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

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Abstract. Counting constructions vary across languages. Some languages like English that distinguish between the unmarked and plural form of the noun also reflect this in their numeral constructions. They use the unmarked form for 'one' and the plural for higher numerals. Other languages like Chinese which lack a systematic number marking system use the unmarked form for all numerals and yet require a classifier in numeral constructions. A lot has been written about these systems and we have well-worked out semantics for them. This paper looks at yet another type of language, one in which counting constructions use classifiers optionally. Relatively little is understood about such systems. This paper aims at filling this gap by analyzing the Turkish classifier *tane*. Although Turkish has a systematic number marking system, numeral constructions bear the unmarked form for all numerals. Crucially, *tane* restricts numeral constructions to indefinite interpretations only while in its absence they can be both definite and indefinite. I show that *tane* is distinct from obligatory classifiers that are argued to be atomizers operating on kind terms (Krifka 1995 and Chierchia 1998). Following Scontras (2014) in that counting is universally ensured by a cardinal head, I argue that *tane* is the overt counterpart of this head in Turkish. The contrast in the form of the noun in English and Turkish numeral constructions is reduced to the presence/absence of number agreement, rather than genuine plurality (Ionin and Matushansky 2006, 2019). I explain the obligatory indefiniteness in the presence of *tane* by a built-in choice function variable in its semantics in the sense of Reinhart (1997). I also discuss two cases where numeral constructions with *tane* can unexpectedly be definite, but I account for these cases without compromising the indefiniteness of the classifier. Finally, I show that inherent indefiniteness is not a cross-linguistic property of optional classifiers, based on data from two more optional classifier languages, Western Armenian and Persian. Nevertheless, the restrictedness of *tane* together with the analysis of the classifiers in these languages illustrates that realizing the cardinal head overtly as well as covertly is not entirely optional, but might come at a language-specific cost.

1. Introduction

Turkish systematically distinguishes between the unmarked/singular and plural forms of nouns (*kitap* 'book' and *kitap-lar* 'book-s'). However, Turkish Numeral Constructions (NCs, henceforth) not only share features with NCs of similar languages like English but also with NCs of languages like Chinese that lack a systematic number marking system. As in Chinese but differently from English, the noun always appears in the unmarked form. Central to the discussion in this paper, Turkish NCs also feature an optional classifier between the numeral and the noun, e.g., *iki (tane) kitap* 'two CL book'. This makes them partially similar to English NCs which do not have a classifier and Chinese NCs which obligatorily have a classifier.

Despite its seemingly optional status, the classifier *tane* limits NCs to indefinite interpretations only while the form without *tane* is free in having both definite and indefinite interpretations. However, there are two cases where NCs with *tane* are surprisingly compatible with definiteness. These cases emerge when they are modified with relative clauses that are situated outside of NCs and when they occur in a special type of partitive constructions.

The challenge posed by Turkish NCs then has two pieces: One concerns the optionality of the classifier and where Turkish NCs stand with respect to NCs of languages like English and Chinese. The second piece concerns the non-optional aspect of the classifier, that is how the presence of *tane* affects interpretation.

I start by comparing *tane* with obligatory classifiers in Chinese-like languages, where nouns are argued to denote kinds uniformly. Classifiers are obligatory in these languages since they make the atomic level of kinds available for counting (Krifka 1995 and Chierchia 1998). The Turkish nominal semantics patterns with English instead (XXX). That is, unmarked nouns are singular and plurals are number neutral terms (cf. Bliss 2004, Bale et al. 2010, and Görgülü 2012). Furthermore, while plurals have plural kind reference in the sense of Chierchia (1998), unmarked nouns have singular kind reference in the sense of Dayal (2004b). Based on this, I show that *tane* does not combine with kind terms and hence is not an atomizer.

I follow Scontras (2014) in that counting is universally ensured by a cardinal head that denotes the cardinality measure function. While the English cardinal head is always covert, the Turkish cardinal head has also the option of being realized overtly as *tane*. Building on Ionin and Matushansky's (2006, 2019) view of numerals, I argue that the Turkish and English cardinal heads presuppose atomic properties. This requirement is fulfilled by unmarked nouns in Turkish, while English NCs further reflect number agreement on the noun.

Having an overt cardinal head is not completely an optional aspect of Turkish NCs, but comes at a cost. I propose that *tane* bears a choice function variable in the sense of Reinhart (1997), resulting in obligatory indefiniteness. I also account for the two cases where NCs with *tane* can be interpreted as definite without losing the indefinite status of *tane*. My analysis distinguishes between two types of relative clauses in Turkish, outer relative clauses situated outside of DP/NC, and inner relative clauses situated pre-nominally inside DP/NC. I propose that relative clauses can be nominalized and combine with an *e* type expression (e.g., a NC with *tane* bearing the choice function) outside of DP/NC, resulting in a definite expression. I also extend this reasoning to the special type of partitive constructions.

While the discussion centers around *tane* substantially, it also extends to the optional classifiers of two more languages, Western Armenian and Persian. I illustrate that the form with the classifier can be definite in these languages, and hence inherent indefiniteness is not a cross-linguistic feature of optional classifiers. Nevertheless, the optionality of the classifier brings restrictions in other aspects in Persian, which indicates that realizing the cardinal head covertly and overtly might come with a language-specific price to pay.[1]

This paper is organized as follows: Section 2 introduces the core data and the puzzles. Section 3 discusses earlier analyses of Turkish nominals and numeral semantics. Section 4 compares *tane* with obligatory classifiers and shows that it is not an atomizer. Section 5 presents the analysis of Turkish NCs and explains the indefiniteness of *tane*. Section 6 analyzes the two cases where the obligatory indefiniteness is overridden. Section 7 discusses the cross-linguistic implications. Section 8 concludes.

2. The Core Puzzle

Turkish NCs have two features: First, the noun always appears in the unmarked form even with numerals higher than 'one'. Second, there is an optional element between the numeral and the noun, i.e., *tane*, which is known in the literature as a numeral classifier (Underhill 1976,

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[1]The English data comes from the literature and the Turkish data comes from 15 native speakers including myself. The Western Armenian data was collected from 8 native speakers (6 from Istanbul and 2 from Beirut) and the Persian data comes from 9 native speakers. The data collection was done through informal interviews and a questionnaire where the consultants were asked to rate the sentences from 1 (very bad) to 7 (very good) in a given context. I also appeal to Mandarin data which is sourced from the literature.

Schroeder 1992, Lewis 2000, Göksel and Kerslake 2005, Öztürk 2005):[2]

(1) bir (tane) kitap/ iki (tane) kitap(*-lar)
     one CL book two CL book-PL
     'one book/two books'

Turkish presents an interesting puzzle to the cross-linguistic semantics of counting constructions because its NCs share features with two types of languages: languages like English where nouns systematically come in unmarked and plural forms, and languages like Chinese, Japanese, and Korean, where the unmarked form is number neutral while the plural marker is only optionally allowed under certain conditions (Yang 2001, Kurafuji 1999, and Kim 2009).

Although Turkish distinguishes between the unmarked and plural forms of nouns as English, NCs of the two differ in the form of the noun; in English, the plural is used with numerals higher than 'one'. However, Turkish NCs also allow the numeral and the noun to combine directly without a classifier, making them partially similar to English NCs which do not feature classifiers. Turkish NCs are also both similar to and different from NCs in Chinese-like languages, where the plural is never allowed in NCs, as in Turkish, but NCs obligatorily occur with a classifier, unlike in Turkish. This is exemplified for Mandarin in (2) (see Jiang 2012 and Kim 2009 for Mandarin, Japanese, and Korean, among others):

(2) san *(zhi) bi
     three CL pen
     'three pens'

The immediate challenge that these variations introduce is to understand where Turkish counting constructions stand in comparison to NCs in English and Chinese-like languages and what role the optional classifier plays in this. The picture becomes more complicated when we have a closer look at the behavior of NCs with and without *tane*. Despite its seemingly optional status, the classifier comes with restrictions in interpretation. While NCs without *tane* are free in being indefinite and definite, the form with *tane* is limited to indefinite interpretations only.

Below, I will first discuss the indefinite behavior of NCs and then the definiteness problem of NCs with *tane*.

2.1. Numeral Constructions 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, but 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). However, Turkish indefinites are like indefinites in other languages in showing scope ambiguity and having exceptional scope taking abilities. That is, they can violate the scope rigidity (Kelepir, 2001).[3]

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[2]Turkish has two classifiers. One is *tane* and it is compatible with all kinds of count nouns. The other is *adet* and it is 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.

[3]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 this is because non-case-marked indefinites are situated inside the VP, where they are locally ∃-closed, unlike case-marked indefinites which are outside the VP. Note also that accusative case-marked indefinites always receive a wide scope

Just like regular indefinites, NCs with and without *tane* show scope ambiguity when they interact with other quantifiers.[4] The sentence in (3) can be true in three different contexts. The first one is that every student wrote comments on two (possibly different) books, which represents the narrow scope non-specific reading. The second one is that every student wrote comments on two (possibly different) books from a pre-determined set of books, reflecting the narrow scope partitive specific reading, where the NC is interpreted as a covert partitive (Enç, 1991). Finally, the third one is that there are two specific books such that everybody wrote comments on them, which reflects the wide scope specific reading.

(3) Her   öğrenci iki (tane) kitab-a   yorum   yaz-dı.
     every student two CL   book-DAT comment write-PAST
     'Every student wrote comments on two books.' (**every > two, two > every**)

These facts also hold when NCs interact with intensional verbs and negation. For example, (4a) can either mean that Ali needs any two doctors that could also potentially be from a pre-determined set of doctors, or that Ali needs two specific doctors. (4b) can either mean that it is not the case that Ali wrote comments on two books, but maybe three books, or that there are two specific books such that Ali did not write comments on them.

