# Witness-loaded and Witness-free Demonstratives

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**Abstract**

According to current theories of demonstratives, both discourse referentially (endophoric) and real-world referentially (exophoric) uses of demonstrative noun phrases (DemNPs) obey the same mode of reference. Based on the clarification potential of DemNPs and on data on bridging and deferred reference it is argued that only exophoric DemNPs allow for the identification of a demonstratum, while endophoric ones do not. Furthermore, the view that discourse reference does not involve a demonstration act is taken and, hence, contrary to standard assumption, the claim is made that both uses follow different modes of reference. In order to maintain a unified analysis of DemNPs, it is argued to spell out their semantics in terms of a grammar-dialog interface, where demonstratives and demonstration acts contribute to processing instructions for reference management. In this system, exophoric DemNPs are modeled as witness-loaded referential expressions, while endophoric DemNPs remain witness-free. A final claim is that the witness gives rise to manifold perceptual classifications, which in turn license indirect reference. The analysis is implemented in *Type Theory with Records* (which provides the notion of a witness) within Ginzburg's dialog framework called *KoS*. The dynamics of demonstratives is captured by a set of rules that govern their processing in dialog.

**Keywords**: demonstratives, demonstration, reference, deferred reference, witnesses, dialog

## 1 Introduction

Demonstrative noun phrases (DemNPs) like *this painting* can be used in two ways: *exophorically* and *endophorically* (the latter can be further distinguished into anaphoric and cataphoric). Depending on this use, demonstratives pick out their referent from one of two sets of referents [Kamp, 2002]. In exophoric (or deictic) uses, the referent is a *real world entity*, as in (1).

(1) This painting [*nodding towards a canvas*] is from Chagall.

In a variety of endophoric (or discourse referential) uses, the referent is selected from the set of *discourse referents* [Karttunen, 1969] introduced by antecedent (resp. "postcedent") expressions from the co-text, for instance:

(2) a. Every father dreads that moment when his eldest child leaves home. [*Quantified in* use, King, 2001, p. 10]

b. Mary talked to no senator$_i$ before that senator$_i$ was lobbied. [*Bound variable* use, Elbourne, 2008, p. 445]

Both uses are clearly separated by the occurrence of a *demonstration act*: a demonstration cannot be associated with an endophoric demonstrative, while it is obligatorily connected to exophoric uses – in fact, only the couple of demonstrative and demonstration constitutes a *complete* (exophoric) *demonstrative* [Kaplan, 1989, p. 527]. This is illustrated in (3) and (4), where the iconographic convention of Carlson [2004, p. 91] is employed who uses the symbol "☛" to stand for any kind of demonstration (a demonstration can be instantiated by many means, including pointing gestures, head nods or some salient feature from the environment, say, an outstanding noise or a sudden appearance – in general, anything that catches or directs attention).

(3) a. This painting [☛] is from Chagall.

b. ?This painting is from Chagall.

The demonstration act in (3-a) indicates an exophoric use of the demonstrative and provides the deictic element required for Kaplanian completeness. If the demonstration is missing, as in (3-b), the recipient is left with an endophoric reading, which fails due to missing co-text in (3-b). Likewise, the referential interpretation of (4-a) is ruled out in virtue of the Kaplanian incompleteness constraint: since no demonstration act triggers an exophoric understanding, only the anaphoric reading where *that donkey* co-varies with its quantificationally bound antecedent, is available.

(4) a. Every farmer who owns a donkey$_i$ beats that donkey$_{i/*\,j\neq i}$.

b. Every farmer who owns a donkey$_i$ beats that[☛] donkey$_{*\,i/j\neq i}$.

The demonstration from (4-b) in turn constrains the interpretation domain for the DemNP to a real world situation containing a real donkey (for an analysis of respective use types of demonstrative *so* and related expressions see König & Umbach in this volume). Now, the anaphoric interpretation is impossible.

Note that there are also rhetoric uses of DemNPs. A simulation of a proper deictic use can induce an "empathetic" effect [Lyons, 1977, p. 677]; the simulative nature of such cases is due to the referent being unknown to the speaker (see Chen [1990] for a collection of uses of English demonstratives):

(5) That student who scored one hundred on the exam is a genius. [*No demonstration no speaker referent* use, King, 2001, p. 3]

We will not be deeply concerned with rhetoric uses here, assuming that they just trigger additional interpretation procedures on top of the canonical uses, procedures that are outside the scope of this chapter. However, rhetoric and descriptive uses contributed to giving up analyzing DemNPs in a directly referential manner in favor of descriptive or quantificational approaches. Accordingly, canonical DemNPs, are assumed to be a species of definite descriptions [see e.g. Roberts, 2002]: they obey the uniqueness constraint of definites plus $X$, where the proposals for $X$ include

- speaker intentions [King, 2001],
- familiarity presuppositions [Roberts, 2003],
- anchoring relations [Asher, 2010],
- contextually fixed relation variables [Elbourne, 2008],
- resource situation anchors [Poesio and Rieser, 2011].

Roughly speaking, the additional impact of demonstratives compared to definites is that they require their referent not only to be unique (relative to a certain situation), but also to be *identifiable* in the utterance context (see Arsenijevic in this volume for (un)identifiability marking in Serbo-Croatian). Since the difference between endophorically and exophorically used DemNPs basically seems to reside only in finding the referent in one of two different kinds of contexts – utterance situation vs. co-text (i.e., discourse markers), respectively – the approaches each propose a unified semantics. For instance, according to the system of Elbourne [2008, p. 430], a DemNP is analyzed according to the following configuration: $[_{\text{DemNP}}\ [[\text{that}\ i]R]\ \text{NP}]$, where $i$ is a contextually given index and $R$ is a contextually salient relation (possibly bridging between $i$ and $[\![\text{NP}]\!]$, the common noun (CN) contribution of the DemNP) – the Nunbergian (1993) deictic and relational elements. The most relevant part of the account of Roberts [2003] for present purposes is the demonstratum condition of her presupposition definition of DemNPs. Its central logical form is as follows: $\text{demonstratum}(w)(g(j), g(S), \delta)$. Here, $\delta$ is a demonstration act, which, depending on discourse or real-world referential use, is an exophoric demonstration act or a so-called *demonstration in discourse*. The speaker is denoted by $g(S)$ and $g(j)$ is the demonstratum, the value of assignment $g$ applied to *discourse referent* $j$ at world $w$ according to the current common ground.

However, in this chapter it is argued that in endophoric uses there is no demonstratum available – that is, there is no $i$ and no $g(j)$ (and neither a demonstration in discourse). Unified approaches, it is diagnosed, unduly conflate real world referents and discourse referents. This is motivated by observing that both uses of DemNPs exhibit a different range of possible *indirect references* (Section 2) and show different clarification potential (Section 3). Furthermore, using terminology from situation semantics and the theory of generalized quantifiers for interpreting $i$ and $g(i)$ as *witnesses*, it is argued that discourse

referential DemNPs are *witness-free*, while real-world referential DemNPs are *witness-loaded* expression. Putting together the functioning of demonstration acts and witness loading, Section 4.1 argues that a unified theory of DemNPs has to build on discourse theory and dialog management. An implementation of this analysis is given in Section 4 in terms of *Type Theory with Records* and the formal dialog theory named *KoS* [Ginzburg, 2012].[1] Finally, given this framework, in Section 5 it is sketched how witness-loaded but not witness-free expressions give rise to indirect reference.

