

A SINGULAR PLURAL

1. Introduction: Any semantic theory of numerals has to explain the modified numeral construction in (1). This construction has many bizarre properties, such as **the appearance of the indefinite singular article despite the plurality** of the entire xNP (extended NP) and the **correlation between the appearance of *a* and the presence of an adjective** before the numeral (2). We will use this construction as a litmus test to decide between different theories of numerals and to argue that numerals must have the semantic type $\langle et, et \rangle$ (see Link 1987, Verkuyl 1993 and Carpenter 1994, among others).

2. Semantics of numerals: In principle, numerals can have any one of the following three semantic types: $\langle e, t \rangle$ (predicate), $\langle et, et \rangle$ (modifier), and $\langle et, \langle et, t \rangle \rangle$ (determiner), since all of these types allow the numeral to combine with an NP (type $\langle e, t \rangle$).

The determiner theory (Bennett 1974, Scha 1981, van der Does 1992, 1993, among others) is ruled out when we consider the compositional semantics of the construction in (1). It is easy to show that in (1a), the adjective *healthy* combines with the entire xNP *112 performances* rather than with just the numeral (see (3)). If *112* has type $\langle et, \langle et, t \rangle \rangle$, then the xNP *112 performances* has the type $\langle et, t \rangle$ (generalized quantifier). Since *healthy* is of type $\langle e, t \rangle$ (abstracting away from scalarity, intensionality, etc.), it **cannot combine with something of type $\langle et, t \rangle$** and still produce a legitimate NP. Thus, we rule out the determiner theory.

Moreover, we make a prediction. It has been argued (e.g., Kamp and Reyle 1993) that NPs containing modified numerals (*more than three books*, *exactly two students*) are generalized quantifiers. Therefore, they cannot combine with adjectives, and should never appear in the modified numeral construction. This prediction is confirmed by (4).

The next step is to decide between the predicate and modifier theories. A problem for the former is that **numerals cannot function as predicates (of small clauses)**, as shown in (5) (see Stowell 1991). This is explained if **they are modifiers** ($\langle et, et \rangle$) and thus necessitate an argument NP (*one book*) or PP (*one in three people*). We propose that the meaning of numerals is based on the existence of a number of non-intersecting subsets, as exemplified by the lexical entry in (6), which allows for a compositional treatment of the complex numerals in (7).

3. Syntax of numerals: If numerals are modifiers, it follows straightforwardly that their syntax has to be that in (8). This contradicts the standard assumption that the numeral heads its own projection and that its complement is the NP. However, this standard assumption cannot be right for an independent reason: it is difficult to claim that the complex numerals in (7) can be regarded as heads.

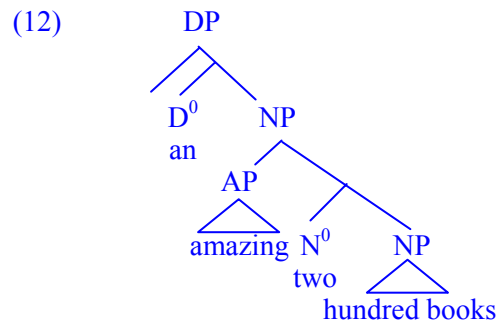
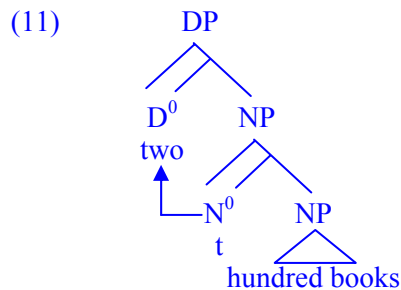
We will argue that the English numerals in (8) are in fact nominals, and propose a treatment for their Case assignment. We will show that the Russian construction in (9a) and the Hebrew construction in (9b) provide strong support for this analysis. Besides, this analysis predicts that if English numerals are nouns, then, like any other nouns, they should allow modification – and our construction in (1) shows that **a noun phrase headed by a numeral can be modified by an AP**.

The theory that numerals are nouns also correctly predicts their co-occurrence with a D^0 (10). The only determiner that seemingly cannot combine with numerals is *a* (2b). We suggest that the reason for this is **the movement of the numeral to the indefinite D^0** , as shown in (11). **The appearance of an adjective in (1) blocks N-to- D^0 movement and forces an overt indefinite article**, as shown in (12).

4. Number: The remaining issue is the fact that in the numeral modification construction the **singular indefinite article occurs with what is arguably a plural NP** (not only does the NP behave like a normal plural with respect to collectivity (13) and scope (14), but both concord and agreement are plural with numerals other than *one* (15a-c)). We observe that **numeral nouns are morphologically singular** (7). Support for the analysis that they *are* in fact singular comes from time / distance phrases, which allow singular agreement both with modification (16) and without it (17). Since singular agreement is not possible in the absence of the numeral (see 18), we suggest that the singular agreement in (16-17) is in fact agreement with the numeral. We will tie the peculiarities of the agreement facts in this construction to a similar variability in gender agreement in NPs with gender conflict (Casillas Martínez 2001).

- (1) a. *Our Bettors* ran for a healthy 112 performances.
(Ted Morgan, "Maugham, a biography", p. 220)
b. We spent a meager two hours in the alien ship.
- (2) a. **Our Bettors* ran for healthy 112 performances.
b. **Our Bettors* ran for a 112 performances.
- (3) a. the long [2 hours and 15 minutes]
b. a healthy [112 performances and 602 rehearsals]
- (4) a. Keleti won a staggering ten Olympic medals.
b. *Keleti won a staggering more than ten/at least twenty/exactly five medals.
- (5) a. *The students seem four.
b. *I consider them three.
- (6) $[[\text{three}]] = \lambda f \in D_{\langle e, t \rangle} . \lambda x \in D_e . \exists y_1, y_2, y_3 \subseteq x \ \& \ y_1 \cap y_2 \cap y_3 = \emptyset . f(y_1) \ \& \ f(y_2) \ \& \ f(y_3)$
- (7) a. two hundred books (*two hundreds books)
b. zwei und zwantig
two and twenty
twenty-two (German)
c. quatre-vingt(s)
4-twenty(s)
eighty (French)
- (8) [two [hundred [books]]]
- (9) a. šest' spiček Russian (Gen on the NP, nominal declension of the numeral)
six-Nom/Acc matches
(the) six matches
b. štej našim Hebrew (numeral in construct state)
two-CS women
two women

(10) the twenty people / every seven days / these five books



- (13) a. **A staggering 120 people** have met for the flash mob. collective
b. **A staggering 120 people** took turns trying to lift the piano. distributive
- (14) a. Every champion won **an amazing five medals**. narrow scope
b. At midday, everyone paused for **a haunting three minutes**. wide scope
- (15) a. You can read those/*that additional five books now.
b. A staggering one hundred and two chairs were/?? was piled in the corner.
c. In this country a staggering one person in two die*(s) without a Will.
- (16) a. The meager two hours in the alien ship was/were clearly not enough. time
b. A long ten miles separate(s) the castle from the dragon lair. distance
- (17) a. Two hours in the alien ship was/were clearly not enough.
b. 10 miles separate(s) the castle from the dragon lair.
- (18) a. The hours spent in the alien ship *was/were highly enjoyable.
b. The miles that the giant walks every day separate(*s) his castle from the dragon lair.