The partitive article *dei* in Italian*

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1. Background and intuitions

This paper is situated on the join of two particularly fertile grounds of discussions in formal semantics. The first is the distinction between bare nominals and indefinite DPs (Chierchia 1998, Dayal 2004, Farkas & de Swart 2004), the second the distinctions among indefinite DPs (Farkas 2002a,b, Stark 2002, Jayez 2006, Gutiérrez-Rexach 1999). A special status in these two debates is reserved for an expression known as the partitive article. What makes the partitive article (henceforth *Pa*) so difficult to analyze is that it seems to have the same origin in different Romance languages, but nevertheless behaves differently. In French e.g. *Pa N* seems to replace the bare plural and in Italian *Pa N* behaves more as a standard indefinite DP. My contribution is to radically separate diachrony / synchrony and to flesh out the status of the partitive article in Italian by showing that it cannot be analyzed in the same way as its French counterpart nor as other closely related expressions in Dutch, French and Italian. The main claim of this paper is that *dei* should be analyzed as an indefinite determiner.

To get a preliminary idea of the facts, I will informally discuss a simple example and formulate the two possible ways of analyzing *dei* that appear in the literature.

(1) Ho visto dei ragazzi.
   I have seen DEI boys

(1) is true if I saw at least two boys. The interpretation of this sentence can lead to the hypothesis that *dei* functions as an indefinite determiner indicating vague (plural) cardinality. Let us call this the atomic (i.e. non-decomposable) determiner analysis. Another hypothesis becomes available once we note that *dei* is the standard contracted form of the preposition *di* (‘of’) and the definite article *i* (‘the₃₈’). This is shown for the partitive construction in (2):

(2) Uno dei ragazzi
    one of-the boys
Based on this morphology and the link with the partitive construction one can entertain the hypothesis that *dei N* is a kind of partitive construction lacking a determiner preceding *of*. Let us call this the decomposition analysis.

The paper is organized as follows. In Section 2, I present the paper that introduced *dei N* into the formal semantics literature, viz. Chierchia (1997). The problems with Chierchia (1997) will lead us to consider the analysis of Storto (2003) and Zamparelli (2002). Zamparelli’s analysis will be presented in Section 3 and extensively discussed in Section 4. My own analysis will be formulated in the latter section as a solution to the problems of Zamparelli’s analysis. Section 5 summarizes the main claims of the paper.


This section sketches the analysis Chierchia (1997) proposed for *dei N*. Chierchia’s analysis is a decomposition analysis. In a nutshell he proposes that *dei* is the composition of the existential quantifier, the part-of relation and the definite article. Under his analysis a sentence like *Dei ragazzi stano giocando* (‘DEI boys stand playing’) is true if some boys (‘some parts of the boys’) are playing. The syntax and semantics are worked out below.

The syntax Chierchia assumes is the following:

(3) \[
\begin{array}{c}
[DP][NP [+part] [PP di [DP i [NP ragazzi]]]] \\
[DP dei[part]_{j,k} [NP t_j+t_i+t_k [PP t_j+t_i [DP t_i [NP ragazzi]]]]]
\end{array}
\]

In a first movement the definite article *i* incorporates into the preposition *di*. This complex then further incorporates into the empty N and into the higher D position. The first movement is triggered by some clitic feature, the other two by ordinary phi-features.¹

The semantics follows the syntax closely in this analysis. The only point that may require some further comment is that the preposition *di* is semantically vacuous. The rest of the analysis is straightforward: the definite article denotes the τ-operator, the empty N adds the part-of relation (≤) and the incorporation into the D-position adds the existential quantifier (∃). The resulting semantics is the following:

(4) \[\lambda Q \exists z (≤(z, i λx(R(x)))) & Q(z))\]