## 2 Bridging Demonstratives and Deferred Reference

Both endophorically and exophorically used demonstratives allow for "indirect reference", that is, the entity referred to is not identical to the referent provided by the context, but just somehow related to it. For endophoric uses, this phenomenon is known as *bridging* [Clark, 1975], for exophoric uses it is known as *deferred reference* [Quine, 1968, Nunberg, 1993]. Interestingly, while deferred reference (or *deference*, for short) seems to be broadly possible, bridging demonstratives are licensed only in specific contrastive configurations [Wolter, 2006]. For instance, one can proceed from a demonstrated painting (the *index* or *demonstratum*) to its painter:

(6) This[☞: *demonstrating a painting*] painter is my favorite one.

However, no such transition is possible with a bridging demonstrative from a mentioned painting, whereas this works with a canonical bridging definite:

(7) In the museum there is a beautiful a painting.

a. ?That painter is my favorite one.

b. That painting is my favorite one.

c. The painter is my favorite one.

While there is a unique painter detectable in context *via* a *necessary role* bridge [Clark, 1975, p. 171], the stronger identifiability requirement seems not to be fulfilled, therefore the bridging definite but not the bridging demonstrative is licensed (this phenomenon is used by Cui (this volume) in order to distinguish a definite from a demonstrative use of the Chinese demonstrative 那, *nà*). However, there is an identifiable painting, the one introduced verbatim in the first sentence, so the painting is a possible (and actually the only) antecedent expression for the DemNP. Let us call this *identification by repetition* of linguistic material.

The stronger identifiable requirement is satisfied if the co-text offers a choice: demonstrative bridging is possible if a contrast is exploited, as is argued by Wolter [2006] by example of the following sentences:

[1] Note that "KoS is not an acronym" [Footnote 1, page 2 Ginzburg, 2012].

(8) a. A car drove by. The horn was honking. Then another car drove by. *That horn* was honking even louder.

b. A car drove by. The horn was honking. Then another car drove by. ?*The horn* was honking even louder.

c. ?A car drove by. *That horn* was honking.

As can be seen in (8-b), however, the uniqueness requirement is not fulfilled (there are two horns involved in the described situation), which precludes the use of the definite. According to Wolter [2006], the bridging demonstrative is licensed due to a *shift of the resource situation* associated with the DemNP. In the example, the shifted salient situation is a sub-situation of the described one, namely the sub-situation containing only the second car, and its respective horn. This analysis matches nicely with the conclusions drawn by Bosch [2012], who argues, partly based on the topic avoidance of demonstrative pronouns in German [Bosch and Umbach, 2007], that demonstrations "mark a shift in focus" (see also Hinterwimmer in this volume).

A shift in focus is also involved in deference. A demonstration act directs the attention of the interlocutors towards a perceptible situation. For instance, an "exophoric configuration" for the one in (8-c) allows deferring from a perceptually accessible car to its honk:

(9) [Context: *A car is driving by.*] *That[☛] horn* is honking.

This also works for the contrastive set of two cars:

(10) [Context: *Two cars are driving by.*] *That[☛] horn* is honking.

That is, while bridging demonstratives involve a shift within a contrastive context (where identifiability is ensured by eliminating the contrast and leaving just one option), deferred reference involves a shift of the focus of attention of the interlocutors.

At first glance, these examples suggest that bridging respectively deference is just a shortcut construction for something like *the X of that Y*, where *X* is the inferred referent and *Y* the demonstratum [see also Clark, 1975, Nunberg, 1993, Elbourne, 2008]. Rephrasing the examples along the line of this pattern obeys the canonical uniqueness and identifiability constraints of definites and demonstratives:

(11) a. A car drove by. The engine stuttered. Then another car drove by. The engine of that/?the car stuttered, too.

b. A car drove by. The engine of that/the car stuttered.

c. [Context: *A car is driving by.*] The engine of that[☛] car stutters.

However, as illustrated in (11-b), if the bridge is explicated the demonstrative is allowed even without contrast. The reason is that there is now an antecedent expression available of which the CN of the DemNP is a replication (identification by repetition, see above).

Furthermore, bridging demonstratives obey a sequentiality constraint: the bridging demonstrative can only relate to the last-mentioned discourse referent. On the contrary, demonstratives in deferred reference can pick out any car in any order (given that all three cars are perceptually accessible during the time of demonstrative reference).

(12) a. A car drove by. The engine stuttered. Then another car drove by. That engine stuttered, too. Then, yet another car drove by. That engine stuttered, too.

b. [Context: *Three cars are driving by.*] The engine of that[☛] car stutters. The engine of that[☛] car stutters, too. The engine of that[☛] car stutters, too.

It follows from (12-a) that contrast is not restricted to pairs of discourse referents. Rather, the discourse referents of a contrast set seem to be organized as a *sequence* or a *partially ordered set*, where the most recently introduced one precedes all previous ones.

The elements of the contrast set as well as the inferred referents furthermore have to be of the same or at least of a related type. This *semantic parallelism* constraint is illustrated in (13) and (14). Firstly, bridging is licensed only if the bridging demonstrative takes up the previous canonically licensed bridge:

(13) a. A car drove by. The engine stuttered. Then another car drove by. *That engine* stuttered, too.

b. A car drove by. The engine stuttered. Then another car drove by. ? *That horn* was honking.

Secondly, the inferential bases (i.e., discourse referents) have to be sufficiently similar even in case of an uptake of the canonical bridge:

(14) a. A car drove by. The horn was honking. Then a gnu walked by. ? *That horn* was scuffed.

b. A car drove by. The horn was honking. Then a motorbike drove by. That horn was honking, too.

Deferences, on the other hand, do not underlie semantic parallelism:

(15) a. [Context: *A car is driving by.*] *That[☛] engine* stutters.

b. [Context: *Another car is driving by.*] *That[☛] horn* is honking.

(16) a. [Context: *A car is driving by.*] *That[☛] horn is honking.*

b. [Context: *Then a gnu is walking by.*] *That[☛] horn* is scuffed.

These data suggest that bridging demonstratives must piggy-back on a preceding bridging definite; they require a highly specific co-text in order to be licensed. The shift in focus then boils down to a co-text look-up: a matching expression regimented by

identification by replication is retrieved from previous constituents. Thus, as Klaus von Heusinger[2] rightly argues, what Wolter [2006] interprets as bridging demonstrative is a use of a DemNP that picks up a description of the form *the X of that Y*, where *X* and *Y* are taken from co-text, that is, an E-type DemNP. Seen from this perspective, the specific contrast configuration presumably allows for accommodation of the required bridge by copying it, licensed by structural parallelism. This includes the fact that there is no simple translation between the perceptual information of real world referents and descriptive conditions of discourse referents – they are not on a par wrt. inferential reference, as attested in examples (13) to (16). The explanation proposed here is, basically, to ascribe the difference between bridging demonstratives and deferred reference to different notions of identifiability: discourse referents are distinguished numerically (i.e., by sameness of descriptions), real world referents are distinguished perceptually and allow for a plurality of classifications. This difference has repercussions on the respective *clarification potential* of demonstratives, which is examined in Section 3.

