a pointing
gesture; all that is required is that the individual referred to is the focus of the addressee's
attention at the utterance time). On this view, simplex and complex demonstratives only

differ insofar as in the case of complex demonstratives, reference is only established if the individual being demonstrated satisfies the predicate denoted by the NP-complement of the demonstrative determiner (see Braun, 2008 for discussion). Crucially, complex demonstratives are assumed to be fundamentally different from definite descriptions since the reference of definite descriptions is not fixed by the utterance situation. Rather, they refer to the unique individual satisfying the predicated denoted by the NP-complement of the definite determiner (if there is such an individual), where uniqueness is potentially relativized with respect to a situation rather than a possible world.

To see the difference, consider the sentences in (5a) and (5b), uttered in a situation where it is known to both speaker and hearer(s) that (a) Martina is from Cologne and Frederik is from Wuppertal, (b) both Martina and Frederik are sitting on a chair in front of the speaker and (c) the speaker is pointing at Martina while uttering the respective sentence.

(5)   a. If Martina and Frederik had changed places, then the person being pointing at would be from Wuppertal
        b. If Martina and Frederik had changed places, then this person being pointed at would be from Wuppertal.

The sentence in (5a) is clearly true in such a situation. Assuming counterfactual conditionals to express universal quantification over possible worlds where the antecedent proposition is true and that are otherwise as similar as possible to the world of evaluation (Lewis, 1973), the definite description in (5a) denotes in each world quantified over the unique individual being pointed at by the speaker in that world, which is Frederik. Since Frederik is from Wuppertal in the world of evaluation, he continues to be so in the worlds quantified over, and the sentence is consequently true. Concerning the complex demonstrative in (5b), in contrast, its reference is fixed once and for all by the speaker's demonstration in the utterance situation. Consequently, the counterfactual worlds quantified over do not contain the unique individual satisfying the property of being a person pointed at by the speaker in that world. Rather, they contain the individual that the speaker points at in the utterance situation, which is Martina. Since Martina is from Cologne and continues to be so in the worlds quantified over since there is no reason to assume that changing places with Frederik changes her birthplace, (5b) is false.

2.2 Non-deictic uses of complex demonstratives

Various researchers have pointed out that there are numerous uses of complex demonstratives where they are clearly neither deictic nor directly referential (Gundel et al., 1993; King, 2001; Roberts, 2002; Wolter, 2006; Elbourne, 2008; Nowak, 2014). On many of these uses, they behave more or less analogously to definite descriptions. Consider the sentences in (6a) and (6b) first (from King, 2001), which are both assumed to be uttered in a situation where the speaker does not have any particular person in mind that she intends to refer to, but rather believes on purely general grounds that there is exactly one student who satisfies the predicate denoted by the NP-complement of the respective determiner. In such a situation, it does not seem to make much of a difference whether the speaker uses the demonstrative

determiner *that* or the definite determiner, the only potential difference being that the demonstrative determiner is more emphatic.

(6)   a. That student who scored one hundred on the exam is a genius.
        b. The student who scored one hundred on the exam is a genius.

Similarly, not only the definite description in (7b), but also the complex demonstrative in (7a) receives a bound variable-like interpretation along the lines of the paraphrase in (7c).

(7)   a. Mary talked to no senator without declaring afterwards that that senator would cosponsor her bill.
        b. Mary talked to no senator without declaring afterwards that the senator would cosponsor her bill.
        c. No senator x is such that Mary would talk to x without declaring afterwards that x would cosponsor her bill.

Abbott (2002) observes that for donkey sentences like (8a) and (9a), where a pronoun picks up a discourse referent introduced by an indefinite DP that does not c-command it, replacing the pronoun by a complex demonstrative (as in (8b) and (9b)) sounds more natural than replacing it by a definite description (as in (8c) and (9c)).

(8)   a. Last night, I saw a dog in front of my house. It looked really hungry.
        b. Last night I saw a dog in front of my house. That dog looked really hungry.
        c. Last night, I saw a dog in front of my house. The dog looked really hungry.

(9)   a. When I see a dog in front of my house at night, it usually looks really hungry.
        b. When I see a dog in front of my house at night, that dog usually looks really hungry.
        c. When I see a dog in front of my house at night, the dog usually looks really hungry.

2.3 Unified accounts of complex demonstratives

While Braun (2008) assumes the demonstrative determiner to be lexically ambiguous between a directly referential interpretation along the lines of Kaplan (1989) and an interpretation on which it is a (potentially more emphatic) version of the definite determiner, King (2001), Roberts (2002) and Elbourne (2008) all argue for a unified account of all uses of complex demonstratives (see also Wolter, 2006 for a related approach).

2.3.1 Complex demonstratives as definites with an additional predicate variable: The analyses of King (2001) and Elbourne (2008)

Although they are technically quite different, the analyses of King (2001) and Elbourne (2008) are similar insofar as they both treat demonstrative determiners to be essentially a variant of the definite determiner: While a definite description denotes the unique individual that satisfies the predicated denoted by its NP-complement, a complex demonstrative denotes

the unique individual that satisfies both the predicate denoted by the NP-complement of the demonstrative determiner and some additional, contextually determined property that is given in the form of a free predicate variable. Additionally, Elbourne (2008) assumes the demonstrative determiner *this* to require the individual denoted by the complex demonstrative to be proximal to the speaker, while the demonstrative determiner *that* requires it to be distal. Since the difference between *this* and *that* plays no role for the data discussed in this paper, I will set it aside.

In a case like (4), where the speaker intends to refer to a perceptually salient individual and the use of the complex demonstrative is accompanied by a pointing gesture in the direction of that individual, the free predicate variable is assumed to be resolved to the property of being identical to the individual that the speaker intends to refer to. Assuming that the dog being pointed at by the speaker is Rover, the sentence in (4) is thus interpreted as shown in (10) in simplified form.

