

Structural Triggers of the Loss of Scopelessness

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1. Introduction

This paper presents a structural account of the shift from directly referential to non-directly referential interpretation of nominal expressions with strong definite articles in Austro-Bavarian German and demonstratives in English. I propose that such DPs involve a functional projection headed by a relational predicate which can host either a silent individual pronoun, which gives rise to the directly referential behaviour, or a restrictive relative clause, which gives rise to covarying interpretations. The paper thus translates into structural terms the recent proposals that DPs with demonstratives/strong articles have a greater semantic complexity than “regular” Fregean definites (Nunberg 1993, Elbourne 2008a, Schwarz 2009, Elbourne 2013). Previous approaches to this problem did not take into account the role of relative clauses, which are present in the overwhelming majority of non-directly referential uses of English complex demonstratives (King 2001, Dever 2001, Powell 2001).

A well-known feature of demonstratives in English is their scopelessness in the sense of Heim (2004) whereby they are “interpreted as if they had widest scope with respect to any quantificational element”. The same holds of the so called “strong” articles in Austro-Bavarian German, which features “strong” and “weak” paradigms of definite articles. In (1) the DP *des Haus* $\approx$ ‘that house’ is scopeless with respect to the quantifier over situations *jedn Somma* ‘every summer’: the only reading available involves a particular contextually indicated house, which Otto rents every summer. There is no reading on which Otto rents a different house every summer.

- (1) Jedn Somma mietet si da Otto **des** Haus.
every summer rents himself det_{weak} Otto det_{strong} house
(Previous discourse: Every year one house on the seaside remains unrented.) ‘Every summer Otto rents that house for himself.’ (The same house every year.)

To compare this with a scope-sensitive behaviour, consider (2) where the weak-DP *s’ Haus* ‘the house’ allows for two different interpretations: that there was one house for all summer periods, and that for each summer there was a different house. English *the* patterns the same.

- (2) Jedn Somma mietet si da Otto **s’** Haus.
every summer rents himself det_{weak} Otto det_{weak} house
(Previous discourse: Every year one house on the seaside remains unrented.) ‘Every summer Otto rents the house for himself.’ (Can be a different house.)

The scopeless behaviour is what is predicted on the analyses whereby their semantics involves an identity relation with a context-given individual, as proposed by Schwarz (2009) and Elbourne (2008a) for German strong articles and English demonstratives respectively. Such analyses also effectively capture the distributional fact that strong- and demonstrative-DPs in many cases (to be qualified shortly) need an antecedent or a deictic referent to be used felicitously, unlike “weak” definite articles and English *the*.

However, in addition to scopeless behaviour, it was observed that there are uses of demonstratives requiring covariation. In (3) the denotation of the demonstrative DP has to covary with the universal quantifier *every father* to get the most natural reading. King (2001) uses the term “quantifying in” for cases when the denotation of a demonstrative DP covaries with a variable it embeds.

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- (3) Every father dreads that moment when his eldest child leaves home.

We observe the same effect in the Austro-Bavarian example with a strong-DP.

- (4) Jedn Somma mietet si da Otto **des** Haus [wos neamd ondara wü].
 every summer rents himself det_{weak} Otto det_{strong} house comp nobody else wants
 ‘Every summer Otto rents himself that house that nobody else wants.’

In what follows I propose and analyze a novel generalization that the scopeless behaviour of strong articles and demonstratives systematically goes away in the presence of restrictive relative clauses. In the next section I discuss how the semantics that has been proposed to capture the scopeless behaviour is insufficient to deal with cases which require covarying readings, such as (3) and (4) above. In section 3 I propose a semantico-syntactic model which accounts for the following major empirical facts: strong- and demonstrative-DPs become scope-sensitive in the presence of a restrictive relative clause; such DPs do not need an anaphoric antecedent; in such DPs the nominal predicate, irrespective of the presence of the relative clause, has to denote a set greater than a singleton. All of these facts are captured on the assumption that there is a relational head in the structure of strong- and demonstrative-DPs introducing either a silent individual pronoun or a restrictive relative clause, and imposing an anti-singleton requirement on its complement, NP. To give a preview, the corresponding LF is sketched below, where D has a “classic” Fregean semantics, and RRC stands for a restrictive relative clause.

