On Saying *Dat*

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1. Introduction: nonagreeing d-words in Dutch

In Dutch, fronted constituents, including subjects, can be resumed by a preverbal demonstrative pronoun, *die* (plural and nonneuter singular) or *dat* (neuter singular):[1,2]

(1) a   Die   man   doet   taalkunde
         DEM-nn,sg   man   does   linguistics
   b   Die   man   die   doet taalkunde
         DEM-nn,sg   man   DEM-nn,sg   does linguistics
         `That man does linguistics.'
(2) a   Dat   boek   leest   bijna niemand
         DEM-n,sg   book   reads   almost nobody
   b   Dat   boek   dat   leest bijna niemand
         DEM-n,sg   book   DEM-n,sg   reads almost nobody
         `Hardly anybody reads that book.'

In (1b) and (2b), the demonstrative pronoun (henceforth referred to as *d-word*) agrees in number and gender with the fronted constituent that it resumes.

In this paper, we will discuss a class of fronting constructions in which the d-word does not agree in number and gender with the fronted constituent that it resumes. In these constructions, the neuter singular demonstrative pronoun *dat* appears:

(3) a   Die   man   dat   is   een soldaat
         DEM-nn,sg   man   DEM-n,sg   is   a soldier
         `That man is a soldier.'
   b   Die   mannen dat   zijn soldaten
         DEM-pl   men   DEM-n,sg   are   soldiers
         `Those men are soldiers.'

We will discuss the distribution of the nonagreeing resumptive d-word, and we will argue that the d-word does not show agreement with the fronted constituent whenever it has the semantic type of a predicate (i.e. $<e,t>$), a proposal that in essence was already entertained by Partee (1986).

There are two cases to consider. First, the fronted constituent can be a predicate syntactically as well as by semantic type (e.g. a Small Clause predicate). This is the standard case in which the nonagreeing d-word appears. Second, the fronted constituent can be an argument syntactically, but a predicate by semantic type. This typically occurs when the fronted constituent is the subject of a Small Clause headed by a second order predicate (which has the semantic type $<<e,t>,t>$). Our analysis predicts, correctly, that the fronted subject of a Small Clause headed by a first order predicate (i.e. $<e,t>$) cannot be resumed by a nonagreeing d-word (as a predicate must be of a higher type than its subject).[3]

2.   The distribution of the nonagreeing d-word

We can make the following generalizations regarding the distribution of the nonagreeing d-word in Dutch:[4]

1.   The nonagreeing d-word is used when the fronted constituent it resumes is a predicate.
2.   Elsewhere, the nonagreeing d-word can only be used if the fronted constituent is a Small Clause subject.

The first generalization is illustrated in the following examples:

(4) a   Ik vind   [Jan   [een echte soldaat]]
          I consider   John   a real soldier
    b   Een echte soldaat,   dat/*die   vind   ik   [Jan   *e*]
          a real soldier   DEM-n,sg/nn,sg   consider   I   John
(5)   Een echte soldaat,   die/*dat   doet   zoiets   niet
          A real soldier   DEM-nn,sg/n,sg   does   something-like-that   not

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[3]   In this paper, we ignore specificational pseudoclefts, like *What I mean is this*, where *what I mean* seems to be the syntactic subject of the predicate *this*, and is of a higher type ($<e,t>$) than the predicate (*e*). In Dutch specificational pseudoclefts, a nonagreeing d-word is used (*Wie ik bedoel, dat is Jan* `Who I mean, DEM-n,sg is Jan'). Possibly, our generalization can be strengthened: the nonagreeing d-word always is (or resumes an element) of a type higher than *e*. We will reserve the properties of pseudoclefts for further study, however (cf. Williams 1983; Partee 1986).

[4]   Here and below it must be understood that use of a resumptive d-word is never obligatory. When we say that a nonagreeing d-word is obligatory, this is correct only in the sense that *if* a d-word is used, it has to be of the nonagreeing type.

(6) a 't Zijn ambtenaren
    it are civil-servants

   b Ambtenaren, dat/*die zijn 't
    civil-servants DEM-n,sg/nn,sg are it
    `Civil servants, that's what they are.'