Note finally that there are certain couples of nouns that at first glance allow for indirect reference, namely hyponyms and their hypernyms:

(17) Chagall walks his/a/the poodle. This/That dog wants to go out every hour.

There is an asymmetry in the inferring direction, however: while one can proceed from hyponyms to hypernyms (as in (17)), the reverse is not permitted:

(18) ?Chagall walks his/a/the dog. This/That poodle needs to go out every hour.

However, since in (17) both the DemNPs pick out the discourse referent introduced by the antecedent NP and inherit its semantic value, no deferring is involved at all. This asymmetry can be explained by a variant of *inclusiveness* [Hawkins, 1978]: while all poodles are dogs, not all dogs are poodles (i.e., the set theoretical relation between the extension of the hyponymically related predicates). In a similar way, if we point at Chagall's pet, we can refer to it with both "this/that dog" and "this/that poodle" and neither is interpreted as involving deference.

*Caveat:* The example in (17), however, illustrates that the *identification by repetition* rule introduced above is too simplistic when repetition is understood as mere replication of linguistic form. Following the analysis of (17), repetition has to include at least sense relations. Furthermore, also implicitly saturated argument roles of verbs can give rise to identifiability in co-text, as illustrated in (19), taken from Gundel et al. [2000], quoted after Cui (this volume).

(19) Kaja's wallet was stolen. I hope they catch that thief.

Drawing on a repetition doesn't account for bare demonstratives at face value. They can be subsumed to this rule, however, if an elliptic resolution is applied, so that, for instance, the demonstrative in "My sister says she is ill, but I don't believe this." is

[2]In a series editor's comment on this chapter.

resolved to *this claim*. Notwithstanding this caveat, in the remainder of the chapter the simplifying repetition rule is used.

## 3 Clarifying Demonstrations

The meaning of nominal expressions is revealed by their *clarification potential* [Purver and Ginzburg, 2004] when used as *reprise fragments*. Applying this method to exophoric DemNPs, the object of clarification seems to be restricted to the identity of the referent/index, as illustrated in (20).

(20) A. This[☛] painting is from Chagall.

B. This[☛] painting?
⇝ *The object over there?*
⇝ ?? *What do you mean 'painting'?*
⇝ ?? *Which one?*

A. Right, this painting. / No, the one to the left.
?? Well, maybe it's a drawing.

The possible answers can each confirm or correct referent identification (see A's second move in (20)). B's clarification request cannot aim to clarify the meaning of the nominal constituent – requesting clarification of the meaning of the CN is possible but have to be produced either without the demonstrative ("painting?"), or with a strongly stressed CN ("this PAINTING?").

Note that the demonstration act has to be part of B's clarification request in (20). If the demonstration is missing from the request, it will be taken to be the requested element:

(21) A. This[☛] painting is from Chagall.

B. This painting?
⇝ *Which one? I missed your demonstration.*
⇝ *Which one? I don't see any painting.*

A. This[☛] one.

B can even modify or skip the CN in the clarification request, as can A in answering it, emphasizing the index-related clarifying potential of the DemNP:

(22) A. This[☛] painting is from Chagall.

B. This[☛] one?
This[☛]?
This[☛] colored something?
⇝ *The object over there?*

A. Right. / No, the one to the left.

Likewise, the clarification potential of deferred reference concerns only the index:

(23) [Context: *A and B are looking at some painting (so A's ☛' is most likely just a nod).*]

A. This[☛] painter died at an early age.

B. This[☛] painter?
   ⇝ ?? *What do you mean 'painter'?* (CN)
   ⇝ ?? *Wouldn't be 'drawer' a better classification?* (bridge)
   ⇝ *The painter of this painting?* (index)
   ⇝ ?? *Which one?* (index or referent)
   ⇝ ?? *There is no painter, there is just a painting.* (referent)

A. ?? Well, the painter of this painting.
   ?? Well, this drawer.
   Yes, this one. / No, that one.

Note that the open clarification request "Which one?", which might concern the index as well as the referent, is not possible. Furthermore, questioning exclusively the referent is not possible either. Therefore, (23) provides evidence against the proposal of Borg [2002], who argues to treat deference and direct reference alike.[3] Again, requesting clarification regarding the referent or the bridge has to be produced without the demonstrative or with a strongly stressed CN:

(24) [Context: *A and B are looking at some painting.*]

A. This[☛] painter died at an early age.

B. Painter?
   ⇝ *What do you mean "painter"?* (CN)
   ⇝ *Wouldn't be 'drawer' a better classification?* (bridge)
   ⇝ ?? *The painter of this painting?* (index)
   ⇝ *Which one?* (index or referent)
   ⇝ *There is no painter, there is just a painting.* (referent)

A. Well, the painter of this[☛] painting (possibly followed by "idiot").
   Well, this drawer.
   ?? Yes, this one. / No, that one.

In case of anaphoric uses, however, requesting an index does not seem to be feasible, nor is it possible to address a discourse referent at all:

[3] The deference "'This is my favorite author' is true just in case the object demonstrated is the speaker's favorite author; what changes here is that the object demonstrated may not be the object pointed at." [Borg, 2002, p. 508]

(25) A. I saw a painting yesterday and this painting was shocking.

B. This painting?
⇝ *Which one?*
⇝ ?? *The object over there?*
⇝ ?? *What do you mean 'painting'?*

A. The painting I saw yesterday. / The painting I just mentioned.
?? This one.

The only available means for identifying discourse referents are the linguistic expressions that introduced them in the first place, complying to the identity by repetition constraint (subject to the caveat from the end of Section 2). Accordingly, the CN can neither be skipped nor modified:

(26) B. ?? This one? / ?? This?
?? This drawing?
?? This colored something?

The same observation can be made in case of bound demonstratives:

(27) A. Mary talked to no senator before that senator was lobbied.

B. That senator?
⇝ *Which senator?*
⇝ ?? *What do you mean 'senator'?*

A. (?) The group of senators Mary talked to.
The one from the group of senators Mary talked to.

B's clarification request in (27) is best answered with a repetition of the descriptive condition concerning an individual referent ('senator' is singular). This is at odds with the claim that "in this case the index is the group of senators talked to by Mary" [Elbourne, 2008, p. 446] and provides clear evidence for unwarranted generalizations of unified theories concerning discourse and real-world referents.

In case of bridging demonstratives no index-specific request is within reach, but the unspecific "which" variant as well as referent requests are:

(28) A. A car drove by. The horn was honking. Then another car drove by. That horn was honking even louder.