- (5) $DP[D_{RP}[i/RRC[R\ NP]]]$

2. The problem of directly referential semantics

In this section I go over the semantics proposed by Schwarz (2009) for German weak articles, which accounts for their scopeless behaviour.¹

Schwarz (2009) assumes for strong-DPs an LF in (6), which involves a silent pronoun over individuals, here bearing the index 1.

- (6) $[i [D_{strong} NP]]$

The strong article denotes a function which takes a property, an individual, and returns the individual identical to the argument individual just in case the former has the relevant property.

- (7) $\llbracket D_{strong} \rrbracket = \lambda P_{\langle e,t \rangle} . \lambda x : \exists! y [P(y) \ \& \ y = x] . \iota y [P(y) \ \& \ y = x]$

This function is equivalent to the following, because for any property P (denotation of the nominal predicate) and individual x for which the function in (7) is defined, its output is x.

- (8) $\llbracket D_{strong} \rrbracket = \lambda P_{\langle e,t \rangle} . \lambda x : P(x) . x$

Assuming that the individual argument of this function is filled by the individual picked out by the silent pronoun, the denotation of a strong-DP is thus “anchored” to a contextually specified individual corresponding to the value of the index. Consequently, this semantics predicts that the denotation of a strong-DP is not going to covary with a quantifier-bound variable.² This captures the reading of the strong-DP in (1).

This, however, makes a wrong prediction for (4), where we find the denotation of the strong-DP covarying with the possessive pronoun presumably bound by the universal quantifier. Let us see what exactly goes wrong. In the following LF for (4) I assume that the universally quantified DP *every father* moves up, creating a lambda-abstraction over the TP.

¹ The original proposal is made in the Kratzerian situation semantics framework. I recast it, for clarity, in extensional semantics. As far as I can see, this mode of presentation does no harm to the truth-conditional import of strong articles/demonstratives in the cases I discuss.

² With the exception, of course, of those cases where the index itself is bound by a quantifier. Such cases are unproblematic for the model discussed in this section and I do not focus on them here.

- (9) Every father₂ λ_2 $TP[t_2$ dreads [1 [that [moment when his₂ eldest child moves out]]]]

The object DP is interpreted as follows.

- (10) $\llbracket DP \rrbracket^g$ is defined iff $g(1)$ is the moment when $g(2)$'s eldest child moves out
if defined, $\llbracket DP \rrbracket^g = g(1)$

Assuming that the definedness condition of a DP becomes a domain restriction on the function denoted by the lambda-abstract over TP, we obtain the following interpretation of the lambda-abstract.³ The possessive pronoun ends up being bound by the same lambda operator that binds the trace of the moved subject *every father*.

- (11) $\llbracket \lambda_2 t_2$ dreads 1 that moment when his₂ eldest child moves out $\rrbracket^g = \lambda z : g(1)$ is the moment when z 's eldest child moves out . z dreads $g(1)$

This TP denotes a function which characterizes a set of all individuals that dread some specific contextually given moment $g(1)$. The whole sentence is true in case every individual from the set of fathers is also a member of the set of people who dread $g(1)$. This, of course, is not the right interpretation, as we want to end up with a reading whereby for every father there is a different dreadful moment.

While “quantifying in” uses of German strong-DPs, as far as I know, is a new problem, this has been a major issue for the theory of English demonstratives (Neale 1993, Nunberg 1993, Lepore & Ludwig 2000, Dever 2001, King 2001, Powell 2001, Elbourne 2008a). The availability of such uses goes against what Dever (2001: 271) formulates as the Dilemma Hypothesis.

- (12) Every term in natural language is either referential or quantificational.⁴

“Quantifying in” uses of demonstrative-DPs were the main reason King (2001) abandoned the Kaplanian analysis of English complex demonstratives as directly referential expressions in favour of a quantificational approach. Elbourne (2008a), building on a proposal put forth in Nunberg (1993), offers a treatment that captures the default scopelessness of demonstratives together with the covariation uses. In the next section I present the proposal of Elbourne (2008a), highlighting those components that differ from the solution of Schwarz (2009) for strong articles and that make it possible to capture the “quantifying in” uses.

3. Towards a solution: introducing a relation

The essential ingredient of the LF proposed by Elbourne (2008a) for demonstrative-DPs is an object-language variable over relations R which mediates the relation between the individual picked out by the silent pronoun and the denotation of the whole DP. As I illustrate below, R can take values which allow the denotation of a DP not to be fixed to the individual picked out by the index. I will end this section by showing that although this approach delivers the right covarying interpretation for the “quantifying in” uses, it does not capture the empirically observed role of restrictive relatives.

