

The Semantics of Numeral Constructions in Turkish

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This study explores Turkish numeral constructions and argues in favor of the semantics of numerals in Ionin & Matushansky 2006 (I+M). The explanation rests on the semantics of bare nouns (uninflected by the plural marker *-lar*) proposed here to denote sets of atoms contra Bale, et al 2010.

THE SEMANTICS OF NUMERALS The numeral constructions of Turkish have two properties: the incompatibility of plurals (1a) and the existence of an optional classifier (1b).

1. a. *iki (tane) kitap-lar b. iki (tane) kitap
 two CL book-PL two CL book

I+M treat numerals as modifiers, the lexical complement of which has to be *atomic* (cf. Link 1983, Landman 1989 & Bale et al 2010). The primary motivation comes from the possibility of a compositional account of complex numerals like *two hundred books*. In their view, $[[two]] = \lambda P_{\langle e,t \rangle}. \lambda x_e. \exists S_{\langle e,t \rangle} [\bigwedge (S)(x) \wedge |S| = 2 \wedge \forall s \in S P(s)]$. ($\bigwedge (S)(x) = 1$ iff S is a *cover* of x , and $\forall z, y \in S [z = y \vee \neg \exists a [a \leq_i z \wedge a \leq_i y]]$ - A set of individuals C is a *cover* of a plural individual X iff X is the sum of all members of C : $\cup C = X$). They also claim that the noun *books* in *two books* is actually atomic and *-s* is not the genuine plural marker, but merely a semantically vacuous morphological agreement.

Adopting their view explains the compatibility of the bare nouns with the numerals ('two book') in contrary to the plurals ('two book-PL') if the following hold: (i) Turkish numeral constructions lack the morphological agreement, (ii) and bare nouns are strict singulars denoting sets of atoms. Taking (i) as an assumption, I motivate and justify (ii) below. Then I discuss how the classifier fits in this overall picture.

THE SEMANTICS OF BARE NOUNS

I. Argument Positions Bale et al 2010 argue that Turkish and Armenian bare nouns denote number neutral sets based on their neutral interpretation in predicate positions as in Turkish 2a. I include the non-case marked object in 2b as another instance where bare nouns are interpreted as number neutral in Turkish.

2. a. Ali ile Merve **çocuk**. b. Ali **kitap** okudu.
 Ali and Merve child Ali book read
 'Ali and Merve are children.' 'Ali did-book reading (one or more books).'

Despite these cases, I argue that bare nouns in Turkish only denote sets of atoms (e.g. $[[child]] = \{a, b, c\}$) since they are strict singular in argument positions, i.e. subject and case-marked object positions (e.g. *Ali kitab-ı okudu*. 'Ali read *the book*.' cf. with 2b). This contrasts with the bare nouns of Armenian which are shown to receive a 'one or more' interpretation in the subject positions in Bale & Khanjian 2008, proving that the two languages should not be treated alike in that respect.

Nevertheless, the case of Turkish seems to be recoverable under the analysis in Bale et al where Turkish (and Armenian) plurals are claimed to denote pluralities only (e.g. $[[child-PL]] = \{ab, bc, ac, abc\}$). Namely, if bare nouns are number neutral and plurals are strict plurals as claimed by Bale et al, the competition between the two results in the singular interpretation for the former¹. (Note that it is not clear how it would apply to Armenian.)

This story cannot be valid for Turkish because **plurals** are actually number neutral (e.g. $[[child-PL]] = \{a, b, c, ab, bc, ac, abc\}$). Unlike the Armenian counterparts (Bale & Khanjian), the 'more than one' meaning of them arises in positive contexts as a result of a scalar implicature,

disappearing in *questions* and *downward-entailing contexts* (nominal restrictors of universal quantifiers, antecedent of conditionals, and negation) in the sense of Zweig 2009 (Krifka 2003 & Sauerland et al 2005). Due to space limitations, I only exemplify the negative contexts.

3. a. **Çocuk-lar** sokak-ta top oynu-yor. b. **Çocuk-lar** sokak-ta top oyna-mı-yor.
 child-PL street-on ball play-prog child-PL street-on ball play-neg-prog
 ‘Children are playing ball on the street.’ ‘Children are not playing ball on the street.’

3b is felicitous when there are no children playing ball, but it cannot mean that more than one child is not playing ball if there is one child playing. In 3a the scalar implicature surfaces since the ‘more than one’ interpretation is stronger than the ‘one or more’ interpretation unlike in 3b².

II. Kinds Besides denoting properties, both bare nouns and plurals are kind terms evidenced by their compatibility with kind-level predicates. Unlike plurals, though, bare nouns cannot get existential readings with object-level predicates via Derived Kind Predication (Chierchia 1998); instead they are interpreted as singular definites. This would not be expected if the instantiations of a bare kind were an inclusive set (atoms and pluralities). Instead, I argue that they are like definite singular kinds of English which are claimed to be taxonomic referring to the whole species as a singleton set in Dayal 2004 (e.g. The dinosaur is extinct). The lack of derived kind predication with bare nouns is shown by their inability to take scope under negation (*Çocuk sokakta top oynamıyor*. ‘*The child* isn’t playing ball on the street.’ Not: ‘There is no child playing.’). This contradicts with Armenian: the bare nouns take scope under negation, preserving their neutrality (Bale & Khanjian).

