On the (non-)optionality of the Turkish classifier *tane*

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Abstract Counting constructions vary across languages. Languages like English that distinguish between the unmarked and plural form of the noun also reflect this in their numeral constructions. Other languages like Chinese, which lack a systematic number marking system, use the unmarked form for all numerals but require the mediation of classifiers in counting. A lot has been written about these systems, and we have well-worked-out semantics for them. There is yet another type of language, one in which counting constructions use classifiers optionally, but relatively little is understood about such systems. This paper aims to fill this gap by analyzing Turkish numeral constructions. Turkish is a language with a systematic number marking system, where numeral constructions bear the morphologically unmarked form for all numerals and feature an optional classifier, *tane*. Combining insights from Ionin and Matushansky (2006, 2019) and Scontras (2014, 2022), I develop an agreement-based account of number marking semantics in counting, motivated by the analysis of two more optional classifier languages, Western Armenian and Farsi. As part of this account, I propose that *tane* and the classifiers in these languages are the overt counterparts of a cardinal head that universally resides in numeral constructions and denotes a counting function. The proposal extends to (in)definite characteristics of Turkish numeral constructions, revealing a non-optional aspect of *tane*, with consequences that will be informative about the interpretation of numeral constructions cross-linguistically. The lesson we learn from this part of the investigation is that indefiniteness is essentially sourced from the cardinal head in counting constructions.

Keywords numeral constructions · (optional) classifiers · number agreement · cardinality · (in)definiteness

1 Introduction

In languages like Mandarin, Cantonese, Japanese, etc., counting/numeral constructions (NCs, henceforth) obligatorily involve a classifier between a numeral and a noun regardless of whether the noun is (ontologically) categorized as count or mass. This is exemplified for Mandarin in (1a) (Cheng and Sybesma 1999, pg. 514; see also Jiang 2012 and Kim 2009 for Mandarin, Japanese, and Korean, among others).

(1)   a.   san   *(zhi) bi
               three CL   pen
               'three pens'
    b.   san   *(ba)   mi
               three handful rice

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S. Author
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'three handfuls of rice'

In many other languages like English, numerals directly combine with a count noun. However, counting with a mass noun still requires the existence of an intervening element, as in Chinese-like languages:

(2) a.   three pens
     b.   three drops of water

There seems to be some sort of complementarity between the presence of systematic number marking in a language and the existence of an obligatory classifier in its NCs that involve a count noun (Sanches and Slobin 1973, Greenberg 1990).

 English-like languages systematically distinguish between the singular and the plural form of the noun. Morphologically unmarked nouns like *book*, convey a singular interpretation, while plural-marked nouns like *book-s* convey a plural/number neutral interpretation (Sauerland et al 2005, Spector 2007, and Zweig 2009, among others.) This distinction is also reflected in NCs: The singular is used with the numeral 'one' while the plural is used with all other numerals. Chinese-like languages, however, do not have a fine distinction between the singular and plural forms of the noun. Unmarked nouns consistently yield number neutral readings, while plural marking is possible only under certain conditions. Accordingly, these languages use the unmarked form of the noun with all numerals but require the mediation of a classifier, as stated above.

 And yet, a third group of languages, including Turkish, presents an interesting puzzle to the cross-linguistic semantics of counting because their NCs share features with these two types of languages. Although Turkish distinguishes between the unmarked and plural forms of nouns as English (e.g., *kitap* 'book' and *kitap-lar* 'books'), the noun in Turkish NCs always appears in the unmarked form even with numerals other than 'one'. Turkish NCs also feature an intervening word between the numeral and the noun, though only optionally. This word, i.e., *tane*, is known in the literature as a numeral classifier (Underhill 1976, Schroeder 1992, Lewis 2000, Göksel and Kerslake 2005, Öztürk 2005):[1]

(3) a.   bir (tane) kitap
          one CL   book
          'one book'
     b.   iki (tane) kitap(*-lar)
          two CL   PL
          'two books'

Just as in the other groups of languages, Turkish mass nouns obligate a mediating element for counting, as shown in (4a). Numerals can directly combine with mass nouns only if some sort of covert universal packaging/sorting is at play, as in 'two waters' in English. Crucially, the co-occurrence of *tane* with mass nouns is also only possible if the mass noun is used in a count sense. This is illustrated in (4b), which refers to two units of water that comes in contextually determined containers.

(4) a.   iki *(damla) su
          two drop   water
          'two drops of water'
     b.   iki (tane) su
          two CL   water
          'two waters'

The picture gets more complicated when the interpretation of Turkish NCs is considered. A difference between the forms with and without *tane* reveals that *tane* is not always a freely available option for NCs.

 It is a well-known fact that in every language, NCs can freely occur in argument positions, receiving indefinite interpretations. This is even the case in languages that strictly disallow bare nouns in argument positions, like French (Chierchia 1998). NCs of languages like English and French can also co-occur with the definite article, but NCs typically require demonstratives to convey definite-like readings in articleless

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[1] *tane* is compatible with all kinds of count nouns. There is another classifier in Turkish, i.e., *adet*, and it is only compatible with non-human count nouns. In this paper, I only discuss *tane* because the distribution of the two classifiers is the same, and *tane* is more commonly used.

languages. Jiang (2012) bases this generalization on Chinese and Russian, a language without classifiers. The inability of NCs to receive definite readings in these languages is particularly puzzling because bare nouns in articleless languages freely allow definite interpretations (Chierchia 1998, Dayal 2004).

Turkish does not have an overt definite article, but only NCs with *tane* show this general restriction to indefiniteness. NCs without *tane* can be interpreted as both definite and indefinite, presenting an exceptional behavior within this cross-linguistic picture (Schroeder 1992). I illustrate this in (5), delaying the detailed discussion of the empirical facts for now. While both forms of NCs can introduce new discourse referents as evidenced by their occurrence in the first sentence, only the form without *tane* can refer to a unique/maximal entity introduced in the preceding context, and hence the contrast in the second sentence. Let us call this the (in)definiteness puzzle of Turkish NCs.[2]

(5) İçeri iki (tane) öğretmen, bir (tane) doktor ve üç (tane) mühendis gir-di. **İki (#tane)**
     inside two CL   teacher, one CL   doctor and three CL engineer enter-PAST two CL
     öğretmen benim-le konuş-mak iste-di.
     teacher   me-with speak-INF want-PAST
     'Two teachers, one doctor, and three engineers entered inside. The two teachers wanted to talk to me.'

To recapitulate, there are four properties of Turkish NCs that make up our core puzzle:

  i. The noun is unmarked for all numerals despite the existence of a systematic number marking system in the language.
 ii. An intervening word, i.e., *tane*, optionally surfaces between a numeral and a count noun.
iii. While NCs are generally indefinite when not accompanied by an overt determiner, Turkish NCs can be definite and indefinite unless *tane* is present.
 iv. Building on the previous point, *tane* may seem optional syntactically but clearly has a non-optional aspect with consequences regarding the interpretation of NCs.

The immediate challenge these properties introduce is internal to Turkish and the group of languages it belongs to, in general. We need to understand how the counting system works in Turkish compared to English and Chinese-like languages and what role *tane* plays in this. A question of particular interest is how the current accounts of relatively better understood obligatory classifiers shape our understanding of the optional-looking classifier-like words such as *tane*, and vice versa. A further issue arising from this inquiry concerns the consequences for a more cross-linguistic picture of NCs. What insights could we potentially gain from our investigation regarding number marking variations in NCs? Finally, we need to understand how the presence/absence of *tane* affects the interpretation of NCs and how this contributes to the exceptional status of the Turkish counting system.

Turkish NCs have received attention in many studies (e.g., Schroeder 1992, Ionin and Matushansky 2006, 2019, Bale et al 2010, Bayırlı 2017, Sağ 2018, Alexiadou 2019, Martí 2020, Scontras 2014, 2022), but the four properties listed above have never been studied all together. This paper proposes a uniform analysis of these properties, taking *tane* as the center of the investigation. The analysis is divided into two parts: The first part, targeting the properties in (i) and (ii), examines the optional occurrence of *tane* and variations in number marking patterns. The second part, concerning the properties in (iii) and (iv), takes up the (in)definiteness puzzle of Turkish NCs and its cross-linguistic implications. The central contribution of this study is that counting is universally dependent on the projection of a cardinal head that may surface covertly and/or overtly, and the cardinal head is the main source of indefiniteness in NCs.

I start the first part of the analysis by illustrating that *tane* is distinct from obligatory classifiers of Chinese-like languages that have been argued to be some sort of repair mechanism for counting with nouns that are mass or mass-like in nature (Chierchia 1998 and Krifka 1989, 1995, 2003, among others). Building on Scontras' (2014, 2022) account of counting constructions, I then propose that *tane* denotes a cardinality function by virtue of being an overtly realized form of the cardinal head in Turkish. While the English cardinal head is always covert, the Turkish cardinal head has both an overt and a covert realization.

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[2] The most natural choice for referring to the two teachers in the second sentence is the plural *öğretmen-ler* 'the teachers'. However, the NC without *tane* is still a grammatical use, in contrast to the form with *tane*, which forces reference to two different teachers in the second sentence.

The proposal is linked to an account of the cross-linguistic variation in number marking in NCs. Building on Ionin and Matushansky's (2006, 2019) view of numerals, I argue that the cardinal head uniformly presupposes a semantically singular form of the noun. This requirement is fulfilled by morphologically unmarked nouns in languages like Turkish, while English NCs further reflect number agreement on the lexical NP. A semantic account of this agreement mechanism draws on Scontras' analysis of English NCs, which, extending to number marking on measure terms like *kilo*, provides the basis of the view that a cardinal head is involved in counting.

While the discussion revolves around Turkish NCs substantially, it also extends to two more optional classifier languages, Western Armenian and Farsi, for which I provide an analysis analogous to Turkish. These languages, where plural marking in NCs is constrained by factors relating to specificity and definiteness, form the central motivation behind an agreement-based approach to variation in number marking in NCs (Ionin and Matushansky 2019 and Alexiadou 2019, cf. Sigler 1996, Borer 2005, Bale and Khanjian 2008, 2014, Khanjian 2013, Martí 2020, Kalomoiros 2021 for WA and Gomeshi 2003, Gebhardt 2009, and Mache 2012 for Farsi).

The second part of the analysis offers an account that will enrich our understanding of the indefinite characteristics of NCs cross-linguistically. In essence, I associate the universal restriction to indefiniteness with a lexical variant of the cardinal head that has a built-in choice function variable in the sense of Reinhart (1997) (cf. Jiang 2012). I further suggest that in languages that have both an overt and a covert cardinal head, one form might be exempt from this lexical variant, making both definite and indefinite interpretations possible. Although the form that comes with an indefinite variant is the overt cardinal head in Turkish, nothing pertaining to *tane* itself hinges on this choice. I show that it is the covert cardinal head, i.e., NCs without the classifier, that reflects exclusively indefinite characteristics in Farsi.

At this point, a note on the choice of terminology is imperative: The term 'classifier' does not have a consistent use in the literature. Some take it to refer to obligatory classifiers in Chinese and languages alike, some use it as a general term for all 'quantizing' words of NCs and measurement. Here, I adopt a descriptive use of the term 'classifier', i.e., an intervening element between a numeral and an (ontological) count noun in NCs. Following the convention in the literature then, I will continue calling *tane* a classifier, although it will be analyzed differently from the classifiers of Chinese-like languages.[3]

The outline of this paper is as follows: Section 2 reviews an existing account of Turkish number marking semantics, which will lay the foundation of the account developed here. The first part of the analysis is sketched in Section 3, where I compare *tane* with obligatory classifiers, and in Section 4, where I present my account of *tane* and the semantics of number marking in NCs. Section 5 is dedicated to the second part of the analysis. Section 6 concludes.[4]

2 Turkish Number Marking Semantics

The first step of solving our puzzles is to understand the semantics of Turkish nominals. In this section, which serves as theoretical backdrop for the analysis, I summarize Sağ's (2019, 2022) account of Turkish number marking system. We will see that morphologically unmarked nouns are strictly singular and plural-marked nouns are number neutral, a distinction that also has consequences for kind reference (see also Sağ 2018, Renans et al 2017, 2020).

English is one of many other languages where there is an asymmetry between morphological and semantic (un)markedness. The standard view is that while morphologically unmarked nouns are semantically marked as strictly singular, plurals have an unmarked denotation (Krifka 2003, Sauerland et al 2005, Spector 2007, and Zweig 2009). Sağ (2019, 2022) argues that Turkish is not different from English in its nominal semantics. Unmarked nouns like *kitap* 'book' denote an atomic set while plural-marked nouns like *kitap-lar* 'book-s' denote a number neutral set, inclusive of atomic and plural entities:

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[3] Quantizing words have various functions and hence more sophisticated categorization in the literature. See Scontras (2014) for an overview.

[4] The Turkish data reflect the judgments of fifteen native speakers, including myself. The Western Armenian data discussed in this paper represents the variety spoken in Beirut, corroborated by Hossep Dolatian). For the Farsi data, ten native speakers have been consulted via informal conversations, including Amir Anvari and Masoud Jasbi. The examples of all the other languages are sourced from the literature.

(6)   a. $[\![kitap]\!] = \{a,\ b,\ c\}$
      b. $[\![kitap + PL]\!] = \{a,\ b,\ c,\ a \oplus b,\ a \oplus c,\ b \oplus c,\ a \oplus b \oplus c\}$

The evidence that Turkish plurals are number neutral comes from their behavior in downward entailing contexts and questions. As in English, Turkish plurals have a 'one or more' reading in these contexts even though they have a multiplicity interpretation in positive contexts. For example, for the condition in (7) to hold, it is enough if one is cheated by one man. Following the analyses of English plurals in Sauerland et al (2005), Spector (2007), and Zweig (2009), Sağ argues that Turkish plurals are number neutral and the multiplicity reading is a conversational implicature. Renans et al (2017, 2020) provide experimental evidence for this view.

(7)   Eğer **erkek-ler** tarafından aldatıldıysan,   sen de   biz-e   katıl-abil-ir-sin.
      if   man-PL   by   you.be.cheated you also we-DAT join-ABIL-AOR-2SG
      'If you have been cheated by men, you can join us.' (one or more men)

The picture is more complicated on the side of morphologically unmarked nouns. English unmarked nouns are identified as singular terms since they yield a singular interpretation consistently.[5] As shown in (8a) and (8b), Turkish unmarked nouns convey number neutrality in certain cases, but as shown in (8c), they are interpreted as strictly singular and definite in case-marked argument positions.

(8)   a.   Ali **kitap** oku-du.
           Ali book   read-PAST
           'Ali read one or more books.'
      b.   Ali ve   Merve **çocuk**.
           Ali and Merve child
           'Ali and Merve are children.'
      c.   Ali **kitab-ı**   oku-du.
           Ali book-ACC read-PAST
           'Ali read the book.'