The predecessor of F. Schwarz's (2009) proposal, Elbourne's (2008a) formalization of Nunberg's (1993) semantics of English demonstratives involves a richer structure than (6): in addition to a silent pronoun and a nominal predicate, D also combines with a relational component R.⁵

- (13) [i [R [D NP]]]

R in (13) is a variable over relational predicates of type $\langle e, \langle e, t \rangle \rangle$ that maps an individual (this ends up being the value of the index) onto a function which maps an individual to truth if it has a particular

³ This follows from the pedantic version of the Predicate Abstraction rule, Heim & Kratzer (1998: 125).

⁴ Note that Dever (2001) assumes that referential terms are “syntactically simple”. This will become of crucial importance later in the discussion when I propose a syntactic decomposition of what appears to be a single demonstrative or strong article.

⁵ To make a parallel with Schwarz (2009) proposal clearer, I changed the original constituency $[[[D i] R] NP]$ to $[i [R [D NP]]]$, changing the order of arguments in the lexical entry of D accordingly.

property. In the default case R corresponds to a functional relation of identity: the denotation of R is a function that maps an individual onto a property of individuals to be identical to the first argument.

$$(14) \quad \llbracket R \rrbracket = \lambda x . \lambda y . y = x$$

Within the framework of Elbourne (2008a), R can denote any sort of relation. Elbourne (2008a), however, emphasizes that the identity relation is the default value and that R takes other values only when the default one is made pragmatically unavailable. Although Elbourne (2008a) does not make it explicit, the shift from a functional to a non-functional semantics of R is what corresponds to the shift from directly referential to covarying interpretation of a demonstrative-DP. I will illustrate both cases below.

The function denoted by D takes a property of individuals P (denotation of the nominal predicate), a relation Q (denotation of R), and an individual type argument x (index value), and, if defined, returns a unique individual which has the property P and the property Q(x). By (14), Q(x) is a characteristic function of the set of individuals identical to x.⁶

$$(15) \quad \llbracket D \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda Q_{\langle e, \langle e, t \rangle \rangle} . \lambda x : \exists! y [P(y) \ \& \ Q(x)(y)] . \iota y [P(y) \ \& \ Q(x)(y)]$$

On the assumption that the relational argument in (15) is filled by R that denotes the identity relation, notice that for all individuals x and for all properties of individuals P for which the function in (15) is defined, its output is identical to the individual argument x, just as it is the case with the function denoted by the German strong article in (8).

$$(16) \quad \begin{aligned} \llbracket 1 \text{ } R \text{ that } cat \rrbracket^g \text{ is defined iff } \llbracket cat \rrbracket(g(1)) \\ \text{if defined } \llbracket 1 \text{ } R \text{ that } cat \rrbracket^g = g(1) \end{aligned}$$

In order to capture “quantifying in” uses, which require that the denotation of the demonstrative-DP covary with a quantifier-bound variable, Elbourne (2008a) proposes that R can assume other values than that of identity. For instance, in the case of the “quantifying in” use in (17) the proposal is that R denotes the relation of exemplification.

$$(17) \quad \text{Every father dreads that moment when his eldest child leaves home.}$$

To illustrate how this delivers the right interpretation, let us consider the following LF for this sentence.

$$(18) \quad \text{Every father dreads } [1 \text{ } R \text{ [that moment when his eldest child leaves home]}].$$

Elbourne (2008a) assumes that the index in (18) points to “the concept of [...] having one’s eldest child leave home”.⁷ Thus, the function denoted by R takes the individual which is a concept and returns a property of being an example of this concept. In (19) I put this proposal in formal terms.

$$(19) \quad \llbracket R \rrbracket = \lambda x . \lambda y . y \text{ exemplifies } x^8$$

Assuming that the assignment function maps the index 1 to the concept of having one’s eldest child leave home and that the pronoun *his* is bound by the universal quantifier higher up in the structure, we get the following interpretation for the demonstrative DP in (18).