(4) a. Ali-nin   iki (tane) doktor-a   ihtiyacı var.
         Ali-GEN two CL   doktor-DAT need   exist
         'Ali needs two doctors.' (**need > two, two > need**)
     b. Ali iki (tane) kitab-a   yorum   yaz-ma-di.
         Ali two CL   book-DAT comment write-NEG-PAST
         'Ali didn't write comments on two books.' (**neg > two, two > neg**)

Turkish NCs also have exceptional scope taking abilities, and hence can be interpreted inside or outside of an island. For example, (5) can be felicitous in two contexts: In the first one, it is enough that any two of my projects are selected for me to be able to receive funding while the other requires the condition that two specific projects of mine be selected.

(5) Eğer iki (tane) proje-m   seçil-ir-se,   ödenek
     if   two CL   project-1SGPOSS select-PASS-AOR-COND, funding
     al-abil-eceğ-im.
     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, and accordingly NCs can take intermediate scope besides the widest and narrowest scope readings. For example, (6) can mean that for every professor there are two specific students of his/her such that if they get A on the exam, he/she will be very happy.

(6) Her   profesör$_i$ eğer iki (tane) öğrenci-si$_i$ sınav-dan A al-ır-sa   çok
     every professor if   two CL   student-3SGPOSS exam-ABL A get-AOR-COND very

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specific reading, which Kelepir (2001) explains by arguing that accusative case carries a presupposition of existence. Therefore, in this paper, the indefinite behavior of NCs will be shown with other case markers.

[4]The narrow scope reading of NCs with *tane* is more salient than their wide scope reading. In Section 5, I will argue that NCs bear a cardinal head that is overtly spelled-out as *tane* in Turkish. I believe that overtly realizing the cardinal head makes the cardinality information more salient, and therefore the narrow scope (i.e., amount) reading is more readily available. Adding stress on the noun makes it easier for the wide scope reading.

mutlu ol-acak.
happy be-FUT
'Every professor will be very happy if two students of his/her get A on the exam.'

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 (7) 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 (8), both NCs can also reflect epistemic specificity.

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

(8) İki (tane) öğrenci sınav-da   kopya çek-ti. Kim ol-duk-ları-nı
     two CL   student exam-LOC cheat-PAST   who be-NMLZ-3PLPOSS-ACC
     bil-iyor-um.   Zeynep ve Merve.
     know-PROG-1SG Zeynep 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 the classifier.

2.2. *tane* and the Definiteness Problem

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

NCs without *tane* can receive a definite interpretation, which is evidenced by their anaphoric behavior, as shown in (9). However, NCs with *tane* cannot behave anaphorically (see also Schroeder 1992). The presence of *tane* forces a partitive specific reading or is understood as introducing new discourse referents, which yields infelicity in this particular context.[5]

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

The lack of the definite reading with NCs with *tane* is also revealed in contexts of uniqueness/maximality. To see this, imagine that Sevgi has two apples only. In this case, the NC with *tane* cannot refer to these two apples, whereas NCs without *tane* can, as shown in (10). In contrast, if Sevgi has three apples, referring to two of them is possible with both forms of NCs,

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[5]In (9), the best option is to use the plural *öğretmenler* 'the teachers', but the NC without *tane* is also grammatical, especially if the antecedent does not immediately precede it. Otherwise, speakers judge against too much of repetition and prefer to use the plural noun. But the anaphoric reading is not available at all for NCs with *tane*.

as in (11). This shows 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.

(10) 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.

(11) 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.'

One other diagnostic showing the incompatibility of NCs with *tane* with definiteness comes from their occurrence with the particle *dA*, which is known to be additive and distributive, besides having various other functions (Göksel and Özsoy 2003, Göksel and Kerslake 2005, and Kamali and Karvovskaya 2013). NCs without *tane* are compatible with both the distributive and additive role of *dA* but when *tane* is present, *dA* can only contribute an additive reading (Öztürk 2005). These effects are most visible when NCs occur with predicates like *drank a bottle of milk*. Although such predicates are ambiguous in being distributive and collective in English, they convey only a collective reading in Turkish. As is clear in (12), the non-distributivity of the predicate is insensitive to the classifier. However, unlike NCs with *tane*, the form without *tane* can receive a distributive reading with *dA*, as shown in (13).

(12) İki (tane) çocuk bir şişe   süt   iç-ti.
      two CL   child   one bottle milk drink-PAST
      w/o tane: '(The) two children drank a bottle of milk.' (collective-1 bottle)
      w/tane: '(*The) two children drank a bottle of milk.' (collective-1 bottle)

(13) İki (tane) çocuk **da** bir şişe   süt   iç-ti.
      Two CL   child   DA one bottle milk drink-PAST
      w/o tane:'The two children **each** drank a bottle of milk.' (distributive-2 bottles)
      w/o tane:'(The) two children, **too**, drank a bottle of milk.' (additive+collect.-1 bottle)
      w/tane:'(*The) two children, **too**, drank one bottle of milk.' (additive+collect.-1 bottle)

The sentence in (13), when it has a NC without *tane* as its subject, is ambiguous in having a distributive and a collective reading where *dA* contributes an additive interpretation. In contrast, the distributive reading is not evident in the presence of *tane*. As is clear in the translations, the distributive reading of *dA* is accompanied by a definite interpretation of its host NC and in fact it is only possible if the NC is definite. This shows that *dA* has a maximality requirement in its distributive function. NCs with *tane* cannot meet this requirement due to their inability to receive definite readings, and hence they are incompatible with *dA* in the distributive reading.[6]

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[6]NCs with *tane* are only incompatible with distributivity when accompanied by *dA*. Otherwise, they are compatible with inherently distributive predicates and reciprocals. Furthermore, plural definites and plural pronouns are incompatible with the distributive *dA*: *Kızlar da bir şişe süt içti.* 'The girls, drank a bottle of milk.' Here, *dA* has only an additive and collective reading, which is unexpected because plural definites and pronouns satisfy the maximality requirement of the distributive *dA*. XXX analyzes *dA* as a post-suppositional item associated with universal quantification on a par with Szabolcsi's (2015) analysis of *mo*, the Japanese kin of *dA*. The unavailability of the distributive reading with plural definites and pronouns follows from their 'weak maximality'. It is a well-known fact that plural definites allow exceptions in their interpretations, as opposed to universal quantifiers (Kroch, 1975). Being associated with universal quantification, *dA* is also sensitive to strong vs. weak maximality

We have seen that NCs with *tane* cannot be definite as opposed to NCs without *tane*, while both forms can yield indefinite readings. In Section 6, we will also see that NCs with *tane* can surprisingly receive definite interpretations when they are modified with a relative clause situated preceding the numeral, i.e., outside of the NC, and when they occur in a special type of partitive constructions. Delaying the discussion of these cases for now, the second challenge is then to explain how the classifier obligates indefiniteness while this constraint appears to vanish in two seemingly unrelated constructions.

To wrap up, the challenges that we are facing have two aspects: First, we need to understand how Turkish NCs contrast with NCs in English and Chinese-like languages in their internal properties. We need to account for why the noun is always in the unmarked form and why the classifier is optional in Turkish NCs. Second, we need to account for the non-optional status of the classifier, i.e., how its presence regulates the interpretation of NCs.

3. Theoretical Backdrop

To solve the first part of the puzzle, we need to understand the semantics of Turkish nominals, which will not only be crucial for the semantics of numerals but also *tane*. There are two opposite views of Turkish nominals in the literature. The first one treats unmarked nouns as number neutral and plurals as strictly plural terms (Bliss 2004, Bale et al. 2010, and Görgülü 2012). The other one treats plurals as number neutral and unmarked nouns as strictly singular terms (XXX, XXX). While the number neutral view of unmarked nouns is compatible with a restrictive numeral semantics (Bale et al., 2010), the strict singular view requires numerals to combine with atomic properties (Ionin and Matushansky, 2006). Below, I discuss these alternatives and adopt the strict singular view of Turkish unmarked nouns.

3.1. The Number Neutral view of Unmarked Nouns and Numeral Semantics

Bliss (2004), Bale et al. (2010), and Görgülü (2012) argue that Turkish unmarked nouns like *kitap* 'book' denote a number neutral set, inclusive of atomic and plural entities, while plural nouns like *kitap-lar* 'book-s' denote pluralities only, exclusive of atoms:

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

This claim is based on the fact that Turkish unmarked nouns yield number neutral interpretations in the non-case marked object position (Bliss 2004 and Görgülü 2012), as in (15a), and in the predicate position (Bale et al. 2010 and Görgülü 2012), as in (15b).

(15)   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.'

This analysis draws a line between Turkish and English in terms of semantic vs. morphological (un)markedness. Turkish is taken to be one of the few languages, along with Western Armenian for example, where the morphologically marked plurals are also semantically marked in having a strictly plural denotation, while the morphologically unmarked nouns are also unmarked in

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potential of its host.

having a number neutral denotation (see Bale et al. 2010 and Bale and Khanjian 2014 for Western Armenian). English, though, is one of many other languages where there is an asymmetry between morphological and semantic (un)markedness. The standard view for English is that while unmarked nouns are semantically marked as strictly singular, plurals have an unmarked denotation (Krifka 2003, Sauerland et al. 2005, Spector 2007, and Zweig 2009).