(7) Ambtenaren, die/*dat werken hard
    civil-servants DEM-nn,sg/n,sg work hard

(8) a Je bent onvergetelijk
    you are-2sg unforgettable

   b Onvergetelijk, dat/*die ben je
    unforgettable DEM-n,sg/nn,sg are-2sg,inv. you
    `Unforgettable, that's what you are.'

In (4), the verb *vinden* `consider' selects a Small Clause complement, indicated by the outer brackets, consisting of a subject *Jan* and a predicate *een echte soldaat*. Fronting of the predicate *een echte soldaat* requires using the nonagreeing d-word, as (4b) shows. If *een echte soldaat* has a syntactic function other than that of Small Clause predicate, it must be resumed by an agreeing d-word (except where generalization 2. above applies), as (5) shows.

    In (6) and (8), *ambtenaren* and *onvergetelijk* are predicates of the subjects *'t* and *je*, respectively. We assume that the copula *zijn* (which has two 2sg present tense forms, *ben* in inversion constructions, and *bent* elsewhere) selects a Small Clause, the subject of which raises to the matrix subject position (cf. Hoekstra 1984):

(9) $[_{IP}$ SUBJECT$_i$ $[_{VP}$ COPULA $[_{SC}$ t$_i$ PREDICATE $]]]$

Subsequent fronting of the predicate then requires using the nonagreeing d-word, as (6b) and (8b) show. Again, if the same fronted element is not a predicate, as in (7), an agreeing d-word must be used (modulo generalization 2. above).

    When an entire verb phrase (VP) is fronted, the resumptive pronoun must again be *dat*:

(10) [Het boek gelezen] dat heb ik niet
    the book read-pcple DEM-n,sg have-1sg I not

Since a VP is a predicate, this falls within generalization 1. above.

    The second generalization above, according to which the nonagreeing d-word resumes a Small Clause subject, is illustrated by (3), and by the following examples (see De Rooy 1970 for excellent discussion of this phenomenon):

(11) a Ik vind [Jan [een echte soldaat]]
    I consider John a real soldier

   b Jan dat/die vind ik [*e* [een echte soldaat]]

	John	DEM-n,sg/nn,sg	consider	I	a real soldier
(12)	Jan	die/*dat	doet	zoiets	niet
	John	DEM-nn,sg/n,sg	does	something-like-that	not

Assuming again the analysis of copular constructions in (9), the examples in (3) illustrate fronting of the Small Clause subjects *die man* and *die mannen* to the sentence initial position. Likewise, (11b) illustrates fronting of the subject of the Small Clause selected by *vinden*. Again, (12) shows that *Jan* requires an agreeing d-word when it is not a Small Clause subject.

As can be seen in (11b), Small Clause subjects can be resumed by an agreeing d-word as well. In this respect, they differ from predicates, which require a nonagreeing d-word when fronted. We will return to the apparent optionality in (11b) in section 5.

Summarizing this section, we have seen that the nonagreeing d-word in Dutch appears under fronting of a) a predicate, and b) a Small Clause subject.[5] In the remainder of this article, we will attempt to determine what Small Clause subjects and predicates have in common, in order to unify the two generalizations regarding the distribution of the nonagreeing d-word in Dutch.[6]

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[5] There is a third class of cases where the nonagreeing d-word appears (De Vries 1910-1911). As discussed below, a subject cannot be resumed by the nonagreeing d-word when the predicate is an adjective (see (i)). However, when the subject contains an adjective or some other modifying element, a nonagreeing d-word is possible in some cases (ii)-(iii):

(i)	*Ambtenaren	dat	is	vervelend
	Civil-servants	DEM	is	annoying
	lazy civil-servants	that	is	annoying
(ii)	Luie ambtenaren	dat	is	vervelend
	lazy civil-servants	DEM	is	annoying
(iii)	Die ambtenaar	dat	was	vervelend
	DEM civil-servant	DEM	was	annoying

In (ii) and (iii), the fronted constituents are `honorary NPs' in the sense of Safir (1983). The d-words in these sentences do not refer to a particular civil servant or class of civil servant, but rather to the situation of having that civil servant, or that class of civil servants, around. The proper generalization appears to be that the agreeing d-word refers to concrete objects (of type e), whereas the nonagreeing d-word denotes more abstract objects (of higher types than e), such as properties, situations, or propositions (see also the discussion of example (23) below).