This analysis is not without problems. I will limit myself to the most tenacious one. The semantics Chierchia proposes for the definite article is the same as the one standardly used for the definite article in non-kind-referring contexts.² Let us call this the specific use of the definite article. The problem resides in the fact that this
use is known to trigger existential presuppositions. This means that a sentence as I saw the apples triggers the presupposition that there are apples. In a lot of contexts these presuppositions have little or no effect but in existential contexts (e.g. There exist elves, There exist flying horses) i N (‘the N’) and hence dei N are expected to be unacceptable or at least odd given that their use already presupposes that there are N. In Italian this test is complicated by the fact that the typical existential context (ci sono ‘there are’) can have both an existential and a locative reading. The prediction then is that dei N can only give rise to a locative interpretation. Example (5), taken from Storto (2003), shows that this prediction is not borne out: 3

(5) So che ci sono dei folletti, e prima o poi ne troverò uno. (OkExistential)
I-know that there are DEI elves, and sooner or later I-ll-find one

On the basis of this problem, call it the presupposition problem, Storto (2003) rejects Chierchia’s decomposition analysis and proposes an atomic determiner analysis. In the next section we will see that the presupposition problem does not suffice to reject a decomposition analysis. This is the contribution made by Zamparelli (2002).


Zamparelli’s (2002) paper attempts to save Chierchia’s decomposition analysis of dei N. The simple move made to avoid the presupposition problem discussed in the previous section is to assume that i ragazzi (‘the boys’) in dei ragazzi (‘DEI boys’) refers to the kind boys. Given that kinds do not trigger existential presuppositions this suffices to solve the problem. Dei ragazzi stano giocando (‘DEI boys stand playing’) is now true if there are instances of the kind boys that are playing. In this section, I will present the details of Zamparelli’s analysis. Before doing so I will make a short excursion into his analysis of partitives (Zamparelli 1998).

Zamparelli’s main aim is to derive proper partitivity without using the proper part operator. Proper partitivity was identified as a characteristic of partitives by Barker (1998). The idea is that two of the boys should only be defined for models in which there are at least three boys. I will now show how Zamparelli’s syntax and semantics derive this. Material preceding of will be referred to as upstairs material whereas material following of will be referred to as downstairs material.

The syntax Zamparelli assumes for partitives as two of the boys is roughly the following:

(6) [dp two [rp [np boys] [r of [dp the boys]]]]
Two properties stand out. The first is the fact that the downstairs NP has been copied to an upstairs NP position. The existence of this NP position is a standard assumption among syntacticians (for a similar assumption see Jackendoff 1977, Cardinaletti & Giusti 1992 and Sauerland & Yatsushiro 2004). The second is the special projection RP. This projection contains the ‘residue’ operator realized as of and is the semantic core of partitivity in Zamparelli’s analysis. The ‘residue’ operator is defined as follows:

$$Re'(A,b) = A - \{b\}$$

Given the syntactic structure Zamparelli assumes, it is not difficult to see how this operator gives us proper partitivity. It suffices to replace ‘A’ by the denotation of boys and ‘{b}’ by the denotation of the boys. The result is the following:

$$\{\{a\},\{b\},\{c\},\{a,b\},\{a,c\},\{b,c\}\} - \{a,b,c\} = \{\{a\},\{b\},\{c\},\{a,b\},\{b,c\},\{a,c\}\}$$

The crucial assumption is that the set corresponding to the upstairs noun has the downstairs DP as its supremum. Whenever this is not the case the analysis is bound to break down.

Now that we have some idea of how Zamparelli analyzes partitives we can take a look at his analysis of dei N. Zamparelli assumes the following syntax:

(i) $$[RP \, di\, [DP2 \, i\, [NP \, ragazzi]]]$$

(ii) $$[RP \, [NP \, ragazzi] \, [R'\, dei\, [DP2 \, i\, ragazzi]]]$$

(iii) $$[DP1 \, dei\, [NumP \, dei\, [RP \, [NP \, ragazzi]] \, [R'\, dei\, [DP2 \, i\, ragazzi]]]]$$

The only difference between dei N and the syntax of partitives is the presence of NumP. The role of this projection is to turn the set denoted by its complement into an unsaturated property (Heycock and Zamparelli 2003). (i) is base generated. In (ii) ragazzi is copied to the upstairs NP position and i causes di to inflect, yielding dei (see endnote 1). In (iii) NumP and DP1 are merged and dei gets copied to both. Finally intermediate copies of i, dei and ragazzi are erased.