Having a distinct nominal semantics, Turkish and English are also expected to differ in the form of the noun in their NCs. This is at least the case in one view of numeral semantics, where numerals are uniformly treated as restrictive modifiers in the sense of Link (1983). In this view, a numeral (higher than 'one') that is of type $\langle e,t \rangle$ intersects with a plural property and denotes a set of individuals with the relevant cardinality (see also Partee 1987, Link 1987, Landman 1989, among others). This immediately explains how numerals combine with plurals in English. Given that numerals can only combine with unmarked nouns in Turkish, but not plurals, Bale et al. propose a slightly different semantics for Turkish numerals and treat them as restrictive modifiers combining with nouns via subsective modification, as illustrated below (Bale et al. 2010, pg.10):

(16)   a. $[\![iki]\!] = \lambda P_{pl}.\{x : x \in P_{pl} \ \& \ \exists Y \ [Y \in \text{PART}(x) \ \& \ |Y| = 2 \ \&$
             $\forall z \ [z \in Y \rightarrow z \in \text{MIN}(P_{pl})]]\}$
       b.   A predicate Q is of type P_{pl} iff $\forall x, y \in Q \ [x \oplus y \in Q]$
       c. $\text{MIN}(P)$ is defined iff
             $\forall x, y \ [[x, y \in P \ \& \ \neg \exists z \ [z \in P \ \& \ [z < y \lor z < x]]] \rightarrow x \land y = 0]$
             When defined $\text{MIN}(P) = \{x : x \in P \ \& \ \neg \exists z \ [z < x]\}$

More precisely, Turkish numerals are functions from number neutral sets to one of their subsets consisting of all and only the pluralities that are composed of n (number denoted by the numeral) non-overlapping (atomic) minimal parts. As stated in (16c), a minimal part in a predicate is the smallest possible individual that does not have a part that other members of the predicate have. Furthermore, as specified in the last conjunct of (16a), the minimal parts have to be included inside the original predicate that the numeral combines with. Based on this, the application of $[\![iki]\!]$ 'two' to $[\![kitap]\!]$ 'book' results as follows:

(17) $[\![iki]\!]([\![kitap]\!]) = [\![iki]\!](\{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}) = \{a \oplus b, a \oplus c, b \oplus c\}$

The result is defined since the numeral requires the denotation of the noun to include the non-overlapping minimal parts of the pluralities that are members of the output set. These are a, b, and c in (17) and they are members of the set denoted by *kitap* 'book'. However, the composition of plurals and numerals is undefined because plurals are exclusive of atoms. Although they denote plural properties meeting the condition in (16b), they do not include the minimal parts of the output set in their denotation.

To summarize, in the number neutral view of unmarked nouns, the difference between the form of the noun in Turkish and English NCs can be explained by adopting two types of restrictive semantics for numerals. However, the presence of an optional classifier has not been addressed under this view and still awaits an explanation.

3.2. The Singular View of Unmarked Nouns

In XXX and XXX, I have argued against the number neutral view of unmarked nouns and claimed that Turkish is not different from English in its nominal semantics. It is in fact plural nouns that denote number neutral sets while unmarked nouns are strictly singular in Turkish, as in English. That is, instead of (14), the denotations of Turkish nominals are as follows:

(18)　　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 has a 'one or more' reading in these contexts despite the fact that they have a multiplicity interpretation in positive contexts. For example, for the condition in (19) to hold, it is enough if one is cheated by one man. Following the analysis of English plurals in Sauerland et al. (2005), Spector (2007), and Zweig (2009), I have argued that Turkish plurals denote number neutral sets and the multiplicity reading is a conversational implicature (see also Renans et al. 2017, 2020).

(19)　　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 unmarked nouns. English unmarked nouns are easily identified as singular terms since they consistently yield a singular interpretation. Turkish unmarked nouns, though, can sometimes behave as number neutral terms and sometimes as singular terms. As shown in (15), they convey number neutrality in certain cases, but they are interpreted as strictly singular and definite in case-marked argument positions:[7]

(20)　　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. Only adjectives that denote classificatory properties are compatible with the number neutral interpretation while modification does not create a contrast in case-marked argument positions. As shown below, the non-case-marked object *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.

(21)　　a.　Ali, ev-e　　　geldikten　　sonra, *dini/*eski* **kitap** oku-du.
　　　　　　Ali home-DAT having.come after　religious 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:

(22)　　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.'

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[7]Unmarked nouns also yield number neutrality in existential statements (Görgülü, 2012). I refer the reader to XXX for this case which fall into the same analysis as the ones occupying the non-case-marked object position.

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.

The puzzling behavior of unmarked nouns is explained following Dayal's (2004b) analysis of English definite singular kind terms like *the dinosaur* in 'The dinosaur is extinct.' That is, 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*. Turkish, however, does not have an overt equivalent of *the* and a widely accepted view for languages without overt definite determiners is that their nouns can undergo covert *iota* type-shifting for definiteness.[8] In object-level contexts, as in (20), 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.

(23) a. $\llbracket kitap \rrbracket = \lambda x.\ book(x)$
      b. $\iota: \lambda P.\ \iota x\ [P(x)]$ (the maximal member of P if there is one, undefined otherwise)
      c. $\iota(\llbracket kitap \rrbracket) = \iota x\ [book(x)]$
      d. $\llbracket (20) \rrbracket = read(Ali, \iota x\ [book(x)])$

Now let us consider the kind-level characteristics of Turkish nouns to understand the nature of singular kind terms. In Turkish, both unmarked and plural nouns can be used in kind-level statements, as shown in (24a). However, only plurals can combine with distributive predicates applying to individual members of the species, such as *come from different regions*, as illustrated in (24b). The same contrast also holds for English as represented in the translations. This indicates that the kind reference achieved by unmarked nouns is different 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).

(24) 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.'

As is claimed for English plurals by Chierchia (1998), Turkish plurals become kind terms via the *nom* operator ($^{\cap}$). It 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 (24a) is interpreted as below:

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[8]Whether Turkish has a determiner or not in the absence of overt determiners is a controversial issue. Although I will assume the absence of it for simplicity, the analyses to come are consistent with both views. See Kornfilt (2005, 2017), Arslan-Kechriotis (2009), von Heusinger and Kornfilt (2017) providing arguments for it, and Öztürk (2005) and Bošković and Şener (2014) providing arguments against it. Notice also that 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 $\exists$, and hence strong indefinite interpretation of bare nouns, in both English and Turkish (Dayal, 2004b).

(25) 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. $[\![(24a)\ w/plural]\!] = evolved(\lambda s.\ \iota x\ [dinosaur_s(x)])$

Plural kind terms can be type-shifted to sets of object level entities that instantiate the kind via *pred* ($^{\cup}$), which takes 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 entities that instantiate the kind (in that world/situation), as shown in (26) (Chierchia 1998, pg. 350).

(26) 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 (24b), 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, as shown in (27).[9] 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 (24b) 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.

(27) $[\![(24b)\ w/plural]\!] = \exists x\ [^{\cup\cap}bear(x) \wedge \forall y,z\ [[y < x \wedge z < x \wedge y \neq z] \rightarrow \iota r_1\ [region(r_1) \wedge came.to.zoo.from(r_1)(y)] \neq \iota r_2\ [region(r_2) \wedge came.to.zoo.from(r_2)(z)]]]$

Unmarked nouns in (24) 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 (24a) with the unmarked noun is as shown below: (Taxonomic entities are represented by capital letters.)

(28) a. $[\![dinozor]\!] = \lambda X.\ DINOSAUR(X)$
   b. $\iota([\![dinozor]\!]) = \iota X\ [DINOSAUR(X)]$
   c. $[\![(24a)\ w/unmarked]\!] = evolved(\iota X\ [DINOSAUR(X)])$

Singular kind terms are like group terms in that they denote impure atomic entities. They do not allow type-shifting to sets of object-level entities we intuitively associate with kinds, and hence the derivation fails when they combine with a distributive predicate, as in (24b). Furthermore, singular kind terms do not yield an existential reading unlike plural kind terms, as evidenced in (20), where the unmarked noun has a singular and definite reading only. This also follows from that type-shifting to object-level entities is not available for singular kind terms. The kind-driven existential reading is dependent on this shift, which is ensured for plural kind terms by *pred* when DKP applies. Nevertheless, singular kinds still hold a relation to object-level entities at the conceptual level (Dayal, 2004b), just like the membership relation that exists between a group and its members (Landman, 1989). I call this relation *belong-to* in XXX:

(29) *Belong-to relation*
   $belong\text{-}to(y, x^K)$ is true iff y is *a member of* the kind x^K, where x^K is a singular kind

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[9]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 narrowest scope. Plurals can also have a definite reading in episodic contexts, which is possible through *iota*.

and *y* is an object-level entity.

Unmarked nouns occurring as non-case-marked objects are an instance of pseudo-incorporation, which 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. 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 (21a). Based on this, the denotation of *Ali kitap okudu.* 'Ali did book-reading.' in (15a) is shown in (30). It means that Ali is involved in a reading event with a theme argument that belongs to the book kind.

(30) $\exists e \, \exists y \, [belong\text{-}to(y, \iota X \, [BOOK(X)]) \land read(e) \land Th(e) = y \land Ag(e) = Ali]$

The contrast in (22) also follows from the ambiguous nature of unmarked nouns. In (22a), 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 (22b) denotes the doctor kind and hence it is only compatible with taxonomic adjectives like *practitioner*. 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 subject term. This phenomenon is called *kind specification*, which specifies the kind that an atomic or plural object-level entity is a member of. Based on this, the denotation of *Ali (ve Merve) çocuk.* 'Ali is a child./Ali and Merve are children.' in (15b) is as shown below:

(31)   a. $[\![COP]\!] = \lambda x^K \lambda y. \, belong\text{-}to(y, x^K)$
         b. $[\![Ali \; child]\!] = belong\text{-}to(Ali, \iota X \, [CHILD(X)])$
         c. $[\![Ali \; and \; Merve \; child]\!] = belong\text{-}to(Ali \oplus Merve, \, \iota X \, [CHILD(X)])$

To wrap up, Turkish and English nominals are similar both 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. Similar effects are also observed in English with so-called weak definites as in 'Lola read the newspaper.', though only to a limited extent. Weak definites are also claimed to be singular kind terms in Aguilar-Guevara and Zwarts (2010), but the productive status of Turkish pseudo-incorporation makes the number neutrality associated with these phenomena more visible in Turkish than in English.

Having established the semantics of Turkish nominals, I will now discuss its implications for counting constructions.

3.3. Counting with Atoms

Recall that Turkish NCs, unlike in English, are incompatible with plurals. Given that Turkish unmarked nouns denote atomic sets at the ordinary object level, this fact is surprising if we adopt a Linkian view of numeral semantics. However, there is an alternative view where numerals are argued to combine with atomic properties based on Turkish, Hungarian, and Welsh, despite the appearance of the noun in English (Ionin and Matushansky, 2006, 2019; cf. XXX, Martí 2020, and Scontras 2014).