[6] In certain copular constructions, notably equative constructions like *Clark Kent is Superman*, it is not always clear which noun phrase is the subject and which is the predicate. One might be tempted to propose that the function of the elements in the Small Clause constructions discussed here is indeterminate in the same way. In other words, one might suppose that what we have identified as Small Clause subjects are in fact Small Clause predicates, thereby reducing generalization 2. in the text to generalization 1. However, many syntactic tests testify to the clear Small Clause subject status of *die man* in (3a), and likewise in the other examples. Note that the resumptive d-word may also appear *in situ*, as in (i):

(i)	Jan, ik	vind	dat	een echte soldaat
	John I	consider	DEM	a real soldier

3.   **Nonagreeing d-words are always of type *<e,t>***

We would like to propose that the characteristic unifying both kinds of nonagreeing d-words is their semantic type: nonagreeing d-words have the semantic type of a predicate, i.e. *<e,t>* (or an intensionalized version thereof), even when syntactically they are subjects.[7] Agreeing d-words, on the other hand, are always of the object denoting type *e*. In essence our proposal can already be found in Partee (1986), who suggests that English *that* is of type *<e,t>* when it is used to pick out a human, as in *That is the president.*

Thus, in (11b), for instance, the agreeing d-word *die* is of type *e* and refers to the object denoted by *Jan*, say j. The nonagreeing d-word *dat* on the other hand is of type *<e,t>*; we propose that it denotes the singleton set that has Jan as its only member, {j}. By claiming that nonagreeing d-words are always of type *<e,t>*, we unify cases where the nonagreeing d-word represents a subject, like (3b) or (11b), with cases where it is a syntactic predicate such as (4b), (6b), (8b), and (10b).

Of course, our hypothesis that a nonagreeing d-word that is the subject of a Small Clause has the semantic type of a predicate immediately raises the question how it can be combined with the syntactic predicate of the Small Clause. In our view this can only happen if the syntactic predicate semantically is a *second order* predicate, in other words, a set of sets. This means that when the subject of the Small Clause is a nonagreeing d-word of type *<e,t>*, then the syntactic predicate of the Small Clause must be of type *<<e,t>,t>*, a generalized quantifier.

The position of *dat* w.r.t. *een echte soldaat* now shows that *dat* is the Small Clause subject and *een echte soldaat* is a predicate. When the d-word is not *in situ*, other syntactic tests yield the same result. Note that, under neutral intonation, Small Clause predicates follow sentence adverbs, and, when indefinite, fuse with the negation element *niet* to yield *geen*. These tests show that *een soldaat* in (ii) is a predicate, rather than a subject (cf. (iii)-(iv)):

(ii)	Jan,	dat	is	een soldaat	
	John	DEM	is	a soldier	

(iii)	a.	Jan	dat	is	altijd	een soldaat	gebleven
		John	DEM	is	always	a soldier	remained

`John has always remained a soldier.'

	b.	*Jan	dat	is	een soldaat	altijd	gebleven
		John	DEM	is	a soldier	always	remained

(iv)	a.	Jan	dat	is	geen soldaat	(geen < niet een)
		John	DEM	is	no soldier	

	b.	*Jan	dat	is	een soldaat	niet
		John	DEM	is	a soldier	not

[7]   Throughout we will only consider extensional types. Our analysis can easily be extended to intensional types, however. A further variant we will not discuss is that nonagreeing d-words denote a nominalized property in Chierchia's sense (cf. Partee 1986, 1987).

Assuming that only DPs can denote generalized quantifiers,[8] this gives rise to the following prediction:

If the subject of the Small Clause is a nonagreeing d-word, then the predicate must be a DP.

Below we will see that this prediction is fully borne out.

Before considering the semantics of sentences with nonagreeing d-words in more detail, let us take a step back and discuss Small Clauses the subject of which is a proper name. Examples are given in (13) and (14):

(13)   Ik vind   [Jan dapper].
        I consider   John brave
(14)   Ik vind   [Jan een soldaat].
        I consider   John a soldier

A Small Clause can only be interpreted if its subject and its predicate have compatible types. The predicate must denote a function which takes things that have the type of the subject and yields a truth value. Thus, if the type of the subject is *X*, then the predicate must be of type $<X,t>$.