The semantics Zamparelli assumes for dei N is very similar to his semantics of partitives. The only difference is that the downstairs DP refers to kinds. Kinds are created via the down-operator. Its inverse — the up-operator — turns kinds into properties.

$$down\text{-}operator \cap P : (For\ any\ situation/world \ s) \lambda s \, P_s \ if \ \lambda s \, P_s \ is \ in \ K, \ undefined\ otherwise \ (P_s \ is \ the \ extension \ of \ P \ in \ s)$$

$$up\text{-}operator \cup d: (Let \ d \ be \ a \ kind. \ For\ any\ situation/world \ s) \lambda x [x \leq d_s] \ if \ d_s \ is \ defined, \ where \ d_s \ is \ the \ plural \ individual \ that \ comprises \ all \ of \ the \ atomic \ members \ of \ the \ kind.$$
Kinds then receive the following interpretation:

\[(12) \text{ The kind corresponding to a set } P \text{ is } \cap P \text{ (Zamparelli’s notation is } \{\text{(the kind) } P\}\right]

The problem Zamparelli faces is that a kind is only the supremum of the singleton set containing the kind itself. In order to maintain a perfect parallelism with partitives, this means he has to propose the following subtraction operation:

\[(13) \{\text{(the kind) } P\} - \{\text{(the kind) } P\} = \emptyset\]

Of course, this cannot be right and in order to save the analysis, he assumes that as a last resort operation the first term can type-shift via the up-operator. The result is the following:

\[(14) P - \{\text{(the kind) } P\} = P\]

By moving to the NumP position, dei checks a plural feature present in Num which adds plurality. In argument position dei moves further to the D position and thus becomes a determiner having existential force. As a result, the sentence Dei ragazzi stano giocando is true if there are at least two boys who are playing. This is exactly the desired result. The way it is obtained is not unproblematic, though. In the next section I will deal with two problems this analysis faces. One is concerned with compositionality, the other with economy.

4. **Dei is a determiner**

In this section I will review Zamparelli’s analysis and propose my own alternative. The argumentation in this section can be summarized as follows: there are expressions that are best analyzed decompositionaly but dei N is not one of them. Zamparelli’s decomposition analysis is moreover not compositional and should therefore be abandoned altogether. 4.1 is devoted to the compositionality problem and proposes a solution along the lines of Le Bruyn’s (2007) analysis of the Dutch van die N (‘of those N’) construction. 4.2 is concerned with why dei N should not receive a decomposition analysis.

4.1 Compositionality\(^4\)

The breach in compositionality in Zamparelli’s analysis is situated in the interpretation he gives of the upstairs (silent) copy of the downstairs NP: he claims that it receives a kind-interpretation. Given that bare plurals in Italian cannot refer to kinds, this forces Zamparelli to assume that what gets copied to the upstairs NP
position is in some sense the downstairs DP and not the downstairs NP. The only way this can be achieved without actually postulating an upstairs DP-copy is to assume the following steps: (i) determine the referent of the downstairs DP, (ii) turn it into a singleton set, (iii) reinterpret the downstairs NP as referring to this set, (iv) copy the NP. This is a clear violation of compositionality and hence bad news for a decomposition analysis. The rest of this subsection will be devoted to the evaluation of two alternatives that both share the intuition that partitive of is not a realization of Zamparelli’s residue operator but of a part-operator.\(^5\)

Analyzing of as a part operator gives rise to at least two different semantic analyses. The first one stays as close as possible to the idea that dei \(N\) behaves like a partitive and that partitives have proper partitivity as a characteristic. The interpretation of of would then be a proper partitive variant of the up-operator:

\[
\langle \cup\rangle d: (\text{Let } d \text{ be a kind. For any situation/world } s) \lambda x[\lambda y(x < d_s)] \text{ if } d_s \text{ is defined, where } d_s \text{ is the plural individual that comprises all of the atomic members of the kind.}
\]

The resulting semantics would be the following:

\[
\lambda Q \exists y (\text{Plural}(y) \& \langle \cup\rangle \lambda z(\text{Ragazzi}(z))(y) \& Q(y))
\]

Unfortunately, this analysis wrongly predicts that (17) should be unacceptable given that dei \(N\) refers to all instances of the kind Martians in the world of evaluation. Note moreover that in Zamparelli’s analysis proper partitivity does not obtain either.