(10) $\text{smart}(\iota x.\ \text{dog}(x) \wedge \text{identical\_to}(\text{Rover}, x))$

In a case like (6a), in contrast, the free predicate variable is assumed to be resolved to some trivial property like existing, which in effect causes the complex demonstrative to have the same denotation as the definite description in (6b). King (2001) does not provide a detailed analysis of bound variable-like interpretations of complex demonstratives as in (7a), but the mechanism proposed by Elbourne (2008) can be implemented in King's (2001) framework as well: The free predicate variable is resolved to the property of being identical to (the value of) the variable bound by the respective quantifier. The sentence in (6a) is thus interpreted as paraphrased in (11).

(11)   For no senator *x*: Mary talked to *x* without declaring afterwards that the unique *y* which is both a senator and identical to *x* cosponsored her bill.

Donkey sentences with complex demonstratives are not discussed by King (2001), but only by Elbourne (2008), who assumes them to be interpreted in essentially the same way in which he assumes donkey sentences with pronouns (which he takes to be definite descriptions with covert NPs) and definite descriptions to be interpreted (Elbourne, 2001; Elbourne, 2005; Elbourne, 2013): There is no direct binding relation between the indefinite DP and the pronoun, definite description or complex demonstrative. Rather, the latter end up denoting the discourse referents introduced by the former as an indirect effect of the binding of a situation variable. Following Kratzer (1989), Elbourne (2001; 2005; 2008; 2013) assumes all predicates (i.e. nominal as well as verbal and adjectival ones) to take additional situation arguments.

In sentences like (9a-c) with overt quantificational adverbs such as *always* and *usually* or in generic sentences, which are assumed to contain a covert generic quantifier with quasi-universal force, those situation arguments are turned into bound variables. Consequently, the sentences express quantification over minimal situations satisfying the respective restrictor and nucleus predicates, where situations are minimal with respect to a situation predicate if they contain nothing more than what is required to satisfy that predicate. Now, the quantificational adverb binds the situation variable of the indefinite in the restrictor as well as

the situation variable of the pronoun, definite description or complex demonstrative in the nucleus. Consequently, since the situations quantified over are minimal with respect to the restrictor and nucleus predicates, the individual denoted by the pronoun, definite description or complex demonstrative in each situation ends up being identical to the individual introduced by the indefinite. The sentences in (9a-c) are thus (roughly) interpreted as paraphrased in (12).

(12)   Most situations s which are minimal situations of there being a dog x such that the speaker sees x in front of his house at night are such that there is a situation s' which is a minimal extension of s such that the unique y which is a dog in s' looks hungry in s'.

Episodic sentences are assumed to contain covert existential quantifiers over minimal situations. For cases like (8a-c), the situation introduced by the covert existential quantifier in the second sentence is automatically understood as an extension of the situation introduced by the first sentence. Consequently, we arrive at the interpretation paraphrased in (13), which ensures that the pronoun, definite description or complex demonstrative in the second sentence ends up denoting the same individual as the one introduced by the indefinite in the first sentence.

(13)   There is a minimal situation s of there being a dog x in front of the speaker's house such that the speaker sees x in s, and there is a minimal extension s' of s such that the unique z which is a dog in s' looks hungry in s'.

Since King (2001), like Elbourne (2008), assumes non-deictic uses of complex demonstratives to be essentially equivalent to definite descriptions, he could either modify his framework along the lines of Elbourne (2008) in order to account for donkey uses of complex demonstratives, or adopt a strategy similar to the one that has originally been proposed for donkey pronouns (Evans, 1977; Cooper, 1979; Heim, 1990): The free predicate variable would then be resolved in such a way that it ends up denoting the same individuals as those introduced by the respective indefinite.

2.3.2 Complex demonstratives as definites presupposing speaker demonstrations: The analysis of Roberts (2001)

In contrast to King (2001) and Elbourne (2008), Roberts (2002) assumes demonstratives to differ from definite descriptions in a fundamental respect: On all their uses, they presuppose a speaker demonstration. For deictic uses, the demonstration is a concrete pointing gesture in physical space, and the demonstratum is an individual present in the utterance situation. For anaphoric or bound uses, in contrast, the demonstration is an abstract demonstration in discourse, and the demonstratum is a previously uttered DP that introduces or picks up the same discourse referent as the one denoted by the complex demonstrative.

Robert's (2002) analysis is couched in a dynamic framework along the lines of Heim's (1982) context change semantics. Going into the technical details would take us too far afield, but the basic idea is that all utterances are interpreted in a context C which is

conceived of as an ordered pair consisting of a domain and a satisfaction set. The domain of C, Dom_C, is the set of familiar discourse referents, and the satisfaction set of C, Sat_C, is the shared information of speaker and addressee(s) about the discourse referents – a set of world-assignment pairs $<w,g>$ such that for all discourse referents $i \in Dom_C$, the individual assigned to i by g verifies in w all the information the interlocuters share about i. The meaning of an utterance is now conceived of as its context change potential, i.e. the information it potentially adds to a context C in which it is uttered. While indefinites introduce novel discourse referents, definites presuppose the existence of a unique discourse referent $i \in Dom_C$ such that for all $<w,g> \in Sat_C$, $g(i)$ satisfies the (possibly liberalized) descriptive content of the NP in w. Note that in Robert's (2002) system, uniqueness is relaxed in two ways: First, insofar as only informational uniqueness is required, i.e. it is not required that there is a unique entity satisfying the respective predicate in the actual world, but only that there is a unique such entity in the common ground (Stalnaker, 1978; 2002) of speaker and addressee(s). Second, insofar as the referent of the definite description does not necessarily have to be (informationally) unique in satisfying the *actual* descriptive content of the NP, but only its *liberalized* descriptive content, i.e. the predicate denoted by the overt NP in combination with other predicates that the referent of the definite description is contextually entailed to satisfy.