$$(20) \quad \llbracket \text{that moment when his}_2 \text{ eldest child leaves home} \rrbracket^{g[2 \rightarrow z]} = \lambda Q_{\langle e, \langle e, t \rangle \rangle} . \lambda x : \exists! y [y \text{ is a moment when } z\text{'s eldest child leaves home} \ \& \ Q(x)(y)] . \iota y [y \text{ is a moment when } z\text{'s eldest child leaves home} \ \& \ Q(x)(y)]$$

⁶ As noted above, I simplify Elbourne’s (2008a) semantics of the demonstratives by removing the intensional dimension represented by situation arguments in the semantics of predicates. In addition, I took out the distal/proximal component of the semantics of the demonstrative since it is not relevant in the discussion of German strong articles. The original version looks as follows: $\llbracket that \rrbracket^{w, h, a, t} = \lambda x . \lambda f_{\langle e, \langle \langle s, e \rangle, \langle s, t \rangle \rangle \rangle} . \lambda g_{\langle \langle s, e \rangle, \langle s, t \rangle \rangle} . \lambda s . \iota z (f(x)(\lambda s'. z)(s) = 1 \ \& \ g(\lambda s'. z)(s) = 1 \ \& \ \text{distal}(x, w, a, t))$ (presuppositional content is omitted in the original).

⁷ Elbourne (2008a) does not give a formal definition for the term “concept”.

⁸ I leave aside the question of how the domain of this function should be restricted. Presumably the function should be defined not for all pairs of individuals.

- (21) $\llbracket R \text{ that moment when his}_2 \text{ eldest child leaves home} \rrbracket^{g[2 \rightarrow z]} = \lambda x : \exists ! y [y \text{ is a moment when } z\text{'s eldest child leaves home \& } y \text{ exemplifies } x] . \iota y [y \text{ is a moment when } z\text{'s eldest child leaves home \& } y \text{ exemplifies } x]$
- (22) $\llbracket 1 R \text{ that moment when his}_2 \text{ eldest child leaves home} \rrbracket^{g[2 \rightarrow z]}$ is defined iff $\exists ! y [y \text{ is a moment when } z\text{'s eldest child leaves home \& } y \text{ exemplifies the concept of having one's eldest child leave home}]$
 if defined, $\llbracket 1 R \text{ that moment when his}_2 \text{ eldest child leaves home} \rrbracket^{g[2 \rightarrow z]} = \iota y [y \text{ is a moment when } z\text{'s eldest child leaves home \& } y \text{ exemplifies the concept of having one's eldest child leave home}]$

While the concept of having eldest children leave home is the same for all fathers on this analysis (which is intuitively okay), for every father there will be a different unique moment which exemplifies this concept, that is, the moment such that his eldest child leaves home.

This approach, while capturing the shift from directly to non-directly referential behaviour of demonstrative-DPs, does not reflect the fact that the meaning supposedly assumed by R in (18) is identical to the meaning of the restrictive relative clause modifying the noun. Elbourne (2008a) does not say much about how the meanings of R other than the default relation of identity come about, except that “the only pragmatic factor capable of forcing another relational component is the index not satisfying the NP descriptive content”, Elbourne (2008a: 441). For instance, in the case of *Every father dreads that moment when his eldest child leaves home*, Elbourne (2008a) assumes that the index value is a concept (of having one’s eldest child leave home) for lack of a visual cue. In fact, Elbourne (2008a: 444) suggests that it is the covarying reading that actually forces a non-default semantics of R and a special interpretation of an index.

However, restrictive relatives make demonstrative-DPs scope-sensitive in a systematic fashion, as the following examples from King (2001) illustrate.

- (23) Every man eagerly looks forward to that day RRC [when he retires].
- (24) Most avid snow skiers remember that first black diamond run RRC [they attempted to ski].

Conceivably, on Elbourne’s (2008a) analysis (23) would involve an index picking out the concept of one’s retiring, while in (24) the index would point to the concept of being skied.

In addition to making covarying interpretation available, it can also be observed that the presence of a restrictive relative systematically makes an anaphoric antecedent or a deictic referent, otherwise needed by a demonstrative-DP, unnecessary. This is illustrated below for English demonstrative-DPs. The same holds for Austro-Bavarian strong-DPs.

- (25) a. Nina chose that bag. (Infelicitous without an anaphoric or deictic antecedent)
 b. Nina chose that bag which Karl recommended to her. (Can be used in any context)

In what follows I develop a structural solution to the problem of the loss of scopelessness which reflects the crucial role of restrictive relative clauses. In a nutshell, I propose that there is a functional head R which can combine either with an individual pronoun or a restrictive relative.