Ionin and Matushansky (2006, 2019), treating numerals as modifiers of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$, argue that only individuals of the same cardinality can be counted. This means that numerals require atomic properties as an argument because the members of a plural property do not nec-

essarily have the same cardinality.[10] A number neutral plural term not only denotes pluralities of different cardinalities but also atoms. Ionin and Matushansky's analysis is illustrated in (32) (Ionin and Matushansky 2006, pg. 321). The constraint ensuring the atomicity requirement of numerals is given in (33) (pg. 329).

(32) $[\![two]\!] = \lambda P \lambda x.\ \exists S\ [\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S\ P(s)]$
   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 a plural individual X iff X is the sum of all members of C: $\sqcup C = X$

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

Based on this, $[\![two\ books]\!]$ can be described informally as follows:

(34) $\lambda x \in D_e.\ x$ 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.

Turkish transparently reflects the atomicity requirement of numerals with the unmarked form of the noun in its NCs. English seems to challenge this view at first glance, given that the noun occurs in the plural form instead. However, Ionin and Matushansky argue that -*s* marking on the noun in English NCs is not the genuine plural marker, but is actually number agreement. That is, *books* in *two books* is semantically singular, denoting a set of atomic individuals. 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.[11]

There are two approaches we can pursue: We can either follow a uniform account for Turkish and English numerals as in Ionin and Matushansky (2006, 2019), or pursue a non-uniform approach following a Linkian view for English numerals (see Rothstein 2017). In either way, the case of Turkish can only be accounted for if counting occurs with atomic properties since Turkish unmarked nouns are singular, not number neutral.

The next issue to be resolved is the nature of the optional classifier *tane*. The investigation of this little-understood element has two aspects: (i) What does it mean for Turkish to have a classifier system as opposed to English, even though the two languages are similar in their nominal semantics? (ii) What is the status of optional classifiers compared to obligatory classifiers?

Below, I start the investigation by addressing (ii), and then return to (i). Answering these questions will also enlighten the definiteness puzzle of NCs with *tane*.

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[10]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 (33), 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.

[11]See also Scontras (2014) and Martí (2020) for the difference in the form of the noun in Turkish and English NCs. Both accounts take Turkish unmarked nouns to denote singular properties. Scontras (2014), adopting a Linkian view of numerals, argues that the number head above NCs determines the shape of the noun. In English, it takes absolute atomicity as the basis, and hence marks NCs with numbers higher than 'one' as plural. In Turkish, it takes relativized atomicity as the basis and considers each individual in the denotation of NCs as an atom, and hence marks the result as singular. Adopting a similar logic, Martí (2020) derives this distinction by Harbour's (2014) feature system, treating English nouns as having the [+/- atomic] feature and Turkish nouns as having the [+/-minimal] feature. The drawback of Martí's account is that Turkish plurals are treated to be strictly plural, having the [-minimal] feature, though it is also noted that a language of this type can also have number neutral plurals in numeral-less phrases, based on Farkas and de Swart's (2010) Strongest Meaning Hypothesis. However, Renans et al. (2017, 2020) provide psycholinguistic evidence against the ambiguity view of Turkish plurals.

4. Obligatory Classifiers vs. *tane*

Optional classifiers have not received as much attention as obligatory classifiers in the literature, and therefore our understanding of classifiers is based on the characteristics of obligatory classifiers. For this reason, I will first present the general view regarding their role in NCs and show that they have an atomizing function. Then, I will illustrate that *tane* directly combines with atomic properties instead.

4.1. Obligatory Classifiers

In languages like Chinese, Japanese, and Korean, NCs obligatorily occur with a classifier, which is exemplified for Mandarin in (2) repeated here as (35) (Cheng and Sybesma 1999, pg. 514) (see also Jiang 2012 and Kim 2009 for Mandarin, Japanese, and Korean, among others).

(35)   san   *(zhi) bi
      three CL   pen
      'three pens'

Just like Turkish, these languages lack overt determiners and hence their bare nouns can freely be arguments (Chierchia 1998, Krifka 1995). However, unlike in Turkish, their unmarked nouns consistently yield number neutral readings, allowing the plural marker only under certain conditions. That is, plural markers in these languages mark more than plurality. 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):

(36)   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.'

As is evident in (36), unmarked nouns are not limited to definite interpretations in Mandarin. They can also receive kind and existential readings, as shown in (37) (Yang 2001, pg. 20, 32). Furthermore, they are compatible with distributive predicates like *come from different regions*, as illustrated in (37c) (p.c. with Yi-Hsun Chen).

(37)   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 plurals. They are number neutral and their kind-level interpretations pattern with plural kind reference in Turkish (see Yang 2001). Following the generally accepted view due to the initial studies of Chierchia (1998), I take unmarked nouns of Chinese-like languages to be 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 (see also Krifka 1995). The availability of type-shifting to sets of object-level entities also makes them compatible with distributive predicates.

More precisely, as opposed to Turkish, in Chinese-like languages, the morphological and semantic (un)markedness align with each other. Morphologically unmarked nouns are also unmarked in interpretation, whereas morphologically marked plurals correspond to a semantically marked denotation, yielding definiteness/specificity. This indicates that the type of the nouns that the Turkish classifier combines with differs from the type of the nouns that obligatory classifiers combine with in these languages. Then, obligatory and optional classifier systems must be distinct from each other.

Chinese-like languages require a mediator between nouns and numerals because atomic instances of kinds are not accessible for counting. This mediation is already identified as an obligatory classifier system in Krifka (1995) and Chierchia (1998). Obligatory classifiers take a kind term and return sets of atomic instantiations of the kind, which, in return, become available for counting. In light of this view, the combination of the classifier and the noun in (35) can roughly be represented as below:

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

In sum, obligatory classifiers operate on kind terms and atomize them for purposes of counting.

4.2. Is *tane* an Atomizer?

We have established that the nominal semantics of obligatory classifier languages is different from that of Turkish, and hence, the semantics of classifiers in these languages is also expected to be distinct from the Turkish classifier. This section confirms this expectation and shows that *tane* is not an atomizer for it combines with properties that are already atomic.

As discussed in Section 3.2, Turkish aligns with English in its nominal semantics and both plurals and unmarked nouns have kind reference. Following Chierchia (1998), I have argued that plural kind terms are derived by *nom* and can be type-shifted to sets of object-level instances via *pred*. Following Dayal (2004b), I have argued that unmarked nouns are ambiguous between atomic properties of ordinary and taxonomic individuals, and their taxonomic denotation yields singular kind reference via *iota* type-shifting.

To recapitulate, singular kind terms are grammatically impure atomic terms, and hence they do not allow type-shifting to sets of object-level entities they are conceptually related to. However, an atomizer demands access to these entities to extract atoms out of them. The fact that singular kind terms cannot meet this requirement suggests that *tane* cannot be an atomizer that operates on kind terms, unlike obligatory classifiers of Chinese-like languages. Otherwise, we would expect it to combine with plurals instead, because plural kind terms allow access to sets of object-level instantiations. But *tane* cannot combine with plural nouns.[12]

We have also discussed a phenomenon where a *belong-to* relation is established between singular kinds and their object-level members in the predicate position. This phenomenon, i.e., *kind specification*, deserves some discussion here since it could potentially be extended to NCs

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[12]Alternatively, *tane* could have an atomizer semantics if it combined with mass nouns, but it is incompatible with them, which contrasts with canonical atomizing elements: *iki damla/*tane kan* 'two drops of blood'.

with *tane*. Recall that the denotation of unmarked nouns in the predicate position can be ascertained 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. The relevant examples are repeated below:

(39) 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.'

The question is whether unmarked nouns that *tane* combines with are singular kind terms, similar to the case in the predicate position. If so, we should expect the same modificational restrictions in NCs with *tane*, but this does not hold. Unmarked nouns in NCs can receive object-level modification regardless of the classifier:

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

Therefore, I conclude that NCs with *tane* do not involve kind specification with singular kind terms. Given that *tane* does not operate on plural kind terms, either, I claim that nouns combining with *tane* already denote atomic properties, and hence *tane* does not have an atomizer semantics, in contrast to obligatory classifiers.

5. The Semantics of *tane*

In this section, I will present my analysis of *tane*. I argue that NCs universally bear a cardinal head that denotes the cardinality measure function (Scontras, 2014), and that *tane* is the overt realization of this head. I further propose that *tane* bears a choice function variable in the sense of Reinhart (1997), which explains the obligatory indefiniteness of NCs with *tane*.

5.1. *tane* as an Overt Cardinality Measure Term

We have concluded that counting requires atomic properties in Turkish since NCs require the unmarked form of the noun and unmarked nouns denote atomic properties. We have also seen that *tane* cannot be an atomizer. Then, why would a language employ a classifier system if it is not required for the purposes of atomization in counting? The answer I propose is that it is needed for counting itself.

I follow Scontras (2014) in that cardinal numerals are formed on the basis of a cardinal head, and what we assume is done by numerals is actually achieved by this head. Numerals are only individual denoting expressions of type *n*, referring to a number (Landman, 2004). I suggest that the semantics of the cardinal head is uniform across languages. Applying Ionin and Matushansky's (2006, 2019) view of numerals to it, I argue that the cardinal head, being an expression of type $\langle n, \langle \langle e,t \rangle, \langle e,t \rangle \rangle \rangle$, denotes the cardinality measure function. 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*. While in Turkish, the atomicity presupposition results in the unmarked form of the noun, in English the noun further reflects morphological number agreement, as stated before.