B. That horn?
⇝ *Which horn?* (index or referent)
⇝ ?? *The horn of that car?* (index)
⇝ ?? *What do you mean "horn"?* (CN)
⇝ ?? *Wouldn't be 'bell' a better classification?* (bridge)
⇝ *I thought another car drove by?* (referent)

A. The horn of the second car. (index-related)

Oh, I haven't told you about the horn yet. (referent-related)
?? Well, maybe it was a bicycle bell. (CN)

A can resolve the unspecific clarification either in terms of the referent or the index. There is no good way to give an index-related answer other than counting antecedents, either in the order of appearance in the narrative or in the order of uttering the corresponding linguistic expressions [cf. Roberts, 2002, p. 306]. In particular, and in contrast to deferred reference, clarification requests cannot involve demonstrations themselves (which is why in (28) it is impossible to specifically request index-related information). B might employ a definite description, though, like "The horn of the first or the second car?".

In sum, then, discourse referential DemNPs are individuated according to the descriptive conditions bound up with discourse markers. Real-world referential DemNPs are individuated according to the perception of their demonstrata. This ontological difference is not represented by the unified approaches briefly discussed in Section 1. In particular, according to the evidence collected above, no index $i$ nor demonstratum $g(j)$ is retrievable from endophoric DemNPs. In terms of situation semantics, this difference is captured in terms of *witness sets*, respectively *witnesses* [Barwise and Cooper, 1981, p. 191 et seq.]: exophoric DemNPs are witness-loaded while endophoric DemNPs are witness-free. At least the unified accounts of Elbourne [2008] and Roberts [2003] reviewed in Section 1, to the contrary, assume that even endophoric DemNPs relate to an (maybe hidden) index. If a unified account is given up, however, we are left with the option of treating endophoric and exophoric demonstratives as different lexemes. In order to avoid this undesirable option and maintain the unity of DemNPs, a unified theory is sketched in the following that rests on the function of demonstration acts and DemNPs in the grammar-dialog interface.

# 4 Witness-loaded and Witness-free DemNPs

## 4.1 Demonstratives as Processing Instructions

The natural place for demonstrations is dialog, anyway: there is no point for the speaker in demonstratively identifying something to him- or herself. Accordingly, the observation that "referring expressions are no more than guidelines for retrievals" [Ariel, 1988, 68] is not a new one. However, the findings from the previous discussion can be collected in the form of more precise retrieval instructions:

1. *If there is a demonstration act accompanying the DemNP, then the DemNP is witness-loaded and identifiable in the utterance situation.* This follows from Kaplan's completeness constraint and the deictic force of demonstratives (cf. Section 1).

2. *If there is no demonstration act, but a repetition of a constituent, the DemNP remains witness-free but is anchored to the repeated constituent.* This rule captures endophoric as well as E-type uses of DemNPs (see Sections 2 and 3).

3. *Otherwise, the DemNP contributes a discourse referent, which is not required to be witness-loaded or identifiable.* This rule is intended to cover rhetoric uses of DemNPs like *no demonstration no speaker reference* and empathetic uses (see Section 1).

Recall that the second case eventually has to be modified according the caveat formulated at the end of Section 2. Rhetoric or empathetic uses typically have no antecedent in co-text, so they are not covered by the second rule. Note that by dint of the third rule, such DemNPs are likened to culturally grounded proper names like 'Marc Chagall'.

Now suppose there is a management sheet that keeps track of discourse referents. Think, for instance, of a structured set of reference markers known from the DRSs of DRT [Kamp and Reyle, 1993]. A toy illustration is given in (29), where the first three columns systematize the requirements for demonstratives, and the right column hosts all further discourse referents (e.g., introduced by definites and indefinites), including perceptually accessible objects in the utterance situation.

(29)

| witness-free | witness- | identify- | given |
|---|---|---|---|
| | | context | |
| | | co-text | |
| | | none | |

Given such a discourse referent sheet, the difference between the sentences from example (4), repeated in (30), is reflected in a different "reference marker management".

(30) a. Every farmer who owns a donkey$_i$ beats that donkey$_{i/*j\neq i}$.

b. Every farmer who owns a donkey$_i$ beats that[☛] donkey$_{*i/j\neq i}$.

From (30-a) we get two co-textually given discourse referents, $x$ and $y$, from *every farmer* and *a donkey*, respectively. Since the DemNP is not accompanied by a demonstration act and its CN is an uptake of a previous expression, the second above-given rule applies and instructs to shift the discourse referent $z$ of *that donkey* into the "witness-free/co-text" field. The result is as follows:

(31)

| witness-free | witness- | identify- | given |
|---|---|---|---|
| | | context | |
| $z(= y)$ | | co-text | $x$, $y$ |
| | | none | |

Since there is a suitable antecedent, $z$ can be identified in co-text with $y$.

The sentence in (30-b) gives rise to the same given discourse referents. However, the demonstration act, according to rule 1 above, instructs to move the discourse referent

of the DemNP into the "witness-loaded/context" field. Additionally, the demonstration itself indicates where the witness is to be found in the utterance situation:

(32)

| witness-free | witness- | identify- | given |
|---|---|---|---|
| | $z(= a)$ | context | 👉$(a)$ |
| | | co-text | $x$, $y$ |
| | | none | |

Finally, a *no demonstration no speaker reference* DemNP like that in (33) fills the "witness-free/none" filed of the reference sheet, as illustrate in (34).

(33) That woman who won the lottery yesterday must be really happy.

(34)

| witness-free | witness- | identify- | given |
|---|---|---|---|
| | | context | |
| | | co-text | |
| $x$ | | none | |

By means of bookkeeping instructions for discourse referents in dialog, a unified theory of DemNPs can be maintained. This section introduced a "pedagogic" sketch of the underlying rationale. In order for this sketch to work, its core ingredients have to be formulated in terms of a dialog theory. We use KoS, the dialog theory developed by Ginzburg [2012], for this purpose. Since KoS is implemented within a constructive type theory, the basic functioning of the type system is introduced subsequently.

## 4.2 A Short Primer to TTR

As the formal framework for representing DemNPs in dialog *Type Theory with Records* [TTR, Cooper, 2005, 2012] is chosen. TTR provides semantic objects at both the token and the type level, structures to organize these objects (viz., records and record types), and (Montagovian) $\lambda$-abstraction and functional application. The basic notion in TTR is a *judgment* of the form $a : T$, meaning that object $a$ is of type $T$. This gives rise to classifications with basic types like *Ind(ividual)*, *Time* or *Loc(ation)* as in (35-a–d):

(35) a. x : *Ind*

b. y : *Ind*

c. t : *Time*

d. l : *Loc*

e. s : *sit-on*(x, y, t, l)

The judgment in (35-e) involves a complex type, which has argument slots of a certain arity. It is the typ of situations where $x$ sits on $y$ at time $t$ and location $l$. The obvious dependency between types as in (35) is captured in TTR in terms of *record types*. A record type is a set of fields of pairs of labels and (basic or complex) types. Judgments like those in (35) can be used to build the following record type which is associated to the declarative sentence "The cat sits on the mat." (ignoring the semantic contribution of the definite article and time and location arguments for the sake of exposition):

(36) Record type that is assigned to the statement "The cat sits on the mat.":

$$\begin{bmatrix} \text{x} & : \textit{Ind} \\ \text{c1} & : \text{cat(x)} \\ \text{y} & : \textit{Ind} \\ \text{c2} & : \text{mat(y)} \\ \text{c3} & : \text{sit-on(x,y)} \end{bmatrix}$$

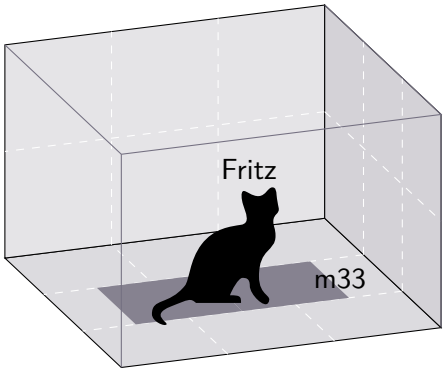


Figure 1: The cat sits on the mat.