(17) Dei marziani che sono atterrati nel mio giardino mi hanno detto che loro sono gli ultimi rappresentanti della loro specie. (Storto 2003)

DEI Marians that are landed in-the my garden to-me have said that them are the last representatives of-the their species.

One way to do better is to assume that we do not use the proper partitive variant of the up-operator but the up-operator itself. A similar analysis has been proposed for the Dutch van die \(N\) (‘of those \(N\)’) construction by Le Bruyn (2007). The resulting semantics is exactly what we want.\(^6\)

(18) \(\langle \cup\rangle z(\text{Ragazzi}(z))\)

\[
\begin{align*}
\lambda d(\langle \cup\rangle d) & \quad [\text{dp}i \text{ ragazzi}] \\
\lambda z(\text{Ragazzi}(z)) & \quad \text{di} \\
\lambda P \lambda y (\text{Plural}(y) \& P(y)) & \quad [\text{pp} \text{di } i_1[\text{dp} t_1 \text{ ragazzi}]] \\
\lambda y (\text{Plural}(y) \& \langle \cup\rangle z(\text{Ragazzi}(z))(y)) & \quad \text{move to NumP and checking } [+\text{Plur}] \\
\lambda P \lambda y (P(y) \& Q(y)) & \quad [i_{\text{NumP}} d_i + i_1[\text{ppP}] t_1 + t_i[\text{dpP}] t_1 \text{ ragazzi}]] \\
\lambda Q \exists y (\text{Plural}(y) \& \langle \cup\rangle z(\text{Ragazzi}(z))(y) \& Q(y)) & \quad \text{move to DP} \\
\end{align*}
\]
From the preceding I conclude that the lack of compositionality in Zamparelli’s analysis can be neutralized and that, even though I will not adopt a decomposition analysis for *dei N*, other expressions might receive this kind of analysis. This is the underlying idea of 4.2.

### 4.2 Economy

In 4.1 I argued that Zamparelli’s decomposition analysis cannot be maintained because of its lack of compositionality. However, I showed that a fully compositional alternative is available and concluded that decomposition analyses are in principle still viable. In this section, I will argue that decomposition analyses of *dei N* should nevertheless be abandoned altogether for reasons of economy.

Given that decomposition analyses are more complex than atomic determiner analyses they should only be preferred over them if they allow to account for more facts (Occam’s razor). For a decomposition analysis to be feasible for *dei N* we would therefore expect it not to behave as a DP. In 4.2.1. I will however show that *dei N* does behave as a DP. This will lead to the conclusion that a decomposition analysis cannot be preferred over an atomic determiner analysis. Put differently: given that a decomposition analysis has to assume that *dei* ends up in the D position anyway it seems more natural to propose an analysis in which *dei* functions as a determiner in the first place. I will refer to this argument as the economy argument.

Straightforward as the economy argument might seem, it nevertheless hides a dangerous pitfall. Suppose that all expressions of the form *of + definite determiner + noun* (henceforth bare partitives) behave as DPs. In this case the economy argument would boil down to a rejection of compositionally deriving the meaning of bare partitives. This cannot be correct. To show that my analysis manages to avoid this pitfall I will make an inventory of bare partitives in Dutch, Italian and French and I will show that none of these show DP behaviour. This not only guarantees the validity of the economy argument but also suggests that the move from Num to D of *dei* should not be part of a decomposition analysis. I conclude that *dei N* cannot (or at least no longer) receive a decomposition analysis and that *dei* has become a full determiner. The decomposition analysis can be maintained for other bare partitives and as a grammaticalization path for *dei N*. In the remainder of this subsection I will provide the facts that backup the above argumentation.