I propose that *tane* is the overt realization of the cardinal head in Turkish (cf. XXX). The semantics of the overt and covert cardinal heads is then illustrated as below:[13]

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[13]I suggest that complex numerals are derived by covert arithmetic operators, multiplication and addition, the

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(41)   The Semantics of the Cardinal Head (to be revised for *tane*):
$[\![Card_\emptyset/tane]\!] = \lambda n\lambda P\lambda x\colon \forall y\,[P(y) \to AT(y)].\ \exists S\,[\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\ P(s)]$

   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 a plural individual X iff X is the sum of all members of C: $\sqcup C = X$

Below is the derivation of $[[iki\ (tane)]\ kitap]$ 'two books', where AT in P_{AT} is short for the presuppositional content. It denotes a set of plural individuals x divisible into 2 non-overlapping individuals such that their sum is x and each individual is a book.

(42)   a. $[\![book]\!] = \lambda x.book(x)$

   b. $[\![Card_\emptyset/tane]\!] = \lambda n\lambda P_{AT}\lambda x.\ \exists S\,[\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\ P(s)]$

   c. $[\![two]\!] = 2$

   d. $[\![two\ Card_\emptyset/tane]\!] = \lambda P_{AT}\lambda x.\ \exists S\,[\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S\ P(s)]$

   e. $[\![two\ Card_\emptyset/tane\ book]\!] = \lambda x.\ \exists S\,[\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S\ book(s)]$

The disparity in the form of the noun in English and Turkish NCs then does not imply variation in the semantics of number marking. We have taken the cardinal head to have a uniform semantics across languages, but this conclusion also holds even if it is parametrized. Similarly, the fact that Turkish NCs bear an optional classifier in contrast to English NCs does not point to a contrast in the nominal semantics of the two languages. In English, the cardinal head is always covert, and in fact this is the case in many languages. Turkish, though, is special in also featuring an overt version of this head, and that is how *tane* only optionally appears in NCs. It is also worth noting that the optionality is not an inherent property of such classifiers. In fact, it would be possible to find languages where the cardinal head is always overt.

Likewise, the use of unmarked nouns and the presence of a classifier in Turkish NCs do not mean that Turkish patterns with obligatory classifier languages in its nominal semantics, and in fact, I have shown the opposite. We have also seen that *tane* and obligatory classifiers have separate roles. We then expect a cardinal head besides the classifier in NCs of Chinese-like languages. It could be the case that it is a separate covert head or its semantics is intertwined with the atomizing classifier. The latter is argued by Krifka (1995) where obligatory classifiers are analyzed as functions that take kinds and measure the number of specimens of that kind. Similarly, Scontras (2014) analyzes them as having the dual role of atomization and counting.

In Turkish, *tane* does not appear with canonical atomizers, as shown in (43a), implying that the cardinal and atomizing functions might be realized by one lexical item when atomizers are present. Notice, though, the optional classifier in Western Armenian, *had*, which we will discuss in Section 7, can co-occur with such atomizers, as exemplified in (43b). Then, atomizer and the cardinality functions can be spelled-out as separate heads, but further research is required to understand what determines these choices.

(43)   a.   iki (*tane) damla kan
            two CL   drop blood

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result of which is a complex number that feeds the argument slot of the cardinality measure 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) (see fn 10). This would mean that *tane* could 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' Based on this, instead of Ionin and Matushansky's constraint in (33) 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.

           'two drops of blood'
b.   jergu (had) gatil arujn (WA)
     two   CL   drop blood
     'two drops of blood'

To wrap up, I have argued that counting expressions are formed on the basis of a cardinal head and the optional classifier *tane* is the overt realization of this head in Turkish.

5.2. Associating *tane* with Indefiniteness

Analyzing *tane* as an overt cardinality measure term explains its optionality in Turkish NCs but *tane* also has a non-optional aspect. That is, overtly realizing the cardinal head is not a random choice but brings a restriction in interpretation. In Section 2, we have seen that NCs with *tane* are not compatible with definiteness as opposed to NCs without *tane*, while both can convey indefinite readings. I will now account for this disparity between the two forms of NCs.

Recall that NCs with and without *tane* can behave like regular indefinites, including taking exceptional scope out of islands and intermediate scope. Following Reinhart's (1997) choice function theory, I propose that indefiniteness of NCs is ensured by a choice function variable (f) applying to a non-empty set to yield a member of that set, which is eventually existentially closed (see also Kelepir 2001; cf. Fodor and Sag 1982, Winter 1997, and Kratzer 1998). In this theory, the existential closure of the choice function variable is assumed to apply at any compositional level. This not only explains the exceptional scope ability of indefinites without a need for a mechanism to extract the indefinite from an island, but also their intermediate scope readings. Below, I exemplify how a NC is interpreted with respect to an island under this view.

(44)   Eğer iki (tane) projem seçilirse, ödenek alabileceğim.
       'If two of my projects are selected, I will receive funding.' (**if** > **two**, **two** > **if**)
      a.   Narrow Scope Reading:
          $[\exists f\,[CH(f)\wedge be.selected(f(two\ projects))] \rightarrow funding]$
          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:
          $\exists f\,[CH(f)\wedge[we\ be.selected(f(two\ projects))] \rightarrow funding]$
          There is a choice function such that if the two projects that it selects are selected (by the committee), I will get funding.

Since NCs have a predicative denotation, they can also undergo *iota* type-shifting, besides being associated with a choice function variable. This predicts the fact that NCs without *tane* are ambiguous in having both indefinite and definite interpretations. The question is what changes in the presence of *tane*. Since NCs with *tane* cannot be interpreted as definite, *iota* type-shifting must be incompatible with them. To understand this case better, let us consider the following generalization.

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). In languages like English and French, NCs can also be definite via their overt definite articles. Interestingly, though, in bare NP languages, regardless of whether they have obligatory classifiers or not, NCs typically do not undergo *iota* type-shifting, but require demonstratives to convey definite readings. Jiang (2012) bases this generalization on Chinese, an obligatory classifier language, and Russian, a language without classifiers (see also Bošković 2005 for Russian).

Turkish is a bare NP language and yet it has two strategies to represent its NCs, one with a classifier, one without a classifier. Given that NCs in all languages have indefinite denotations and NCs in bare NP languages typically have indefinite denotations only, what is more striking is the fact that NCs without *tane* can undergo *iota* type-shifting. It seems that Turkish is in between the two groups of languages in that regard.

Based on this, I assume that NCs without *tane* are like English NCs in having a predicative semantics which can feed into whatever comes above and become arguments, and these could be *iota* or the choice function. English NCs differ in ruling out *iota* type-shifting due to the presence of *the*. On the other hand, on a par with NCs of bare NP languages, I propose that NCs with *tane* have an argumental denotation with a built-in choice function variable.[14] I further suggest that the choice function is introduced by *tane* itself.[15]

In light of this view, the semantics of *tane* is given in (45), comparing it with the covert cardinal head. The structures of NCs occurring with and without *tane* are represented in (46).[16]

(45)   The Semantics of the Covert and Overt Cardinal Heads (final)
    a. $[\![Card_\emptyset]\!] = \lambda n \lambda P_{AT} \lambda x. \exists S\, [\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\, P(s)]$
    b. $[\![tane_f]\!] = \lambda n \lambda P_{AT}.\, f(\lambda x\, \exists S\, [\prod(S)(x) \wedge |S| = n \wedge \forall s \in S\, P(s)])$

(46)   a.   NCs without *tane*   b.   NCs with *tane*

To summarize, I have argued that NCs with *tane* are devoid of definiteness since *tane* bears a built-in choice function variable.

6. Where the Indefiniteness of *tane* is Overridden

So far, we have examined the fact that NCs with *tane* are restricted to indefinite interpretations only. I will now illustrate the two cases where they can receive definite readings, which seems to contradict with the claim of obligatory indefiniteness. These involve their modification with what I call *outer relative clauses* and their occurrence in a special partitive construction. I will derive the definiteness in these cases retaining the indefinite status of *tane*.

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[14]NCs with and without *tane* can combine with demonstratives and the universal quantifier: *o iki (?tane) çocuk* 'those two children', *her on (tane) çocuktan biri* 'one out of every ten children' NCs with *tane* then should also have a predicative denotation independently of the one with a choice function variable. It seems, however, that their predicative denotation is only available for overt determiners. These facts also hold for NCs in Chinese and Russian and hence it is an open problem for NCs of bare NP languages in general. Therefore, I set this issue aside.

[15]Jiang (2012) argues that the source of the choice function variable is numerals in every language. However, this does not explain the difference between NCs with and without *tane*.

[16]I represent *iota* under a syntactic node for expository purposes, but I assume it to apply as a covert type-shifting rule in Turkish (see fn 8). I also assume that in Turkish the CardP is in the specifier of the NP for reasons that are not relevant for our purposes (cf. von Heusinger and Kornfilt 2017). This contrasts with English, where the Card head is argued to take the NP as its complement in Scontras (2014). See XXX for details.

6.1. Outer Relative Clauses and *tane*

In Turkish, relative clauses (RC, henceforth) can potentially appear in two positions: one where they precede a determiner i.e., outside of DP, and the other where they are situated inside DP, between the determiner and the noun they modify (Kornfilt 2000a, 2005, Özçelik 2016, and Gökgöz 2014). Let us call the former *outer RCs* and the latter *inner RCs*:[17]

(47) a. [[Gör-düğ-ü]   **her**   kitab-ı]   al-dı.   *Outer RC*
          see-DIK-3SGPOSS every book-ACC buy-PAST
          '(S)he bought every book that (s)he saw.'

      b. [**Her** [[gör-düğ-ü]   kitab-ı]]   al-dı.   *Inner RC*
          every see-DIK-3SGPOSS book-ACC buy-PAST
          '(S)he bought every book that (s)he saw.'

The position of RCs creates a contrast in the interpretation of NCs with *tane*. When they are modified by outer RCs, NCs with *tane* can behave as a definite expression besides an indefinite one. However, when they are modified by inner RCs, they can only be interpreted as indefinites.[18] Consider (48) to see this contrast. The form without *tane* can refer to the two women who knew how to swim regardless of the position of the RC. The form with *tane* can also be anaphoric but only if the RC is situated outside the NC.[19] Note that if three women knew how to swim in the context below, rather than two, the NC with *tane* would be felicitous in both (48a) and (48b), yielding an indefinite interpretation.