In (13) the predicate is the AP *dapper* `brave' which is of type $<e,t>$ and can therefore be applied directly to the subject *Jan* which is of type $e$.[9] In (14), however, the predicate is the DP *een soldaat* `a soldier' which is of type $<<e,t>,t>$ (a generalized quantifier) and therefore cannot combine directly with a subject of type e. Following Partee (1987) we will assume that there is a type-shift operation called BE (not to be confused with the copula *be*) which lowers an expression of type $<<e,t>,t>$ to one of type $<e,t>$:

Type lowering (Partee 1987)
BE $<<e,t>,t>$ ⇒ $<e,t>$ $[\![BE(DP)]\!] = \{x \mid \{x\} \in [\![DP]\!]\}$

Intuitively, BE picks out all the singletons from a generalized quantifier and collects their elements in a set. If **een**(**soldaat**) denotes the generalized quantifier $\{X \mid X \cap SOLDAAT \neq \varnothing\}$ (the set of all sets that have a non-empty intersection with the set SOLDAAT), then BE(**een**(**soldaat**)) denotes the set SOLDAAT, the set of all soldiers. Thus, by applying BE to the generalized quantifier denoted by a singular indefinite noun phrase we get back an object of type $<e,t>$, namely the set denoted by the

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[8]   This assumption is one half of the NP-Quantifier universal proposed by Barwise and Cooper (1981), updated to DPs.

[9]   For quantified subjects like *iedere jongen* `every boy', which are of type $<<e,t>,t>$, we can adopt one of two options. Either a quantified subject can combine directly with a predicate of type $<e,t>$ by taking the latter as its argument (rather than vice versa), or quantified subjects obligatorily undergo Quantifier Raising leaving a trace of type e.

head noun. After the Small Clause predicate *een soldaat* in (14) is lowered to type $<e,t>$, it can apply to the subject *Jan* which is of type *e*. The calculation of the truth conditions of the Small Clause in (14) is shown in (14'):

(14')   **een(soldaat)** $\{X \mid X \cap \text{SOLDAAT} \neq \varnothing\}$
        BE(**een(soldaat)**) $\{x \mid \{x\} \in \{X \mid X \cap \text{SOLDAAT} \neq \varnothing\}\} =$
                                      $\{x \mid \{x\} \cap \text{SOLDAAT} \neq \varnothing\} =$
                                      SOLDAAT
        BE(**een(soldaat)**)(**jan**) $j \in \text{SOLDAAT}$

If the subject is an agreeing d-word such as *die* in (15) and (16), the situation is essentially the same:

(15)   Jan   die   vind ik   [t   dapper].
       John   DEM-nn,sg   consider I   brave
(16)   Jan   die   vind ik   [t   een soldaat].
       John   DEM-nn,sg   consider I   a soldier

Die is of type *e* and therefore the predicate of the Small Clause must be of type $<e,t>$, either inherently or after type-lowering by BE.

   Now consider the corresponding sentences with the nonagreeing d-word *dat*. Importantly, *dat* cannot be used when the predicate is an AP like *dapper* `brave' in (17):

(17)   *Jan   dat   vind ik   [t   dapper].
       John   DEM-n,sg   consider I   brave

Assuming that nonagreeing d-words are always of type $<e,t>$ it is easy to see why (17) is ungrammatical. Both the subject and the predicate of the Small Clause are of type $<e,t>$, which makes it impossible for one expression to take the other as its argument. The sentence is therefore uninterpretable because of the incompatibility of types.

   In (18), however, the situation is different:

(18)   Jan   dat   vind ik   [t   een soldaat].
       John   DEM-n,sg   consider I   a soldier

Here the predicate is a DP and therefore has type $<<e,t>,t>$. Since the subject is of type $<e,t>$, we can directly apply the predicate to the subject. Below it is shown that we obtain the right result: the Small Clause is true iff Jan is a member of the set SOLDAAT:

(18')   **dat** $\{j\}$
        een(soldaat) $\{X \mid X \cap \text{SOLDAAT} \neq \varnothing\}$

een(**soldaat**)(**dat**)   {j} ∈ {X│ X∩SOLDAAT ≠ ∅} iff j ∈ SOLDAAT

Note that this does not involve the type lowering BE.

(14) and (16) on the one hand and (18) on the other hand can be viewed as employing two different strategies to combine a subject with a DP predicate. In (14) and (16) the predicate is lowered to type $<e,t>$ so it can combine with a subject of type e. In (18) the subject *dat* is of type $<e,t>$, which makes it possible for a predicate of type $<<e,t>,t>$ to apply to it directly.