4. New ingredients for the semantics of strong- and demonstrative-DPs

In this section I propose that a restrictive relative effectively replaces the silent individual pronoun in the LF of strong- and demonstrative-DPs, as in (26). Covariation facts then follow, as well as the fact that the presence of a restrictive relative systematically makes an antecedent unnecessary for strong- and demonstrative-DPs.

- (26) $DP[D_{RP}[i/RRC [R NP]]]$

The discussion in this section is dedicated to independent considerations supporting (26) and consists of the following parts. I first show that within strong- and demonstrative-DPs the nominal predicate, together with its adjectival modifiers, is subject to an anti-uniqueness presupposition. I then present

evidence in section 4.2 that restrictive relatives are not part of the nominal predicate with respect to this presupposition. Finally, in section 4.3 I show how these facts are captured by the configuration in (26).

4.1. Anti-uniqueness presupposition

As mentioned in Wiltschko (2012) for Austro-Bavarian, strong articles are incompatible with nominal predicates which denote at most a singleton, such as *hechste Beag* ‘highest mountain’, in contrast to the weak article.

- (27) a. da hechste Beag
 D_{weak} highest mountain
 ‘the highest mountain’
 b. #da hechste Beag
 D_{strong} highest mountain

The observation is thus that strong articles require the nominal predicate to denote a set larger than a singleton. Notice also that the same holds for English demonstratives.

- (28) the/#that highest mountain

That is, in order to felicitously use a given strong- or demonstrative-DP, the conversation participants must assume that the property denoted by the nominal predicate holds of more than one individual (in a given domain). I will treat this requirement as an *anti-uniqueness presupposition*. That demonstrative-DPs carry an anti-uniqueness presupposition straightforwardly explains the perceived infelicity of the example in (29-b).

- (29) a. There are two suns. (False)
 b. #That sun is bright. (Infelicitous)

The next question of course is what triggers this presupposition in our model. For instance, it can be encoded as a restriction on the domain of the P-argument of Elbourne’s (2008a) D-function, as below (cf. (15)). Recall that this argument slot is filled by the denotation of the NP on the LF in (13).

- (30) $\llbracket D \rrbracket = \lambda P_{\langle e, t \rangle} : |\mathbf{P}| > 1 . \lambda Q_{\langle e, \langle e, t \rangle \rangle} . \lambda x : \exists ! y [P(y) \ \& \ Q(x)(y)] . \iota y [P(y) \ \& \ Q(x)(y)]$

There is, however, another set of data which suggests that the semantics of the presupposition trigger needs to discriminate between the nominal predicate with its adjectival modifiers on the one hand and restrictive relatives on the other.

4.2. Exemption of restrictive relatives from anti-uniqueness

I show below that the lexical entry in (30), which implicitly involves the assumption that restrictive relatives are mere nominal modifiers, just as adjectives, makes the wrong prediction that a noun with a restrictive relative denoting a singleton would be incompatible with strong articles/demonstratives, or, schematically,

- (31) #D [NP + RRC] if $|\llbracket NP \rrbracket \cap \llbracket RRC \rrbracket| = 1$

The prediction is wrong because in English in demonstrative-DPs we *can* have [NP + RRC] denoting a singleton.

- (32) that/the day on which I was born

This, again, contrasts, with the behaviour of demonstrative-DPs where [AP + NP] denotes a singleton, as the infelicitous example below illustrates.

(33) #That first day of my life was not very good.⁹

That adjectives but not restrictive relatives are relevant for the anti-uniqueness presupposition is further illustrated with the paradigm below. The example in (34-b) is infelicitous in a context where there are just two dogs, since there is only one individual fitting the description *young dog*. In contrast, the fact that there is only one individual fitting the description *dog which is going to be trimmed* in this context does not make (34-c) infelicitous.

- (34) a. (Context: There are two dogs in a house, of different ages.) Feed that dog first.
 b. #Feed that young dog first.
 c. Feed that dog which is going to be trimmed first.

Likewise, the prediction in (31) is not born out in the case of Austro-Bavarian strong-DPs. In the following example the complement of the article, [NP + RRC], denotes a singleton, and yet the strong article is not only a possible, but in fact a preferred option.