Although this dual nature of unmarked nouns makes it hard for them to be identified as number neutral or singular terms, there is evidence for the strict singular view.[6] Let us start with (8a), where the unmarked noun occupies the non-case-marked argument position. This is an instance of a well-known phenomenon, i.e., pseudo-incorporation (due to Massam 2001), in Turkish (Öztürk 2005). Sağ shows that only adjectives that denote classificatory properties are compatible with the number neutral interpretation of incorporated nouns while modification does not create contrast in case-marked argument positions. As shown below, the incorporated noun *book* can be modified with *religious*, yielding a 'one or more books' reading. However, its modification with *old* meaning *worn-out*, as opposed to *ancient/historical*, is ungrammatical, which instead requires the indefinite or plural form of the noun.

(9)   a.   Ali, ev-e   geldikten   sonra, *dini/*   *eski **kitap** oku-du.
           Ali home-DAT having.come after   religious old   book   read-PAST
           'After he came home, Ali read one or more religious books.'
           Not:'After he came home, Ali read one or more old (worn-out) books.'

A similar case arises in the predicate position, except that modification introduces a contrast in number interpretation. When the unmarked noun *doktor* is modified by the adjective *practitioner*, it is compatible with both a singular and plural subject. If the adjective is *handsome*, though, it is only compatible with a singular subject:

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[5] There are cases where English unmarked nouns do not receive a strictly singular reading, such as in compounds, e.g., *book-shopping* and with weak definites, *John reads the newspaper*. However, such cases have a wider distribution in Turkish compared to English.

[6] Bliss (2004), Bale et al (2010), and Görgülü (2012) argue that Turkish unmarked nouns denote a number neutral set, while plural nouns denote pluralities only, exclusive of atoms. While the data reviewed in this section provides evidence against this view, I refer the reader to Sağ (2022) for a more in-debt discussion. Furthermore, unmarked nouns also yield number neutrality in existential statements (Görgülü 2012). The reader can also find the discussion of this case in Sağ (2022), where the analysis is similar to those occupying the non-case-marked object position to be explained below.

(10)   a.   Ali (ve Mehmet) *pratisyen*   **doktor**.
            Ali and Mehmet   practitioner doctor
            'Ali is a practitioner doctor.' 'Ali and Mehmet are practitioner doctors.'
       b.   Ali (*ve Mehmet) *yakışıklı*   **doktor**.
            Ali and Mehmet handsome doctor
            'Ali is a handsome doctor.' Not: 'Ali and Mehmet are handsome doctors.'

The adjectives that are compatible with the number neutral reading of unmarked nouns define a type of the noun that they modify; religious books are types of books, and practitioner doctors are types of doctors. In contrast, the other set of adjectives does not have such a function; both *worn-out* and *handsome* define some physical properties of books and doctors, respectively.

Sağ (2022) explains the puzzling behavior of unmarked nouns following Dayal's (2004) analysis of English definite singular kind terms like *the dinosaur* in 'The dinosaur is extinct.' English and Turkish unmarked nouns are ambiguous in denoting atomic properties of ordinary individuals and atomic properties of taxonomic individuals, i.e., (sub-)kinds. English unmarked nouns can either be definite singulars at the ordinary object level or definite singular kind terms by their combination with *the*. A widely accepted view for languages without overt definite determiners such as Turkish is that their nouns can undergo covert *iota* type-shifting for definiteness.[7] In object-level contexts, as in (8c), then the unmarked noun *kitap* 'book' denotes an atomic set of ordinary book individuals, and refers to a contextually salient unique book via *iota* type-shifting. This explains its strictly singular and definite interpretation.

(11)   a. $[\![kitap]\!] = \lambda x.\ book(x)$
       b. ι: $\lambda P.\ \iota x\ [P(x)]$
       c. $\iota([\![kitap]\!]) = \iota x\ [book(x)]$
       d. $[\![(8c)]\!] = read(Ali, \iota x\ [book(x)])$

Now let us consider the kind-level characteristics of Turkish nouns to understand the cases in (8a) and (8b). In Turkish, both unmarked and plural nouns can be used in kind-level statements, as shown in (12a). However, only plurals can combine with distributive predicates applying to individual members of the species, such as *come from different regions*, as illustrated in (12b). The same contrast also holds for English as represented in the translations. This indicates that the kind reference achieved by unmarked nouns differs from the one achieved by plurals although kinds, in general, are inherently plural entities in that they are associated with atomic and plural object-level entities (Carlson 1977).

(12)   a.   **Dinozor(-lar)** 250 milyon yıl   önce evrimleş-miş-tir.
            dinosaur-PL   250 million year ago   evolve-PERF-GEN
            'The dinosaur/Dinosaurs evolved 250 million years ago.'
       b.   **Ayı*(-lar)** bu   hayvanat bahçesi-ne farklı   bölge-ler-den gel-di.
            bear-PL   this zoo-DAT   different region-PL-ABL come-PAST
            'Bears/*The bear came to this zoo from different regions.'

Sağ analyzes Turkish plurals as kind terms via the *nom* operator ($^\cap$), as claimed for English plurals by Chierchia (1998). *Nom* is a function from properties to functions from situations s to the maximal entity satisfying that property in that situation (Chierchia 1998, pg. 351). Based on this view, the plural kind term *dinozorlar* 'dinosaurs' in (12a) is interpreted as below:

(13)   a.   For any property P and world/situation s, where P_s is the extension of P in s
            $$^\cap P = \begin{cases} \lambda s.\ \iota x\ [P_s(x)], & \text{if } \lambda s.\ \iota x\ [P_s(x)] \text{ is in } K, \text{the set of kinds} \\ \text{undefined, otherwise} \end{cases}$$
       b. $[\![(12a)\text{ with plural}]\!] = evolved(\lambda s.\ \iota x\ [dinosaur_s(x)])$

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[7] Covert *iota* type-shifting is blocked by *the* in English due to the Blocking Principle which ensures the use of lexical items before covert type-shifting operations are resorted to (Chierchia 1998). Furthermore, type-shifting operators are assumed to be regulated by Revised Meaning Preservation, which bans ∃, and hence strong indefinite interpretation of bare nouns, in both English and Turkish (Dayal 2004). We revisit these principles in Section 5.3.

Plural kind terms can be type-shifted to sets of object-level entities that instantiate the kind via *pred* ($^{\cup}$). This operator applies to the extension of the kind (i.e., extension in whatever world/situation it is interpreted relative to) and returns the set of singular and plural instantiations of the kind (in that world/situation) (Chierchia 1998, pg. 350):

(14)   Let d be a kind. Then for any world/situation s, where d_s is the plural individual that comprises all of the atomic members of the kind
$$^{\cup}d = \begin{cases} \lambda x.\ x \leq d_s, \text{if } d_s \text{ is defined} \\ \lambda x.\ FALSE, \text{ otherwise} \end{cases}$$

In episodic contexts as in (12b), Derived Kind Predication (DKP) applies, which provides sort-adjustment introducing $\exists$-quantification over the instantiations of the kind provided by *pred* in a given situation. This results in an existential reading.[8] The ability of plural kind terms to be type-shifted to sets of object-level entities makes them compatible with distributive predicates which require access to different parts of these entities. The plural version of (12b) means that some bear individuals that instantiate the bear kind in the relevant situation came to this zoo and the regions that these individuals came from are different, as demonstrated below:

(15) $[\![(12b) \text{ with plural}]\!] = \exists x\ [^{\cup\cap}bear(x) \wedge \forall y, z\ [[y < x \wedge z < x \wedge y \neq z]\ \rightarrow \iota r_1\ [region(r_1) \wedge$
$came.to.zoo.from(r_1)(y)] \neq \iota r_2\ [region(r_2) \wedge came.to.zoo.from(r_2)(z)]]]$

Unmarked nouns in (12) denote a singleton set whose member is a taxonomic individual, i.e., a (sub-)kind. Undergoing covert *iota* type-shifting, they denote a singular kind term and refer to a unique kind. Based on this, the interpretation of (12a) with the unmarked noun is as shown below: (Taxonomic entities and properties of taxonomic entities are represented by the superscript K.)

(16)   a. $[\![dinozor]\!] = \lambda x^K.\ dinosaur^K(x^K)$
        b. $\iota([\![dinozor]\!]) = \iota x^K.\ dinosaur^K(x^K)$
        c. $[\![(12a) \text{ with unmarked}]\!] = evolved(\iota x^K.\ dinosaur^K(x^K))$

Dayal (2004) claims that singular kind terms are grammatically atomic entities, similar to group terms like *team*. They do not allow type-shifting to sets of object-level entities we intuitively associate with kinds. Hence, the derivation fails when they combine with a distributive predicate, as in (12b). Furthermore, singular kind terms do not yield an existential reading, unlike plural kind terms, as evidenced in (8c), where the unmarked noun only has a singular and definite reading. This also follows from that type-shifting to object-level entities is not available for singular kind terms. The kind-driven existential reading depends on this shift, which is ensured for plural kind terms by *pred* when DKP applies. Dayal argues that singular kinds still hold a relation to object-level entities at the conceptual level despite their atomic nature at the grammatical level, analogous to the membership relation that exists between an atomic group term and its members. Sağ calls this relation *belong-to*, as defined below:

(17)   *Belong-to relation*
        belong-to(y, x^K) is true iff y is *a member of* the kind x^K, where x^K is a singular kind and y is an object-level entity. (Sağ 2022, pg. 764)

As stated above, non-case-marked unmarked nouns have been analyzed as pseudo-incorporated arguments in Turkish literature. Sağ argues that incorporation takes place with an incorporating thematic function that establishes a *belong-to* relation between singular kinds and their object-level members, resulting in number neutrality.[9] The restriction in modification follows from the fact that taxonomic kinds can only be modified by adjectives that denote a classificatory/sub-kind forming property, like *religious*, as in (9a). Based on this, the denotation of *Ali kitap okudu.* 'Ali did book-reading.' in (8a) is shown in (18). It means that Ali is involved in a reading event with a theme argument that belongs to the book kind.

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[8] Plurals take obligatory narrow scope in their existential reading. This is ensured by DKP because the sort-adjusting $\exists$-quantification is introduced locally at the level of predication, and therefore takes the narrowest scope. Turkish plurals can also have a definite reading in episodic contexts, which is possible through *iota*.

[9] See Martí (2020) and Sağ (2018) for other accounts that dedicate the number neutrality of unmarked nouns to the semantics of incorporation.

(18) $\exists e\ \exists y\ [belong\text{-}to(y, \iota x^K\ [book^K(x^K)]) \land read(e) \land Th(e) = y \land Ag(e) = Ali]$

The modificational contrast arising in the predicate position with respect to the number interpretation of unmarked nouns also follows from their ambiguous nature. In (10a), the noun *doktor* denotes an atomic property at the ordinary object level. Therefore, it can only be modified by adjectives that describe an object-level property like *handsome* and be predicated of only singular subjects. On the other hand, *doktor* in (10b) denotes the doctor kind, and hence it is only compatible with taxonomic adjectives like *practitioner*.

Sağ proposes that singular kind reference in the predicate position is made possible through a null copula that establishes a *belong-to* relation between the referent of a singular kind term and the referent of a singular or plural subject term, similar to what happens in pseudo-incorporation.[10] This phenomenon, called *kind specification*, will be crucial when we compare *tane* with obligatory classifiers in Section 3.2. Thus, for an example, the denotation of *Ali (ve Merve) çocuk.* 'Ali is a child./Ali and Merve are children.' in (8b) is provided in (19). (19b) and (19c) can be paraphrased as 'Ali is a member of the child kind' and 'Ali and Merve are members of the child kind', respectively.

(19)   a. $\llbracket COP \rrbracket = \lambda x^K \lambda y.\ belong\text{-}to(y, x^K)$
        b. $\llbracket Ali\ child \rrbracket = belong\text{-}to(Ali, \iota x^K.\ child^K(x^K))$
        c. $\llbracket Ali\ and\ Merve\ child \rrbracket = belong\text{-}to(Ali \oplus Merve,\ \iota x^K.\ child^K(x^K))$

To wrap up, Turkish and English nominals are similar at the ordinary object and kind-level domains. The fact that singular kind reference extends to pseudo-incorporation and the predicate position in Turkish results in the illusion that Turkish and English unmarked nouns must be different.

Having established our take on the semantics of Turkish nominals, we are now ready for a theoretical inspection of *tane*, compared to obligatory classifiers.

3 Comparing *tane* with Obligatory Classifiers

A notable distinction between English and obligatory classifier languages is the fact that while only mass nouns are incapable of directly combining with a numeral in the former (excluding 'packaging/sorting' coercions), all nouns, including those that we intuitively categorize as count, require the mediation of an intervening item in the latter. This disparity has led scholars to hypothesize that all nouns are mass or mass-like kind terms in Chinese-like languages, at least as far as a grammatical level of distinction is concerned. As a consequence, classifiers have been claimed to exist as a repair mechanism in NCs (e.g., Krifka 1989, 1995, 2003 and Chierchia 1998, cf. Cheng and Sybesma 1999). Central to these views is the obligatory emergence of classifiers with counting. That is, obligatoriness points to a level of deficiency in the noun denotation that requires some sort of fixing to make counting possible.

The Turkish classifier is similar to classifiers in Chinese-like languages in that it appears between a numeral and an (ontological) count noun. But it fundamentally differs from these classifiers in being optional, which, at first sight, suggests that it is not an essential category and therefore, should belong to a separate category. However, being optional is not necessarily a distinguishing factor. As sketched out above, Turkish nominals are rich in interpretation, having ordinary object and kind-level interpretations, each displaying variations based on number marking. As will be discussed below, Turkish also displays countability distinctions, and *tane* is sensitive to them. Hence, it is necessary to assess to what extent this diversity plays a role in the optionality of the classifier. The question is whether the noun can be deficient in some way when it combines with *tane*, unlike what happens when it surfaces in the absence of *tane*.

In this section, maintaining the spirit of the analyses offered for obligatory classifiers, I will provide a negative answer to this question and illustrate that the noun takes part as an atomic property of ordinary individuals in Turkish NCs regardless of the classifier. In other words, I will confirm the intuition that *tane* is an instance of a different category.

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[10] The copula has an overt exponent when followed by overt tense/aspect markers (Kornfilt 1996, Kelepir 2003).

3.1 Obligatory Classifiers

Chinese, Japanese, and Korean are articleless languages and hence their bare nouns can freely be arguments, as in Turkish (e.g., Krifka 1995, Chierchia 1998, Kurafuji 1999, Li 1999, Yang 2001, Jiang 2012, and Kim 2009). However, unlike in Turkish, their unmarked nouns consistently yield number neutral readings while the plural marker surfaces in a limited way. The Chinese plural marker *-men* (see Yang 2001) and the Japanese plural marker *-tachi* (see Kurafuji 1999) include definiteness in their denotation, whereas the Korean plural marker *-tul* denotes specificity (Kim 2009). Consider the following contrast in Mandarin (Li 1999, pg. 78):

(20)   wo qu zhao haizi(-men).
         I   go find child-PL
         w/o plural: 'I will go find a child/children/the child/the children.'
         w/plural: 'I will go find the children.'

Unmarked nouns can receive kind-level, existential, and definite readings in these languages, as exemplified for Mandarin again in (21a) and (21b) (Yang 2001, pg. 20, 32). They are also compatible with distributive predicates like *come from different regions*, as illustrated in (21c) (p.c. with Yi-Hsun Chen).

