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Dressed numerals and the structure of Universal Numeric Quantifiers

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1. Introduction

This squib examines the internal structure of nominal constructions featuring a so-called Universal Numeric Quantifier (cf. Cirillo 2009). As shown in (1a), this UNQ can be part of a larger noun phrase, but it can also be separated from it, as in (1b). The latter pattern instantiates the well-known and much-debated phenomenon of Quantifier Floating.

- (1) a. *Alle drie de studenten* hebben Jans boek gelezen. (Dutch)
all three the students have Jan's book read
b. *De studenten* hebben *alle drie* Jans boek gelezen.

In his recent study on floating quantifiers, Cirillo (2009) analyzes a UNQ as a complex syntactic word in the sense of Di Sciullo and Williams (1987), which is created by a lexical rule and base-generated in Q. As shown in (2) and (3), the UNQ *alle drie*, just like the 'bare' universal quantifier *al* selects DP as its complement.

- (2) [_{QP} [_Q *alle drie*] [_{DP} *de* [_{CardP} \emptyset [_{NP} *studenten*]]]]
(3) [_{QP} [_Q *al*] [_{DP} *de* [_{CardP} \emptyset [_{NP} *studenten*]]]]

Adopting a stranding analysis of Q-floating, Cirillo proposes that the floating pattern in (1b) results from DP-internal movement of the DP *de studenten* to [Spec,QP], with subsequent movement of DP to a DP-external position.

In this squib, in which I will abstract away from the floating pattern, I will present an alternative analysis of the internal syntax of noun phrases featuring a UNQ. More specifically, I will argue that *alle drie* is a phrasal constituent, which starts out low in the noun phrase and ends up in the left periphery of the noun phrase as a result of DP-internal displacement. The empirical basis for my analysis comes from the phenomenon of "dressed (i.e. inflected) numerals", which is attested in a variety of Dutch dialects.

2. A micro-comparative perspective on UNQ's

As shown by the following examples – which are drawn from the DiDDD-project (Diversity in Dutch DP Design), carried out at Utrecht University (Corver et al. 2007) – Dutch dialects display subtle variation in the manifestation of the UNQ-construction:¹

(4)	PATTERN A: ALL + FIVE + THE + SISTERS									
a. Standard Dutch	ik	heb	bij	alle	vijf	de	zusjes	van Pien	op school	gezeten
b. Bergum Dutch	ik	ha	bij	alle	fijf	de	suskes	fan Pien	op skoalle	sitten
(5)	PATTERN B: ALL + FIVE-E + THE + SISTERS									
a. Ouddorp Dutch	ik	he	bie	alle	vuuf-e	de	zusjes	van Pien	op school	ezeten
b. Zierikzee Dutch				alle	vuuf-e	de	zusjes	van Pien		
(6)	PATTERN C: ALL + FIVE + SISTERS (= ENGLISH PATTERN)									
a. W. Terschelling Dutch	ik	hab	bie	alle	fief		suskes	van Pien	op school	sitten
b. Beekbergen Dutch				alle	vijf		zusjes	van Pien		
GLOSS	I	have	with	all	five	the	sisters	of Pien	at school	been

The examples in (4) exemplify the 'Standard Dutch' pattern. The pattern in (5) minimally differs from it, viz., in the presence of a morpheme *-e* that immediately follows the numeral. As opposed to the patterns in (4) and (5), the pattern in (6) lacks a definite article, just like the English pattern *all five sisters of Pien's*. In the data collection of the DiDDD-project, the fourth logically possible pattern *all + five-e + sisters* is not attested.

Arguably, the most striking pattern is the one in (5). It raises the question about the nature of the element *-e* (pronounced as a schwa), which appears attached to the numeral. More specifically, could it tell us something about the internal structure of the UNQ? In what follows, I will argue that *alle vuufe* in (5) is a complex phrase. More specifically, *alle vuufe* precedes a covert (i.e. phonologically empty) NP, as in (7). This implies that the universal numeric quantifier in *alle vuufe de zusjes van Pien* cannot simply be analyzed as a complex word (i.e. a Q-head) taking a DP as its complement. This, obviously, also raises the question as to whether the UNQ in the other patterns has phrasal status.

(7) [alle vuufe *ec*] de zusjes van Pien (ec = empty category)

1. The research carried out for the DiDDD-project is financially supported by The Netherlands Organization for Scientific Research (NWO).

3. Numerals and emptiness

Consider the following examples from Ouddorp Dutch (cf. Kranendonk 2008, to appear; Corver & Kranendonk 2008).

- (8) a. Teun heet vuuf(*-e) boeken ekocht. (Ouddorp Dutch)
 Teun has five(-e) books bought
 ‘Teun bought five books.’
- b. Teun heet-er vuuf*(-e) ekocht.
 Teun has-there five(-e) bought
 ‘Teun bought five of them.’