(48)   Pazar günü plaja gittik. Plajda dört (tane) kadın, iki (tane) adam ve iki (tane) de çocuk vardı. Kadınların iki (tane)si yüzme biliyordu. Sonra aniden çocukların biri boğulmaya başladı.
          'We went to the beach on Sunday. There were four women, two men, two kids on the beach. Two of the women knew how to swim. Then, all of a sudden one of the kids started to drown.'

      a. [**Yüzme bil-en**   iki (?tane) kadın] hemen deniz-e koş-tu.
          swimming know-AN two CL   woman quickly sea-DAT run-PAST
          'The two women who knew how to swim ran to the sea.'

      b. [İki (#tane) [[**yüzme bil-en**] kadın]] hemen deniz-e koş-tu.

The case of the form without *tane* is expected because it is possible for it to be associated with *iota*. However, the fact that the form with *tane* can behave as a definite and this is dependent on the position of the the RC is surprising under our analysis. If *tane* bears a choice function

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[17]When a subject is relativized, the verb receives the suffix *-An* (e.g., (48)), and when an object is relativized, the verb receives the nominalizer suffixes *-DIK* or *-AcAK*, depending on the tense, (e.g., (47)) (Underhill 1972, Hankamer and Knecht 1976, Csató 1985, Barker et al. 1990, Kornfilt 2000b, Öztürk 2008, Özçelik 2016). In the latter case, the RC appears with a possessive structure where the subject receives the genitive case and the verb+-*DIK/-AcAK* receives the possessive agreement marker. See Özsoy (1994), Aygen (2003), and Öztürk (2008).

[18]These two options are not freely available to all types of RCs. While some RCs only precede the numeral/determiner, some RCs are free to occur inside or outside of NCs/DPs. For example, when an object RC modifies a NC, it only surfaces as an outer RC, but a subject RC can be both an inner and outer RC, as in (48). However, the position of a RC is not entirely dependent on whether it is an object or a subject RC. With a universally quantified DP, both subject and object RCs can accompany the DP as an inner and outer RC. To my knowledge, there is no clear-cut explanation for these variations in the literature. Since we are only concerned with the contrast that RCs create for NCs, I ignore the underlying factors behind these choices.

[19]I represent the case with *tane* in (48a) with a question mark because the use of *tane* feels redundant, though not unacceptable. The best way is to use the plural, e.g., *yüzme bilen kadınlar* 'the women who knew how to swim'. When the NC is fully spelled out, *tane* feels extra since it is less of a repetition without *tane*. Notice, though, that NCs with *tane* modified by inner RCs are completely unacceptable in anaphoric contexts.

variable, we do not expect NCs with *tane* to be interpreted as a definite at all.

I argue that the surprising behavior of NCs with *tane* is not against the claim of the obligatory indefiniteness of *tane*, but instead follows independently from the semantics of outer RCs. I will first discuss how NCs with *tane* can be indefinite when they are modified by an inner or outer RC, and then I will return to their definite interpretation with outer RCs.

I follow Özsoy (1996), Meral (2010), Baturay Meral and Meral (2016), and Demirok (2017) in that the internal position of a RC involves null-OP movement for predicate abstraction (Chomsky 1977, Heim and Kratzer 1998). I further follow Demirok (2017) in that a RC can move out of its pre-nominal position and be realized outside the DP, but it reconstructs for interpretation in this case. Consider (49), where the RC involves a modified numeral. The RC precedes the universal quantifier and hence the modified numeral is expected to take wide scope due to scope rigidity, but it is interpreted under the universal quantifier. This proves that outer RCs are interpreted in their base position, and therefore they are underlyingly inner RCs despite the appearance. I call such outer RCs, *reconstructing outer RCs*.

(49)　[**En az　iki öğrenci-nin çöz-ebil-diğ-i**　　her　soru]　kolay-dı.
　　　at　least two student-GEN solve-ABIL-DIK-3POSS every question easy-PAST
　　　'Every question that at least two students were able to solve was easy.'
　　　($\forall >$ at least, *at least $> \forall$)

The structures of inner and reconstructing outer RCs can then be represented as follows:[20]

(50)　a.　Inner RCs: $[_{DP}\ every\ [_{D'}\ [_{NP}\ [RC\ N]\ D]]]$
　　　b.　Reconstructing Outer RCs : $[_{DP}\ RC_i\ [_{DP}\ every\ [_{D'}\ [_{NP}\ [\ \cancel{RC_i}\ N]\ D]]]]$

To reiterate, these two types of RCs are interpreted in the same way. When they modify a NC with *tane*, the NC is obligatorily an indefinite due to the choice function introduced by the classifier. Below, I illustrate the derivation of NCs with *tane* modified by a reconstructing outer RC, but the same holds for inner RCs as well. (51) represents the interpretation of the NC with *tane* in (48a) in a context that supports an indefinite interpretation rather than an anaphoric one.

(51)　a.　$[\![RC_i\ two\ tane\ \cancel{RC_i}\ woman]\!] = f(\lambda x.\ \exists S\ [\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S\ k.swim(s)$
　　　　　$\wedge\ woman(s)])$
　　　b.　$\exists f\ [CH(f)\ \wedge\ ran.to.sea(f(\lambda x.\ \exists S\ [\prod (S)(x) \wedge |S| = 2 \wedge \forall s \in S\ k.swim(s) \wedge$
　　　　　$woman(s)]))]$
　　　c.　There is a choice function such that the plural individual that it selects, which is two women that knew how to swim, ran to the sea.

If NCs with *tane* are only interpreted as an indefinite when the RC reconstructs, their definite denotation must be derived if the RC stays above the NC. The challenge, then, is to ensure that the RC is interpreted in its outer position and its combination with the NC of type *e* results in a definite expression. Below, I show that both of these are possible.

I argue that outer RCs can also be merged directly above expressions of type *e*. This is distinct from reconstructing outer RCs which raise from the pre-nominal position. In the alternative option, the RC modifies a null noun, analogous to the case of *the rich* in English, as suggested in Chierchia (1998). That is, the outer RC is nominalized by combining with a null nominal head, which Chierchia represents as Δ.[21] I call this type of outer RCs *genuine outer RCs*.

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[20]Turkish is a head-final language. I assume that *her* 'every' is in Spec DP to derive the correct word order.

[21]It is not clear how Δ is licensed under the view that deleted/null categories require licensing by a c-

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(52)   RC Nominalization: $[_{NP} [RC] [_N \Delta]]$

This is not an implausible view since RCs can surface in the argument positions without an overt noun in Turkish. Although the null noun of *the rich* is interpreted as 'people', in RC nominalization in Turkish, its denotation is provided by the context, and it could be singular or plural, as exemplified for the plural in (53).[22]

(53)   a.   Marketten üç (tane) yumurta aldım. Pazardan da iki (tane) yumurta aldım.
               'I bought three eggs from the grocery store. I also got two eggs from the bazaar.'
        b.   Ama [**market-ten al-dığ-ım**   (y̶u̶m̶u̶r̶t̶a̶-l̶a̶r̶)] bozuk çık-tı.
               but   grocery-ABL buy-DIK-1SGPOSS egg-PL   rotten turn.out-PAST
               'But the ones (eggs) that I bought from the grocery store turned out to be rotten.'

Chierchia (1998) suggests that the null noun in *the rich* is a function that applies to a modifier and returns the property of the totality of the people having the property ascribed by the modifier.[23] Along the same lines, I suggest the semantics in (54a) for the null noun in nominalized RCs and illustrate the denotation of [*yüzme bilen* Δ] 'Δ that knew how to swim' in (54b). *K* is a contextually supplied plural woman property in this case. So, the nominalized RC denotes the property of the maximal individual that knew how to swim and that are women.

(54)   a. $\Delta = \lambda P \lambda x.\ x = \iota z\ [P(z) \wedge K(z)]$, where K is a contextually supplied property.
        b. $[_{NP}\ RC\ \Delta] = \lambda x.\ x = \iota z\ [k.swim(z) \wedge women(z)]$

The next step is to combine this $\langle e,t \rangle$ type RC with the *e* type NC with *tane*. The standard tools do not provide a way of doing this. Therefore, I adopt a novel way, which is the type-shifting operator *e-ident* shown in (55). It is implemented in Demirok (2019) to derive the semantics of expressions like 'War and Peace by Tolstoy', where 'War and Peace' is an expression of type *e* combining with the $\langle e,t \rangle$ type 'by Tolstoy'. Applying the same logic to our case, the derivation of (48a) with *tane* in the context given in (48) is illustrated below:[24]

(55)   e-ident: $\lambda x \lambda P.\ \iota y\ [P(y) \wedge x = y]$

(56)   [RC Δ two tane woman]
$$\iota y\ [y = \iota z\ [k.swim(z) \wedge women(z)]\ \wedge\ f(\lambda x.\ \exists S\ [\textstyle\prod(S)(x) \wedge$$
$$|S| = 2 \wedge \forall s \in S\ woman(s)]) = y]$$

RC+Δ
$\lambda x.\ x = \iota z\ [k.swim(z) \wedge women(z)]$

$\lambda P.\iota y\ [P(y) \wedge\ f(\lambda x.\ \exists S\ [\textstyle\prod(S)(x) \wedge$
$|S| = 2 \wedge \forall s \in S\ woman(s)]) = y]$

2 tane$_f$ woman
$f(\lambda x.\ \exists S\ [\textstyle\prod(S)(x) \wedge$
$|S| = 2 \wedge \forall s \in S\ woman(s)])$

e-ident
$\lambda x \lambda P.\iota y\ [P(y) \wedge x = y]$

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commanding licensor (see Lobeck 1995). However, it is well-known since Longobardi (1994, 2000) that modification overrides this requirement. See also Dayal (2004a).

[22]This also holds for simple adjectives in Turkish, and in no way is restricted to RCs. However, adjectives tend not to occur preceding NCs, unlike RCs.