The presuppositions of complex demonstratives subsume those of definites, with an additional presupposition added: They presuppose that there is a demonstration δ of the speaker in C such that either the demonstratum of δ (in case δ is pointing gesture in physical space) or the discourse referent associated with the demonstratum in δ (in case δ is a pointing gesture in discourse space and the demonstratum of δ is a previously uttered DP) is the unique discourse referent $i \in Dom_C$ such that for all $<w,g> \in Sat_C$, $g(i)$ satisfies the (possibly liberalized) content of the NP-complement of the demonstrative determiner in w.

For deictic uses, the presuppositions of the complex demonstrative are satisfied if the utterance of the complex demonstrative is accompanied by a pointing gesture to an individual that is present in the utterance situation, and if that individual is the unique familiar entity satisfying the (possibly liberalized) descriptive content of the complex demonstrative. In the case of (4), repeated here as (14), the presuppositions of the complex demonstrative *that dog* are satisfied if (a) the speaker points at an individual while uttering the complex demonstrative and (b) the individual she points at is the unique entity in the common ground of speaker and addressee(s) that satisfies the (in that case quite likely liberalized) descriptive content of the noun *dog*.

(14)   That dog is really smart!

For donkey uses such as (8b), repeated here as (15), the presuppositions of the complex demonstrative are satisfied if (a) there is an abstract speaker demonstration in discourse to a DP and (b) the discourse referent introduced by that DP is the unique familiar entity satisfying the (possibly liberalized) descriptive content of the complex demonstrative. In the case of (8b)/(15), the presuppositions of the complex demonstrative *that dog* are thus satisfied in any context in which the two sentences are uttered, since there is a DP in the preceding sentence that the speaker can plausibly be assumed to have demonstrated, namely the indefinite *a dog*, and the discourse referent introduced by that DP is the unique familiar

entity satisfying the liberalized descriptive content of the noun *dog*, i.e. a predicate such as *dog seen by the speaker last night in front of his house*.

(15)   Last night, I saw a dog in front of my house. That dog looked really hungry.

Roberts (2002) explicitly cites examples with complex demonstratives bound by quantificational DPs as counterarguments against the assumption that complex demonstratives are necessarily directly referential. It is not quite clear to me how she accounts for such cases as well as for donkey sentences with quantificational adverbs, since in both cases there is no single discourse referent introduced by the demonstrated DP, but rather a multiplicity. Since my own analysis, which is presented in Section 4, builds on Roberts (2002) but implements her idea in a different framework, I will not speculate on how sentences with complex demonstratives that are directly or indirectly bound by (nominal or adverbial) quantifiers can be accounted for in Roberts (2002) system.

3. The pattern to be accounted for

Consider again the contrast between (1a), repeated here as (16a), on the one hand, and (2b) and (2c), repeated here as (16b) and (16c), on the other. While it is entirely natural to pick up the discourse referents introduced by the two indefinites in the first sentence by definite descriptions in the second sentence, picking them up by complex demonstratives is infelicitous. The order in which the discourse referents are picked up does not matter, i.e. whether the last mentioned one is picked up by the first or by the second complex demonstrative does not have any influence on the felicity of the resulting text segment.

(16)   a. Last night, a dog chased a cat in front of my house. Fortunately, [the CAT] was
           pretty fast, while [the DOG] was rather slow.
           b. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that CAT] was
           pretty fast, while [that DOG] was rather slow.
           c. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that DOG] was
           pretty slow, while [that CAT] was pretty fast.

As shown by (17), it also does not help when the last mentioned discourse referent is picked up by a complex demonstrative headed by *this*, while the first mentioned one is picked up by a demonstrative headed by *that*.

(17)   Last night, a dog chased a cat in front of my house. [??]Fortunately, [this CAT] was
           pretty fast, while [that DOG] was rather slow.

At the same time, the felicity of (2a-d), repeated here as (18a-d), shows that whenever only one of the two discourse referents is picked up by a complex demonstrative, the resulting text segment is felicitous, irrespective of whether it is the first or the second one, and irrespective of whether the other discourse referent is not picked up at all, or picked up by a definite description.

(18)   a. Last night, a dog chased a cat in front of my house. Fortunately, [that CAT] was pretty fast.
b. Last night, a dog chased a cat in front of my house. Fortunately, [that DOG] was pretty slow.
c. Last night, a dog chased a cat in front of my house. Fortunately, [that CAT] was pretty fast, while [the DOG] was rather slow
d. Last night, a dog chased a cat in front of my house. Fortunately, [that DOG] was rather slow, while [the CAT] was pretty fast.

The same pattern holds in German, as evidenced by the results of an acceptability study in the form of a yes/no-judgement task in which participants (36 students from the University of Cologne) were presented one of the four variants of 38 short texts consisting of two sentences like those in (19), interspersed with the same amount of fillers. Participants were instructed that these were beginnings of stories produced by advanced German learners and their task was to judge whether the students had reached German native proficiency (by responding "yes, they have" or "no, they haven't").

(19)   Im Zoo hat gestern ein Schimpanse einen Zoowärter angespuckt.
In the zoo, a chimpanzee spit at a zoo keeper yesterday.
    a.   Dann hat der Schimpanse den Zoowärter auch noch angegriffen.
        Then the chimpanzee also attacked the zoo keeper.
    b.   Dann hat der Schimpanse diesen Zoowärter auch noch angegriffen.
        Then the chimpanzee also attacked that zoo keeper.
    c.   Dann hat dieser Schimpanse den Zoowärter auch noch angegriffen.
        Then that chimpanzee also attacked the zoo keeper.
    d.   Dann hat dieser Schimpanse diesen Zoowärter auch noch angegriffen.
        Then that chimpanzee also attacked that zoo keeper.