4. Some consequences

Our proposal makes a number of empirical predictions.

First, as already mentioned, we expect that a nonagreeing d-word can only be used as the subject if the predicate is a generalized quantifier, hence a DP. The contrast between (17) and (18) already indicates that the predicate cannot be an AP. Further support for our proposal is based on the fact that in Dutch bare nouns can be used as predicates under certain circumstances, in particular when they refer to a certain social role or profession:

(19)   Jan   is   soldaat.
        John   is   soldier
        `John is a soldier.'

We will assume that syntactically such bare nouns are NPs (as opposed to DPs) and that because they lack a determiner their semantic type is that of a predicate, namely $<e,t>$. Just like an AP, a bare noun can therefore not be the predicate if the subject is a nonagreeing d-word, whereas there is no problem if the subject is an agreeing d-word (cf. de Rooy 1970):

(20)   Jan   die/*dat   is   soldaat.
        John   DEM-nn,sg/n,sg   is   soldier

The contrast in (20) is reminiscent of a similar contrast in English that was noted by Higgins (1973) (see also Partee 1986):

(21)   a.   John is (the) mayor of Cambridge.
        b.   That is *(the) mayor of Cambridge.

A second empirical consequence is that a nonagreeing d-word cannot be the subject or object of a verb which takes arguments of type e. Assuming that extensional verbs have this property (Partee and Rooth 1983), this explains why d-words must agree in examples like (5), (7), and (12) and also the following:

(22)   Jan   die/*dat   heb ik gezien.
        John   DEM-nn,sg/n,sg   have I seen

It has been argued recently, by Zimmerman (1992-93), that the objects of intensional verbs like *seek* are of a predicative type rather than full generalized quantifiers. This is confirmed by the fact that such arguments can be expressed by a nonagreeing d-word, which we have argued to be predicative:

(23)   Een eenhoorn   die/dat   zoek ik.
        a unicorn   DEM-nn,sg/n,sg   seek I
        `A unicorn that's what I'm looking for.'

Notice that the agreeing d-word *die* can be used here too, but this gives the sentence a *de re* rather than a *de dicto* reading, as is to be expected if agreeing d-words are always of type *e*.

A third prediction following from our theory is that a preposed predicate can be resumed only by a nonagreeing d-word. As noted above, this is borne out by the facts (see Ross 1969 and Partee 1987 for observations on the use of *that* as a predicate in English):

(24)   Soldaat/Een soldaat/Groot   *die/dat   is Jan.
        soldier/a soldier/big   DEM-nn,sg/n,sg   is John

5.   Other singular DPs as predicates

In section 3 we have shown how a singular indefinite DP like *een soldaat* `a soldier' can be the predicate of a Small Clause of which the subject is either of type *e* (such as a name or an agreeing d-word) or of type *<e,t>* (a nonagreeing d-word). Singular indefinites are not the only kind of DPs that can be predicates, of course. We will first discuss other types of singular DPs and then in the next section turn to plurals.

Partee (1987) has shown that her type lowering operation BE can be meaningfully applied to DPs whose determiner is *a(n)*, *the* or *no*, but not *every*. When we apply BE to the generalized quantifier denoted by *every soldier* the result will be the empty set whenever there are two or more soldiers (the reason being that in that case the generalized quantifier does not contain any singletons). Partee argues that this is why a universally quantified DP cannot be used as a predicate:

(25)   John is a/the/no/*every soldier.

In Dutch we find parallel data: when the subject is an agreeing d-word, the predicate can be a DP headed by an indefinite or a definite determiner (*een* `a' or *de* `the', respectively) or *geen* `no', but not *iedere* `every':

(26)   Jan   die   is   een/de/geen/*iedere   soldaat.
       John   DEM-nn,sg   is   a/the/no/every   soldier

In (26') we show what the result is of applying BE to each of these DPs (except for *een soldaat* which was already discussed in section 2). Note the degenerate result in the case of *iedere* `every':