[23]Chierchia (1998) considers Δ to be the property of a maximal individual since nominalized adjectives are only compatible with *the*, not other quantificational elements. As being true of at most one thing, nominalized adjectives can only be a restrictor to the definite determiner. This also holds for nominalized RCs in Turkish; they can only be interpreted as definite and are incompatible with quantifiers like *her* 'every'.

[24]See Huang (2006), Jiang (2012), and Li (2015) for a similar analysis of Chinese RCs.

a. $\exists f \, [CH(f) \wedge ran.to.sea(\iota y \, [y = \iota z \, [k.swim(z) \wedge women(z)] \wedge f(\lambda x. \, \exists S \, [\prod(S)(x) \wedge |S| = 2 \wedge \forall s \in S \, woman(s)]) = y)]]$

b. There is a choice function such that the maximal plural individual [$_{RC}$ that equals the maximal individual that are women and that knew how to swim] and [$_{NC}$ that equals the two women the choice function selects] ran to the sea.

In (56), the [RC Δ] + [NC] combination denotes the unique individual which equals the totality of the women that knew how to swim and which equals the individual a choice function selects out of the set denoted by the NC. Therefore, it is compatible with anaphoric contexts.[25]

Finally, let us briefly review what happens when NCs without *tane* combine with outer RCs. Since *iota* type-shifting is not ruled out they can be definite even with reconstructing outer RCs. Additionally, there is nothing to prevent them from occurring with genuine outer RCs via *e-ident* type-shifting, where they can be associated with the choice function or *iota*.

To sum up, NCs with *tane* can convey a definite interpretation when modified by genuine outer RCs and yet still retain their inherent indefiniteness.

6.2. The Special Partitive Construction

I will now discuss the other case where NCs with *tane* are compatible with definiteness. This arises when they occur in a special type of partitive constructions, which bears the genitive-possessive morphology just like the regular partitive construction (see von Heusinger and Kornfilt 2017), but is obligatorily followed by the particle *dA*. The presence of *dA* adds a distributive reading, and brings with it a maximality requirement. In other words, the NC occurring in this construction has to refer to a contextually salient maximal entity. The contrast between the regular and the special partitive construction is illustrated below:

The Regular Partitive Construction

(57) Dolapt-tan dört (tane) elma çıkar-dı-m. **(Elma-lar-ın) üç-ü/ üç**
fridge-ABL four CL apple take.out-PAST-1SG apple-PL-GEN three-3SGPOSS three
tane-si masa-nın üst-ün-de.
CL-3SGPOSS table-GEN on-3SGPOSS-LOC
'I took out four apples from the fridge. Three of the apples are on the table.'

The Special Partitive Construction

(58) Dolapt-tan üç (tane) elma çıkar-dı-m. **(Elma-lar-ın) üç-ü/ üç**
fridge-ABL three CL apple take.out-PAST-1SG apple-PL-GEN three-3SGPOSS three
tane-si de masa-nın üst-ün-de.
CL-3SGPOSS DA table-GEN on-3SGPOSS-LOC
'I took out three apples from the fridge. The three apples each are on the table.'

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[25]The claim that genuine outer RCs are directly merged above the NC raises the question whether they are appositive/non-restrictive RCs. In the null-OP movement analyses, a restrictive RC is a sister of the antecedent noun (Chomsky 1977, Heim and Kratzer 1998). Appositive RCs, though, cannot be situated inside a DP since D does not take scope over the RC. Potts (2005) takes such RCs to be supplementary expressions contributing a conventional implicature along a separate dimension of semantic composition. These expressions have some properties distinguishing them from the expressions that are part of the at-issue content. The most prominent difference is that supplementary RCs cannot restrict the head noun. In the context of (48a) though, there are more than two women, and the RC restricts the denotation to the ones who knew how to swim. If genuine outer RCs were necessarily appositive, we would expect the NC with *tane* in (48a) to be only compatible with contexts where there are exactly two women.

As is clear in (58), both forms of NCs are felicitous in the special partitive construction. The question, though, is how NCs with *tane* can take part in this construction. That is, given the maximality requirement, they are expected to be infelicitous due to their inherent indefiniteness. I suggest that the explanation offered for the case of outer RCs also applies here.

The partitive construction is composed of two parts in English, an NP1 which often consists of only the determiner or numerals, and an NP2 accompanied by the preposition 'of': [[NP1 two] [of [NP2 these eight girls]]]. The partitive construction has certain semantic conditions (Hoeksema 1996, Chierchia 1997, Barker 1998, Zamparelli 1998). NP2 must be definite or specific indefinite and this condition is called 'The Partitive Constraint' (Jackendoff 1977, Barwise and Cooper 1981, Ladusaw 1982, de Jong 1991, among others). Additionally, the expressed relation between NP1 and NP2 is a part-of relation, which Barker (1998) explains by claiming that 'of' returns a proper part of its complement (cf. Ionin et al. 2006). This is based on the fact that there is an anti-uniqueness effect associated with the partitive construction. Namely, a partitive cannot appear with a definite determiner (examples adopted from Ionin et al. 2006):

(59)   a.   *I met the two of John's friends.
       b.   *I met the two of John's parents.

Syntactically, Ionin et al. (2006) propose that due to the atomicity requirement of cardinals, a partitive construction involving a NC as its NP1 involves an empty/deleted singular noun. Adopting this view, I propose the following structure for both types of partitive constructions in Turkish, where the correspondence of 'of' is the genitive marker.[26]

(60)   Partitive Constructions with NCs
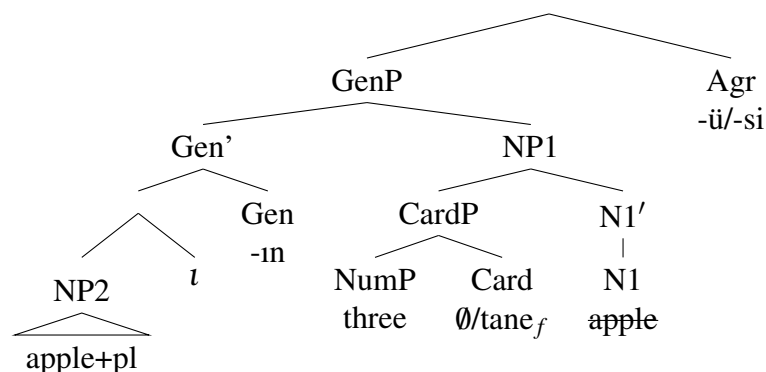
Due to the anti-uniqueness effect, NCs can only be indefinite when they take part in the regular partitive construction. Although *Gen* denotes a part-of relation in the regular partitive construction as proposed for 'of' by Barker (1998), I suggest that in the special partitive construction, it takes the role of *ident*, overriding the anti-uniqueness effect. It takes an individual and returns the property true of that individual. In our case, *Gen* takes the definite plural *elma-lar* 'the apples', and returns the property of the maximal plural apple individual:

(61)   a. $[\![Gen]\!] = \lambda y \lambda x.\, x = y$
       b. $[\![\, [[\iota\ apple+pl]\ Gen]\,]\!] = \lambda x.\, x = \iota z\, [apples(z)]$

When the special partitive construction has a NC without *tane*, the $\langle e,t \rangle$ type expression denoted by the application of *Gen* to NP2 as in (61b) and the NC of type $\langle e,t \rangle$ intersect via Predicate Modification. The result is type-shifted via ι, as shown in (62), which denotes the unique individual that equals the maximal plural apple individual of cardinality three.

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[26]The empty noun is licensed by the possessive agreement morpheme (cf. von Heusinger and Kornfilt 2017).

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(62) The Special Partitive Construction without *tane*
$$\iota x\ [x = \iota z\ [apples(z)] \ \wedge\ \exists S\ [\textstyle\prod(S)(x) \wedge |S| = 3 \wedge \forall s \in S\ apple(s)]]$$

In the case of NCs with *tane*, since ι is not available due to the choice function variable, I propose the following composition in (63) where the combination of NP2+Gen and the NC occurs through *e-ident*. (63) denotes the unique individual that equals the maximal plural apple individual and the plural individual of cardinality three which is selected by a choice function.

(63) The Special Partitive Construction with *tane*
$$\iota y\ [y = \iota z\ [apples(z)] \wedge f(\lambda x.\ \exists S\ [\textstyle\prod(S)(x) \wedge |S| = 3 \wedge \forall s \in S\ apple(s)]) = y]$$

Gen′
$\lambda x.\ x = \iota z\ [apples(z)]$

$\lambda P.\iota y\ [P(y) \wedge f(\lambda x.\ \exists S\ [\textstyle\prod(S)(x) \wedge |S| = 3 \wedge \forall s \in S\ apple(s)]) = y]$

3 tane$_f$ apple
$f(\lambda x.\ \exists S\ [\textstyle\prod(S)(x) \wedge |S| = 3 \wedge \forall s \in S\ apple(s)])$

e-ident
$\lambda x \lambda P.\iota y\ [P(y) \wedge x = y]$

The distributive interpretation obtained by the combination of (62) and (63) with *dA* in (58) is derived as represented below. I assume that *dA* acts as a distributive operator in the sense of Link (1987) for simplicity. Assuming that the definite expressions derived in (62) and (63) equal a⊕b⊕c, then (58) means that a, b, and c each are on the table.

(64) a. $[\![dA]\!] = \lambda P \lambda x.\ \forall y\ [[y \leq x \wedge AT(y)] \rightarrow P(y)]$
  b. $[\![(58)\ w/o\ tane]\!] = \forall y\ [[y \leq [\![(62)]\!] \wedge AT(y)] \rightarrow on.the.table(y)]$
  c. $[\![(58)\ w/tane]\!] = \exists f\ [CH(f)\ \wedge\ \forall y\ [[y \leq [\![(63)]\!] \wedge AT(y)] \rightarrow on.the.table(y)]]$

To summarize, the unexpected definiteness of NCs with *tane* in the special partitive construction is derived in a way that is compatible with the inherent indefiniteness of *tane*, following a similar line of logic proposed for the case of genuine outer RCs.