This minimal pair shows that the numeral must be morphologically bare (i.e. schwa-less) when it is followed by an overt noun, as in (8a), but must be morphologically “dressed” (i.e. NUM+(-e)) when it is followed by a gap (i.e. an empty noun), as in (8b).² In the latter example, the gap arguably results from displacement of the quantitative pronoun *er* from within the noun phrase to a noun phrase-external position. Schematically:

- (9) er_i.....[vuufe t_i]..... (vuufe followed by a gap)

This dressed status of the numeral in nominal environments in which the nominal head is phonologically empty is attested in sixteen out of fifty-three dialects in the DiDDD-database. In other variants of Dutch, the numeral remains “naked”, with cross-dialectal variation in the obligatory (cf., (10a)) or optional (cf., (10b)) presence of the quantitative pronoun.

- (10) a. Teun heeft er_i [vijf t_i] gekocht (Standard Dutch)
 Teun has there five - bought
 ‘Teun bought five of them.’
- b. Ik heb (t_r_i) [twai t_i] kocht (Onstwedde Dutch)
 I have (there) two - bought
 ‘I bought two of them.’

As shown by the examples in (11), the phenomenon of dressed numerals also existed in Middle Dutch dialects (1150–1500); examples drawn from Stoett (1923: 57, 67). The examples in (11) show the presence of *-e* on the numeral when it is not followed by an overt noun, and (12) shows the absence of *-e* when *vier* is followed by an overt noun.

2. The characterizations “dressed” (i.e. inflected) and “naked” (i.e. non-inflected) are borrowed from Marácz (1989), who uses them for characterizing two types of postpositions in Hungarian.

- (11) a. Tappula heeft voete viere (Middle Dutch)
 Tappula has feet four-e
 b. Si zochte of daer eneghe klavere stoet met bladen viere
 they searched if there any clover stood with leaves four-e
- (12) Uptie [vier hoeke] stonden [vier torre], ... (Middle Dutch)
 at-the four corners stood four towers

Also these Middle Dutch examples suggest that the presence of *-e* on the numeral is somehow related to the fact that it is not followed by an overt noun. Suppose now that analogously to the pattern in (9), the nominal element has been moved leftward leaving behind a gap (i.e. trace) in the base position. Interestingly, on the basis of example (11b), it can be concluded that this displacement operation takes place noun phrase-internally. In this example, the noun *bladen* is contained within the nominal complement of the preposition *met*. Schematically:

- (13) [_{pp} met [bladen_i viere t_i]]

If it is a noun phrase-internal displacement operation, which triggers the appearance of *-e* on the numeral, then (9) might be reinterpreted as (14); i.e. the quantitative pronoun leaves the noun phrase after it has been moved noun phrase internally to an escape hatch position.

- (14) er_i.....[t_i [vuufe t_i]].....

4. *-e* as a reflex of Spec-Head agreement

After the preliminaries in the previous section, we can now come to a more precise analysis of the phenomenon of dressed numerals. We take the appearance of *-e* on the numeral to be a morphological reflex of a Spec-Head (number) agreement relationship, more specifically, between the numeral head projecting a NumP and the displaced element (e.g. *er* in (8b) and *voete/bladen* in (11)):

- (15) a. [_{NumP} [_{Num} vuuf][_{NP} boeken]] (Ouddorp Dutch)
 b. ...er... [_{NumP} ~~er~~ [_{Num} vuuf+-e] [_{NP} ~~er~~]]
- (16) a. [_{NumP} [_{Num} vier] [_{NP} voete]] (Middle Dutch)
 b. ... [_{NumP} voeten [_{Num} vier+-e] [_{NP} ~~voeten~~]]

Of course, the “rich” morphological spell-out of the Spec-Head configuration is familiar from other phenomena in natural language (cf., Koopman 2006), past participle agreement in Romance languages being one of them. Although formulated originally in terms of the notion of government, the phenomenon of past participle agreement was later reinterpreted as a consequence of a nominal element (typically a direct object)

passing through the Spec-position of the past participle projection (cf., Kayne 1989). Thus, in (17a), inflectional morphology (i.e. *-es*) does not surface on the participle *conduit*, since the direct object is in the complement position of the verb. In (17b), on the contrary, inflectional morphology is expressed as a result of the direct object *wh*-phrase *combien de voitures* moving through the Spec-position of the participle verb on its way to Spec,CP.