(21)   a.   Gou juezhong le
               dog extinct   ASP
               'Dogs are extinct.'
         b.   Waimian gou zai-jiao
               outside   dog be-barking
               'Outside, (dogs)/(the) dog(s) are/is barking.'
         c.   Xiong cong butong   de   quyu laidao-le zhe-zuo-dongwuyuan
               bear   from different MOD region come-ASP this-CL-zoo
               'Bears came to this zoo from different regions.'

These facts show that Mandarin unmarked nouns are similar to Turkish and English bare plurals. They are number neutral and their kind-level interpretations pattern with plural kind reference (see Yang 2001). The generally accepted view due to Chierchia (1998) is that unmarked nouns of Chinese-like languages are uniformly kind terms of type $\langle s, e \rangle$, which can be type-shifted to sets of object-level entities via *pred*. They can further undergo *iota* type-shifting for definite readings and DKP for existential readings in episodic contexts. The availability of type-shifting to sets of object-level entities also makes them compatible with distributive predicates.

NCs in Chinese-like languages require a mediator between the noun and the numeral because kinds are 'deficient' for counting purposes. That is, under the view that counting operates on the predicative meanings of nouns, kinds are not the right type. In Chierchia's account, kinds are mass-like in that they are inherently plural, and their atomic instances are not accessible for counting. Classifiers play a role of an *atomizer* function in returning the atomic instances of the kind to fix the type mismatch. Based on this, the combination of the classifier and the noun in *san zhi bi* 'three CL pen' in (1a) can be represented as below.

(22)   a. $[\![zhi]\!] = \lambda k \lambda x \, [^{\cup}k(x) \wedge \; AT(x)]$
         b. $[\![bi]\!] = pen^k$
         c. $[\![zhi \; bi]\!] = \lambda x \, [^{\cup}pen^k(x) \wedge \; AT(x)]$

Chierchia's view is similar to the account provided in Krifka (1989, 1995, 2003) in requiring classifiers for access to object-level instances of kinds to make counting possible with them. However, in Krifka's account, classifiers have a dual role of instantiation and counting; they take a kind and measure the number of specimens instantiating that kind. English differs from Chinese in having a count-mass distinction, but its mass nouns are similar to Chinese nouns and hence require a classifier. (Krifka uses the term classifier to include all quantizing nouns.) Count nouns, however, are different and directly combine with a numeral.

To capture the count-mass distinction in English NCs, Krifka (2003) proposes that count nouns have a built-in classifier, an idea first discussed in Krifka (1989, 1995).[11] A count noun entering the derivation as

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[11] An alternative account that is discussed and adopted in Krifka (1995) is that numerals have a built-in classifier. Due to the similarity between the two proposals, I only discuss the view adopted in Krifka (2003).

a kind term is first shifted to an object-level denotation by a null operator. In virtue of this operator, a count noun has a number argument and hence denotes an extensive measure function. Based on this, the derivation of 'three dogs' is as shown below. R represents the instantiation relation holding between a kind and its object-level instantiations, OU corresponds to the measurement of the number of atoms or 'an object unit' of an entity:[12]

(23)   a. $[\![dog_{kind}]\!] = dog^k$
       b.   count operator: $\lambda y^k \lambda n \lambda w \lambda x \ [R_w(x, y^k) \wedge OU_w(y)(x) = n]$
       c. $[\![dog_{count}]\!] = \lambda n \lambda w \lambda x \ [R_w(x, dog^k) \wedge OU_w(dog^k)(x) = n]$
       d. $[\![three \ dogs]\!] = \lambda w \lambda x \ [R_w(x, dog^k) \wedge OU_w(dog^k)(x) = 3]$

Kind terms denoted by mass nouns do not involve this inherent shifting mechanism. Hence, mass nouns lack a number argument and rely on measure terms for quantization, as *gallon* in *three gallons of milk*, illustrated in (24a). Chinese-like languages do not have count nouns and the classifier does this job for all nouns, as exemplified for *ben* in *san ben shu* 'three CL book' in (24b).

(24)   a. $[\![gallon]\!] = \lambda y^k \lambda n \lambda w \lambda x \ [R_w(x, y^k) \wedge GALLON_w(y^k)(x) = n]$
       b. $[\![ben]\!] = \lambda y^k \lambda n \lambda w \lambda x \ [R_w(x, y^k) \wedge OU_w(y^k)(x) = n]$

To wrap up, in languages like Chinese, classifiers are essential elements of counting because all nouns, being kinds inherently, have a mass or mass-like nature, and this makes them ineligible for directly combining with a numeral.[13]

I will now show that *tane* does not fit with the analyses of obligatory classifiers in the accounts summarized above. We will see that *tane* does not have a repairing role in counting with kind terms or mass nouns.

3.2 *tane* and Kind Terms

As discussed in Section 2, Sağ (2022) claims that Turkish aligns with English in its nominal semantics, and both plurals and unmarked nouns have kind reference. Following Chierchia (1998), plural kind terms are derived by *nom* and can be type-shifted to sets of object-level instances via *pred*. Following Dayal (2004), unmarked nouns are ambiguous between atomic properties of object-level and taxonomic individuals, and their taxonomic denotation yields singular kind reference via covert *iota* type-shifting.

Given that Turkish NCs require the unmarked form of the noun, we expect two possibilities for the noun denotation: it can either be a singular kind or an atomic property of object-level individuals. If the former, we need a transformation from the kind-level denotation into an object-level one to proceed with counting. This cannot be achieved through a freely available covert type-shifting operator (like *pred*). As we have seen, singular kind terms are grammatically atomic and hence disallow type-shifting to sets of object-level instances, making certain interpretations unavailable for them unlike the case with plural kind terms. For this reason, we expect the noun in Turkish NCs to denote atomic properties of object-level individuals, at least in NCs without *tane*.

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[12] In Krifka's account, singular kinds participate in English NCs when the noun is count, not plural kinds. The plural marking in NCs is an instance of syntactic agreement with the number word, which does not exist in languages like Turkish and Hungarian. In the absence of a number word, the plural marker is semantically contentful and creates a property leaving the number argument unspecified. Note also that Krifka analyzes singular kinds as names of kinds, where the definite article, when present, takes the role of the identity function. That is, both *dog* and *the dog* refer to the dog kind in English. Furthermore, R does not distinguish between singular and plural kinds. As discussed in Section 2, we follow Dayal's (2004) view, instead. We have seen that singular and plural kind reference have different distributions and hence differ in the nature of the instantiation operator/relation applicable to them.

[13] There are also other studies that do not take the role of kind reference as a key factor for the semantics of classifiers in NCs. But in these accounts, classifiers are also given some function that would 'fix' the denotation of the noun otherwise unsuitable for counting. Borer (2005), as an example, argues that "...all nouns, in all languages, are mass, and are in need of being portioned out, in some sense, before they can interact with the 'count' system." (pg. 93). In her view, mass nouns represent the absence of a dividing structure, and in English-like languages, plurals, and in Chinese-like languages, classifiers are 'stuff dividers.' The evidence for this view is provided based on Armenian, reported to be a language where a classifier and the plural marker can optionally occur in NCs, but never surface in the same structure. Borer takes this as the indication of identity between plural markers and classifiers. My stance against this view draws on data from Western Armenian spoken in Beirut and Farsi. As discussed in Section 4.1, these languages allow the classifier and the plural marker to co-occur. See also Doetjes (2019) for a discussion of other such languages.

Could it still be possible for the noun to denote a singular kind in NCs with *tane*? An analysis to consider could be in lines with Krifka (1989, 1995, 2003) where count nouns have a built-in classifier, one function of which involves the establishment of a relation between a kind and its object-level instances. To see whether this role could potentially be attributed to *tane*, let us now return to the phenomenon of *kind specification* we have seen in Section 2.

In kind specification, a *belong-to* relation is established by the (null) copula between a singular kind and its object-level members in the predicate position. We have ascertained the denotation of unmarked nouns in the predicate position on the basis of taxonomic vs. object-level modification. When they receive object-level modification, they are atomic predicates; when they receive taxonomic modification, they are singular kind terms, as repeated below:

(25) a. Ali (*ve Mehmet) *yakışıklı* doktor.
          'Ali is a handsome doctor./*Ali and Mehmet are handsome doctors.'
      b. Ali (ve Mehmet) *pratisyen* doktor.
          'Ali is a practitioner doctor./Ali and Mehmet are practitioner doctors.'

If kind-specification is also possible with NCs, *tane* could be establishing a *belong-to* relation between a singular kind and object-level entities associated with it, as illustrated in (26), similar to what the copula does. If so, we expect the same modificational restrictions to surface in NCs with *tane*, but this is not attested. Unmarked nouns in NCs can receive object-level modification regardless of the classifier, as shown in (27). So, we can also conclude that NCs do not involve kind specification with singular kind terms.

(26) $\llbracket tane \rrbracket = \lambda x^K \lambda y.\ belong\text{-}to(y, x^K)$

(27)   Sevgi iki (tane) *yakışıklı* doktor-a mesaj at-mış.
        Sevgi two CL   handsome doctor-DAT text   send-EVID
        'Apparently, Sevgi texted two handsome doctors.'

Considering the problem of covert type-shifting with singular kind terms and the lack of kind specification in NCs, *tane* could not be given an atomizer semantics in the sense of Chierchia (1998). This is because an atomizer demands access to object-level entities to extract atoms out of them. A semantics of this sort could be possible if *tane* combined with plural kind terms, because plural kinds allow type-shifting to sets of object-level instantiations (via *pred*). However, neither *tane* nor *numerals* take the plural form of the noun.

For these reasons, we do not expect singular kinds to be an option for the noun denotation in Turkish NCs in the presence or absence of *tane*.

3.3 *tane* and Mass Nouns

We have seen that *tane* does not have a type-fixing function on kind terms. We can then conclude that unmarked nouns participate in NCs in their ordinary object-level denotation. The next step is to see whether *tane* might have anything to do with the counting of mass nouns.

So far, we have only focused on the interpretation of ontological count nouns in Turkish. However, it is crucial to see where Turkish stands regarding the count-mass distinction compared to English and Chinese-like languages. Whereas English grammatically distinguishes between the count and mass sense of the noun, Chinese-like languages are known to reflect this distinction only with the choice of the classifier, not at the level of the noun (Cheng and Sybesma 1999).

I have shown in Section 1 that Turkish numerals cannot directly combine with a mass noun like *water* unless the mass noun is coerced into a count interpretation through covert universal packaging/sorting (see (3) and (4)). This is similar to 'two waters' in English. We have seen that coercion is also necessary for *tane* to co-occur with mass nouns.[14] The contrast between count and mass nouns in their ability to directly combine with numerals and the numeral+*tane* combination already points to a more English-like characteristic of

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[14] Mass nouns are generally known to be capable of directly combining with a numeral if a sub-type interpretation is at issue. The famous example discussed for English is *two bloods* to mean two types of blood. The Turkish counterpart requires the intervention of *tür* 'type/kind' for this interpretation, i.e., *iki #(tür) kan* 'two type blood'. However, as shown in (i), numerals and the numeral+*tane* combination are compatible with a sub-kind interpretation in general.

Turkish nominals. It also shows that *tane* is selective for the count sense of the noun just like numerals. However, before reaching this conclusion, we need more evidence to confirm the status of the count-mass distinction in Turkish. Furthermore, there is an analysis we need to take into consideration.

Rothstein (2017) and Schvarcz and Rothstein (2017) claim that ontological count nouns in Brazilian Portuguese and Hungarian are flexible in their grammatical representation, analogous to *stone/stones* pair in English (see also Pires de Oliveira and Rothstein 2011 for Brazilian Portuguese). The mass denotation of ontological count nouns is identified as *furniture*-type mass nouns, which denote sets of naturally individuable units. This claim partly relies on the fact that in Brazilian Portuguese and Hungarian, most nouns are compatible with a comparative evaluation in terms of both cardinality and a non-cardinal measure dimension like volume, just like *furniture*-type nouns in these languages. Schvarcz and Rothstein further argue that Hungarian, being an optional classifier language, reflects this ambiguity in its NCs. In its count use, a singular noun can directly combine with a numeral, but it needs an intervening classifier in its mass use.

If a similar case exists in Turkish, we can point to a difference in the type of the noun in NCs with and without *tane*. This difference can be captured by Krifka's analysis if we assume that a count noun inherently involves a number argument, rather than obtaining it through a null operator that transforms a kind term into an object-level one. The hypothesis is then as follows: In NCs without *tane*, the noun is count, with a denotation as in (28a), and therefore, it can directly combine with a numeral. In NCs with *tane*, the noun is mass, with a denotation as in (29a), and that is why a classifier is needed for counting.

(28)   *üç köpek* 'three dog':
   a. $[\![dog_{count}]\!] = \lambda n \lambda w \lambda x \; [OU_w(dog)(x) = n]$
   b. $[\![three \; dog]\!] = \lambda w \lambda x \; [OU_w(dog)(x) = 3]$

(29)   *üç tane köpek* 'three CL dog':
   a. $[\![dog_{mass}]\!] = \lambda w \lambda x \; [dog_w(x)]$
   b. $[\![tane]\!] = \lambda n \lambda P \lambda w \lambda x \; [OU_w(P)(x) = n]$
   c. $[\![three \; tane \; dog]\!] = \lambda w \lambda x \; [OU_w(dog)(x) = 3]$

I will now demonstrate that Turkish displays a three-way classification of noun denotations- count, mass, and an intermediate class of *furniture*-type nouns, but there is no sign of flexibility in the grammatical representation of ontological count nouns.

3.3.1 On the Count-Mass Distinction

Departing from the traditional view (ter Meulen 1981, Link 1983, Bunt 1985, Pelletier and Schubert 1989) where nouns are considered within a two-way count-mass distinction, Doetjes (1997), Chierchia (2010), Barner and Snedeker (2005), Rothstein (2010), Landman (2011), Grimm (2012), and Deal (2017) recognize three different categories of noun denotations. These are roughly represented by *cat*, which we readily conceptualize as count, *water*, which we readily conceptualize as mass, and *furniture*, which share characteristics with both.

Without getting into the theoretical stance taken, I will refer to the diagnostics used in Deal (2017) to show that this three-way distinction is also evident in Turkish, though with a slightly varying behavior compared to English. The difference between ontological count and mass nouns surfaces through five diagnostics: ability to directly combine with numerals, choice of quantificational elements, plural marking, combination with so-called 'count adjectives', and comparison with respect to numerosity vs. mass/volume.

kedi 'cat' vs. su 'water' We know that the ability to directly combine with numerals and *tane* is a distinguishing factor for count and mass nouns in Turkish. These nouns also differ in their choice of quantifiers. For example, *cat*-like nouns are compatible with *bir kaç* 'a few', *water*-like nouns are compatible with *biraz* 'a

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(i)   Bu muazzam tür-ler arasından, malesef   iki (tane) kuş yok   olma   tehlikesi-yle karşı karşıya.
      this astonishing kind-PL among   unfortunately two CL   bird extinct become danger-with facing
      'Among these astonishing kinds, unfortunately, two birds are facing extinction. '

little', as shown in (30) (see Göksel and Kerslake 2005 and Görgülü 2010).[15] Note further that *tane* remains to be an option with the count quantifier, but it cannot co-occur with the mass quantifier, as evidenced in these examples.