A *witness* for the record type in (36) is a *record* that provides suitable objects for each field of the record type (and possibly more). A record is a set of fields of assignments from labels to values. For instance, the situation depicted in Figure 1 corresponds to the record in the left-hand part of (37). The witnesses for complex judgments are *proof objects* [Martin-Löf, 1984]. Since the record in (37) is of the type required by the record type, the type correctly classifies the situation in question.

(37) $$\begin{bmatrix} \text{x} & = \text{Fritz} \\ \text{c1} & = \text{cprf} \\ \text{y} & = \text{m33} \\ \text{c2} & = \text{mprf} \\ \text{c3} & = \text{sprf} \end{bmatrix} \quad : \quad \begin{bmatrix} \text{x} & : \textit{Ind} \\ \text{c1} & : \text{cat(x)} \\ \text{y} & : \textit{Ind} \\ \text{c2} & : \text{mat(y)} \\ \text{c3} & : \text{sit-on(x,y)} \end{bmatrix}$$

In general, a record $r$ is of record type $RT$, $r : RT$, if all objects of the record are of the type required by the record type. The record in (38) is a witness for the record type just in case $\text{o}_1 : \text{T}_1$, $\text{o}_2 : \text{T}_2(\text{o}_1)$, …, $\text{o}_n : \text{T}_n(\text{o}_1, \text{o}_2, \ldots, \text{o}_{n-1})$.

(38) $$\begin{bmatrix} \mathrm{l}_1 = \mathrm{o}_1 \\ \mathrm{l}_2 = \mathrm{o}_2 \\ \cdots = \cdots \\ \mathrm{l}_n = \mathrm{o}_n \\ \cdots \end{bmatrix} : \begin{bmatrix} \mathrm{l}_1 : \mathrm{T}_1 \\ \mathrm{l}_2 : \mathrm{T}_2(\mathrm{l}_1) \\ \cdots = \cdots \\ \mathrm{l}_n = \mathrm{T}_n(\mathrm{l}_1,\mathrm{l}_2,\ldots,\mathrm{l}_{n-1}) \end{bmatrix}$$

Although record types will be represented in the format given above, technically they involve Montagovian functions from individuals, not labels, to predicational types (but unlike in Montague's system, simultaneous abstraction over several objects is allowed). That is, officially the "cat part" of the record type in (37) has the following structure:

(39) $$\begin{bmatrix} \mathrm{x} : \mathit{Ind} \\ \mathrm{c1} : \Big\langle \lambda v : \mathit{Ind} \;.\; \mathrm{cat}(v),\ \langle \mathrm{x} \rangle \Big\rangle \end{bmatrix}$$

The predicational type c1 from (39) is a function from individuals to cats, i.e. it is of type $\langle e, t \rangle$, where the object abstracted over is to be found at path x in the record type. This function is characterized by the set of ordered pairs $\{\langle v, \mathit{cat}(v) \rangle \mid v : \mathit{Ind}\}$ and thereby is linked to classical extension. Accordingly, the official architecture of the general record type in (38) is the one in (40):

(40) $$\begin{bmatrix} \mathrm{l}_1 : \mathrm{T}_1 \\ \mathrm{l}_2 : \Big\langle \lambda v_1 : \mathrm{T}_1 \;.\; \mathrm{T}_2(v_1),\ \langle \mathrm{l}_1 \rangle \Big\rangle \\ \cdots = \cdots \\ \mathrm{l}_n = \Big\langle \lambda v_1 : \mathrm{T}_1 \;.\; \lambda v_2 : \mathrm{T}_2(v_1) \;.\; \ldots.\; \lambda v_n : \mathrm{T}_n(v_1, v_2, \ldots, v_n)\ ,\ \langle \mathrm{l}_1,\mathrm{l}_2,\ldots,\mathrm{l}_{n-1} \rangle \Big\rangle \end{bmatrix}$$

## 4.3 Modeling DemNPs in Dialog

Within the dialog theory of Ginzburg [2012], the public part of dialogical exchange is regimented by a specific record type, a *Dialog Game Board* (DGB). DGB is an information state-based sheet for describing communicative interactions. The DGB from KoS tracks the interlocutors (*spkr* and *addr* fields), their dialog history (*Moves*), and the assumptions shared among the interlocutors (*Facts*).[4] A move is brought about by an utterance act (*c-utt*) of a speaker directed to an addressee at a given utterance situation, i.e. at a certain time (*utt-time*) and place (*utt-loc*). The simplified TTR representation of a DGB following Ginzburg [2012] is given in (41):

[4] We make the simplification of ignoring dialog moves that are in the process of grounding (*Pending*) and the question(s) currently under discussion (*QUD*). Our concern here is simply to spell out the grammar-dialog interface for DemNPs, explicating dialog dynamics would lead us beyond the scope of this chapter.

(41)
$$\begin{bmatrix} \text{spkr} & : \mathit{Ind} \\ \text{addr} & : \mathit{Ind} \\ \text{utt-time} & : \mathit{Time} \\ \text{utt-loc} & : \mathit{Loc} \\ \text{c-utt} & : \text{addressing(spkr, addr, utt-time, utt-loc)} \\ \text{Facts} & : \text{Set}(\mathit{Prop}) \\ \text{Moves} & : \text{list}(\mathit{LocProp}) \end{bmatrix}$$

What is important with regard to the concern intuitively sketched in Section 4.1 is that KoS implements a grammar-dialog interface. On the one hand, linguistic expressions are DGB-aware. On the other hand, linguistic expressions are involved in building objects of type *LocProp*, which in turn constitute dialog moves. Linguistic expressions are modeled as signs known from *Head-driven Phrase Structure Grammar* [HPSG; Pollard and Sag, 1994]. Using the TTR variant of HPSG defined in [Cooper, 2008], a uniform framework can be used to model lexical and phrasal expressions (for details, see HPSG text books and Ginzburg [2012]):

(42)
$$\mathit{Sign} =_{def} \begin{bmatrix} \text{phon} & : \text{list}(\mathit{phonform}) \\ \text{cat} & : \begin{bmatrix} \text{cat} : \mathit{PoS} \end{bmatrix} \\ \text{cont} & : \mathit{SemObj} \\ \text{dgb-params} & : \mathit{RecType} \\ \text{q-params} & : \mathit{RecType} \end{bmatrix}$$

The semantic objects allowed as content values of signs are individual objects (type *Ind*) or abstract objects like propositions. Propositions in TTR can be developed in an explicit Austinian (1950) way, where a proposition is individuated in terms of a situation and situation type [cf. Ginzburg, 2011, p. 845].