As shown in Figure 1, the condition with the two complex demonstratives (light grey column on the left) was rated as native significantly less often than the other three conditions. At the same time, there were no significant differences between the other conditions.

Unsurprisingly, the pattern exemplified by (16a-c) and (19a-d) also obtains in donkey sentences with quantificational adverbs, as shown by (20a-e).

(20)   a. When a dog chases a cat in front of my house, [the CAT] is usually pretty fast, while [the DOG] is rather slow.
b. [??]When a dog chases a cat in front of my house, [that CAT] is usually pretty fast, while [that DOG] is rather slow.
c. [??]When a dog chases a cat in front of my house, [that DOG] is usually rather slow, while [that CAT] is pretty fast.
d. When a dog chases a cat in front of my house, [that DOG] is usually rather slow, while [the CAT] is pretty fast.
e. When a dog chases a cat in front of my house, [that CAT] is usually pretty fast, while [the CAT] is pretty fast.
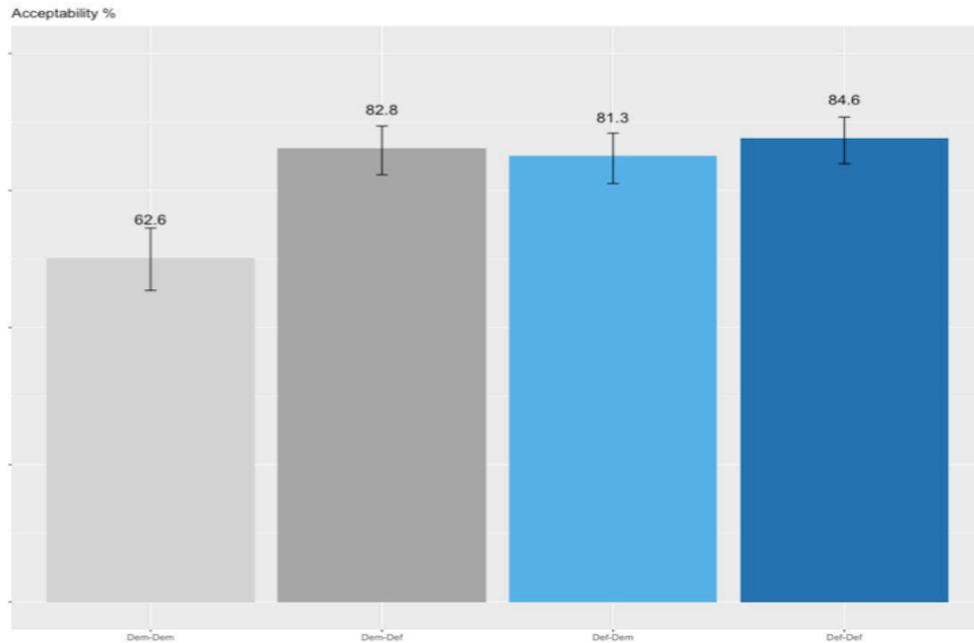
Figure 1. Response proportions for the respective conditions, where *Dem-Dem* is the condition with two complex demonstratives (as in (19d)), *Dem-Def* the condition with a complex demonstrative followed by a definite description (as in (19c), *Def-Dem* the condition with a definite description followed by a complex demonstrative (as in (19b) and *Def-Def* the condition with two definite descriptions (as in (19a)).

Consider next the sentences in (21a-c). In the case of (21a), (21c) and (21d), co-varying interpretations are easily available for both demonstratives, while (21b) is rather infelicitous.

(21)   a. Mary gave no child a cookie before [the child] had thanked her for [the cookie].
        b. [??]Mary gave no child a cookie before [that child] had thanked her for [that cookie].
        c. Mary gave no child a cookie before [that child] had thanked her for [the cookie].
        d. Mary gave no child a cookie before [the child] had thanked her for [that cookie].

Crucially, in order for the definite description *the child* or the complex demonstrative *that child* to receive bound variable-like interpretations, the negative quantifier *no child* has to c-command them, i.e. we have to assume that *no child* c-commands the adjunction site of the *before*-clause. Since the pattern in (21a-d) is the same pattern that we have observed in cases where there is no c-command relation between the complex demonstratives and their antecedents, I conclude that linear precedence is the crucial notion and c-command plays no role: The co-occurrence of two complex demonstratives that are anaphorically related to or bound by DPs linearly preceding them leads to infelicity.

Finally, both (3a) and (3b), repeated here as (22a) and (22b), are felicitous when the utterance of the respective complex demonstrative is accompanied by a pointing gesture in the direction of a perceptually salient individual of the right kind. This shows that the infelicity of sentences with two anaphoric or bound complex demonstratives is neither due to a general

constraint against the occurrence of more than one demonstrative in a sentence, nor a constraint that prevents demonstratives with contrasting NPs from co-occurring.

(22)   a. [THAT dog] is smarter than [THAT dog].
       b. [That DOG] is smarter than [that CAT].

Let us now turn to the question of whether the pattern under consideration can be accounted for by any of the analyses that we have discussed in Section 2.

Let us start with the analyses proposed by King (2001) and Elbourne (2008). As already said in Section 2, both King (2001) and Elbourne (2008) assume complex demonstratives to only differ from definite descriptions insofar as they introduce an additional covert predicate variable that needs to be resolved on the basis of contextual information. The presence of that variable enables complex demonstratives to receive deictic interpretations on which they are directly referential, since the variable is then resolved to the property of being identical to the entity demonstrated by the speaker in the utterance situation. On all other uses, however, complex demonstratives are predicted to behave in the same way as definite descriptions. Consequently, there should be no contrast between sentences with two definite descriptions picking up discourse referents introduced in the previous sentence and sentences with two complex demonstratives.