(30) a. bir kaç (tane)/ *biraz (tane) kedi
          a   few CL   a.little CL   cat
          'a few cats'
      b. *bir kaç (tane)/ biraz   (*tane) kan
          a   few CL   a.little CL   blood
          'a little blood'

Turkish also distinguishes between count and mass nouns through plural marking, though in a different way from English. Turkish mass nouns can be pluralized, but this is possible with an additional *abundance* or *unorderly scattered* interpretation, as exemplified in (31a) and (31b). That is, the plural marker brings with it some special interpretations when inflected on mass nouns. In this way, the pluralization of mass nouns contrasts with the pluralization of count nouns in Turkish.[16]

(31) a. Adam-ın burn-un-dan   kan(-lar) akı-yor-du.
          man-GEN nose-3SGPOSS-ABL blood-PL flow-IMPERF-PAST
          without PL: 'There was (some) blood flowing from the man's nose.'
          with PL: 'There was a lot of blood flowing from the man's nose.'
      b. Yerdeki   kan(-lar)-ı   temizle-yeceğ-im.
          on.the.ground blood-PL-ACC clean-FUT-1SG
          without PL: I will clean the blood on the ground.
          with PL: 'I will clean the scattered amounts of blood on the ground.'

One other distinguishing factor is that the combination of nouns with the so-called 'count adjectives' (the term due to Quine 1960) such as *small* and *round* is possible with count nouns, but not with mass nouns:

(32) küçük kedi/ *küçük kan
      small cat   small   blood
      'small cat'/ '*small blood'

Finally, comparatives are assessed based on numerosity with count nouns and based on volume with mass nouns (Barner and Snedeker 2005, Bale and Barner 2009). (33a) is true if Sevgi has more number of books compared to İrem, irrespective of their volume or length. But (33b) is assessed based on who has a greater volume of water, regardless of the number of portions of the water.

(33) a. Sevgi-nin İrem-den daha çok kitab-ı   var.
          Sevgi-GEN İrem-ABL more very book-3SGPOSS have

          'Sevgi has more books than İrem.'
      b. Sevgi-nin İrem-den daha çok su-yu   var.
          Sevgi-GEN İrem-ABL more very book-3SGPOSS have

          'Sevgi has more books than İrem.'

These diagnostics clearly show that Turkish count and mass nouns have distributional and semantic distinctions.

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[15] This contrast also surfaces with question words *kaç* 'how many' and *ne kadar* 'how much', though there are also other quantifiers that are compatible with both count and mass nouns like *çok* 'a lot of' and *bütün* 'all'. Furthermore, count nouns can co-occur with *biraz* if pseudo-incorporated, as shown below. Görgülü (2010) notes that in such cases, quantification is over the event denoted by the verbal complex, as reflected in the translation.

(i) Biraz   kitap oku-du-m.
     a,little book read-PAST-2SG
     'I did a little book-reading.'

[16] The terms *abundance* and *unorderly scattered* are used in Tsoulas (2009) and Kouneli (2019), as a similar phenomenon exists in Greek.

mobilya 'furniture' Nouns like *mobilya* 'furniture' and *mücevher* 'jewelery' share characteristics with both count and mass nouns, and hence constitute a third variety in Turkish, as in English, albeit with some less clear-cut differences.

These nouns are degraded, if not fully ungrammatical, when they combine with a numeral or a count quantifier directly. The intervention of *parça* 'piece' makes it perfect, but the degradedness persists with *tane* instead, as evidenced in (34a). Note that *parça* would be incompatible with count nouns unless the noun is coerced into a mass use via universal grinding. That is, (34b) could not mean 'three chickens', as is the case with the English counterpart.

(34) a. üç/   bir kaç ??(parça)/ (??tane) mobilya
          three a   few piece   CL   furniture
          'three/a few pieces of furniture'
      b. üç/ bir kaç parça tavuk
          'three/a few pieces of chicken'

The co-occurrence of *mobilya* with the mass quantifier is not preferred. However, if the context supports a focus on the volume of the furniture, it could be possible. Suppose that we are going to move and need to rent a truck. The following would be felicitous in a conversation with the renting agent to assess how large a truck we would need.

(35) Biraz mobilya-mız   var, çok   değil.
      a.little furniture-1SGPOSS have much not
      We have a little furniture, not much.'

These tests point to more mass-like characteristics of *furniture*-type nouns, but they also pattern with count nouns in that they can be pluralized without inducing special interpretations. They are also compatible with count adjectives:[17]

(36) a. Mobilya(-lar) bugün gel-iyor.
          furniture-PL   today come-PROG
          'The furniture will be delivered today.'
      b. yuvarlak /küçük mobilya
          round   small   furniture

Finally, *furniture*-type nouns allow comparison based on numerosity and volume, sharing characteristics with both count and mass nouns. While (37) compares quantities of furniture in terms of numbers of pieces in the most natural sense, if it is accompanied by a follow-up such as 'She will need a larger moving truck.' it can also compare their volume.

(37) Sevgi-nin İrem-den daha çok mobilya-sı   var.
      Sevgi-GEN İrem-ABL more very furniture-3SGPOSS have

      'Sevgi has more furniture than İrem.'

The characteristics of the three varieties of nouns are summarized in Table 1 (cf. Deal's table for English, pg. 9).

To conclude, Turkish nouns have clear distributional and semantic distinctions in countability, making it more similar to English-like languages despite some puzzling variations such as the compatibility of mass nouns with the plural marker in Turkish. As much as these variations await independent research, our goal has been to establish that Turkish departs fundamentally from obligatory classifier languages in having a three-way classification of count-mass distinction.

3.3.2 Interim Discussion

What mainly concerns us in this comparison is that *tane* is only compatible with count nouns like *kedi* 'cat'. While it is not obvious to what extent *furniture*-type nouns are count and to what extent they are mass, it

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[17] The modification with these adjectives points to a type of furniture.

	kedi	mobilya	su
direct combination with numerals and the count quantifier	✓	??	*
combination with *tane*	✓	??	*
combination with mass quantifier	*	✓	✓
regular pluralization	✓	✓	*
pluralization only with special interpretations	*	*	✓
combination with count adjectives	✓	✓	*
comparison based on number	✓	✓	*
comparison based on volume	*	✓	✓

Table 1: The Three-way Count-Mass Distinction in Turkish

seems that they do not (fully grammatically) allow counting without the mediation of the intervening item *parça* 'piece', similar to the case with mass nouns. This mediation is not (readily) provided by *tane* either.

The facts also illustrate that analyzing Turkish unmarked nouns as flexible nouns is problematic. As we have seen above, there are cases where *furniture*-type nouns have count behavior, but ontological count nouns do not display any mass behavior (modulo coercion).[18] In contrast to the *furniture*-type, *cat*-type nouns are not compatible with mass quantification (30a), and they do not allow comparison based on volume (33a). Central to our purposes, count and *furniture*-type nouns differ in their ability to combine with *tane*. These differences are not expected if unmarked count nouns have a mass denotation that groups with the *furniture*-type nouns and if the intervention of *tane* is a way of making counting possible with them.[19]

Eliminating the possibility that Turkish count nouns have a flexible denotation, we have ample evidence against analyzing *tane* as some sort of repair mechanism with kind terms or mass nouns on par with obligatory classifiers in Chinese-like languages. Based on this, I argue that unmarked count nouns in Turkish NCs uniformly denote atomic properties of object-level individuals and hence they do not need a mediator to make counting possible with them.

4 Counting, Number Marking Variations, and *tane*

In this section, I present my account of Turkish NCs and *tane*. Following Scontras (2014, 2022), I take NCs to universally bear a cardinal head that denotes a counting function. One difference between English and Turkish NCs lies in the form of the cardinal head. While in English, it is always realized covertly, Turkish also has *tane* as an overt form of this head. So, the (main) role of *tane* in Turkish NCs, I propose, is to count.

My analysis builds on an account of variation with respect to number marking in NCs. Following Ionin and Matushansky (2006, 2019), I argue that the lexical NP in NCs is semantically singular. Plural marking surfacing in languages like English is the product of a semantically contentful number agreement mechanism, which is further conditioned on animacy, definiteness, and specificity in some languages, such as Farsi and Western Armenian. I offer a semantic account of this mechanism informed by Scontras' analysis of number marking in English NCs, which forms the basis of the proposal that counting is established by a cardinal

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[18] It is not obvious where fruit and vegetable nouns belong in this classification. They can directly combine with numerals(+*tane*) and the count quantifier, but there are also cases where they co-occur with the mass quantifier.

(i) Derin-in   bir kaç/ biraz elma-sı   var.
    Derin-GEN a   few   a.litlle apple-3SGPOSS exist
    'Derin has a few/some apples.'

While it is unclear to what extent universal grinding is at play here, the mass-like behavior of such nouns cannot be a factor in the semantics of *tane*. This is because *tane* is compatible with all types of count nouns, including those that strictly display a count behavior and do not readily give rise to universal grinding coercions (e.g., human and inedible animates.)

[19] We have noted that *furniture*-type nouns are not fully ungrammatical in their direct combination with numerals and *tane*. The degradedness should not be taken as support for the possibility that *tane* operates on furniture-type mass nouns. Otherwise, we would expect *tane* to be perfect with these nouns, as is the case with count nouns. It instead raises the question to what extent *furniture*-type nouns are count in nature, so they are compatible with *tane* to some degree, being awkward at best.

head. I provide arguments in favor of the view that Turkish lacks number agreement in its NCs. At the end, I re-evaluate the status of optional classifier languages within the framework adopted here.

4.1 Counting with Atoms and Number Agreement in NCs

We have concluded that NCs require the noun to denote an atomic property in Turkish. Let us take this as the initial step on our way to the analysis of *tane*.

Ionin and Matushansky (2006, 2019) claim that the lexical NP appearing with a cardinal is semantically singular cross-linguistically, despite the appearance of the noun in languages like English. They argue that only individuals of the same cardinality can be counted. That is, numerals, being modifiers of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$, require atomic properties as an argument; the members of a plural property do not necessarily evaluate to the same cardinality.[20] Based on this analysis, the semantics of the numeral *two* is illustrated in (38). The constraint ensuring the atomicity requirement of numerals is given in (39) (Ionin and Matushansky 2006, pg. 321 & 329).

(38) $[\![two]\!] = \lambda P \lambda x. \, \exists S \, [\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S \, P(s)]$
   a. $\prod(S)(x) = 1$ iff S is a cover of x, and $\forall z, y \in S \, [z = y \vee \neg \exists a \, [a \leq_i z \wedge a \leq_i y]]$
   b.   A set of individuals C is a cover of an individual X iff X is the sum of all members of C: $\sqcup C = X$

(39) $[\![two]\!](P)(x)$ is defined iff $\exists n \, \forall z \, [P(z) \rightarrow |z| = n]$

Then, $[\![two \ books]\!]$ can be described informally as follows:

(40) $\lambda x \in D_e. \, x$ is a plural individual divisible into 2 non-overlapping individuals p_i such that their sum is x and each p_i is a book.

Languages like Turkish, Finnish, Hungarian, and Welsh transparently reflect the atomicity requirement of numerals with the singular form of the noun in their NCs. Languages like English, though, seem to challenge this view at first glance, given that the noun occurs in the plural form instead. Ionin and Matushansky argue that the plural marking on the lexical NP is number agreement reflecting the semantic plurality of NCs. That is, *books* in *two books* is lexically singular, denoting a set of atomic individuals, but the entire NC is semantically plural denoting a set of plural individuals divisible into two nonintersecting parts. The plural marker is the indicator of this plurality.[21] This view then dedicates the difference in the form of the noun in English and Turkish NCs to the presence/absence of number agreement reflected on the noun.

Delaying the discussion of the evidence for this approach until Section 4.3.1, I will now combine insights from Ionin and Matushansky's view of numerals and Scontras's analysis of English NCs to provide a semantic account of number agreement in NCs.

Scontras claims that number marking does not contribute to the semantics of the nominal but instead is dependent on it, similar to Ionin and Matushansky's view. That is, the plural in *three books* does not spell out the * operator (Link 1983), which closes an atomic property under sum. Assuming that syntactic number features are located on a designated functional head (Sauerland 2003), Scontras argues that there is a number head, i.e., #, that projects above NCs and and hosts singular (SG) and plural (PL) features.[22] SG carries with it a numerical presupposition for *one-ness* of the property with which it composes and PL surfaces when the presupposition of SG fails to be satisfied. The choice between SG and PL is determined by Maximize Presupposition (Heim 1991), which requires the use of SG whenever its presupposition is met.[23]

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[20] This generalization holds for simplex numerals. Ionin and Matushansky argue that complex numerals as in *two hundred books* are derived compositionally, i.e., *hundred books* being of type $\langle e,t\rangle$ can be a sister to *two* that is of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$. Given the constraint in (39), it is ensured that the set denoted by *hundred books* can be an argument to the numeral *two* since the set of *hundred books* contains plural individuals of the same cardinality.

[21] A syntactic implementation of this approach can be found in Alexiadou (2019) (building on Landau 2016 and Wechsler and Zlatić 2003) and Bayirli (2012). See also Krifka (1989, 1995, 2003), Ortmann (2019), Farkas and de Swart (2010), Sağ (2018) for studies adopting an agreement-based approach to number marking in NCs.
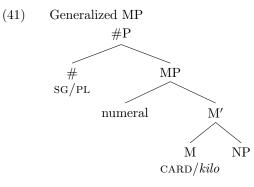
[22] See also Martí (2020) for a similar analysis where number marking distinctions, concerning also dual, trial, paucal values of grammatical number, are derived by Harbour's (2014) feature system.

[23] Scontras does not call number marking in NCs an agreement phenomenon. This is a contribution made in this paper.

In *one book*, every member of the set evaluates to 1 with respect to cardinality, and hence the lexical NP surfaces in the singular form. In *two books*, every member of the set evaluates to a number other than 1 yielding a presupposition failure for SG, and therefore probing plural morphology on the noun.

The *one-ness* presupposition of SG in English is not only determined by cardinality but also a measure that is specified by the head of a measure phrase, such as *kilo*. As evidenced in *three kilos of apples*, the specific measure supplied by the measure term determines number morphology. In *one kilo of apples*, every member of the set necessarily evaluates to 1 with respect to the kilo measure, and hence we witness the singular form *kilo*. With a different number, such as *three*, though, the plural morphology surfaces, i.e., *kilos*, due to the presupposition failure.[24]

For a straightforward account of number marking in constructions with cardinals and measure terms, Scontras analyzes numerals as individual-denoting expressions referring to natural numbers of type n that serve as an argument of a functional counting element CARD or a measure term (see also Zabbal 2005 and Landman 2004). Offering a generalized Measure Phrase structure, Scontras proposes that CARD is introduced as a measure head just like other measure terms.[25]

(41) Generalized MP

An MP denotes a quantity-uniform (QU) property with respect to the measure expressed by the M head. That is, every member of the set denoted by the MP maps to the same number with respect to this measure. The one-ness presupposition of SG involves this information. In the case of CARD, number marking is sensitive to the quantity-uniform measure μ_{CARD}, while in the case of measure terms, number marking is sensitive to the quantity-uniform measure internal to the measure term, e.g., μ_{kg}. Based on this, the semantics of English # heads is represented as below:

(42) English # heads:
   a. $[\![\text{SG}]\!] = \lambda P : \forall\mu\forall x \in P[QU_\mu(P) \rightarrow \mu(x) = 1].\ P$
   b. $[\![\text{PL}]\!] = \lambda P.\ P$
   c. $QU_\mu(P) = 1$ iff $\forall x\forall y\ [P(x) \wedge P(y) \rightarrow \mu(x) = \mu(y)]$

Number morphology surfaces on the closest head to the # head. In the presence of an overt measure head like *kilo*, it is expressed on M, while in the presence of a covert measure head, i.e., CARD, it is expressed on the head of the next closest phrase, the lexical NP.