(43)
$$\mathit{Prop} =_{def} \begin{bmatrix} \text{sit} & : \mathit{Rec} \\ \text{sit-type} & : \mathit{RecType} \end{bmatrix}$$

Signs are building blocks of a special kind of proposition, namely *locutionary propositions* [*LocProp*; Ginzburg, 2012], which can be defined as follows:

(44)
$$\mathit{LocProp} =_{def} \begin{bmatrix} \text{sit=Sign} & : \mathit{Rec} \\ \text{sit-type} & : \mathit{RecType} \end{bmatrix}$$

For instance, the concrete but imperfect phonetic realization of *this* as /t̪e̪s/ is classified as belonging to the phonological type [ðɪs], i.e. [t̪e̪s : ðɪs] – likewise for other sign fields, resulting in a sign token-sign type judgment (i.e., a *LocProp*).

The content of nominal expressions is represented in terms of $\lambda$-abstracts over individuals into a descriptive condition. For example, the definite description *the thief* from an utterance like "The thief has stolen my purse." can be represented as a function from *Ind* to individuals that have the property of being a thief:[5]

[5] Recall from Section 4.2 that (45) makes use of a notational convention – the relation to $\lambda$-abstraction gets fully transparent in the official notation.

(45) $\begin{bmatrix} \text{x} & : \textit{Ind} \\ \text{c1} & : \text{thief(x)} \end{bmatrix}$

Now, the referent of the definite *the thief* may be known to the interlocutors, namely when the culprit is part of the common ground of the discussants Clark et al. [1983]. In this case, the semantic contribution of the definite is this witness. If not part of common ground, the definite has no speaker reference, amounting to saying "The thief, whoever he is, has stolen my purse." Now, the contribution cannot be an individual (witness) but rather a property. Following the analysis of Purver and Ginzburg [2004] and Ginzburg and Purver [2012], referential NPs that acquire a witness in the process of grounding are separated from quantificational ones by contributing to two different sets of parameters of a dialog game board: the former contribute to contextual dialog game board parameters (dgb-params), the latter contribute to quantificational parameters (q-params) – see (42) above. The elements from the quantificational parameters do not receive a referential value in grounding, i.e. a witness, they are existentially quantified over and contribute to the descriptive content. Respectively, a witness-loaded interpretation of the definite description *the thief* is captured in (46-a), while the witness-free one is expressed in (46-b):

(46) a. $\begin{bmatrix} \text{dgb-params} & : & \begin{bmatrix} \text{x} & : \textit{Ind} \\ \text{c1} & : \text{thief(x)} \end{bmatrix} \\ \text{q-params} & : & [\,] \\ \text{cont} & = \text{dgb-params.x} & : \textit{Ind} \end{bmatrix}$

b. $\begin{bmatrix} \text{dgb-params} & : & [\,] \\ \text{q-params} & : & \begin{bmatrix} \text{x} & : \textit{Ind} \\ \text{c1} & : \text{thief(x)} \end{bmatrix} \\ \text{cont} & = \text{q-params.x} & : \textit{Ind} \end{bmatrix}$

The mechanism of requiring referential witnesses for the elements of dgb-params in order to add the respective contribution to common ground while keeping q-params existentially quantified is exploited by the dialog management rules imposed by DemNPs (eventually in combination with demonstration acts). However, in order to capture the grounding of exophorically used DemNPs properly, their witnesses are not only part of dgb-params but are additionally required to be in the *focus of attention*. As motivated in Sections 1 and 2, a demonstration act not only divides exophoric from anaphoric uses, it also shifts the focus of attention towards some scene that makes the referent identifiable in the utterance situation (for a related view on demonstration acts as anchoring devices for resource situations see Poesio and Rieser [2011]). So far, dialog game boards and signs do not have a means for representing perceptual access. To this end, a new field of type *FoA* is introduced in the *Facts* field of a DGB.[6]

[6] FoA is similar to the *Visual Information* field used in Ginzburg and Moradlou [2013] to account for kinds of parent-child interactions which are about objects which are part of mutual visual attention.

(47) $FoA =_{def}$

$$\begin{bmatrix} \text{foc-sit} & : RecType \\ \text{JointAttention} & : Ind \\ \text{c-foc} & : \text{member(JointAttention, foc-sit)} \\ \text{spkr} & : Ind \\ \text{addr} & : Ind \\ \text{dgb-params} & : \begin{bmatrix} \text{s1=foc-sit} & : RecType \\ \text{dem} & : Dem \end{bmatrix} \\ \text{c-dem} & : \text{triangle(dgb-params.dem, spkr, addr, foc-sit)} \end{bmatrix}$$

FoA is instantiated by a demonstration act, which invokes a triangulation [Davidson, 1991, Tomasello, 1998] between the interlocutors and the focus situation. Instead of, say, a visual condition, the more abstract triangle relation is intended to cover the attention fixing aspect of demonstration in general.[7] The focus situation contains the referent and is also the value of the witness-loaded dialog game board parameters. In order to account for this achievement of demonstrations, they are represented as contextual parameters of dialog game boards.[8]

Given this set-up, the processing rules for DemNPs from Section 4.1 can now be spelled out more formally with respect to KoS. It is proposed that the dynamic semantics of DemNPs in dialog is governed by the following three-fold processing rule:

(48) **Processing Rule for Managing DemNPs in Dialog**

1. If there is a demonstration act, then the DemNP contributes to dgb-params and is witness-loaded in the focus of attention.

2. If there is no demonstration, but a repetition of an antecedent constituent, the DemNP contributes to q-params, is bound to the antecedent but remains witness-free.

3. Otherwise, the DemNP contributes to q-params and remains unbound.

Utilizing the processing rule from (48) and the new type *FoA*, the grammar-dialog-interface representation of the exophoric demonstrative *this*[☛] *painting* is given in (49) (the path 'dgb-params' is abbreviated 'dgb'):

[7] An anonymous reviewer came up with the following example: suppose the interlocutors are driving in a car and suddenly perceive a bump. Then the driver might say 'Sorry, I didn't see this pothole'. Here, no *visual* perception is involved.

[8] Taking demonstrations to be part of the context is the traditional way. A more provocative account would add demonstrations to the constituents of locutionary propositions. The role of demonstration in clarification requests indeed can be seen as evidence for the more provocative way (cf. Section 3).