Now, it might at first sight be tempting to try to account for the infelicity of sentences with two anaphoric complex demonstratives by combining a semantic analysis of complex demonstratives along the lines of King (2001) and Elbourne (2008) with a pragmatic account based on the following idea: Complex demonstratives are more marked than definite descriptions in virtue of being not only morphologically, but also semantically more complex (due to the additional predicate variable), just like so-called demonstrative pronouns of the *der*/*die*/*das*-variety are more marked than the personal pronouns *er*/*sie*/*es* ('he'/'she'/'it') in German and thus have a more limited distribution (Patel-Grosz and Grosz, 2017). More specifically, it is well-known that demonstrative pronouns (DemPros) have a strong tendency to pick up less prominent antecedents, where prominence has been defined in terms of subjecthood (Bosch et al., 2003), topicality (Bosch and Umbach, 2007; Hinterwimmer 2015), proto-agentivity (Schumacher et al., 2016, 2017) and perspective-taking (Hinterwimmer and Bosch, 2016, to appear). Concerning the sentence in (23), for example, there is a strong tendency to interpret the demonstrative as picking up the donkey introduced by the indefinite, although it is rather implausible that a donkey is wealthy. This is expected, since (the proper name referring to) Peter is more prominent in virtue of being the subject, the topic (by default) and the proto-agent (Dowty, 1991).

(23)   Peter besitzt einen Esel.   Der   ist
       Peter owns   a-ACC donkey   DemPro-MASC-NOM-SING   is
       ziemlich   wohlhabend.
       rather   wealthy
       'Peter owns a donkey. It is rather wealthy.'

Applying a similar reasoning to definite descriptions and complex demonstratives, one could now argue that in virtue of being more marked, complex demonstratives have a strong

tendency to pick up less prominent antecedents. Consequently, whenever one of two previously introduced discourse referents is picked up by a complex demonstrative, the corresponding discourse referent is automatically signaled to be taken as less prominent by the speaker than the other discourse referent. But then picking up the other discourse referent by a complex demonstrative as well becomes awkward, since that discourse referent is thereby signaled to be taken as less prominent by the speaker than the one picked up by the first complex demonstrative, which is of course contradictory.

Concerning sentences with two deictically used complex demonstratives such as (3a)/(22a) and (3b)/(22b), in contrast, that reasoning does not apply since there is an independent reason to choose complex demonstratives instead of definite descriptions – namely to arrive at a directly referential interpretation via resolving the free predicate carriable to the property of being identical to the demonstrated entity. It is only on their non-deictic uses, where complex demonstratives are predicted to be semantically equivalent to definite descriptions by King (2001) and Elbourne (2008), that we expect them to compete with definite descriptions.

Attractive as such a reasoning might seem at first, it faces a serious problem. Whenever only one of the two previously discourse referents is picked up by a complex demonstrative and the other by a definite description, we would expect there to be a contrast in acceptability between the two following combinations: Cases where the discourse referent introduced by a subject DP that is at the same time the (proto-)agent is picked up by a definite description, and the one introduced by an object DP that is at the same time the patient or theme is picked up by a complex demonstrative should be more felicitous than cases where it is the other way around. Consequently, text segments such as (18c) and (19b), repeated here as (24a) and (25a), respectively, should be more felicitous than text segments such as (18d) and (19c), repeated here as (24b) and (25b), respectively. The reason is that subjecthood and (proto-)agentivity should at least make discourse referents maximally prominent by default, i.e. in the absence of contextual information promoting other discourse referents to topics.

(24)   a. Last night, a dog chased a cat in front of my house. Fortunately, [that CAT] was pretty fast, while [the DOG] was rather slow
        b. Last night, a dog chased a cat in front of my house. Fortunately, [that DOG] was rather slow, while [the CAT] was pretty fast.

(25)   Im Zoo hat gestern ein Schimpanse einen Zoowärter angespuckt.
        In the zoo, a chimpanzee spit at a zoo keeper yesterday.
        a. Dann hat der Schimpanse diesen Zoowärter auch noch angegriffen.
        Then the chimpanzee also attacked that zoo keeper.
        b. Dann hat dieser Schimpanse den Zoowärter auch noch angegriffen.
        Then that chimpanzee also attacked the zoo keeper.

This prediction is not borne out, however: Intuitively, there is no contrast in acceptability between (24a) and (25a), on the one hand, and (24b) and (25b), on the other, and for sentences such as (26a) and (26b) this has been confirmed by the experimental evidence reviewed above: The latter were rated as native (almost) as often as the former (see Figure 1). To make things worse, in the case of sentences mixing demonstrative and personal pronouns it does make a difference which one of the two previously introduced discourse referents is

picked up by a personal pronoun and which one by a demonstrative pronoun. To see this, consider the sentences in (26a) and (26b).

(26)   Im Zoo hat gestern ein Schimpanse einen Zoowärter angespuckt.
        In the zoo, a chimpanzee spit at a zoo keeper yesterday.
        a. Dann hat er den auch noch angegriffen.
        Then he also attacked him(DemPro).
        b. Dann hat der ihn auch noch angegriffen.
        Then he(DemPro) also attacked him.
        c. Dann hat der den auch noch angegriffen.
        Then he(DemPro) also attacked him(DemPro).