#### 4.2.1 *Dei N* includes a D-layer and an existential quantifier

In this paragraph I will show that *dei N* functions as a full DP and differs from a bare plural. The most reliable characteristic of full (indefinite) DPs that distinguishes them from bare plurals is their ability to take both wide and narrow scope. Bare
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plurals are restricted to taking narrow scope. The scope behaviour of *dei N* and the bare plural is illustrated and compared to that of a normal DP in (19)–(20):

(19) Non ho visto bambini
    not I-have seen children

(20) Non ho visto DEI / due bambini
    not I-have seen two children

Whereas (20) can be interpreted as *I didn’t see any / any two children* and *There are particular / two particular children* I didn’t see (19) can only mean *I didn’t see any children*. I conclude that the analysis of *dei N* should include a D-layer and an existential quantifier. In the following paragraph I will argue that ‘normal’ bare partitives don’t include a D-layer and existential quantifier.

4.2.2 Bare partitives don’t include a D-layer and an existential quantifier

In this paragraph I will show that bare partitives in general behave more like bare plurals than like full DPs.

I know of four expressions that resemble *dei N* in being composed of the preposition used in partitives and a definite DP that cannot have a specific reading: the *van die N* (‘of those N’) construction in Dutch (de Hoop, Vanden Wyngaard & Zwart 1991, Oosterhof 2005a,b, Le Bruyn 2007); the *de ces N* (‘of those N’) construction in French (Zribi-Hertz 2002, Roodenburg 2004); the *des N* (‘of-the N’) construction in French (Bosveld-de Smet 1998, Zribi-Hertz 2002, Roodenburg 2004) and finally the *di questi N* (‘of these N’) construction in Italian (Korzen 1998). The fact that they involve the same preposition as the one used in partitives is illustrated in (21)–(23):

(21) twee van de mannen compare: van die ventjes
    two of the men          of these little-guys

(22) deux de ces hommes compare: de ces bonhommes
    two of those men        of those little-men
                         des linguistes
                    of-the linguists

(23) uno di questi uomini compare: di questi stronzi
    one of these men         of these bastards

The fact that the DP they contain cannot receive a specific reading is shown with the existential test in (24)–(27):

(24) Er bestaan nog steeds van die ventjes.
    there exist yet still of those little-guys
(25) Il existe de ces bonhommes.
    there exist of those little-men

(26) Il existe des linguistes.
    there exist of-the linguists

(27) Ci sono di questi stronzi.
    there exist of these bastards.

From (21)–(27) I conclude that bare partitives share with \textit{dei N} the properties that led Zamparelli to assume that \textit{i N} in \textit{dei N} refers to kinds and that \textit{dei N} is related to partitives.\footnote{We can thus safely assume that we are dealing with the same kind of expressions. Note that bare partitives with a demonstrative generally carry a positive or a negative connotation. Why this is so is beyond the scope of formal semantics.}

What I will show now is that bare partitives are crucially distinct from \textit{dei N} in not allowing for wide scope readings. This is done in (28)–(31):

(28) Ik heb nog nooit van die ventjes gezien. \hspace{1cm} (narrow scope only w.r.t. negation)
    I have yet never of those little-guys seen

(29) Je n’ai pas vu de ces bonhommes. \hspace{1cm} (narrow scope only w.r.t. negation)
    I not have not seen of those little-men

(30) Je veux rencontrer des linguistes. \hspace{1cm} (narrow scope only w.r.t. ‘want’)
    I want meet of-the linguists

(31) Non abbiamo di questi libri. \hspace{1cm} (narrow scope only w.r.t. negation)
    not we-have of these books

(28) and (29) can only be interpreted as \textit{I have never seen any of this type of (little) guys}. (30) can only be interpreted as \textit{I want to meet linguists, no matter which}. According to my informant, (31) is best interpreted as a reply by a respectable bookshop owner to a customer asking whether they sell dirty magazines.