Scontras gives CARD a restrictive semantics. That is, with numerals other than *one*, CARD restricts a semantically-plural predicate (formed via *) to just those members with cardinality n. This is one aspect where my account departs from Scontras's view. Instead, I follow Ionin and Matushansky (2006, 2019) in taking the lexical NP in NCs to denote sets of atoms cross-linguistically, as stated above. Applying their

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[24] With numerals like *zero* and decimals like *0.5*, we witness plural morphology because the one-ness presupposition of SG is not met in these cases. See also Martí (2022) for plural marking with *zero*. Note that 1.0, which equals 1 as a mathematical fact, triggers the plural marking on the noun as well, e.g., *1.0 dogs*. Based on this, Krifka (1989, 1995, 2003) concludes that plural marking in NCs must be an instance of semantically vacuous syntactic agreement. However, I depart from this view in taking plural agreement in NCs to be semantically contentful. It is possible to conceive 1.0 to be incompatible with singularity since with 1.0, what is at issue is the whole, i.e., the sum of all fractions. Then, the sense of one-ness in decimals might differ from the sense of one-ness in cardinality and measurement with respect to other measure dimensions.

[25] Scontras takes 'of' in MPs like *three kilos of apples* to be syntactically and semantically vacuous and argues that a difference between CARD and other measure terms like *kilo* is that the former operates on the predicative denotation of the noun while the complement of the latter must be bare plurals or mass nouns, which denote at the kind level.

view of numerals to it, I propose that CARD, is an expression of type $\langle n, \langle\langle e, t\rangle, \langle e, t\rangle\rangle\rangle$. It takes a number n and an atomic property P, and returns a set of individuals x that have the cardinality n, and the atomic parts of each x is in P, as illustrated below:[26]

(43)   The Semantics of CARD:
      $[\![\text{CARD}]\!] = \lambda n \lambda P \lambda x \colon \forall y\ [P(y) \rightarrow AT(y)].\ \exists S\ [\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\ P(s)]$
   a. $\prod(S)(x) = 1$ iff S is a cover of x, and $\forall z, y \in S\ [z = y \vee \neg \exists a\ [a \leq_i z \wedge a \leq_i y]]$
   b.   A set of individuals C is a cover of an individual X iff X is the sum of all members of C: $\sqcup C = X$

Below is the derivation of [two CARD book], where AT in P_{AT} is short for the presuppositional content.

(44)   a. $[\![\text{book}]\!] = \lambda x.\ book(x)$
     b. $[\![\text{CARD}]\!] = \lambda n \lambda P_{AT} \lambda x.\ \exists S\ [\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\ P(s)]$
     c. $[\![\text{two}]\!] = 2$
     d. $[\![\text{two CARD}]\!] = \lambda P_{AT} \lambda x.\ \exists S\ [\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S\ P(s)]$
     e. $[\![\text{two CARD book}]\!] = \lambda x.\ \exists S\ [\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S\ book(s)]$

Together with this twist, number marking in the presence of numerals proceeds as shown below:

(45)   Number marking with *one*:
   a.   ✓ $[\![\text{SG one CARD book}]\!] = \{a, b, c\}$
   b.   ✗ $[\![\text{PL one CARD book}]\!] =$ *failure due to Maximize Presupposition*

(46)   Number marking with *two*:
   a.   ✗ $[\![\text{SG two CARD book}]\!] =$ *presupposition failure*
   b.   ✓ $[\![\text{PL two CARD book}]\!] = \{a \oplus b, b \oplus c, a \oplus c\}$

To sum up, the lexical NP in NCs is semantically singular though NCs in some languages like English also involve plural number agreement. We have analyzed the semantics of number agreement, locating the semantically contentful SG and PL features on a number head that is situated above NCs.
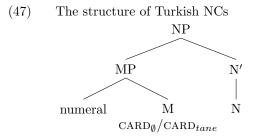

4.2 *tane* as an Overt Form of CARD

Scontras' analysis relies on the presence of a covert cardinal head for a uniform treatment of number marking in constructions with cardinal numerals and measure terms. I propose that the Turkish classifier *tane* is the overt realization of this cardinal head. In essence, *tane* shares the same semantics with the covert CARD given in (43).
    I provide an illustration of Turkish NCs below. Differently from English, MP is represented as a modifier to the noun. This is because Turkish is a head-final language. Unless independent evidence is provided for otherwise, representing a functional projection like M as head-initial in a strictly head-final language would only be a stipulation.[27]

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[26] I suggest that complex numerals are derived by covert arithmetic operators, multiplication and addition, the result of which is a complex number that feeds the argument slot of the cardinality function. E.g., *two hundred* is derived through a covert multiplication operator that takes two numbers and multiplies them. One other way would be to derive them compositionally as in Ionin and Matushansky (2006, 2019), with recurring cardinal heads (cf. Rothstein 2017). However, in the following section, we will analyze the classifier *tane* as the overt realization of CARD, based on which we would expect *tane* to be multiplied for each numeral in a numeral complex. This is not the case, though, since *tane* only follows the numeral closest to the noun: *iki (*tane) yüz (tane) elma* 'two hundred apples' For this reason, instead of Ionin and Matushansky's constraint in (39) that ensures the atomicity requirement of simplex numerals and the compositional derivation of complex numerals, I directly dedicate an atomicity requirement to the cardinal head regardless of simplex and complex numerals.

[27] See Sağ (2019) for other reasons that pertain to licensing of ellipsis in NCs and Sağ (2020) for the implications of this view for the interpretation of measure constructions. See also von Heusinger and Kornfilt (2017) for an alternative representation. Note that treating numerals (corresponding to the projection of CARD, i.e., MP, in our framework) as modifiers/specifiers of the NP is standard in the literature (Link 1987, Verkuyl 1993, Carpenter 1998, Landman 2003, Danon 2012, among others, cf. Mittendorf and Sadler 2005 and Ionin and Matushansky 2006). See Giusti (2002) and Alexiadou et al (2007) for an overview.

(47)   The structure of Turkish NCs

$$
\begin{array}{c}
\text{NP} \\
\diagup \quad \diagdown \\
\text{MP} \qquad \text{N}' \\
\diagup \quad \diagdown \qquad | \\
\text{numeral} \quad \text{M} \qquad \text{N} \\
\text{CARD}_\emptyset/\text{CARD}_{tane}
\end{array}
$$

Then, the difference between English and Turkish NCs not only surfaces in the plural number agreement, but also in the form of CARD.[28] In English, the cardinal head is always covert, and in fact, this is the case in many other languages. Turkish departs from these languages also featuring an overt version of this head. This is the optional aspect of *tane* in NCs.

It should be emphasized that optionality is not an inherent property of an overt CARD head. In fact, it would be possible to find languages where CARD is always overt.[29] Furthermore, the overt vs. covert realization of CARD could be vulnerable to some language-specific factors. Scontras (2022) discusses Mayan languages, Chol and Mi'gmaq as an example where the overt and covert realizations of CARD is dependent on the set of numerals they combine with (see Bale et al 2019 for this generalization).

4.3 More on Number Agreement in NCs

Now that we have the theoretical machinery in place, I will elaborate on the agreement-based approach to number marking variation in NCs. For this, we will examine Western Armenian and Farsi NCs and then discuss the absence of number agreement in Turkish NCs.

4.3.1 Cross-linguistic Evidence for the Agreement Approach

We have adopted Ionin and Matushansky's (2006, 2019) agreement view to explain number marking variation in NCs. While I refer the reader to Ionin and Matushansky (2019) for a more comprehensive list of evidence for this account, one is particularly of interest here: Plural agreement found on predicates, i.e., subject-predicate agreement, and plural marking in NCs are conditioned by similar factors that involve animacy, specificity, and definiteness. Based on this, Ionin and Matushansky conclude that the plural marking in NCs must also be a product of a number agreement phenomenon. They discuss Western Armenian (WA) as one language where we see this correlation, to which I now add Farsi (see also Alexiadou 2019).

WA and Farsi group with Turkish in being optional classifier languages with a systematic number marking system, though they differ from Turkish in also allowing plural marking in their NCs. This is possible with a definite or specific reading in WA and a definite reading in Farsi (e.g., Sigler 1996 for WA and Gomeshi 2003 for Farsi).

To see the case of WA, consider the example in (48). In the presence of the plural marker -*er*, the NC gets a wide scope reading, and the sentence is felicitous in a context where there are two specific elephants that I want to see (de re). Otherwise, the NC receives a narrow scope interpretation.[30]

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[28] Number agreement never emerges in constructions with other measure terms in Turkish: *iki kilo elma'*, lit.: two kilo apple, meaning 'two kilos of apples' Notice also that the noun occurs in the unmarked form generally in Turkish measure constructions. Sağ (2020) argues that measurement operates on the simplest form of the property in Turkish, atomic if count, mass otherwise. See fn 25.

[29] Bangla, known as an obligatory classifier language, could be an example for this, where CARD might always be overtly realized as *ta/to* (Saha 2022). One reason to analyze *ta/to* as CARD rather than a classifier as in Chinese-like languages is that it can co-occur with partitioning quantizing nouns, e.g., *du(-to) bosta caal* 'two-CL sack rice'. See the discussion in Section 4.4 for such double occurrences.

[30] WA shows dialectical variation with respect to the co-occurrence of the classifier and the plural marker. Recall that the data discussed here reflect the variety spoken in Beirut (see fn 4). Based on the judgments of a consultant from Istanbul, plural marking does not surface in the presence of the classifier in the variety spoken in Istanbul, though a specific indefinite interpretation is still possible (see also Sigler 1996, Borer 2005, Bale and Khanjian 2008, 2014, Khanjian 2013). The definite marker can also inflect both forms of NCs in this variety. While it is not obvious what regulates these variations, I do not take it to be internal to the classifier, considering the distribution in WA spoken in Beirut.

(48) g-uz-em   jergu (had) piɣ(-er) desn-el kazananot͡s-i-n met͡ʃ
      INDC-want-PRES1SG two CL   elephant see-INF zoo-GEN-DEF   inside
      with PL: 'I want to see two elephants in the zoo.' (**two** > **want**)
      without PL: 'I want to see two elephants in the zoo.' (**want** > **two**)

WA has an overt definite marker, i.e., -ə, and both forms of NCs are compatible with it, requiring the plural marker, as shown in (49). So, we can conclude that WA NCs are inflected by the plural only in specific and definite contexts.

(49) dup-i-n   met͡ʃ-ə   ga-r   jerek had kirk, meg had dedrag, jev jergu had madid.
      box-GEN-DEF inside--DEF exist-PAST.3SG three CL book one CL notebook and two   CL pencil
      jerek (had) kirk-er-ə   im bəzdig zarmig-i-s   dəv-i.
      three CL   book-PL-DEF my little cousin-DAT-1SGPOSS gave-PAST1SG
      'There were three books, one notebook, two pencils in the gift box. I gave the three books to my little cousin.'

The use of the plural marker in Farsi NCs is more restricted. In the absence of the plural, both forms of NCs can be used as indefinites, including specific interpretations.[31] This is illustrated in (50), which could be paraphrased as follows: (i) If you help any two students in my class, I will increase your grade (if > two). (ii) There are to specific students in my class and if you help both, I will increase your grade (two > if).[32]

(50) Age tu kelās-e man be do (tā) dāneshju komāk kon-i, be nomra-t   ezāfe
      if in class-EZ I   to two CL student help-2SG   to grade-2SGPOSS increase
      mi-kon-am.
      IMPERF-do-1SG
      'If you help two students in my class, I will increase your grade.' (**two** > **if** or **if** > **two**)

Farsi lacks an overt definite article as in Turkish, but NCs are interpreted as definite when inflected with the plural marker -hā. This is shown in (51) where the -hā-marked NC refers to the maximal individual introduced in the preceding sentence, whereas, in the absence of -hā, the NC does not have this ability.[33]

(51) Do (tā) moallem, se   (tā) mohandes, va ye doktor vāred-e otāgh shodan. **Do tā**
      two CL teacher   three CL engineer   and a doctor inside-EZ room become-3PL two CL
      moallem#(-hā) dar mored-e ye chiz-i   sohbat   mi-kard-an.
      teacher-PL   about-EZ a thing-INDEF conversation IMPERF-PAST.do-3PL
      'Two teachers, three engineers, and a doctor entered inside the room. The two teachers were talking about something.'

Plural agreement is known to be sensitive to two hierarchies: an animacy hierarchy (i.e., human > animate > inanimate) and a definiteness hierarchy (i.e., definite > specific > non-specific) (Smith-Stark 1974, Corbett 2000, see also Alexiadou 2019). WA and Farsi are languages that display this sensitivity in their subject-predicate agreement mechanism. Sigler (1996) reports that in WA, plural agreement on the predicate is obligatory with definite subjects, though both singular and plural agreement is possible when the subject is an indefinite. This is similar to the pattern in NCs, though with a different degree of sensitivity to the definiteness spine. In Farsi, on the other hand, the subject-predicate plural agreement is restricted with respect to the animacy hierarchy. That is, only animate subjects trigger plural agreement on the predicate

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[31]   The consultants report that the presence/absence of the classifier in Farsi NCs signals a difference in informal vs. formal registers. While NCs with *tā* are linked to more of a colloquial use, the omission of *tā* is found in formal (often written) contexts.

[32] Consultants find it harder to get a wide scope interpretation in the absence of the classifier compared to the case with the classifier. However, if the names of two students are mentioned as a follow-up to the conditional, the wide scope reading becomes salient: *Age tu kelas-e man be do daneshju komak koni, be nomrat ezafe mikonam. Amir o Hooman.* 'If you help two students in my class, I will increase your grade. (These students are) Amir and Hooman.'

[33]   The plural marker does not surface in the absence of the classifier. We will discuss this in Section 5.4. Note also that Farsi has a so-called uniqueness marker, *-(h)e/a*, which can be mistaken with a definite article. Jasbi (2019) claims that *-(h)e/a* introduces a uniqueness implication on the nominal it attaches to. It can appear with both nominals and indefinites. When it appears on a noun, the uniqueness implication ensures a definite interpretation. When it appears with indefinites, it yields specific indefiniteness.