In the case of (26a), the personal pronoun is automatically interpreted as picking up the zoo keeper, resulting in a coherent interpretation. The sentence in (26b), in contrast, is incoherent. The demonstrative pronoun can only be interpreted as picking up the zoo keeper, and the personal pronoun as picking up the chimpanzee. Such an interpretation clashes with the presupposition of *auch noch*, ('also'), however, which requires there to be another contextually salient action by the zoo keeper, not by the chimpanzee. Demonstrative pronouns, in contrast to complex demonstratives, thus behave as predicted by a pragmatic account based on markedness. Finally, according to my (native speaker's) intuitions, the sentence in (26c) with two demonstrative pronouns is coherent (with the subject pronoun picking up the chimpanzee, and the object pronoun picking up the zoo keeper) and slightly marked, but far more felicitous than the sentences with two complex demonstratives in (16b-c) and (19d). This is as predicted: Since violating the preference of demonstrative pronouns for less prominent antecedents once cannot be avoided anyway, the hearer is free to resolve the demonstrative pronoun in such a way that a coherent interpretation results. At the same time, the violation of a pragmatically derived constraint results in (slight) markedness, but does not make the sentence completely infelicitous. The infelicity of the sentences in (16b-c) and (19d), in contrast, suggest that a semantic instead of a pragmatic constraint is violated.

Let us now turn to the analysis proposed by Roberts (2002), according to which complex demonstratives on their anaphoric uses presuppose abstract demonstrations in discourse by the speaker such that the discourse referents introduced by the demonstrated DPs are the unique familiar discourse referents satisfying the (possibly liberalized) descriptive content of those DPs. As it stands, the analysis does not predict the infelicity of sentences with two complex demonstratives picking up discourse referents introduced in the previous sentence. Let us consider the text segment in (16b), for instance, repeated here as (27).

(27)   Last night, a dog chased a cat in front of my house. [??]Fortunately, [that CAT] was pretty fast, while [that DOG] was rather slow.

The complex demonstratives *that cat* presupposes an abstract demonstration in discourse such that the demonstrated DP introduces a discourse referent that is the unique familiar discourse referent satisfying the (quite likely liberalized) descriptive content of the complex demonstrative. Now, the previous sentence contains a DP that can plausibly be assumed to be demonstrated by the speaker, namely the indefinite DP *a cat*. That DP introduces a discourse referent that by the time at which the complex demonstrative is interpreted is the unique

familiar discourse referent satisfying the predicate *cat chased by a dog in front of the speaker's house* (assuming that predicate to be the liberalized semantic content of the complex demonstrative). Concerning the complex demonstrative *that dog*, the same reasoning applies. Again, the previous sentence contains a DP that can plausibly be assumed to be demonstrated by the speaker, namely the indefinite DP *a dog*. Since that DP introduces a discourse referent that by the time at which the complex demonstrative is interpreted is the unique familiar discourse referent satisfying the predicate *dog that chased a cat in front of the speaker's house last night* (assuming that predicate to be the liberalized semantic content of the complex demonstrative), all presuppositions are satisfied and the sentence is accordingly predicted to be felicitous.

We have just seen that as it stands, the analysis of complex demonstratives proposed by Roberts (2002) does not predict sentences with two anaphoric complex demonstratives to be infelicitous. In Section 4 I will show, however, that by combining the basic idea behind that approach with a simple general principle we arrive at an analysis that makes the right predictions.

4. The Analysis

As we have seen in the previous sections, the generalization we want to account for is that two (or more) complex demonstratives are not allowed to co-occur in a sentence if they are anaphorically related to DPs in the preceding sentence. I propose to capture this generalization by combining Robert's (2002) assumption that demonstratives on all their uses presuppose (concrete or abstract) demonstrations with the assumption that the trajectories of such demonstrations may not overlap.

Let us assume that the utterance of a sentence in a conversation not only causes the introduction of discourse referents for the entities talked about in that sentence, and for the proposition it denotes, but also for the sentence itself and all of its constituents. Likewise, for sequences of sentences uttered in a discourse, discourse referents for the corresponding text segments are introduced. Crucially, discourse referents for sentences and text segments contain information concerning the linear sequence of their constituents. Demonstrations in discourse therefore occur in a discourse space set up by those linear sequences, and the trajectories of demonstrations in discourse connect the position of a demonstrative in the currently uttered sequence with the position of some DP in a previously uttered sequence. The trajectories of demonstrations in discourse therefore necessarily overlap whenever there is more than one demonstrative anaphorically related to a DP in a previous sentence. Concerning concrete demonstrations in three-dimensional space, in contrast, it is (almost) never the case that their trajectories necessarily have to be construed as overlapping – even in cases of seemingly crossing trajectories, one trajectory can always be construed as been placed slightly above or below the other one.

Consider again the text segments in (16b)/(27) and (16c), repeated here as (28a) and (29a), respectively. In (28b) and (29b), schematic representations of the demonstrations presupposed by the complex demonstratives in the second sentence are given, with the arrows visualizing the trajectories of the demonstrations.

(28) a. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that CAT] was pretty fast, while [that DOG] was rather slow.
b. … a dog … a cat … that cat … that dog …

(29) a. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that DOG] was pretty slow, while [that CAT] was pretty fast.
b. … a dog … a cat … that dog … that cat …

Obviously, in both cases there is no possible demonstration whose trajectory links the position of the first demonstrative in the linear sequence to the position of its demonstratum that does not overlap with the trajectory that links the position of the second demonstrative in the linear sequence to the position of its demonstratum.

In (30) a lexical entry for the demonstrative determiner *that* is given that incorporates the assumptions just outlined. Following Link (1983), I assume the iota-operator to pick out the maximal element of the set it is applied to. For sets of sets of atomic individuals, maximality is only defined if they are singleton sets.

(30) $[[that]]^{C,w,g} = \lambda P_{<e,<s,t>>} . \lambda s . \iota\{x: P(x)(s) \wedge \exists y \in DOM_C \exists \delta_1 \in DOM_C \neg [\exists \delta_2 \in DOM_C \exists z \in DOM_C [Agent(\delta_1)(Author(C)) \wedge Demonstratum(\delta_1)(y) \wedge interpretatively\_dependent\_on(x)(y) \wedge Agent(\delta_2)(Author(C)) \wedge Demonstratum(\delta_2)(z) \wedge z \neq y \wedge overlap(trajectory(\delta_1))(trajectory((\delta_2))]]\}$.