- (17) a. Il a conduit(*es) [beaucoup de voitures]. (French)
 he has driven(PL.FEM) many of cars
- b. Combien de voitures a-t-il conduites?
 how-many of cars has-he driven:PL.FEM

5. Dressed numerical quantifiers

Having interpreted the phenomenon of dressed numerals as a morphological reflex of the Spec-head agreement relationship, I will now return to the UNQ-pattern in (5), which may now be labeled as the “dressed” UNQ-pattern. If I am right in saying that *vuufe* is a complex phrase (i.e. a NumP in which the Num-head is followed by a gap/trace), then *alle vuufe* in *alle vuufe de zusjes van Jen* (all five the sister-DIM-PL of Jen) should also be a complex phrase; i.e. [*alle vuufe -*] *de zusjes van Jen*. In other words, the UNQ is not simply a complex head that combines with a DP, as in Cirillo’s (2009) analysis in (2a). The question therefore arises as to what the internal syntax looks like and, more specifically, how the supposed gap following the numeral is created.

Let me first of all point out that in certain Dutch dialects it is possible to have the UNQ either to the right or to the left of the sequence ‘article + noun’. This is exemplified in (18) for Oosteeklo Dutch.

- (18) a. [De vrouwen alle vijf] herkende hij van vroeger.
 the women all five recognized he from earlier
 ‘He recognized all five women from former times.’ (Oosteeklo Dutch)
- b. [Alle vijf de vrouwen] herkende hij van vroeger

In the previous section we concluded that the *-e* shows up in contexts in which movement of the NP-complement of Num has taken place. More specifically, *-e* is a morphological reflex of a Spec-Head agreement configuration between a Num-head and a displaced NP. If so, (DP-internal) displacement of the lexical projection NP should also have taken place in the two nominal constructions in (18). Furthermore, In view of the relationship between (18a) and (18b), it is likely that both surface patterns start out from the same ‘underlying’ structure. Making things more precise, I propose that the sequence *de vrouwen alle vijf* in (18a) has the derivation in (19).

- (19) a. $[_{NumP} [alle\ vijf] [_{NP}\ vrowen]]$ (base representation)
 b. $[_{NumP} [_{NP}\ vrowen]_i [_{NumP} [alle\ vijv+-e] t_i]]$ (mvt. to Spec,NumP & SHagr)
 c. $[_{DP}\ de\ [_{NumP} [_{NP}\ vrowen]_i [_{NumP} [alle\ vijfve] t_i]]]$ (merger of D)

In (19a), the NP *vrowen* is in the complement position of the UNQ *alle vijf*, which for the moment I will simply analyze as Num. In (19b), *vrowen* has been moved to Spec,NumP, which triggers the morphological realization of number agreement onto the numeral (i.e. *alle vijf-e*). In (19c), the definite article is merged with NumP.

Turning next to the sequence *alle vijfve de vrowen* in (18b), we propose that the derivation of this structure involves exactly the same derivational steps, with one step added to it, viz., phrasal movement of the lower NumP-segment to Spec,DP. Thus:

- (20) $[_{DP} [_{NumP} [alle\ vijfve] t_i]_j [_{DP}\ de\ [_{NumP} [_{NP}\ vrowen]_i [_{NumP} t_j]]]]$

Standard Dutch (see (21a)) minimally differs from Ouddorp Dutch: there is no morphological reflex of the Spec-Head agreement relationship. That is, in step (19b), there is no morphological marking of the numeral. Beekbergen Dutch in (6b) also lacks morphological agreement and further differs from Ouddorp Dutch (and Standard Dutch) in that the definite article is absent; see (21b).

- (21) a. $[_{DP} [_{NumP} [alle\ vijf] t_i]_j [_{DP}\ de\ [_{NumP} [_{NP}\ vrouwen]_i [_{NumP} t_j]]]]$
 b. $[_{DP} [_{NumP} [alle\ vijf] t_i]_j [_{DP}\ D_\emptyset\ [_{NumP} [_{NP}\ vrouwen]_i [_{NumP} t_j]]]]$

6. *Alle* as a dressed universal quantifier

So far, I have argued that the schwa appearing after the UNQ, as in *alle vijfve*, should be interpreted as a morphological reflex of a Spec-Head-agreement relationship between a displaced NP and a numeral head. This analysis raises the question as to whether the *-e* appearing on *alle* in the Standard Dutch example (22) could also be analyzed as the result of a Spec-Head relationship between a displaced NP *vrouwen* and a quantifying head *al*. Under such an analysis, the derivation would be as in (23).