This lack of wide-scope readings can be explained if we assume the following syntax and semantics:

\begin{align*}
(32) & \left[ \text{Num}^p_{\text{of}} j + \text{D}_{\{pp^t_j + t_i[\text{DP}^t_i \text{N}]\}} \right] \\
(33) & \lambda y (\text{Plural}(y) \& \sqsubseteq \text{[DP]}(y) \& Q(y))
\end{align*}

The crucial difference with the decomposition analyses of \textit{dei N} is that there is no D-layer in the syntax and no existential quantifier in the semantics.

From the preceding I conclude that bare partitives standardly lack a D-layer and an existential quantifier. On the basis of this result and the fact that \textit{dei N} contains both I furthermore conclude that an atomic determiner analysis of \textit{dei N}
should be preferred over a decomposition analysis. This means I agree with Storto (2003) and propose an atomic determiner analysis along the following lines:

\[(34) \lambda P \lambda Q \exists X (P(X) & Q(X))\]

5. General conclusion

In this paper I defended the following claims:

\[(35)\] Zamparelli’s decomposition analysis of \textit{dei N} is non-compositional and should therefore be abandoned.

\[(36)\] Bare partitives should receive the following decomposition analysis:

\[\text{Syntax } [\text{NumP}_i + \text{D}_i + \text{t}_i + \text{t}_i + \text{DP}_i + \text{t}_i + \text{N}]]\]

\[\text{Semantics } \lambda y (\text{Plural}(y) & \cup [\text{DP}](y) & Q(y))\]

\[(37)\] \textit{Dei} should be analyzed as a determiner: \(\lambda P \lambda Q \exists X (P(X) & Q(X))\)

(35) was discussed in 4.1. (36) contains the compositional alternative I proposed in 4.1 and 4.2.2. (37) was extensively discussed in 4.2. The main argument came from the comparison between \textit{dei N} and bare partitives in Dutch, French and Italian.

Notes

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1. As Chierchia notes himself this analysis violates the mirror principle (which would impose \(*i+di\). This can be avoided if we follow Zamparelli in assuming that \textit{dei} is an inflected form of \textit{di} and that inflection is triggered by movement of the definite determiner onto P. In the remainder of this paper I will ignore the mirror principle assuming that if it is valid ‘a local rearrangement at the phonetic interface’ can always be postulated (cf. Chierchia 1997).

2. Romance languages standardly use definite plurals to refer to kinds. \textit{Dogs are rare} e.g. is translated as \textit{I cani sono rari} ‘the dogs are rare’.

3. Chierchia originally defended the position that the prediction was borne out. His defence was based on the negative \textit{Non ci sono dei folletti} (‘There are no elves here’). Chierchia’s judgment of this sentence has not been challenged in the literature. Note though that if we assume that \textit{dei} triggers locative readings in existential sentences it should always trigger these readings and not only in negative existential sentences.

4. The argumentation in this section is worked out in more detail in Le Bruyn (to appear).
5. There is a third alternative: one can simply assume that the upstairs NP is not interpreted as a kind. Surprisingly this gives the correct results. The reason why I do not treat this alternative is that it cannot account for bare partitives containing a demonstrative (see 4.2.2).

6. This analysis is insensitive to the presence or absence of an upstairs noun. Note moreover that it raises important questions for semantics and syntax. For semantics: (i) Can we safely assume that of is the realization of the up-operator? (ii) Can of be a proper part operator in partitives and an (unreal) part operator in the analysis of dei? I leave these questions as open issues. For syntax: Can we add a NumP on top of a PP? Put differently: are there singular and plural PPs? Following recent explorations into the semantics of PPs (e.g. Zwarts 2005) and assuming a strict syntax / semantics correspondence I'm inclined to answer affirmatively.

7. Complexity can be thought of in number of projections.

8. Judgments for di questi N tend to vary. The examples I picked are acceptable at least for some of my informants.

9. The demonstrative DPs refer to subkinds. Their formal semantics is the following: $\forall x[\text{PLURAL}(x)\&\text{D}(x)\&\text{P}(x)]$ (D tentatively represents the semantic contribution of the demonstrative.

10. For independent reasons (competition with de) narrow scope cannot be easily demonstrated for des with respect to negation.

References


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