A1. If *y* is a concrete individual in physical space, *x* is interpretatively dependent on *y* iff *x* is identical to *y*.

A2. If *y* is a DP that is contained in a previously uttered sequence, *x* is interpretatively dependent on *y* iff *x* is either identical to the discourse referent introduced by *y* or to (the value of) a variable bound by *y*.

B1. If the demonstratum of a demonstration *δ* is a concrete individual *y* in physical space and the speaker is the agent of *δ*, the trajectory of *δ* connects the location of the speaker in the utterance situation with the location of *y* in the utterance situation.

B2. If the demonstratum of a demonstration *δ* is a DP that is contained in a previously uttered sequence and the speaker is the agent of *δ*, the trajectory of *δ* connects the location of the demonstrative determiner presupposing in the sequence of uttered words with the location of *y* in the previously uttered sequence.

In words: *that* takes a predicate *P* of type *<e,<s,t>>* and a situation *s* as arguments and maps them to the unique *x* such that
(a) *x* satisfies *P* in *s*,
(b) there is a (concrete or abstract) demonstration δ_1 in the domain of *C* whose agent is the speaker and whose demonstratum is a *y* on which *x* is interpretatively dependent,
(c) there is no (concrete or abstract) demonstration δ_1 in the domain of *C* whose agent is the speaker and whose demonstratum is a *z* distinct from *y* such that the trajectories of δ_1 and δ_2 overlap.

Let us now have a look at the felicitous example in (18c), repeated here as (31a), which combines a complex demonstrative and a definite description. The interpretation it receives on the proposed analysis is given in strongly simplified form in (31b). Note that I assume episodic sentences to contain covert existential quantifiers quantifying over minimal situations. Additionally, I assume that in cases of two episodic sentences immediately following each other in a narrative sequence, the situation introduced by the second sentence is automatically interpreted as a (minimal) extension of the first (see section 2.3.1 above). Since existential quantification over a minimal situation s satisfying P and a situation s_1 that is a minimal extension of s satisfying Q is equivalent to existential quantification over a minimal situation satisfying both P and Q, I have simplified the formula accordingly.

(31)   a. Last night, a dog chased a cat in front of my house. Fortunately, [that CAT] was pretty fast, while [the DOG] was rather slow.
b. $\exists s[\min(s, \lambda s'. \exists x \exists y [\text{dog}(x)(s') \land \text{cat}(y)(s') \land \text{chase}(y)(x)(s') \land \text{fast}(\iota\{z: \text{cat}(z)(s')$
$\land \exists z_1 \in \text{DOM}_C \ \exists \delta_1 \in \text{DOM}_C \ \neg[\exists \delta_2 \in \text{DOM}_C \ \exists z_2 \in \text{DOM}_C \ [\text{Agent}(\delta_1)(\text{Author}(C)) \land$
$\text{Demonstratum}(\delta_1)(z_1) \land \text{interpretatively\_dependent\_on}(z)(z_1)$
$\land \text{Agent}(\delta_2)(\text{Author}(C)) \land \text{Demonstratum}(\delta_2)(z_2) \land z_1 \neq z_2$
$\land \text{overlap}(\text{trajectory}(\delta_1))(\text{trajectory}(\delta_2))]]\}) \land \text{slow}(\iota\{z_3: \text{dog}(z_3)(s')\})])]$

First, since the indefinite in the first sentence has introduced a cat, the situation bound by the existential quantifier contains a z that is a cat. Second, it is unproblematic to accommodate a demonstration whose agent is the speaker and whose demonstratum is a discourse referent on which z interpretatively depends–namely the previously uttered DP *a cat.* Third, there is no need to accommodate a second demonstration whose agent is the speaker and whose demonstratum is a familiar discourse referent such that the trajectories of the two demonstrations overlap. The application of the iota-operator therefore yields a defined result, and the text segment in (30a) receives a straightforward interpretation.

Let us now turn to the infelicitous example with two complex demonstratives in (28a), repeated here as (32a), and (29a), repeated here as (33a), and the (strongly simplified) interpretation they would receive on the proposed analysis in (32b) and (33b), respectively.

(32)   a. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that CAT] was pretty fast, while [that DOG] was rather slow.
b. $\exists s[\min(s, \lambda s'. \exists x \exists y [\text{dog}(x)(s') \land \text{cat}(y)(s') \land \text{chase}(y)(x)(s') \land \text{fast}(\iota\{z: \text{cat}(z)(s')$
$\land \exists z_1 \in \text{DOM}_C \ \exists \delta_1 \in \text{DOM}_C \ \neg[\exists \delta_2 \in \text{DOM}_C \ \exists z_2 \in \text{DOM}_C \ [\text{Agent}(\delta_1)(\text{Author}(C))$
$\land \text{Demonstratum}(\delta_1)(z_1) \land \text{interpretatively\_dependent\_on}(z)(z_1)$
$\land \text{Agent}(\delta_2)(\text{Author}(C)) \land \text{Demonstratum}(\delta_2)(z_2) \land z_1 \neq z_2$
$\land \text{overlap}(\text{trajectory}(\delta_1))(\text{trajectory}(\delta_2))]]\}) \land \text{slow}(\iota\{z_3: \text{dog}(z_3)(s') \land \exists z_4 \in \text{DOM}_C$
$\exists \delta_3 \in \text{DOM}_C \ \neg[\exists \delta_4 \in \text{DOM}_C \ \exists z_5 \in \text{DOM}_C \ [\text{Agent}(\delta_3)(\text{Author}(C))$
$\land \text{Demonstratum}(\delta_3)(z_4) \land \text{interpretatively\_dependent\_on}(z_3)(z_4)$
$\land \text{Agent}(\delta_4)(\text{Author}(C)) \land \text{Demonstratum}(\delta_4)(z_5) \land z_4 \neq z_5$
$\land \text{overlap}(\text{trajectory}(\delta_3))(\text{trajectory}(\delta_4))]]\})])]$