- (22) *alle vrouwen*
 'all women'

- (23) a. $[_{NumP} [al] [_{NP}\ vrouwen]]$ (base representation)
 b. $[_{NumP} [_{NP}\ vrouwen]_i [_{NumP} [al+-e] t_i]]$ (mvt. to Spec,NumP & SHagr)
 c. $[_{DP}\ D\ [_{NumP} [_{NP}\ vrouwen] [_{NumP} [alle] t_i]]]$ (merger of D)
 d. $[_{DP} [_{NumP} [alle] t_i]_j [_{DP}\ D\ [_{NumP} [_{NP}\ vrouwen]_i [_{NumP} t_j]]]]$
 (mvt. of lower NumP-segment to Spec,DP)

Potential support for the analysis in (23) comes from a number of observations. First of all, in Middle Dutch it was possible to have patterns such as (24a), in which

the NP-part precedes the quantifier. In other words, the (derived) word order pattern N + Q was attested. This ordering would correspond to the configuration depicted in (23b). Secondly, as shown in (24b), Middle Dutch, as opposed to present-day Standard Dutch (i.e. *al(*-e) die parochianen*) permits the sequence *alle die N*. Interestingly, this pattern is superficially very similar to another remarkable nominal construction in Middle Dutch, viz., the one in (24c), which displays a dressed numeral (*achte*) before *die* and which, for some reason, requires the presence of a superlative adjective (see Kranendonk, to appear, for further discussion).

- (24) a. met sinen lieden al (Middle Dutch; de Vooyts 1967: 321)
with his men/people all
'with all his men'
- b. alle die prochiane
all-e the parishioners
'all parishioners'
- c. achte die starcste ridders (Middle Dutch, Stoett 1923: 69)
eight-e the strongest knights
'the eight strongest knights'

If the dressed form of the pre-determiner numeral *achte* in (24c) results from its standing in a Spec-Head relationship with a displaced NP at some point in the derivation – see (25) for the derived representation adopted here – then arguably a similar analysis should be assigned to the pattern in (24b), which features *alle* in a pre-determiner position. This analysis is depicted in (26).

(25) $[_{DP} [_{NumP} [achte] t_i] [_{DP} die [_{NumP} [_{NP} starcste ridders] [_{NumP} t_j]]]]$

(26) $[_{DP} [_{NumP} [alle] t_i] [_{DP} die [_{NumP} [_{NP} parochianen] [_{NumP} t_j]]]]$

7. *Alle vier* as an instance of first conjunct agreement

Thus far, I have analyzed *alle vuufe/alle vijve* as a NUM-head, with the *-e* on *vuufe/vijve* as a morphological reflex of the Spec-Head-configuration (cf. Section 5). In Section 6, I suggested that *alle* in *alle vrouwen* is a dressed quantifier and that its form results from the presence of a Spec-Head relationship between NUM and a displaced NP in the course of the derivation. If this is the correct analysis for *alle*, then the question arises as to how to analyze the UNQ *alle vuufe/alle vijve*. More specifically, how can we have *-e* on both *alle* and *vuufe/vijve*? My brief and tentative answer to this question is that the UNQ represents a coordinate structure: a quantifier head and a numeral head are (asyndetically) coordinated with each other; i.e. [*alle* [~~∅~~ *vuufe/vijve*]]. In line with the general behavior of coordinate structures, a morphological property (*in casu* appearance of *-e*) is realized on both conjuncts. The suggestion that the UNQ has a

coordinate structure receives some indirect support from Italian. As shown in (27), the Italian UNQ displays an overt instance of the coordinate conjunction (cf. Cirillo 2009: 181).

- (27) [Tutti e tre gli studenti] hanno letto il libro
 all and three the students have read the book
 ‘All three students have read the book.’

If *alle vuufe/vijve* is a conjunction of two morphologically dressed heads, then what about the UNQ *alle vijf*, as in standard Dutch *alle vijf de zusjes van Pien* in (4a), where it is only the quantifier *alle* which is inflected? If my coordinate structure analysis is correct, the pattern *alle vijf* could be analyzed as an instance of first conjunct agreement, a phenomenon which is also familiar from the process of complementizer agreement as depicted in (28); see van Koppen (2005: 63):

- (28) de-s [doe en Marie] uch ken-t
 that-2SG you_{SG} and Marie each other know-2PL
 ‘...that you and Marie know each other.’

8. Conclusion

Summarizing, I have argued in this article that the UNQ *alle vijf* is not an X-zero constituent but rather a phrasal constituent. Evidence for a phrasal interpretation came from the phenomenon of dressed numerals (and dressed UNQs): a numeral (NUM) can get an inflected (i.e. dressed) form if its complement-NP has been moved into the Spec,NumP position. Thus, *alle vuufe* in *alle vuufe de zusjes* actually contains a movement-derived gap after *alle vuufe*; i.e. *alle vuufe – de zusjes*. It was further argued that the dialectal UNQ *alle vuufe* is a coordination of two quantifying heads, where both heads have an inflected form. The standard Dutch form *alle vijf*, in which only the left conjunct has a dressed form, could then be interpreted as an instance of first conjunct agreement.

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