(26')   a.   **de**(**soldaat**) $\{X \mid \iota x[x \in \text{SOLDAAT}] \in X\}$
             BE(**de**(**soldaat**)) $\{\iota x[x \in \text{SOLDAAT}]\}$
        b.   **geen**(**soldaat**) $\{X \mid X \cap \text{SOLDAAT} = \varnothing\}$
             BE(**geen**(**soldaat**)) $\{x \mid \{x\} \in \{X \mid X \cap \text{SOLDAAT} = \varnothing\}\} =$
                                            $\{x \mid \{x\} \cap \text{SOLDAAT} = \varnothing\} =$
                                            U-SOLDAAT
        c.   **iedere**(**soldaat**) $\{X \mid \text{SOLDAAT} \subseteq X\}$
             BE(**iedere**(**soldaat**)) $\{x \mid \{x\} \in \{X \mid \text{SOLDAAT} \subseteq X\}\} =$
                                            $\varnothing$ whenever card(SOLDAAT) ≥ 2.

What if the subject is a nonagreeing d-word? Since in that case the subject is of type $\langle e,t \rangle$, application of BE to the predicate is not necessary. Hence we expect all singular DPs to be able to function as the predicate. In particular, there should be no problem with the universal quantifier *iedere soldaat* `every soldier':

(27)   Jan   dat   is   een/de/geen/$^{?}$iedere   soldaat.
       John   DEM-n,sg   is   a/the/no/every   soldier

Although admittedly the variant of (27) with *iedere* `every' is not perfect (a fact for which we have no good explanation), it improves markedly when we add a relative clause. Thus, we find a sharp contrast in (28) between using the agreeing *die* or the nonagreeing *dat*:

(28)   Jan   *die/dat   is   iedere soldaat   die we hebben.
       John   DEM-nn,sg/n,sg   is   every soldier   that we have

Notice also that in English we find the same contrast between using a name or the demonstrative *that*:

(29)   *John/That is every soldier we have.

In (27') we show that our assumptions yield the right truth conditions for each of the variants of (27) (for *een soldaat* `a soldier' see (18')):

(27')   a.   **de**(**soldaat**)(**dat**) $\{j\} \in \{X \mid \iota x[x \in \text{SOLDAAT}] \in X\}$ iff
                                              $\iota x[x \in \text{SOLDAAT}] \in \{j\}$ iff
                                              $j = \iota x[x \in \text{SOLDAAT}]$

        b.   **geen**(**soldaat**)(**dat**) $\{j\} \in \{X \mid X \cap \text{SOLDAAT} = \varnothing\}$ iff
                                              $\{j\} \cap \text{SOLDAAT} = \varnothing$ iff
                                              $j \notin \text{SOLDAAT}$

        c.   **iedere**(**soldaat**)(**dat**) $\{j\} \in \{X \mid \text{SOLDAAT} \subseteq X\}$ iff
                                              $\text{SOLDAAT} \subseteq \{j\}$

6. Plurals

Nonagreeing d-words can not only be used to resume preposed singular DPs, but also plurals:

(30)   Jan en Piet   dat   zijn de soldaten.
       John and Pete   DEM-n,sg   are the soldiers

   We assume that the plural *dat* is also of type *<e,t>* and hence denotes a set. In (30) this would be the set containing just Jan and Piet (i.e. {j,p}). This means that when *dat* is the subject, the predicate can be any DP, and this is indeed what we find:

(31)   Jan en Piet   dat   zijn
       John and Pete   DEM-n,sg   are
       twee/minder dan vijf/alle/de meeste   soldaten
       two/fewer than five/all/most   soldiers

(31') is a sample calculation of the truth conditions of sentences of this type. The other cases are exactly parallel.[10]

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[10]   The calculation in (31') implies that in order for (31) to be true it is only necessary that the set denoted by *dat* include two soldiers. Any additional individuals also included in this set are irrelevant for the truth conditions. In other words, (i) will turn out to be true:

      (i)   Jan, Piet en Bert   dat   zijn twee soldaten.
            John, Pete and Bert   DEM-n,sg   are   two soldiers

Although this sentence does intuitively strike one as being false or at least odd, we believe this fact can ultimately be given a pragmatic explanation along Gricean lines. The sentence is literally true, but it would be misleading to utter it because the speaker uses the preposed DP to refer to a group of people which explicitly includes more than just two soldiers. The implicature that *dat* refers to a set consisting of just two soldiers can be cancelled by adding expressions of uncertainty. (ii) for instance is much less odd than (i):