Explaining Neutrality To conclude, bare nouns are atomic in Turkish, and the number neutrality in 2 is due to external factors. In predicate positions (2a), I suggest that a null D operator, in the sense of Link 1983, distributes the property of the predicative noun to the individuals of the subject (i.e. $2a = \forall x [[x \leq \text{ali+merve} \wedge AT(x)] \rightarrow \text{child}(x)]$). It is supported by the fact that *an indefinite can be a predicate to a plural subject* in Turkish, which is only possible by a D operator: *Onlar bir çocuk*. Lit. ‘They are a child.’ In the non-case marked objects (2b), analyzed as pseudo-incorporation in Öztürk 2005, the number neutrality is available only in atelic contexts (following Dayal 2011, cf. 2b with a telic context: *Ali iki saatte araba tamir etti*. ‘Ali fixed a car/*one or more cars in two hours.’)

THE SEMANTICS OF THE CLASSIFIER Returning back to the classifier, its presence is legitimate because it is a partial identity function having a similar role as the numerals. Namely, it *triggers a presupposition* that the property it combines with denotes a set of atoms. Since *tane* only appears with numerals, I treat it as taking the numeral as one of its arguments (*f* representing numerals).

4. $[[tane]] = \lambda P_{\langle e,t \rangle} : \forall x [P(x) \rightarrow AT(x)]. \lambda f_{\langle et,et \rangle} f(P)$

This accounts for ‘two tane book’ (1b) and ‘*two tane book-PL’ (1a). The optionality of the classifier is a consequence of the fact that besides the numeral that can directly combine with atomic properties, the language has also a partial identity function that takes both numerals and atomic properties as its arguments. (Whether *tane* has any extra roles on the external behaviors of the numeral constructions requires a further inquiry, which is beyond the main purpose of this study.)

On the other hand, Krifka 1995 & Chierchia 1998 propose that in obligatory classifier languages like Chinese classifiers are functions from kinds into sets of atoms constituted by the instantiations of the kind, i.e. $\lambda x^k \lambda y [\cup x(y) \rightarrow AT(y)]$. Kinds are inherently plural and classifiers are required to access their atomic level in view of the claim that atoms are crucial in counting. Note that such kind of semantics would force *tane* to be attested obligatorily on the plural kinds as in Chinese, but plurals cannot occur in numeral constructions and *tane* is not compulsory.

IMPLICATIONS My analysis implicates that the denotations of nouns in Turkish aligns with the ones of English in that bare nouns are strict singulars and plurals are underspecified for number. However, the two languages differ in the absence/presence of a semantically vacuous morphological agreement in their numeral constructions. I suggest that this is a cross-linguistic variation and the absence of such kind of agreement in Turkish might be related to the presence of a classifier system in the language. I leave this issue as an open question for future research.

References

Bale and Khanjian 2008. *Classifiers and number marking.* **Bale, Gagnon, and Khanjian 2010.** *Cross-linguistic representations of numerals and number marking.* **Chierchia 1998.** *Reference to kinds across languages.* **Dayal 2004.** *Number marking and (in)definiteness in kind terms.* **Dayal 2011.** *Hindi pseudo-incorporation.* **Göksel and Kerlake 2005.** *Turkish: A Comprehensive Grammar.* **Ionin and Matushansky 2006.** *The composition of complex cardinals.* **Krifka 1995.** *Common nouns: a contrastive analysis of Chinese and English.* **Krifka 2003.** *Bare NPs: kind-referring, indefinites, both, or neither?.* **Landman 1989.** *Groups I.* **Link 1983.** *The logical analysis of plural and mass nouns: a lattice theoretic approach.* **Öztürk 2005.** *Case, Referentiality and Phrase Structure.* **Sauerland, Anderssen, and Yatsushiro 2005.** *The plural is semantically unmarked.* **Zweig 2009.** *Number-neutral bare plurals and the multiplicity implicature.*

Endnotes:

¹ Notice this competition story cannot be the one where the singular interpretation of the bare nouns arises as a scalar implicature. That would be only possible if they were interpreted existentially, but they are interpreted as definites in the argument positions.

² Plurals cannot be predicated of singular subjects in Turkish which is shown as evidence for the strict plurality of the plurals in Bale et al. However, they are not predicated of plural subjects, either. Either *çocuklar* in *Ali ve Merve çocuk(-lar)* ‘Ali and Merve child-PL’ means *the children* or *-lar* is the third person plural agreement, which is an optional marker and a clitic shifting the stress to the preceding syllable (Göksel & Kerlake 2005). In contrary, the genuine plural marker (as in 3) receives the stress on itself.