- (35) a. dea Tog an dem i auf 'd Wöd kumma bin
 det_{strong} day on which I to det_{weak} world come be
 'that day on which I was born'
 b. da Tog an dem i auf 'd Wöd kumma bin
 det_{weak} day on which I to det_{weak} world come be
 'the day on which I was born'

I take the fact that strong articles and demonstratives can be used in cases where [NP + RRC] denotes uniquely to suggest that the lexical entry in (30) needs to be revised. If it was the case that the predicate *Tog an dem I auf 'd wöd kumma bin* 'day on which I was born' played the same role in the LF of the strong article as *hechste Beag* 'highest mountain' in (27-b) does, the sentence in (35-a) should have been ungrammatical, contrary to fact. This, in turn, means that the head carrying the anti-uniqueness presupposition has to have access to the NP to the exclusion of the restrictive relative. This requires the following additions to the LF and the lexical entry of strong articles/demonstratives, where the S-argument is supposedly filled by the property denoted by a restrictive relative.

(36) [i [[R [D_{strong} NP]] RRC]]

(37) $\llbracket D_{strong} \rrbracket = \lambda P_{\langle e, t \rangle} : |P| > 1 \cdot \lambda Q_{\langle e, \langle e, t \rangle \rangle} \cdot \lambda S_{\langle e, t \rangle} \cdot \lambda x : \exists! y [P(y) \ \& \ Q(x)(y)] \cdot \iota y [P(y) \ \& \ Q(x)(y) \ \& \ S(y)]$

The new lexical entry is, however, highly problematic. First, a restrictive relative is by no means a necessary part of the syntactic structure of strong- and demonstrative-DPs. Second, both from the syntactic and semantic points of view, this is a very cumbersome object which does not seem to occur anywhere else in the grammar. In the next section I propose a solution to this conundrum, namely, to assume that a silent individual pronoun and a restrictive relative “compete” for the same argument slot.

4.3. A relational head *R*

In this section I show how assuming the structure in Fig. 1 for strong- and demonstrative-DPs captures all the patterns discussed so far and, moreover, makes it possible to assume a simple Fregean

⁹ Apparently, the sentence improves on a reading which implies a particular emotional attitude towards the day in question. This case belongs to the group of apparent violations of the anti-uniqueness requirement (e.g. *That albino gorilla is very dangerous!* when uttered in a context where there is only one albino gorilla, etc.). This phenomenon was also mentioned in Wolter (2006: 81). Although I do not offer a full analysis of these cases, my speculation is that the emphatic effect results precisely from a mismatch between the anti-uniqueness requirement and the context. Informally, the speaker uses an expression that is normally used to “make a selection” out of a set (e.g. *that day...*, *that gorilla...*) to point to the only individual with the relevant property, and the “overuse” of a referring device implies a special emphasis. It is interesting to note that such emotive uses also seem to make demonstrative-DPs scope-sensitive, as in the following example: *Every author cherishes that first major book contract*. One possible treatment of these cases involves some sort of an “emotive” feature that stands in complementary distribution to the index. Thanks to Florian Schwarz (p.c.) for the discussion of such cases.

lexical entry for the D head, with a proviso that D *spells out* as a strong article in case it takes a relational phrase, RP, as its complement.

In the configuration below the relational head R takes NP as its complement and *either* a silent individual pronoun *or* a restrictive relative as its specifier.¹⁰

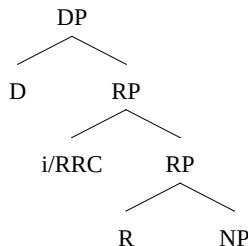


Figure 1: LF of a strong-eNP

On this LF, the head R denotes a function which takes two properties of individuals and, if defined, returns a set of individuals with both properties. The domain restriction on the first argument corresponds to the anti-uniqueness presupposition with respect to the denotation of the NP.

$$(38) \quad \llbracket R \rrbracket = \lambda P_{\langle e, t \rangle} : |P| > 1 . \lambda Q_{\langle e, t \rangle} . \lambda y . P(y) \ \& \ Q(y)$$