(Ortmann 2002, Alexiadou 2019, Mahootian 1997, Mache 2012). While this does not fully correlate with the restriction in NCs, it is still viable to consider plural marking in NCs as an instance of agreement. It seems that the two hierarchies are split between NCs and the predicate domain in Farsi.[34]

It should be noted that bare plurals are not constrained by specificity/definiteness in WA and Farsi. They can have a non-specific reading, suggesting that the plural marking on bare nouns and the plural marking in NCs must be of different nature. This is illustrated for WA in (52a) and for Farsi in (52b).

(52) a. turs-ə   manug-ner t͡ʃ-en   xaɣ-ar-gor
          outside-DEF child-PL   NEG-PRES3PL play-NegPart-PROG
          'Children aren't playing outside.'   (no children, #some children > not)
      b. In   ruz-hā gorbe-hā be bāgh-e-man   ne-miāy-and.
          this day-PL cat-PL   to garden-EZ-my NEG-IMPERF.come-3PL
          'These days, cats are not coming to my garden.'   (no cats, #some cats > not)

English, in contrast, subject-predicate plural agreement surfaces without any interpretational restrictions with respect to the animacy and definiteness hierarchies. Likewise, the plural marking in NCs is not associated with any constraints.

Turkish, behaving more like WA and Farsi, displays sensitivity to the two hierarchies in subject-predicate agreement. That is, inanimate and non-specific subjects cannot trigger plural marking on the predicate (Kornfilt 1997, Bamyacı et al 2014, see also Alexiadou 2019). Although we will take Turkish as a language that lacks number agreement in NCs for simplicity, it is worth mentioning that globally unique entities like well-known fictional characters involve plural marking on the noun, as shown in (53a). Furthermore, there is a peculiar way of forming place names that involves plural marking in NCs, as demonstrated in (53b).[35]

(53) a. yedi cüce-ler
          seven dwarf-PL
          'the seven dwarfs'
      b. beş yüz   ev-ler
          five hundred house-PL
          'the five hundred houses' (a name of a neighborhood)

Considering these cases as a sub-type of definiteness, which would then be ranked high in the definiteness hierarchy, these idiosyncratic phenomena might be limited instances of number agreement in Turkish NCs (Alexiadou 2019).

In sum, those factors that govern subject-predicate plural agreement are also involved with the choice of plural marking in NCs. Therefore the latter must be analyzed within a theory of agreement.

Returning to WA and Farsi NCs, a natural move that follows from the discussion above is to analyze the classifiers of these languages as the overt form of CARD, analogous to the Turkish classifier.[36] Given that plural number agreement is involved in WA and Farsi NCs, we expect the agreement system of English NCs to apply in these languages as well but with one difference: Agreement is only established in the case of definiteness and specificity in WA, and in the case of definiteness in Farsi. That is, only the D head with these features can select a NC involving the projection of #P in these languages.
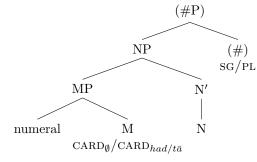
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[34] Ionin and Matushansky (2019) give Chadic language Miya as an example where plural agreement on predicates and in NCs is conditioned by animacy. See Schuh (1998) for this generalization.

[35] This is not possible with NCs with *tane*, which I believe is due to the restriction to indefiniteness in the presence of the classifier.

[36] Sağ (2019) shows that WA and Farsi pattern with Turkish in number marking semantics and kind reference (cf. Sigler 1996, Borer 2005, Bale and Khanjian 2008, 2014, Bale et al 2010, Khanjian 2013, Ionin and Matushansky 2019 and Alexiadou 2019, Martí 2020, and Kalomoiros 2021 for WA, and Gomeshi 2003, 2016, Gebhardt 2009, Mache 2012, Krifka and Modarresi 2016, and Alexiadou 2019 for Farsi). Farsi is also similar to Turkish in having distributional distinctions in terms of countability (Gomeshi 2003 and Mache 2012). The count-mass distinction in WA, though, requires further study (see Bale and Gillon 2020). However, crucial for our purposes, *had* and *tā* only co-occur with (ontological) count nouns, as in Turkish. Kalomoiros (2021), building on Sağ's (2022) pseudo-incorporation analysis, argues that *had* establishes a *belong-to* relation between singular kinds and their object-level members in WA NCs. This is what we have eliminated for *tane* in Section 3.2. If Kalomoiros's analysis is on the right track, then *had* could have both a type-fixing and a counting role in NCs in line with Krifka's view of obligatory classifiers discussed above. We return to this possibility for obligatory classifiers in Section 4.4.

The structural construal adopted in Scontras' analysis, i.e., the structure where the NP is a complement to the M head, shown in (41), predicts number agreement to fall on *had* in WA and tā in Farsi. Recall that number morphology is assumed to surface on the closest overt head to #P. However, plural morphology always appears on the noun in these languages, not on the classifiers when present. This problem disappears if WA and Farsi NCs have a structure similar to Turkish NCs, because then the closest head to #P will never be the M head; it will always be the head of the lexical NP. Therefore, I assume the structure in (54) for WA and Farsi NCs, though I leave the exploration of this remedy for future research (see also Mache 2012 for Farsi, cf. Bale and Khanjian 2014 for WA).

(54)   The structure of WA and Farsi NCs

```
                        (#P)
                       /    \
                    NP       (#)
                   /  \      SG/PL
                 MP    N′
                /  \    |
          numeral  M    N
          CARD_∅/CARD_{had/tā}
```

Before concluding, I should emphasize that for Scontras, plural marking on all nominal projections is supplied by the # head. We have seen that plural marking on WA and Farsi bare nouns is not subject to the restrictions observed with the plural marker in their NCs. Therefore, I utilize the # head only to account for the semantics of number agreement in NCs (perhaps also for subject-predicate agreement). I take the plural marking on a numeral-less lexical NP in WA, Farsi, and Turkish as the spell-out of the * operator, leaving the question open whether this is also the case in English.

To wrap up, we have discussed WA and Farsi NCs as the central motivation behind an agreement-based approach to number marking variation in NCs. I have proposed that these languages are similar to Turkish in featuring both an overt and a covert cardinal head, though they depart from Turkish in displaying a somewhat constrained version of number agreement in their NCs.

4.3.2 On the Absence of Number Agreement in Turkish NCs

I have argued that plural number agreement does not arise in Turkish NCs, excluding the abovementioned cases in (53). Scontras (2014, 2022), on the other hand, has a different view. He proposes that a separate strategy of number marking is implemented in Turkish NCs. I will now discuss the details of this proposal and explain the reasons why the case of Turkish should rather be taken as *absence of agreement*.

In Scontras' view, number marking in Turkish NCs is not sensitive to absolute atomicity (ability to evaluate to 1 with respect to a measure) but instead sensitive to relative atomicity. Quantized predicates are relatively atomic because every member in their denotation is a smallest member, and hence an atom, relative to the predicate in question. In other words, these relative atoms, called P-atoms, are those elements of P that have no other elements of P as parts. In Turkish, the one-ness presupposition of SG checks the relative atoms of nominal predicates. Since measurement always results in a quantized property regardless of the numeral accompanying, an MP is always marked with SG.[37] For example, *two books* is a quantized property because no member of $\{a \oplus b, b \oplus c, a \oplus c\}$ has parts which are also a member of this set.

As innovative as this proposal is, there are two reasons to believe that the lack of plural marking in Turkish NCs is due to the absence of number marking/agreement.

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[37] Scontras (2022) assumes that Turkish NCs have the same structure as English NCs, shown in (41). However, this makes wrong predictions for his account of Turkish number marking. Recall that only in the absence of an overt M head number marking falls on the lexical noun. When *tane* is present, the SG marking is expected to be reflected on it. But the lexical NP should surface in the plural form (the spell-out of the * operator) in NCs with *tane* since with numerals other than 'one' CARD is assumed to combine with a semantically plural property in this view. This is not attested, though: **iki tane elma-lar*: two CL apple-PL. This problem would be resolved under the view that CARD takes a singular property. Alternatively, the issue would not arise with the structure of Turkish NCs adopted in (47), for the closest head to # would always be the N head. However, I adopt the view that Turkish NCs do not implement number agreement as discussed in this section.

The first one pertains to our take on WA and Farsi number agreement. Scontras assumes that WA is a language where both the English and Turkish number marking systems are implemented. This idea, obviously, can be extended to Farsi as well. However, it is difficult to explain what triggers a switch from the Turkish system to the English system in case of specificity/definiteness without ad hoc stipulations under this view. It seems more plausible to hypothesize that agreement can arise when these conditions are met; otherwise, the # head is not projected.

The second reason is Turkish-internal. The agreement view is motivated by the fact that plural marking on the predicate and plural marking in NCs are conditioned by the same factors. Considering that a similar mechanism of number marking is at play in the two domains of agreement, let us look into the predicate domain to get a sense of what the absence of plural marking means in the Turkish agreement system.

I have stated above that Turkish subject-predicate plural agreement is sensitive to animacy and definiteness hierarchies. For example, with non-specific animate plural subjects, the plural agreement marker does not surface on the verb (Kornfilt 1997, pg. 385):

(55) Köy-ü   haydut-lar bas-mış(-lar).
      village-ACC robber-PL raid-PAST-3PL
      With -3PL: 'The robbers raided the village.'
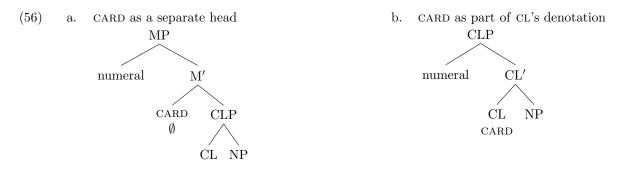   Without -3PL: 'Robbers raided the village.'

As indicated in (55), the 3rd person plural marker is realized as *-lAr*, which is homophonous with the nominal plural marker. Its absence is often associated with the 3rd person singular agreement but (55) clearly shows that the lack of the plural is not necessarily an indicator of singularity. Despite the plural form of the subject, the verb fails to be marked with *-lAr* since the subject is non-specific. If we take this one step further and associate the lack of plural marking with quantization in Turkish, in light of Scontras's view, the conclusion does not change. Although the plural subject does not denote a quantized property, the verb remains to be unmarked.

Taking these factors into account, I analyze the absence of plural marking in NCs as the reflection of no agreement rather than a covert form of SG-agreement.

4.4 CARD in Obligatory Classifier Languages

Before starting the second part of the analysis, there is one issue remaining that we need to address.

As discussed in Section 3.1, obligatory classifiers in Chinese-like languages take the role of a repair mechanism to ensure counting with nouns that are otherwise unsuitable for counting. Based on the analysis developed in this paper, we then expect a cardinal head besides a classifier in NCs of these languages. There are two routes to take here: CARD might be a separate covert head, as shown in (56a), or its semantics might be intertwined within the denotation of the classifier, as shown in (56b). As we have seen, a view along the lines of the latter is argued by Krifka (1989, 1995, 2003) where obligatory classifiers are analyzed as functions that take a kind and count the number of specimens of that kind. Scontras (2014) offers a similar analysis.

(56) a. CARD as a separate head   b. CARD as part of CL's denotation

              MP   CLP
             / \   /   \
       numeral   M'   numeral   CL'
                / \   / \
            CARD   CLP   CL   NP
             ∅   / \   CARD
                  CL NP

As shown in (57a), *tane* does not appear with quantizing nouns that we readily associate with a partitioning function on mass nouns, a role on par with the one dedicated to obligatory classifiers of Chinese-like languages. This means that partitioning and cardinality functions are realized by one lexical item when they co-occur

in Turkish, pointing to the structure in (56b) when the interaction of CARD and obligatory classifiers is considered analogously. Intriguingly, though, the co-occurrence of the overt CARD and partitioning words is possible in WA and Farsi, as exemplified in (57b) and (57c). Then, these functions can be spelled-out as separate heads, compatible with the structure proposed in (56a). However, further research is required to understand what determines these choices.[38]

(57)   a.   iki   (*tane) *damla*/ *şişe*   kan   Turkish
             two   CL   drop   bottle blood
             'two drops/bottles of blood'
        b.   jergu (had) *gatil* arujn   WA
             two   CL   drop blood
             'two drops of blood'
        c.   do   (tā) *shishe* golab   Farsi
             two CL   bottle   rose-water
             'two bottles of rose-water'

Based on these facts, the two structural configurations are equally possible for NCs in Chinese-like languages. To leave both alternatives open, in the remainder of this paper, I will take these languages to *presumably* involve a covert CARD in their NCs, while assuming the structure in (56a) for simplicity.

Let me summarize the key elements of the analysis laid out so far: I claim that the Turkish optional classifier differs from obligatory classifiers in Chinese-like languages in that it does not take a type-fixing/repairing role to make counting possible with kinds and mass nouns. I propose that *tane* denotes a counting function as being the overt counterpart of the cardinal head argued to project typically covertly in NCs cross-linguistically. The nominal argument of the cardinal head is semantically singular, but some languages (partially) conceal this, displaying plural number agreement in their NCs.

In the following section, I will present the second part of my analysis regarding the interpretational differences between NCs with and without *tane* and discuss the cross-linguistic implications.

5 Cardinality and (In)definiteness

We have focused on one aspect of *tane*, the fact that it optionally surfaces between the numeral and the noun in Turkish NCs. Our investigation also involves a case where its realization is not an available option: when the NC is interpreted as a definite expression. I will now account for this disparity between NCs with and without *tane*.

As stated in Section 1, NCs with *tane* are restricted to indefinite interpretations only, a cross-linguistic tendency of NCs when not accompanied by an overt determiner. NCs without *tane*, on the other hand, display exceptional behavior in freely allowing both definite and indefinite readings.

With an aim to account for the general behavior of NCs, I propose that the source of indefiniteness lies in a lexical variant of the cardinal head that has a built-in choice function variable in the sense of Reinhart (1997) (cf. Jiang 2012). That is, CARD has two lexical variants, one predicative and one argumental. Preventing an argumental type-shifting of any sort that could apply to the predicative variant, the variant with the choice function variable restricts NCs to indefiniteness when they occupy an argument position without an overt determiner. This restriction can be lifted in languages that have both an overt and a covert cardinal head by liberating one form from the argumental variant. If the language at issue is articleless, the liberated form can be both definite and indefinite via covert type-shifting. While the form associated with a choice function is the overt CARD, i.e., *tane*, in Turkish, this is a language specific choice. We will see that Farsi is the mirror image of Turkish in this regard.

I will discuss the empirical facts concerning (in)definite interpretations of NCs with and without *tane* before presenting my account.

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[38] *tane* can co-occur with container nouns if the container noun forms a compound with the lexical noun: *iki (tane) şişe-su* 'two bottle-waters'. (In such compounds, the stress falls on the container noun, as opposed to the ungrammatical form given in (57a).) This could mean that quantizing nouns, when used in their lexical sense, cannot spell out CARD, allowing *tane* to surface.

5.1 Turkish NCs and Indefiniteness

Indefinites differ from quantificational elements in that they have unusual scope behavior, with the ability to take wide scope in unexpected contexts (Fodor and Sag 1982). Like universal quantifiers, they can take wide scope over a preceding quantifier. Still, unlike universal quantifiers, they can also take scope out of islands such as complex noun phrases and the antecedent of conditionals.