(49) a. This[☛] painting

b.
$$\begin{bmatrix}
\text{phon} & = [\text{ðɪs ˈpeɪn.tiŋ}] : \textit{Phon} \\
\text{facts.foa} & : \begin{bmatrix}
\text{foc-sit} : \left[\text{u} : \textit{Ind}\right] \\
\text{JointAttention=foc-sit.u} : \textit{Ind} \\
\text{c-foc} : \text{member(JointAttention, foc-sit)} \\
\text{c-dem} : \text{triangle(dgb.dem, dgb.spkr, dgb.addr, foc-sit)}
\end{bmatrix} \\
\text{dgb-params} : & \begin{bmatrix}
\text{s1=foc-sit} & : \textit{RecType} \\
\text{spkr} & : \textit{Ind} \\
\text{addr} & : \textit{Ind} \\
\text{dem} & : \textit{Dem} \\
\text{x=JointAttention} & : \textit{Ind} \\
\text{c1} & : \text{painting(x)}
\end{bmatrix} \\
\text{q-params} & : [\,] \\
\text{cont} & : \left[\text{dgb-params.x} : \textit{Ind}\right]
\end{bmatrix}$$

The anaphoric use of DemNPs neither involves *FoA* nor a demonstration. Here, the content of the DemNP has to be found within the semantic values of the constituents of prior dialog moves, namely the semantic value of the constituent that matches the phonology of the head noun – in line with the identification by repetition constraint. The basic picture for discourse-referential DemNPs is given by example of *that horn* in (50):

(50) a. That horn

b.
$$\begin{bmatrix}
\text{phon=[ðæt hɔːn]} : \textit{Phon} \\
\text{dgb-params} : & \begin{bmatrix}
\text{constits} : \text{list}(\textit{Sign}) \\
\text{a} : \textit{Sign} \\
\text{c1} : \text{member(a, constits)} \\
\text{c2} : \text{match(a.phon, dtrs.hd-dtr.phon)} \\
\text{a.cont} : \left[\text{a.cont.x = dtrs.hd-dtr.cont.y} : \textit{Ind}\right]
\end{bmatrix} \\
\text{dtrs} : \left[\text{hd-dtr} : \begin{bmatrix}
\text{phon} : \textit{Phon} \\
\text{cont} : \left[\text{y} : \textit{Ind}\right]
\end{bmatrix}\right] \\
\text{q-params} : \begin{bmatrix}
\text{y=dtrs.hd-dtr.cont.y} : \textit{Ind} \\
\text{c3} : \text{horn(y)}
\end{bmatrix} \\
\text{cont} : \left[\text{y=q-params.y} : \textit{Ind}\right]
\end{bmatrix}$$

Note that the endophoric, demonstration-free DemNP in (50-b) contributes to the quantificational parameters of the content. That means that it is exempted from the need to be witnessed in the process of grounding, as suggested in Sections 2 and 3.

In order to account for the contrast observed in Section 2, the discourse referents figuring as possible antecedents form a partially ordered set. The type for partially ordered sets is given in (51), where $a : \text{po}(R, S)$ iff $a = \langle R, S\rangle$ and $R$ is a partial order on $S$ [Cooper and Ginzburg, 2015]:

(51)
$$Poset =_{def} \begin{bmatrix} \text{set} : \{T\} \\ \text{rel} : \left\{ \begin{bmatrix} \text{left} & : T \\ \text{right} : T \end{bmatrix} \right\} \\ \text{c1} : \text{po(rel, set)} \end{bmatrix}$$

Imposing a partially ordered set over DGB parameters captures that only the most recent (i.e., the left one in a *Poset*) of several matching expression is available as antecedent. The accordingly modified structure is shown in (52):

(52)
$$\begin{bmatrix} \text{phon=[ðæt hɔːn]} : \textit{Phon} \\ \text{dgb-params} : \begin{bmatrix} \text{constits} & : \text{list}(\textit{Sign}) \\ \text{a} & : \text{Poset}(\textit{Sign}) \\ \text{c1} & : \text{member(a.rel.left, constits)} \\ \text{c2} & : \text{match(a.rel.left.phon, dtrs.hd-dtr.phon)} \\ \text{a.rel.left.cont} & : \left[\text{a.rel.left.cont.x = dtrs.hd-dtr.cont.y} : \textit{Ind}\right] \end{bmatrix} \\ \text{dtrs} : \begin{bmatrix} \text{hd-dtr} : \begin{bmatrix} \text{phon} : \textit{Phon} \\ \text{cont} : \left[\text{y} : \textit{Ind}\right] \end{bmatrix} \end{bmatrix} \\ \text{q-params} : \begin{bmatrix} \text{y=dtrs.hd-dtr.cont.y} : \textit{Ind} \\ \text{c3} : \text{horn(y)} \end{bmatrix} \\ \text{cont} : \left[\text{y=q-params.y} : \textit{Ind}\right] \end{bmatrix}$$

The previous examples illustrate that a unified theory of DemNPs that draws on the grammar-dialog interface is feasible. Since the underlying constructive type theory facilitates access on the level of tokens (that is, records), even deferred reference can be modeled.

# 5 Deference and Witness-loaded Demonstratives

In Section 2, data on bridging respectively deference was used to motivate referential differences between exophoric and endophoric uses of DemNPs. It has been shown that the witness of witness-loaded real-world referential DemNPs provide additional information that is exploited for deferred reference. In conclusion, the analysis from the preceding Section 4.3 is applied to a simple example in order to illustrate how witness-loading gives rise to deference.

Consider the scene depicted in Figure 2, in which a manikin, let us call it George,[9] is pointing towards a block table on top of which there is a coffee cup in sub-situation $s_1$ and an egg in sub-situation $s_2$ (the reader, as viewer of the figure, is invited to imagine him-/herself in the unfilled corner of the triangulation). At the table's feet there is a second egg (sub-situation $s_3$). The "spatial extension" of George's demonstration act is indicated by its *pointing cone* [Lücking et al., 2015]. The cone covers sub-situations $s_1$

[9]The name 'George' is chosen reminiscent of the deference examples given by Clark [1996, p. 168].

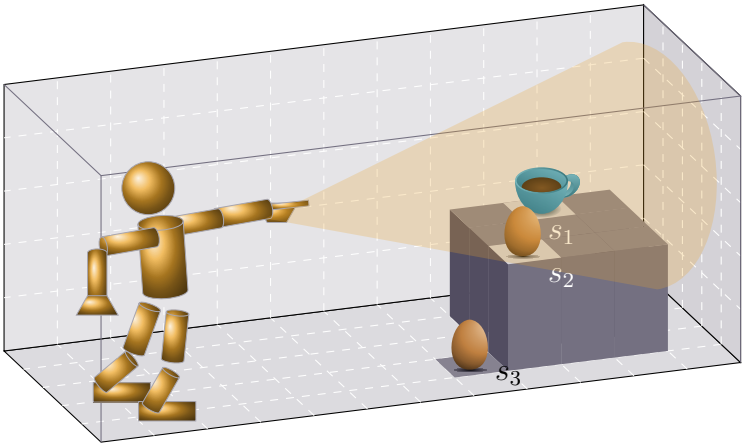


Figure 2: George referring to cups, eggs and hens – running example (using TikZ figures by percusse and Mark Wibrow from `www.texample.net`).

and $s_2$ but not $s_3$. This kind of "fuzziness" of pointing gestures has been investigated empirically [Bangerter and Oppenheimer, 2006, Lücking et al., 2015, Bangerter, 2004, Clark and Bangerter, 2004], strengthening the view that demonstrations function as attention directing (and not as directly referring) devices.

This example shall illustrate a number of things about exophoric demonstratives, including those given in (53). Given the scene and the pointing cone as depicted in Figure 2, then

(53) a. George can refer to the cup in $s_1$ by "this cup";

b. George can refer to the egg in $s_2$ by "this egg";

c. George cannot refer to the egg in $s_3$ by "the egg";

d. George can refer to the laying hen of the egg in $s_2$ by "this hen";

e. George cannot refer to the laying hen of the egg in $s_3$ by "this hen".