The case where R takes a silent individual pronoun as its specifier is analyzed by assuming a type-shifting operation *indent* of Partee (1987), which outputs a set of individuals identical to $g(i)$, that is, a singleton.¹¹

$$(39) \quad \textit{indent}(g(i)) = \lambda x . x = g(1)$$

Notice that on the LF in Fig. 1, D can have a regular Fregean semantics in weak- and strong-DPs, as well as in demonstrative- and *the*-DPs. A strong article or a demonstrative will then be considered a spellout of D in the context of RP. All grounds can now be covered with a single D, as in (40).¹²

$$(40) \quad \llbracket D \rrbracket = \lambda P_{\langle e, t \rangle} : \exists ! x [P(x)] . \iota x [P(x)]$$

The idea that a restrictive relative can play special role in a definite expression is not new. Bach & Cooper (1978) defended on semantic grounds the then-mainstream hypothesis that D forms a constituent with NP to the exclusion of a relative: $[[D \ NP] \ RRC]$. Although not assuming that kind of constituency, my proposal incorporates their insight that the relation between the relative and the NP can be “mediated” by a head which is not part of either projection. Instead of D, $\llbracket NP \rrbracket$ and $\llbracket RRC \rrbracket$ are co-arguments of the R-function on my proposal. A similar intuition is expressed in the proposals of Sternefeld (2008), Larson & Yamakido (2008), and Blümel (2011), who assume ${}_{DP}[[D \ RRC] \ NP]$ (for German), ${}_{DP}[NP \ [D \ RRC]]$ (for Persian) and ${}_{nP}[[D \ RRC] \ nP]$ (for German *derjenig* determiner) constituency respectively.

Likewise, Schwarz (2009: 268) tentatively suggests the option of treating restrictive relatives as another argument of the strong article, which will need to be supplemented with an account of what happens to the index, such as “assuming accommodation of the relevant individual, perhaps by assigning

¹⁰ In fact, Elbourne (2008a) assumes a somewhat similar constituency, $[D \ [R \ i]]$, for simple pronouns, which he treats as demonstratives minus NP and distal components. For Elbourne (2008a: 430) the only reason to have *i* and *R* as separate constituents in the case of demonstratives, $[[[D \ i] \ R] \ NP]$, is because it is “useful to have direct access to the index in order to deal with proximal and distal features...”. Elbourne’s (2008a) D-function introduces a presupposition that *i* is either close or far from the speaker. For the treatment of strong articles, and also of demonstratives with relative clauses, this issue seems to be of little concern since distal/proximal distinction is neutralized in these cases. In order to cover demonstratives proper in English I would have to relegate the proximal/distal feature to the semantics of *R*, which would come in two “flavours”, denoting functions defined for individuals that are either near the speaker or far from the speaker.

¹¹ Elbourne (2008b) makes an extensive use of this operation to capture various uses of personal pronouns.

¹² Of course, as is usual in the case of Fregean definites, we would need to supplement this entry with some domain restriction machinery.

the relative clause a special role in the process”. On the proposal I have just outlined no such accommodation is needed, since the index is simply not there. We get it all at once: independence from the presence of an antecedent, exemption of restrictive relatives from the anti-uniqueness requirement, and, as I illustrate in the next section, “quantifying in” uses.

4.4. Covariation: analysis

The main focus of this paper are the uses of strong- and demonstrative-DPs whereby they do not behave scopelessly and the role of restrictive relatives in this phenomenon. This role was left largely unnoticed on previous accounts.¹³ On the hypothesis that a restrictive relative clause replaces a silent individual pronoun, it is expected that a restrictive relative makes it possible for the denotation of a strong- or demonstrative-DP to covary. The simple reason is that, in the absence of the silent individual pronoun, the denotation is no longer “anchored” to the contextually provided value for the pronoun, and hence is expected to behave like a Fregean definite. If so, the denotation of a strong- or demonstrative-DP that contains an operator-bound variable is expected to covary with that variable.

Below I illustrate the semantic contribution of a restrictive relative to the interpretation of strong- and demonstrative-DPs with the example in (41), whose LF is given in (42).

- (41) A jeda Bua lest die Gschicht [wos da Hons üba eam gschriem hot].
 a every boy read det_{strong} story comp det_{weak} Hans about him written has
 (Previous discourse: there are three kids, and Marta and Hans each wrote a short story about each child.) ‘Every boy read that story which Hans wrote about him.’
- (42) Every boy₂ λ_2 t₂ read [D [[OP₁ λ_1 Hans wrote t₁ about him₂][R story]]]

Without going into semantic composition of restrictive relatives, I will simply assume that they denote properties obtained as a result of a lambda abstraction over the relativization site. We then get the denotation of the relative in (43), where y is bound by the universal quantifier higher up in the structure.