Turkish is a scope rigid language, where scope relations reflect the surface order of quantifiers (Zidani-Eroğlu 1997, Göksel 1997, Aygen-Tosun 1999, Kelepir 2001, among others), as illustrated by the following example from Kelepir (pg. 57):

(58) Bir öğrenci her   kitab-ı   oku-du.
      one student every book-ACC read-PAST
      'A student read every book.' ($\exists > \forall$, *$\forall > \exists$,)

In contrast to its English counterpart, (58) is only true in a situation where each book at issue was read by the same single student, and it would be false in a situation where each book was read by different students. This shows that the universal quantifier that is in the object position cannot take wide scope over the indefinite subject. In order to get a narrow scope reading for the indefinite, the universal quantifier needs to be fronted, resulting in different word order:

(59) Her   kitab-ı   bir öğrenci oku-du.
      every book-ACC one student read-PAST
      'A student read every book.'($\forall > \exists$, *$\exists > \forall$)

Despite scope rigidity, Turkish indefinites are like indefinites in other languages in showing scope ambiguity and having exceptional scope-taking abilities (Kelepir 2001):[39]

(60) Öğrenci-ler-in   tam olarak yarısı bir kitab-a   yorum   yaz-dı.
      student-PL-GEN exactly   half one book-DAT comment write-PAST
      'Exactly half of the students wrote comments on a book.'
      (**exactly half > a, a > exactly half**)

Imagine that there are four students, and two wrote comments on a (possibly different) book. In this situation, (60) is true reflecting the narrow scope reading of the indefinite. Now suppose that out of four, two students wrote comments on the same specific book, while a third student wrote comments on a different book. In this situation, (60) is still true, showing that the indefinite can take wide scope over the quantifier in the subject position. Notice that the narrow scope reading of (60) would be false in this scenario because more than half of the students wrote comments on a book.[40]

Just like regular indefinites, NCs with and without *tane* show scope ambiguity when interacting with other quantifiers. The following sentence can be true in a situation where three of six students wrote comments on (possibly different) two books, reflecting the narrow scope reading of the NCs. It can also be true in other situations where more than half of the students commented on two books as long as the same two books were chosen by half of the students. Just like its English counterpart, (61) can also receive a distributive reading in the wide scope interpretation of the NC: There are two books such that exactly half of the students wrote comments for each.

(61) Öğrenci-ler-in   tam olarak yarısı iki (tane) kitab-a   yorum   yaz-dı.
      student-PL-GEN exactly   half two CL   book-DAT comment write-PAST

---

[39] This is the case for case-marked indefinites. Non-case-marked indefinites always yield narrow scope readings. Kelepir (2001), following Diesing (1992), Kennelly (1994), and Zidani-Eroğlu (1997), argues that non-case-marked indefinites are situated inside the VP, where they are locally $\exists$-closed, unlike case-marked indefinites which are outside the VP. Note also that accusative case-marked indefinites always receive a wide scope specific reading, which Kelepir (2001) explains by arguing that accusative case carries a presupposition of existence (cf. Enç 1991). Therefore, in this paper, the behavior of indefinites is shown with other case markers.

[40] To show the scope-taking ability of Turkish indefinites, examples with a non-monotone quantifier are given. Following Fodor and Sag (1982) and Ruys (1992), this is to avoid cases where the wide scope reading of indefinites entails the narrow scope reading, which makes it hard to tease apart the two. See also Reinhart (1997).

'Exactly half of the students wrote comments on two books.'
(**exactly half > two, two > exactly half**)

Turkish NCs also have exceptional scope-taking abilities, and hence can be interpreted inside or outside of an island. For example, (62) can be felicitous in two contexts: In the first one, it is enough that any two of my projects are selected for me to receive funding, while the other requires the condition that two specific projects of mine be selected. However, contrasting with the case in (61), the wide scope reading requires a collective selection of two projects in line with the facts in English.

(62)   Eğer iki (tane) proje-m   seçil-ir-se,   ödenek al-abil-eceğ-im.
        if   two CL   project-1SGPOSS select-PASS-AOR-COND, funding take-ABIL-FUT-1SG
        'If two of my projects are selected, I will receive funding.' (**if > two, two > if**)

One other general aspect of indefinites is that they can take intermediate scope (Ruys 1992, Abusch 1993, Farkas 1981). Turkish indefinites also show this general behavior; accordingly, NCs can take intermediate scope besides the widest and narrowest scope readings. For example, in (63), it is possible that different linguists gave an A to every student if they answered two questions that are fixed for every student of a single professor. (Linguist 1 gave an A to every student who answered Question a and b. Linguist 2 gave an A to every student who answered Question c and d, etc.)

(63)   Çoğu dilbilimci iki (tane) soru-ya   yanıt ver-en her   öğrenci-ye   A ver-di.
        most linguist   two CL   question-DAT answerREL every student-DAT A givePAST
        'Most linguists gave an A to every student that answered two questions.'

We have seen that NCs behave like regular indefinites in their scope-taking properties. They can also receive specific readings other than the ones induced by scopal interactions, such as partitive specificity and epistemic specificity (see Von Heusinger 2002). The sentence in (64) shows that both forms of NCs can be partitive specifics. Epistemic specificity, on the other hand, expresses the speaker's knowledge about the referent of an indefinite. As shown in (65), both NCs can also reflect epistemic specificity.

(64)   Oda-da   bir sürü çocuk var-dı.   İki (tane) çocuk kart oynu-yor-du.   Üç   (tane) çocuk
        room-LOC one many child exist-PAST two CL   child card play-PROG-PAST three CL   child
        televizyon izli-yor-du.
        TV   watch-PROG-PAST
        'There were many children in the room. Two children were playing cards. Three children were watching TV.'

(65)   İki (tane) öğrenci sınav-da   kopya çek-ti. Kim ol-duk-ları-nı   bil-iyor-um.   Zeynep
        two CL   student exam-LOC cheat-PAST who be-NMLZ-3PLPOSS-ACC know-PROG-1SG Zeynep
        ve   Merve.
        and Merve
        'Two students cheated on the exam. I know who they are: Zeynep and Merve.'

In sum, the facts discussed above demonstrate that NCs of Turkish can be indefinite regardless of the absence/presence of *tane*.

5.2 Turkish NCs and The Definiteness Puzzle

I will now show that in the absence of *tane*, NCs can also be definite, but in the presence of *tane*, they cannot.

As first shown in Section 1, NCs without *tane* can receive a definite interpretation, evidenced by their ability to refer back to a unique/maximal entity introduced in the preceding context. However, NCs with *tane* do not show this type of anaphoric behavior (Schroeder 1992). Below, I provide another example to illustrate this contrast. The presence of *tane* forces a partitive specific reading or is understood as introducing a new discourse referent in the second sentence, which yields infelicity in this particular context.

(66) Polis iki (tane) hemşire-nin ölüm-ü-nü araştır-ıyor. Edinilen bilgilere
    police two CL female.nurse-GEN death-3POSS-ACC investigate-PROG gathered information
    göre, **iki (#tane) kadın**-ın ellili yaş-lar-da ol-duğ-u tahmin ed-il-iyor.
    according.to two CL woman-GEN fifties age-PL-LOC be-NMLZ-3POSS predict-PASS-PROG
    'The police is investigating the death of two nurses. Based on the information gathered, it is predicted
    that the two women were in their fifties.'

The contrast in (66) shows that NCs without *tane* do not support a definite interpretation. This is also
revealed in situational contexts where reference to a unique/maximal entity that is familiar in the common
ground can be established. To see this, imagine that Sevgi has two apples only and this fact is known by
both the speaker and the addressee. In this case, the NC with *tane* cannot refer to these two apples, whereas
NCs without *tane* can, as shown in (67). In contrast, if Sevgi has three apples, referring to two of them is
possible with both forms of NCs, as in (68). This demonstrates once again that while both NCs with and
without *tane* are compatible with partitive specificity, only NCs without *tane* can yield definiteness.

Context: Sevgi has two apples only, familiar to the interlocutors.

(67) Sevgi-nin iki (#tane) elma-sı-nı Merve-ye ver-di-m.
    Sevgi-GEN two CL apple-3SGPOSS-ACC Merve-DAT give-PAST-1SG
    'I gave Sevgi's two apples to Merve.'

Context: Sevgi has three apples, not necessarily familiar to the addressee.

(68) Sevgi-nin iki (tane) elma-sı-nı Merve-ye ver-di-m.
    Sevgi-GEN two CL apple-3SGPOSS-ACC Merve-DAT give-PAST-1SG
    'I gave two of Sevgi's apples to Merve.'

In summary, while both forms of NCs can yield indefinite readings, *tane* does not surface in the definite
interpretation.[41] To put it another way, the form with *tane* reflects the cross-linguistic characteristic of NCs
in being restricted to indefiniteness. On the other hand, Turkish NCs without *tane* are extraordinary in also
allowing a definite interpretation freely. Our goal is then to account for the obligatory indefiniteness of NCs
in the presence of *tane* while this constraint appears to vanish in its absence.

5.3 A Cross-linguistic Glance at the Interpretation of NCs

For an understanding of the (in)definiteness puzzle of NCs with and without *tane*, let us step back and
elaborate on the interpretations allowed by NCs cross-linguistically.

  Jiang's (2012) generalization is that NCs of every language can receive an indefinite interpretation when
they occur in an argument position without an accompanying overt determiner. This is even the case for
NCs in languages with an overt definite article (i) that strictly ban the occurrence of bare nouns in argument
positions, e.g., French, and (ii) that allow bare nouns in argument positions only with a narrow scope
existential reading, e.g., English.

  There are two principles in the neo-Carlsonian approach that determine the interpretation of bare argu-
ments:

(69) a. *Blocking Principle* (Chierchia 1998):
         For any type shifting operation ϕ and for any X: *$\phi(X)$ if there is a Determiner D such that
         for any set X in its domain, $D(X) = \phi(X)$.
      b. *Revised Meaning Preservation* (Dayal 2004) : $\{\cap, \iota\} > \exists$

Revised Meaning Preservation dictates type-shifters to apply in a certain order, as long as the Blocking
Principle is respected. The Blocking Principle requires the use of lexical items instead of covert type-shifting
operations for reasons of economy. So, based on the Blocking Principle, bare nouns in languages with an
overt definite article cannot undergo covert *iota* type-shifting, and hence they disallow definite interpretation.

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[41] One might wonder if there is any difference between the two forms in the indefinite interpretation. To the best of my
knowledge, there is no difference, at least in any visible way.

Due to Revised Meaning Preservation, bare nouns cannot be interpreted as strong indefinites because ∃ type-shifting is low-ranked and hence unavailable. The narrow scope existential reading of bare nouns is independently possible through Derived Kind Predication (Chierchia 1998).

The fact that French and English NCs can have strong indefinite interpretations then shows that Revised Meaning Preservation is not applicable to NCs, unlike the case with bare nouns. However, the Blocking Principle still appears to be relevant, given that NCs need the overt determiner or the demonstrative for a definite interpretation in these languages, as exemplified for French in (70).

(70)   ean aacheté   deux chiens et   deux chats. *(Les)/ *(ces) deux chats sont coûteux.
        John has.bought two dogs   and two cats, The/these   two cats are costly
        'John bought two dogs and two cats. The/these two cats are very expensive.'   (Jiang 2012, pg. 95)

In articleless languages, the picture is surprisingly similar. Although definite interpretation is available for bare nouns through covert *iota* type-shifting, this does not seem to be the case with NCs. In an obligatory classifier language like Mandarin and a classifier-less language like Russian, NCs can only be interpreted as a strong indefinite when they freely occupy an argument position. A definite-like behavior is possible if NCs are preceded by a demonstrative, as exemplified below for Russian (see also Bošković 2005):

(71)   Ivan kupil   pjat' sobak i   pjat' koshek, *(Eti) pjat' koshek ochen' dorogie.
        Ivan bought five dogs and five cats.   these five cats   very   expensive
        'Ivan bought five dogs and five cats; these five cats are very expensive.'   (Jiang 2012, pg. 95)

A striking confirmation of the fact that NCs do not undergo covert *iota* type-shifting comes from Yi, an obligatory classifier language with a definite article. Yi is special in also allowing bare nouns to receive definite interpretation without the definite article, suggesting that the Blocking Principle does not apply in this language (see Jiang 2018 though). Despite this level of freedom with bare nouns, NCs still require the presence of the article for definite interpretation:

(72)   sse-vo nyip ma *(su) dza dzu ndʑɔ.
        boy   two CL DEF rice eat PROG
        'The two boys are having meal.'   (Jiang 2012, pg. 334)

The interim conclusion based on these languages is as follows: While strong indefiniteness is the default interpretation available to NCs, definiteness of NCs cannot be achieved through covert means but instead requires an overt marking by a definite article, or alternative markers such as demonstratives, if the language lacks a definite article.

Among the optional classifier languages analyzed in this paper, WA complies with this generalization. The attachment of the definite article is mandatory for the definite interpretation of NCs with or without *had*. On the other hand, Turkish shows exceptional behavior, as sketched out above. While the form with *tane* manifests the cross-linguistic tendency of NCs to indefiniteness, the form without *tane* also allows definiteness through covert type-shifting.

The articeleless mate of Turkish, i.e., Farsi, exhibits an opposite pattern. While NCs with tā can receive definite interpretation that also triggers plural agreement marking on the noun as we have seen above (see (51)), NCs without tā require a demonstrative to display a definite-like behavior, as exemplified below (cf. with the Turkish (66)). Since NCs are incompatible with definiteness in the absence of tā, number agreement does not arise, either. Therefore, we do not observe plural marking on the lexical NP in NCs without tā.[42]

(73)   Polis dar hāl-e barrasi-e marg-e **do moallem-e zan**   ast. Rasāne-hā-ye mahali migooyand
        police in investigation-EZ death-EZ two teacher-EZ female is   channel-PL-EZ local   say
        #(in) do zan/ ***do zan-hā**   ke   dar daheye panjah-e zendegi-e khod   budand.
        these   two woman two woman-PL that in fifties-EZ   life-EZ   themselves were.
        'The police are investigating the death of two female teachers. Local channels report that these two women were in their fifties.'

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[42] As stated in fn 31, the omission of tā signals a formal register, therefore, the behavior of NCs without tā is exemplified with an imaginary newspaper script.

The interpretational possibilities of NCs in the languages discussed above are summarized in Table 2.[43]

	CARD$_\emptyset$		Presumably CARD$_\emptyset$	CARD$_\emptyset$ & CARD$_{overt}$	
Languages with THE	**French**	**English**	**Yi**	**WA**	
indefinite NCs	✓	✓	✓	✓	
definite NCs with THE	✓	✓	✓	✓	
definite NCs with ι	✗	✗	✗	✗	
Languages without THE	**Russian**		**Mandarin**	**Turkish**	**Farsi**
indefinite NCs	✓		✓	✓	✓
definite NCs with Dem	✓		✓	✓	✓
definite NCs with ι	✗		✗	✓	✓
				with CARD$_\emptyset$	with tā

Table 2: The Cross-linguistic Interpretation of NCs

To wrap up, languages with an overt definite article have the same interpretational distribution regardless of whether they have one form of CARD or two. In the articleless group, though, two languages stand out by allowing a definite interpretation with *iota*. These languages are the ones that feature both an overt and a covert CARD in their NCs.