(33) a. Last night, a dog chased a cat in front of my house. [??]Fortunately, [that DOG] was pretty slow, while [that CAT] was pretty fast.

b. $\exists s[\min(s, \lambda s'. \exists x \exists y$ [dog(x)(s') $\wedge$ cat(y)(s') $\wedge$ chase(y)(x)(s') $\wedge$ slow($\iota\{z$: dog(z)(s') $\wedge \exists z_1 \in DOM_C \exists \delta_1 \in DOM_C \neg[\exists \delta_2 \in DOM_C \exists z_2 \in DOM_C$ [Agent(δ_1)(Author(C)) $\wedge$ Demonstratum(δ_1)(z$_1$) $\wedge$ interpretatively_dependent_on(z)(z$_1$) $\wedge$ Agent(δ_2)(Author(C)) $\wedge$ Demonstratum(δ_2)(z$_2$) $\wedge z_1 \neq z_2$ $\wedge$ overlap(trajectory(δ_1))(trajectory(δ_2))]]\}) $\wedge$ fast($\iota\{z_3$: cat(z$_3$)(s') $\wedge \exists z_4 \in DOM_C \exists \delta_3 \in DOM_C \neg[\exists \delta_4 \in DOM_C \exists z_5 \in DOM_C$ [Agent(δ_3)(Author(C)) $\wedge$ Demonstratum(δ_3)(z$_4$) $\wedge$ interpretatively_dependent_on(z$_3$)(z$_4$) $\wedge$ Agent(δ_4)(Author(C)) $\wedge$ Demonstratum(δ_4)(z$_5$) $\wedge z_4 \neq z_5$ $\wedge$ overlap(trajectory(δ_3))(trajectory(δ_4))]]\})]])]

Now, the first iota-operator in (32b) yields a defined result for exactly the same reasons as the iota-operator in (31b). For the second iota-operator, however, this is not the case. There is a *z* that is a dog in the situation bound by the existential quantifier and it is unproblematic to accommodate a demonstration δ_3 whose agent is the speaker and whose demonstratum is a familiar discourse referent on which *z* interpretatively depends – namely the previously uttered DP *a dog*. But there is another demonstration δ_4 by the speaker whose demonstratum is a familiar discourse referent such that the trajectories of δ_3 and δ_4 overlap – namely the demonstration whose trajectory connects the position of the complex demonstrative *that cat* and the position of the indefinite DP *a cat* in the linear sequence. Consequently, the application of the second iota-operator does not yield a defined result, and (32b) is not available as an interpretation of the text segment in (32a). Exactly the same reasoning applies to the second iota-operator in (33b), thus accounting for the infelicity of the text segment in (33a).

Let us finally consider the sentence in (22b), repeated here as (34a), and its interpretation in (34b).

(34) a. [That DOG] is smarter than [that CAT].

b. $\exists s[\min(s, \lambda s'.$ smarter_than($\iota\{x$: dog(x)(s') $\wedge \exists y \in DOM_C \exists \delta_1 \in DOM_C \neg[\exists \delta_2 \in DOM_C \exists z \in DOM_C$ [Agent(δ_1)(Author(C)) $\wedge$ Demonstratum(δ_1)(y) $\wedge$ interpretatively_dependent_on(x)(y) $\wedge$ Agent(δ_2)(Author(C)) $\wedge$ Demonstratum(δ_2)(z) $\wedge z \neq y$ $\wedge$ overlap(trajectory(δ_1))(trajectory((δ_2))]]\})($\iota\{x$: cat(x)(s') $\wedge \exists y \in DOM_C \exists \delta_1 \in DOM_C \neg[\exists \delta_2 \in DOM_C \exists z \in DOM_C$ [Agent(δ_1)(Author(C)) $\wedge$ Demonstratum(δ_1)(y) $\wedge$ interpretatively_dependent_on(x)(y) $\wedge$ Agent(δ_2)(Author(C)) $\wedge$ Demonstratum(δ_2)(z) $\wedge z \neq y$ $\wedge$ overlap(trajectory(δ_1))(trajectory((δ_2))]]\})(s'))]

If (34a) is uttered in a situation where both a dog and a cat are present and where the speaker points at the dog and the cat, both iota-operators in (34b) are guaranteed to yield defined results when they are applied to the respective sets since it is never the case that the trajectories of the two demonstrations necessarily overlap. Even in a case where the speaker is standing in the middle of a room, pointing at the cat that is sitting in the right corner in front of her with her left hand and at the dog that is sitting in the left corner in front of her with her right hand, the trajectory of the first demonstration can be construed as slightly below or above the trajectory of the other one, thus avoiding overlap.

5. Conclusion

In this paper I have argued for an analysis of complex demonstratives which builds on Roberts (2002) assumption that demonstratives, not only on their deictic, but also on their anaphoric or bound uses, involve (concrete or abstract) demonstrations. Based on the observation that sentences with two complex demonstratives are infelicitous when the demonstratives are anaphorically related to or bound by linearly preceding DPs, but not when they are used deictically, I have proposed that the demonstrations presupposed by complex demonstratives may not have overlapping trajectories. Finally, by comparing the behavior of complex demonstratives to that of German demonstrative pronouns, I have shown that the proposed analysis is more adequate than a pragmatic prominence-based account.

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