      (ii)   Jan, Piet en Bert   dat   zijn misschien niet meer dan   twee soldaten
             John, Pete and Bert   DEM-n,sg   are   perhaps not more than   two soldiers

(31')   **twee**(**soldaat**) $\{X \mid card(X \cap \text{SOLDAAT}) \geq 2\}$
      dat $\{j,p\}$
      twee(**soldaat**)(**dat**) $\{j,p\} \in \{X \mid card(X \cap \text{SOLDAAT}) \geq 2\}$ iff
                                       $card(\{j,p\} \cap \text{SOLDAAT}) \geq 2$ iff
                                       $\{j,p\} \subseteq \text{SOLDAAT}$

By contrast, the agreeing d-word *die* is incompatible with a plural DP as predicate:

(32)   *Jan en Piet   die   zijn
      John and Pete   DEM-nn,pl   are
      twee/minder dan vijf/alle/de meeste soldaten
      two/fewer than five/all/most   soldiers

The reason is that all these DPs yield degenerate results when Partee's type-lowering BE is applied to them. They will always denote either the empty set or the whole domain of quantification U (cf. Partee 1987). (32') gives an example of both cases:

(32')   a.   **twee**(**soldaat**) $\{X \mid card(X \cap \text{SOLDAAT}) \geq 2\}$
          BE(**twee**(**soldaat**)) $\{x \mid \{x\} \in \{X \mid card(X \cap \text{SOLDAAT}) \geq 2\}\} =$
                                  $\{x \mid card(\{x\} \cap \text{SOLDAAT}) \geq 2\} = \varnothing$
      b.   **minder dan vijf**(**sold.**)) $\{X \mid card(X \cap \text{SOLDAAT}) < 5\}$
          BE(**min. d. vijf**(**sold.**)) $\{x \mid \{x\} \in \{X \mid card(X \cap \text{SOLDAAT}) < 5\}\} =$
                                  $\{x \mid card(\{x\} \cap \text{SOLDAAT}) < 5\} = U$

There is one apparent counterexample to our claim that the subject cannot be an agreeing d-word if the predicate is a plural DP. This concerns bare plurals. At least for some speakers (but apparently not for all) (33) is fine:

(33)   %Jan en Piet   die   zijn soldaten
      John and Pete   DEM-nn,pl   are soldiers

We would like to argue that here the predicate is not a DP, but a bare NP which shows number agreement with its subject.

Recall that bare NPs are of type $<e,t>$, just like APs, which explains why they can combine with a subject of type *e*. Number agreement in bare NPs is not obligatory in Dutch, as can be seen in (34) (in fact, for those speakers who reject (33), number agreement in bare NPs is even excluded):

(34)   Jan en Piet   die   zijn soldaat
      John and Pete   DEM-nn,pl   are soldier

When the subject is the nonagreeing d-word *dat* only the plural form *soldaten* is allowed:

(35)   Jan en Piet   dat   zijn *soldaat/soldaten.
         John and Pete   DEM-n,sg   are soldier/soldiers

The ungrammaticality of the singular *soldaat* is as expected: *dat* is of type $<e,t>$ and hence cannot have a bare NP, which is of the same type, as its predicate. The grammaticality of the plural *soldaten* indicates that here *soldaten* should not be analyzed as a bare NP, but as a full DP with an empty determiner. Hence the nominal predicate *soldaten* in (33) has a different syntactic and semantic status than its homophonous counterpart in (35). Whereas *soldaten* in (33) is a bare NP showing number agreement with the subject (which is impossible for some speakers), *soldaten* in (35) is a plural DP with an empty indefinite determiner.

Evidence supporting this view can be obtained by adding an adjective to the nominal predicate. As (36a) shows, a bare NP cannot be modified by an adjective. The plural *goede soldaten* (`good soldiers') in (36b) can therefore only be a DP and is hence incompatible with the agreeing d-word as the subject, even for speakers who accept (33):

(36)   a.   Jan   die   is   (*goed) soldaat
              John   DEM-nn,sg   is   good   soldier
         b.   Jan en Piet   *die/dat   zijn goede   soldaten
              John and Pete   DEM-nn,pl/n,sg   are good   soldiers