5.4 Associating CARD with Indefiniteness

We have seen that NCs have an indefinite interpretation in the argument position across languages regardless of the differences concerning the rules regulating bare arguments. Considering this, Jiang (2012) suggests that NCs must have a distinct source to form arguments from bare nouns when they occupy an argument position without an overt D. She links this source to a lexical variant of numerals that allows NCs to behave in a uniform way across languages. In her view, numerals are lexically ambiguous in being modifiers of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$ and modifiers with a built-in choice function variable of type $\langle\langle e,t\rangle,e\rangle$ in the sense of Reinhart (1997) (cf. Fodor and Sag 1982, Winter 1997, and Kratzer 1998). NCs involving the first variant have a predicative denotation that can be an argument to a category at D (the definite article, demonstrative, and the universal quantifier). In contrast, numerals with the second variant have an individual type denotation that eventually requires an existential closure.

In Reinhart's theory, the $\exists$-closure of the choice function variable is assumed to apply at any compositional level. This explains the intermediate scope readings of indefinites and their ability to take exceptional scope without a need for a mechanism to extract the indefinite from an island. The lack of distributive readings with NCs in exceptional scope cases is also derived in this theory, because the distributive reading can only be obtained by a QR-analysis of indefinites and this account rejects a generalized quantifier analysis of indefinites (cf. Fodor and Sag 1982).[44]

Below, I exemplify semi-formally how a NC is interpreted with respect to an island under this view.

(74)   If two of my projects are selected, I will receive funding.

    a.   Narrow Scope Reading (**if > two**):
       $[\exists f\ [CH(f) \wedge\ be.selected(f(\llbracket two\ projects\rrbracket))] \to funding]$
       I will get funding if there is a choice function and the two projects that it selects are selected (by the committee).

    b.   Wide Scope Reading (**two > if**):
       $\exists f\ [CH(f) \wedge [we\ be.selected(f(\llbracket two\ projects\rrbracket))] \to funding]$

---

[43] Recall that the categorization *presumably* CARD$_\emptyset$ is used for obligatory classifier languages, as stated in Section 4.2.
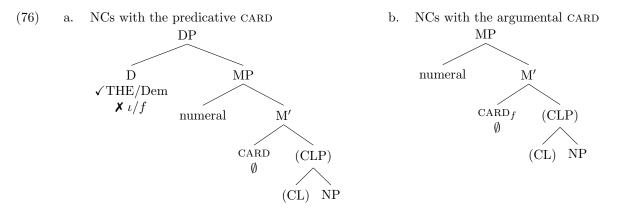
[44] A choice function analysis predicts that a distributive reading should be unavailable for indefinites all the time, because indefinites are not generalized quantifiers, so they never undergo QR. An example proving the opposite is 'A guard is standing in front of two buildings.' which requires the existence of a guard in front of each building to be felicitous (pg. 366). While Reinhart (1997) remains agnostic about how the distributive reading is possible in such cases, Winter (1997) shows that a choice function theory can still handle them without a need for a separate generalized quantifier analysis of existentials.

> There is a choice function such that if the two projects that it selects are selected (by the committee), I will get funding.

Now considering the case with NCs in Turkish and Farsi, I propose that the source of indefinite interpretations associated with NCs is CARD. While the deeper connection between indefiniteness and cardinality awaits future explorations, here I maintain Jiang's view to construct a typological framework as a first step to understanding why NCs have a universal tendency to favor indefinite interpretations over definite ones. The twist that I offer is that CARD has two lexical variants cross-linguistically, one that creates predicative NCs and one that results in argumental NCs, bringing with it a choice function variable:[45]

(75) a. The predicative variant of CARD $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\langle n, \langle\langle e, t\rangle, \langle e, t\rangle\rangle\rangle$
          $[\![\text{CARD}]\!] = \lambda n \lambda P_{AT} \lambda x.\ \exists S\ [\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\ P(s)]$
      b. The argumental variant of CARD $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\langle n, \langle\langle e, t\rangle, e\rangle\rangle$
          $[\![\text{CARD}_f]\!] = \lambda n \lambda P_{AT}.\ f(\lambda x\ \exists S\ [\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\ P(s)])$

In languages like French, English, and Russian, where CARD is strictly covert, and in languages like Mandarin and Yi, where CARD is presumably covert, NCs have the following construals, represented with a generalized MP structure, ignoring number marking and potential variations in structure:

(76) a. NCs with the predicative CARD $\qquad\qquad\qquad$ b. NCs with the argumental CARD

At this point, we need to explain why the predicative denotation of NCs is only available for overt determiners in the argument position, but barred from undergoing covert type-shifting, particularly via the *iota* operator, as illustrated in (76a). For this, I follow Dayal (2013) in that if a maximal projection has a predicative value of type $\langle e, t\rangle$ and an argumental value of type e then an argumental type-shifter cannot apply to its predicative value (see also Jiang 2018). I call this principle *Shifting Economy* (p.c. with Gennaro Chierchia):

(77) *Shifting Economy*
      *SHIFT(XP) if the XP has inherently an argumental meaning.

The Shifting Economy ensures that NCs do not undergo covert *iota* type-shifting in articleless languages like Mandarin and Russian. It also captures the unavailability of *iota* type-shifting with NCs in languages that have an overt definite article, such as French, English, and Yi, without resorting to the Blocking Principle. Given that argumental type-shifting operators of any sort are blocked by the inherent argumental value of NCs, no competition arises with the overt definite article.
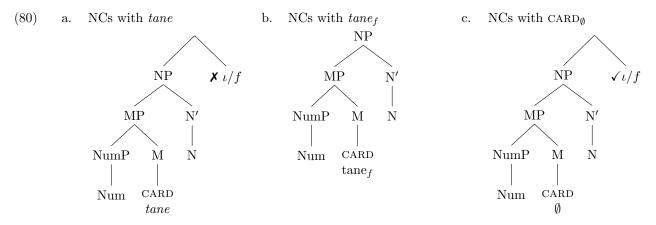
   Associating the choice function with CARD makes it possible to account for the interpretational variation between the two forms of NCs in Turkish and Farsi. In these languages, while one form of NCs continues to retain the ambiguous construal in cardinal semantics, the other form is used as a way to resolve this ambiguity by being divorced from the choice function. That is, either the overt or the covert CARD has only the predicative denotation in (75a). The unambiguous construal of NCs is then enriched in meaning since it is not subject to the Shifting Economy, which makes argumental type-shifting possible. To put it another way, Turkish and Farsi resolve the ambiguity in cardinal semantics to allow ambiguity in the interpretation

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[45] My proposal should rather be taken as a cross-linguistic tendency. One exception I am aware of is Vietnamese, an articleless obligatory classifier language. In Vietnamese, which presumably has only one form of CARD, NCs allow both definite and indefinite interpretations (Phan and Chierchia 2022).

of NCs. The choice for the liberated construal is NCs with the covert CARD in Turkish, while it is NCs with the overt CARD in Farsi.[46] I demonstrate this for Turkish below:

(78)   The Semantics of the overt CARD
   a. $[\![tane]\!]$ = (75a), the predicative value
   b. $[\![tane_f]\!]$ = (75b), the argumental value

(79)   The Semantics of the covert CARD
        $[\![\text{CARD}_\emptyset]\!]$ = (75a), predicative only

Having a value with a built-in choice function variable, NCs with *tane* are restricted to indefinite interpretations when they occupy an argument position due to the Shifting Economy. In contrast, NCs without *tane* can feed into whatever comes above, including *iota* and the choice function. This is schematized in (80):

(80)   a.   NCs with *tane*   b.   NCs with *tane_f*   c.   NCs with CARD_∅

Let us know briefly consider NCs in WA, where both forms of NCs require the attachment of the definite article for the definite reading. Even if one form of CARD is liberated as in Turkish and Farsi, we will never see its effects. While the application of *iota* to the predicative variant of the ambiguous construal will be blocked by the Shifting Economy, the application of *iota* to the unambiguous construal with the CARD that is only predicative will be ruled out due to the Blocking Principle. That is, the existence of an overt definite article will never allow type-shifting via *iota* even if it is not inherently prevented by the Shifting Economy.

Table 3 summarizes how covert *iota* type-shifting is blocked/allowed in WA, Turkish, and Farsi.

	with THE	without THE	
Card with two variants	**WA**	**Turkish**	**Farsi**
Predicative variant	Shifting Economy	Shifting Economy	Shifting Economy
Argumental variant	N/A	N/A	N/A
Liberated Card			
Predicative only	Blocking Principle	allowed	allowed

Table 3: The blockage/possibility of *iota* in languages with an overt and a covert CARD

Although an unambiguous semantics for CARD would be more desirable from a theoretical point of view, there is no escape from the predicative variant. Take Turkish NCs, for example. As in all the other languages discussed above, both forms of NCs can combine with demonstratives. They can also occur with the universal quantifier and occupy the predicate position, as exemplified in (81), respectively.

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[46] The argumental value of NCs bearing the ambiguous CARD (*tane* in Turkish) is not an argumenttal value of NCs bearing the unambiguous CARD (the covert form in Turkish) and hence does not trigger Shifting Economy for the type-shifting of the unambiguous construal. Why languages like Turkish and Farsi allow NCs with the unambiguous construal to also have an indefinite reading despite the inherent indefiniteness of NCs with the ambiguous construal is an independent question.

(81) a. O   iki   (?tane) kitab-ı   bana   uzatır mı-sın?
          that two   CL   book-ACC me.DAT give   Q-2SG
          'Can you give me those two books?'
      b. her   on   (tane) çocuk-tan bir-i
          every ten CL   child-ABL one-3SGPOSS
          'one out of every ten children'
      c. Bu   sene al-dığ-ım   ilk   hediye iki (tane) kitap-tı.
          this year receive-REL-1SGPOSS first gift   two CL   book-PAST
          'The first gift that I received this year was two books.'

More strikingly, NCs with *tane* can be a restrictor to generalized existential quantificational determiners like 'exactly' and 'at least'. Crucially, in these cases, the existential construction does not show an exceptional scope behavior, for (82) does not mean 'there are at least three specific projects of mine, and if they are selected, I will receive funding'. Instead, it is felicitous in a context where the selection of at least (any) three projects is sufficient for funding. This shows that *tane* cannot be introducing a choice function (or associated with it in any other way) in such cases.

(82) Eğer en az   üç   (tane) proje-m   seçil-ir-se,   ödenek al-abil-eceğ-im.
      if   at least three CL   project-1SGPOSS select-PASS-AOR-COND, funding take-ABIL-FUT-1SG
      'If at least three of my projects are selected, I will receive funding.' (**if > three, #three > if**)

Based on these facts, it must be the case that both forms of NCs should have a predictive value in Turkish. Notably, NCs bearing the overt form of CARD must have a predicative value independently of the argumental one in Turkish.

    To conclude, I have analyzed the interpretational variation observed in NCs with and without *tane*. Relating the cross-linguistic indefiniteness of NCs with a lexical variant of CARD, I have proposed that in articleless languages that feature both an overt and a covert form of CARD, we can observe one form being enriched in meaning, allowing definite interpretations without a need for an overt marker. In Turkish, we see this with the covert CARD, while *tane* is just an ordinary cardinal head restricted to indefiniteness in argument positions as in any other language.

6 Conclusion

This paper has analyzed the Turkish counting system focusing on four core properties of NCs: (i) the occurrence of the unmarked form of the noun with all numerals despite the existence of a systematic number marking system, (ii) the optional realization of the classifier *tane*, (ii) the exceptional behavior of NCs without *tane* in allowing both definite and indefinite interpretations, in contrast to NCs with *tane*, which are exclusively indefinite in argument positions, complying with the general behavior of NCs across languages. And finally, drawing on this, (iv) the non-optional aspect of the classifier, i.e., the fact that the presence/absence of *tane* makes a difference in the interpretation of NCs.

    The analysis of these properties has been divided into two main parts: We first considered the properties in (i) and (ii) with an aim to understand the optional aspect of the Turkish classifier and cross-linguistic variation in patterns of number marking. In the second half of the analysis, shifting our attention to the properties in (iii) and (iv), we examined the (in)definiteness puzzle of Turkish NCs and discussed its consequences for the interpretation of NCs across languages.

    The first part of the analysis started with comparing *tane* with obligatory classifiers of Chinese-like languages and demonstrated that *tane* has distinct characteristics. Relying on Sağ's (2019, 2022) account of the Turkish number marking semantics and an investigation of count-mass distinction in Turkish, we have concluded that the noun in Turkish NCs denotes a semantically singular property whether the classifier is present or not.

    To explain the number marking variation in English and Turkish NCs, I have pursued an agreement-based approach, drawing on evidence from two more optional classifier languages, WA and Farsi. I have proposed a semantic account of number agreement in NCs, integrating Ionin and Matushansky's (2006, 2019) view of numerals into Scontras's (2014, 2022) analysis of English NCs. In short, while some languages, including

Turkish, morphologically exhibit the semantic singularity of the noun in their NCs, some others, including English, disguise this by employing number agreement in NCs. We have seen that the plural inflection in NCs and plural agreement surfacing on predicates emerge in a similarly constrained manner in some languages like WA and Farsi, pointing to an identity between the two instances of plural marking.

The agreement account adopted here relies on the projection of a cardinal head for an equal treatment of number marking with cardinal numerals and the one realized on measure terms. Building on this, I have proposed that *tane* denotes a counting function being an overt spell-out of this head in Turkish. While English and supposedly Chinese-like languages involve only a covert form of CARD, Turkish, Farsi, and WA are languages where it has both an overt and a covert exponent.

The second half of my analysis has demonstrated a connection between CARD and inherently indefinite characteristics of NCs. The core idea of this side of the analysis is that indefiniteness is essentially a contribution of CARD in NCs. Relying on Jiang's (2012) take on the issue, I have proposed that CARD uniformly comes with a predicative and an argumental variant, the latter confining NCs to an indefinite interpretation in argument positions without an overt determiner. The argumental variant of CARD brings with it a choice function and prevents *iota* type-shifting of the predicative variant by the Shifting Economy. This principle disallows an argumental type-shifter to apply to a phrase that has both a predicative and an argumental value.

Languages that have only one (covert) form of CARD display this ambiguous construal in their NCs, whereas some languages resolve the ambiguity if they have an overt form of CARD that alternates with the covert form. In such languages, one of the forms retains the lexical ambiguity while the other is freed from the choice function and hence has only the predicative value. If the language at issue lacks an overt definite article, this resolution exhibits itself as an enrichment in interpretation, allowing both definite and indefinite readings with the liberated form of CARD. Turkish, as being one such language, has the covert CARD for this role, while *tane* is lexically ambiguous just like the cardinal heads in other languages. Farsi, on the other hand, has *tā* as the liberated form, while the covert CARD corresponds to the canonically ambiguous one. These languages in a sense take advantage of having two forms of CARD to generate ambiguity in interpretation by disambiguating a lexical item.

If our discussion is on the right track, then we are one step closer to a general understanding of cardinal semantics. The next task is to investigate the nature of the inherent connection that exists between cardinality and indefiniteness.

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