7. Cross-linguistic Implications

I have argued that NCs are formed on the basis of a cardinal head that denotes the cardinality measure function and Turkish has the option of overtly realizing this head as *tane*, as opposed to languages like English where it is always covert. We have also seen that realizing the cardinal head overtly is not completely optional in Turkish since it restricts NCs to indefinite interpretations only. I have argued that this exclusively indefinite behavior stems from the choice function variable that the classifier is associated with.

One question raised by this analysis is whether the obligatory indefiniteness is an inherent property of optional classifiers in general. I will now show that the case of the Turkish classifier cannot be reduced to a cross-linguistic factor. This is based on two more optional classifier languages, Western Armenian (WA, henceforth) and Persian, where NCs can be definite with and without the classifier. However, we will also see that the optionality of the classifier creates differences in a separate aspect in Persian. Being able to realize the cardinal head overtly as well as covertly then might bring language-specific restrictions.

WA and Persian NCs are similar to Turkish NCs in featuring an optional classifier, *had* in the former, *tā* in the latter, as shown in (65) (Sigler 1996, Borer 2005, Bale and Khanjian 2008,

2014, Khanjian 2013 for WA; Gomeshi 2003, Gebhardt 2009 for Persian).[27] Differently from Turkish NCs, though, WA and Persian NCs can bear the plural marker, adding a specific reading in the former (Sigler 1996) and a definite reading in the latter (Gomeshi 2003). The plural can occur in both forms of NCs for Beirut speakers but Istanbul speakers can only use it in NCs without *had* (cf. Sigler 1996, Borer 2005, Bale and Khanjian 2008, 2014, Khanjian 2013).[28] Persian NCs can have the plural only when *tā* is present.

(65) a. jerek (had) havgit (WA)
          three CL   egg
          'three eggs'

      b. se   (tā) toxm-e morgh (Persian)
          three CL egg
          'three eggs'

WA and Persian have a systematic number marking system, as Turkish and English.[29] Therefore, we can analyze the classifiers of these languages as the overt counterpart of the cardinal head, analogous to their kin in Turkish. I also maintain this view for the cases where they combine with plurals and suggest that the plural inflection in NCs reflects number agreement as in English NCs, but further conditioned by specificity in WA and definiteness in Persian (cf. Sigler 1996, Borer 2005, Bale and Khanjian 2008, 2014, Khanjian 2013, Martí 2020 for WA; Gomeshi 2003, Gebhardt 2009 for Persian).[30]

Crucially, NCs with and without the classifier can receive definite and indefinite interpretations in these languages. WA is a language with an overt definite marker, i.e., *-ə*, and both forms of NCs are compatible with it, as shown in (66).[31] Persian, on the other hand, is a bare NP language; it does not have an overt definite marker. But as in WA, both forms of NCs can be definite, though the form with *tā* requires to be inflected with the plural marker *-hā* or the uniqueness marker *-(h)e/a* for this, as shown in (67a).[32] The form without *tā*, in contrast, cannot combine with these markers, as shown in (67b).

(66) a. dupin met͡ʃə gar jerek had kirk, meg had dedrag, jev jergu had madid.
          'There were three books, one notebook, two pencils in the gift box.'

      b. **jerek (had) kirk(%-er)-ə** im bəzdig zarmig-i-s   dəv-i.
          three CL   book-PL-DEF my little cousin-DAT-1SGPOSS gave-PAST1SG
          I gave the three books to my little cousin.'

(67) Do (tā) moallem, se (tā) mohandes, va ye doktor vāred-e otāgh shodan.
      'Two teachers, three engineers, and a doctor entered inside the room.'

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[27]The WA data is represented with IPA symbols provided by Hossep Dolatian, a phonologist who is one of the consultants. The Persian data is represented with the orthography adopted from Jasbi (2016).

[28]Consultants from Istanbul also report that the plural marker is preferably omitted, still making the specificity available in its absence. See also Martí (2020) for the plural and NCs in WA.

[29]Bale and Khanjian (2008, 2014) and Bale et al. (2010) argue that in WA unmarked nouns are number neutral and plurals are strictly plural. In XXX, I show that WA and Persian are similar to Turkish in their nominal semantics. See also Martí (2020).

[30]The WA and Persian plurals do not necessarily convey specificity/definiteness outside of NCs; they can have generic and narrow scope indefinite readings (XXX, cf. Sigler 1996 for WA; Gomeshi, 2003, 2016 for Persian). Furthermore, Turkish NCs have an extremely limited version of number agreement similar to the one attested in WA and Persian. It is only possible with well-known characters: *yedi (*tane) cüce-ler* 'the seven dwarfs'. But this is incompatible with NCs with *tane*, which I believe is due to the indefiniteness of the classifier.

[31]% represents the variation between Beirut and Istanbul speakers in terms of the plural marker in NCs.

[32]Notice that the uniqueness marker *-(h)e/a* is not a definite marker. Jasbi (2019) claims that *-(h)e/a* introduces a uniqueness implication on the nominal it attaches to. It can appear with both bare nouns and indefinites. When it appears on a bare noun, the uniqueness implication ensures a definite interpretation. When it appears with indefinites, it restricts the domain of quantification to a singleton set, resulting in a specific indefinite interpretation only (in the sense of Schwarzschild 2002).

a. **Do tā moallem*(-e/-hā)** dar mored-e ye chiz-i   sohbat
two CL teacher-UM/PL   about-EZ   a thing-INDEF conversation
mi-kard-an.
IMPERF-PAST.do-3PL
'The two teachers were talking about something.'
b. **Do moallem(*-e/*-hā)** dar mored-e ye chizi sohbat mikardan.
'The two teachers were talking about something.'

In Persian, although the two forms of NCs do not contrast in terms of (in)definiteness, they differ in terms of informal vs. formal register. The omission of *tā* signals a more formal register while NCs with *tā* are used in daily speech and are more common than NCs without it. The incompatibility of the uniqueness marker with NCs without *tā* then might be due to a conflict in register because the uniqueness marker is highly colloquial; it is not used in written language, for example. It is also possible that the uniqueness marker is responsible for the definite interpretation of NCs inflected by the plural marker. It could be the case that *-(h)e/a* is fused into *-hā*, and hence it might not be visible when there is a plural inflection on NCs. If this is the case, then the incompatibility of the formal form of NCs with the plural marker could also be explained as an effect of the colloquial uniqueness marker.

Then, in Persian, the overt cardinal head is the default form. This contrasts with the case in Turkish, where the covert cardinal head is the default instead given that it is the unrestricted form. WA also patterns with Turkish in having the covert cardinal head as the default, but I did not encounter a significant variation between the two forms of NCs. The only difference the consultants report is that in the presence of *had*, the identity of the referent of the NC becomes less important while the amount (i.e., number) interpretation becomes more salient.[33] This is not unexpected under my analysis since it is likely that overtly realizing the cardinal head makes the amount reading more readily available compared to the covert form.

In conclusion, the (in)definite status of NCs in the three optional classifier languages is regulated by language-internal factors, and hence the indefiniteness of *tane* could not be a cross-linguistic property of optional classifiers. Nevertheless, also considering the restrictions observed in Persian NCs, we can draw the following conclusion: Optional classifiers are optional elements in that even if NCs had not resorted to them at all they would not lose anything in interpretation. On the other hand, such classifiers are not entirely optional in that their presence (in Turkish) or absence (in Persian) might have restrictive effects on the interpretation/use of NCs. Although further study is needed for WA and other optional classifier languages to reach a general conclusion, it seems that having the option of realizing the cardinal head covertly and overtly comes at a language-specific cost, at least in Turkish and Persian. The exact reason behind this definitely awaits future research.

8. Conclusion

This paper has analyzed the semantics of Turkish NCs and the optional classifier, i.e., *tane*. The discussion has centered around two issues: The first pertains to the form of the noun in NCs as well as what is implied by Turkish having an optional classifier in contrast to languages like English and obligatory classifier languages like Chinese. The second issue is about the non-optional aspect of *tane*, i.e., the obligatory indefiniteness of NCs in its presence.

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[33]The consultants from Beirut also report that the co-occurrence of the definite marker with *had* leads to awkwardness with animate nouns, but they do not categorize these cases completely unacceptable. See XXX.

I have claimed that Turkish nominal semantics patterns with English and linked the differences in their NCs to the semantics of the cardinal head that I have argued to universally reside in NCs, following Scontras (2014). That is, the cardinal head, denoting the cardinality measure function, presupposes atomic properties (cf. Ionin and Matushansky 2006, 2019). While this requires the unmarked form of the noun in Turkish NCs, English NCs also involve number agreement. Crucially, differing from English, the covert cardinal head has also an overt counterpart in Turkish, realized by *tane*. In that respect, the Turkish classifier departs from well-known obligatory classifiers, which are instead atomizers operating on kind terms.

I have argued that the the obligatory indefiniteness of NCs with *tane* stems from a choice function variable hardwired into the semantics of *tane*. NCs with the covert cardinal head, on the other hand, are not restricted in terms of (in)definiteness. We have also discussed how NCs with *tane* can be definite when they are modified by outer relative clauses, and when they are a part of the special partitive construction. I have provided analyses for these cases without compromising the indefiniteness of *tane*.

The final discussion of WA and Persian classifiers, though, has shown that there is variation with respect to (in)definiteness of NCs cross-linguistically. Although I have remained agnostic on the reasons for these variations, we have seen that the indefiniteness of *tane* is certainly not a property of the optional classifier system. Both forms of NCs accept definite interpretations in WA and Persian. However, Persian departs from Turkish and WA in reserving the form without the classifier for formal settings only. Although no significant differences have been observed in the interpretation of the two forms of NCs in WA, the language-specific restrictions created by the presence/absence of the classifier in Turkish and Persian clearly demonstrate that featuring an optional classifier is not in fact an entirely optional aspect of these languages.

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