- (43) $\llbracket \lambda_1 \text{ Hans wrote } t_1 \text{ about him}_2 \rrbracket^{g[1 \rightarrow x; 2 \rightarrow y]} = \lambda x . \text{ Hans wrote } x \text{ about } y$

Assuming, as in (38), that R denotes a function taking two $\langle e, t \rangle$ -type arguments, the $[R \text{ NP}]$ part of the object DP receives the following interpretation.

- (44) $\llbracket R \text{ story} \rrbracket$ is defined iff $\llbracket \text{story} \rrbracket > 1$
 if defined, $\llbracket R \text{ story} \rrbracket = \lambda Q_{\langle e, t \rangle} . \lambda x . x \text{ is a story \& } Q(x)$

Substituting (43) for the second argument of the R -function, Q , we get,

- (45) $\llbracket R \text{ story} \rrbracket(\llbracket \lambda_1 \text{ Hans wrote } t_1 \text{ about him}_2 \rrbracket^{g[1 \rightarrow x; 2 \rightarrow y]})$ is defined iff $\llbracket \text{story} \rrbracket > 1$
 if defined, $\llbracket R \text{ story} \rrbracket(\llbracket \lambda_1 \text{ Hans wrote } t_1 \text{ about him}_2 \rrbracket^{g[1 \rightarrow x; 2 \rightarrow y]}) = \lambda x . x \text{ is a story \& Hans wrote } x \text{ about } y$

The denotation of the whole strong-DP is given below.

- (46) $\llbracket D \rrbracket(45)$ is defined iff $\llbracket \text{story} \rrbracket > 1 \& \exists! x [x \text{ is a story \& Hans wrote } x \text{ about } y]$
 if defined, $\llbracket D \rrbracket(45) = \iota x [x \text{ is a story about } y \& \text{ Hans wrote } x \text{ about } y]$

There is nothing to prevent the denotation of the strong-DP from covarying together with the quantifier-bound variable y .

Assuming, as before, that the definedness condition of the object DP becomes a domain restriction of the function denoted by the lambda-abstract over TP, we obtain the following interpretation of the TP *likes that story about him that Hans wrote*.

¹³ Tsao (1977: 190) makes an observation that with modifiers such as a relative clause, the demonstrative loses much of its deictic force in English and becomes more like the definite article. Wolter (2007) discusses a related effect, namely that postnominal modifiers such as relative clauses make available opaque interpretations for demonstrative-DPs in modal contexts. This series of facts fits nicely with the proposal developed here that restrictive relatives essentially turn demonstrative-DPs into regular Fregean definites (modulo the anti-uniqueness presupposition).

- (47) $\llbracket \lambda_2 t_2 \text{ read } D \text{ OP}_1 \lambda_1 \text{ Hans wrote } t_1 \text{ about him}_2 \text{ R story} \rrbracket^g$ is defined iff $\llbracket \text{story} \rrbracket > 1$
 if defined, $\llbracket \lambda_2 t_2 \text{ read } D \text{ OP}_1 \lambda_1 \text{ Hans wrote } t_1 \text{ about him}_2 \text{ R story} \rrbracket^g = \lambda y : \exists! x [x \text{ is a story about } y \ \& \text{ Hans wrote } x] . y \text{ read } \iota x [x \text{ is a story about } y \ \& \text{ Hans wrote } x]$

This denotation gives us the intuitively right truth-conditions: (41) is true just in case the set of children (modulo a contextual domain restriction) is a subset of the set of individuals denoted by the lambda-abstract over TP – individuals such that each one read the unique story that Hans wrote about him. That is, we ended up with the interpretation on which the denotation of the strong-DP covaries with the denotation of the personal pronoun bound by the universal quantifier.

5. Conclusions

I proposed that the reason a restrictive relative appears to trigger the loss of scopelessness is that it replaces the silent individual pronoun in the LF of strong- and demonstrative-DPs. An important further question is why restrictive relatives should be able to replace the pronoun. One promising direction is to see if a restrictive relative might actually contain a relation predicate as its head, in which case we could say that what appears as a demonstrative or a strong article is a spellout of a regular D in a “regular” DP where D takes a restrictive relative, RP, as its complement.

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