One of the assumptions underlying the examples in (53) is that descriptions are evaluated against situations [Austin, 1950, Barwise and Perry, 1983]. According to this conception, the pointing gesture restricts the evaluation domain of verbal descriptions – compare (53-b) and (53-c). In terms of Section 4: the demonstration shifts $s_1$ and $s_2$, but not $s_3$, into FoA. Note that the pointing gesture itself is not able to identify a referent for the addressee – or could you decide whether George points at the cup, or at the egg in $s_2$, or possibly even at the wall? These observations require aggravate the problems that arise from introducing individual-valued indices $i$ or demonstrata like $g(j)$ in unified theories of demonstratives (cf. Section 1).

Suppose that, in the situation depicted in Figure 2, George utters "This hen has brown feathers", involving a deference from an egg to its laying hen. In terms of the framework sketched here, the exophoric DemNP starting the utterance is of the type in (54):

(54)
$$\begin{bmatrix} \text{phon} & = [\text{ðɪs hɛn}] : \textit{Phon} \\ \text{facts.foa} & : \begin{bmatrix} \text{foc-sit} : \left[\text{z} : \textit{Ind}\right] \\ \text{JointAttention} : \textit{Ind} \\ \text{c-foc} : \text{member(JointAttention, foc-sit)} \\ \text{c-dem} : \text{triangle(dgb.dem, dgb.spkr, dgb.addr, foc-sit)} \end{bmatrix} \\ \text{dgb-params} & : \begin{bmatrix} \text{s1=foc-sit} & : \textit{RecType} \\ \text{spkr} & : \textit{Ind} \\ \text{addr} & : \textit{Ind} \\ \text{dem} & : \textit{Dem} \\ \text{x=JointAttention} & : \textit{Ind} \\ \text{c1} & : \text{hen(x)} \end{bmatrix} \\ \text{cont} & : \left[\text{x=dgb-params.x} : \textit{Ind}\right] \end{bmatrix}$$

But what is an adequate representation of the focus situation? Witness-loading requires a record for the focus situation, which in the example is part of the block table George attends to in Figure 2. Being a token, a record necessarily has more information than a type [Waisman, 1951]. For instance, it can be readily seen that the cup is blue and filled with a liquid – probably with coffee. By the same token, one can assume that the egg is perceived as a hen's egg, implying that there has to be a laying hen.[10] The scene in question provides, we can assume, *inter alia* the classifications in (55).

(55)
$$\text{foc-sit} = \begin{bmatrix} \text{x=}\,\raisebox{-0.3em}{  } & : \textit{Ind} \\ \text{c}_{\text{egg}} & : \text{egg(x)} \\ \text{y=}\,\raisebox{-0.3em}{  } & : \textit{Ind} \\ \text{c}_{\text{cup}} & : \text{cup(y)} \\ \text{c}_{\text{blue}} & : \text{blue(y)} \\ \text{z} & : \textit{Ind} \\ \text{c}_{\text{hen}} & : \text{hen(z)} \\ \text{c}_{\text{lay}} & : \text{lay(z, x)} \\ \text{u} & : \textit{Ind} \\ \text{c}_{\text{coffee}} & : \text{coffee(u)} \\ \text{c}_{\text{in}} & : \text{in(u, y)} \\ \text{v=}\,\raisebox{-0.3em}{  } & : \textit{Ind} \\ \text{c}_{\text{table}} & : \text{table(v)} \\ \text{c}_{\text{on1}} & : \text{on(x,v)} \\ \text{c}_{\text{on2}} & : \text{on(y,v)} \end{bmatrix} : \textit{RecType}$$

Most importantly, (55) provides a witness for the predicational type *c1 : hen(x)* in (54), since 'x' is also the focused element 'z' (x = JointAttention = z, cf. (54)). The corresponding hen individual is available as a *weak discourse referent* as used in the (non-deferring) analysis of demonstratives of Roberts [2002] (the notion of *implicit discourse*

[10] A misclassification in this respect, say, when the egg is actually a peacock egg, might lead to Donnellan [1966] cases of correct identification despite failed semantic reference. Likewise, of course, for the coffee hypothesis.

*referents* has been introduced by Kamp and Rossdeutscher [1994]). However, unlike in the lexical extension approach of Irmer [2013], additional information that stems from witnesses is not part of the linguistic context and hence is out of reach of linguistic operrations. This seem to be right since, for instance, the only anaphoric binder is the linguistic constituent, *hen* in this case.[11]

(56) This hen has brown feathers.

a. It (= hen) is not able to fly, anyway.

b. *It (= egg) is not able to fly, anyway.

Using perceptual information for classifying focused scenes in a triangulation setting provides a systematic framework for accounting for deferred references. In particular, no hidden relation $R$ has to be postulated on the level of logical form. As a result of dispensing with an external relation $R$, the account given here is more closely related to Nunberg's later view that the deferred referent is somehow made present in the context of the demonstratum [Nunberg, 2004].

# 6 Conclusion

In this chapter, it was argued that endophorically and exophorically used DemNPs actually employ different modes of reference. While the former simply pick out a linguistic antecedent without a demonstration act, the latter employ a deictic act in addition to verbal reference. It is claimed that this difference is related to the ontological status of the respective referents, viz. discourse referents and real world referents.

Evidence for this claim was provided by drawing on the potential of endophoric and exophoric DemNPs for licensing inferential reference (i.e., bridging and deference) and for requesting clarifications. Both uses of DemNPs differ with respect to the following features:

- *identification by repetition*: discourse referents are identified numerically by repetition of their descriptive condition (modulo the caveat at the end of Section 2) while real world referents are identified perceptually and allow for a variety of classifications.
- *semantic parallelism*: bridging demonstratives are E-type demonstratives which require that the inferential bases are similar and pick up the bridge that has been introduced in the previous co-text.
- *sequentiality*: bridging demonstratives refer to their immediate antecedent discourse referent, in the order of appearance. Deferring DemNPs can refer independently of the temporal order of their referents.

[11] The example is due to an anonymous reviewer who rightly insists that elements that are not realized linguistically lack linguistically relevant influence.

- *no index available as part of clarifying potential*: while the clarification potential of deferring DemNPs includes a demonstratum, bridging demonstrative come out as index-unaware and hence, as not involving a deictic act.

These observations provide evidence against current unifying conceptions of demonstratives that reduce both kinds of uses to just one mode of reference and in particular postulate an index in the endophoric use. Rather, the abstract status of discourse referents in contrast to real world referents seems to make them immune against demonstrative identification.

As a result of this discussion, and contrary to unified semantic theories of DemNPs: discourse reference and real world reference has to be clearly separated. This can be achieved in terms of *witness-free* vs. *witness-loaded* demonstratives. A witness-loaded DemNP is structurally similar to an Austinian proposition, a pairing of a semantic object with the scene it is about, where the link to this scene is established by a demonstration. As an alternative to unified approaches, a processing rule for demonstratives is given that captures the semantics of DemNPs in dialog. This analysis has been spelled out in the frameworks of TTR and KoS, which provide records as technical notions for witnesses and a dialog game board as systematic information sheet for keeping track of required internal and external parameters.

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