7.   Conclusion

We have demonstrated that the morphological form of d-words in Dutch is sensitive to semantic type as opposed to syntactic function. D-words which denote individuals have to agree in gender and number with the fronted constituent, whereas d-words which denote sets (or properties in an intensional setting) invariably take the form of singular neutral *dat*. This is true independently of whether the d-word has the syntactic function of argument or predicate. Our analysis allows us to account for several facts that until now had been mysterious, perhaps most importantly the generalization that a nonagreeing d-word can only be the subject of a Small Clause the predicate of which is a DP. In our analysis we have adopted Partee's (1987) approach which allows expressions to have several semantic types related by type shifting operations such as BE. By providing evidence that a syntactic subject can not only be of type *e* (when it is a name, for instance) or $<<e,t>,t>$ (when it is a quantifier), but also of type $<e,t>$, we have given additional empirical support for a flexible relation between syntactic categories and semantic types which is many-to-many rather than one-to-one.

We conclude this paper with an appendix containing a somewhat speculative discussion of the implications of our analysis for the status of lexical subjects.

Appendix: Lexical subjects reconsidered

In the main text of this paper we have largely ignored the semantics of sentences in which the fronted constituent is not resumed by a d-word. One question that can be raised in this connection, is whether in those cases lexical subjects (such as names) can be of type *<e,t>*, just like nonagreeing d-words. In fact we believe that this is the case.

Recall that crucial evidence supporting the hypothesis that nonagreeing d-words are of the type *<e,t>* resides in the fact that nonagreeing d-words can be combined with those DP predicates that could not have undergone the type lowering operation BE (applying BE to these DP predicates would lead to a degenerate result (cf. (28) and (32)). Now the same predicational DPs that can be used with a nonagreeing d-word can also be used with lexical subjects:

(37) a. Jan   is   iedere soldaat   die we hebben
        John   is   every soldier   that we have
     b. Jan en Piet   zijn
        John and Pete   are
        twee/minder dan vijf/alle/de meeste   soldaten
        two/fewer than five/all/most   soldiers

One way of analyzing these examples might be to assume that they involve a silent or deleted d-word which resumes the subject (as in Koster's 1978 analysis of topicalization of clauses in Dutch). However, no such analysis is possible for the cases in (38) where the Small Clause is a complement of a verb and its subject appears in situ rather than fronted:

(38) a. Ik acht   Jan   iedere soldaat die we hebben
        I consider   John   every soldier that we have
     b. Ik acht   Jan en Piet
        I consider   John and Pete
        twee/minder dan vijf/alle/de meeste   soldaten
        two/fewer than five/all/most   soldiers

The implication is that these lexical DP subjects must have type *<e,t>*. How can this be?

We propose that such subjects have undergone another of Partee's type shifting operations, which she calls IDENT. This operation lifts a noun phrase of type *e* to one of type *<e,t>*:

Type-lifting (Partee 1987)
IDENT   *<e>* ⇒ *<e,t>* $[\![\text{IDENT(DP)}]\!] = \{x \mid x = [\![DP]\!]\}$

Note that Partee's IDENT maps an individual onto the singleton set containing it. Thus, j (Jan) is mapped onto the set {j}. The alternation between the agreeing *die* and its nonagreeing allomorph *dat* can now be reinterpreted as an overt morphological reflex of this type-shift when it applies to a d-word.

To deal with plural subjects like *Jan en Piet* in (37b) and (38b) we could use another of Partee's type-shifts, DELINK, which maps a sum or group of individuals onto a set containing all and only the atomic individuals that it consists of. Thus when DELINK is applied to j+p, the sum of Jan and Piet, it would yield the set {j,p}. Since an analysis of groups lies outside the scope of this paper we leave the precise implications of this proposal for further research.

One consequence of the hypothesis that lexical subjects can also be of type $<e,t>$ is that now we have two ways of resolving the type conflict that arises when the subject of a Small Clause is of type e and its predicate is of type $<<e,t>,t>$. Either the predicate can be lowered to type $<e,t>$ by means of BE or the subject can be raised to type $<e,t>$ by means of IDENT. In either case we end up with a situation in which the subject and the predicate can be combined semantically. This implies that there is a dual analysis for sentences like (39):

(39)   Jan   is   een soldaat.
         John   is   a soldier

This does not mean that (39) is (truthconditionally) ambiguous, however. Whether we lower the predicate or raise the subject, the sentence will be true iff Jan is a member of the set of soldiers.

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