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2019

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In

A. Gattnar, R. Hörnig, M. Störzer & S. Featherston (Eds.)

*Proceedings of Linguistic Evidence 2018: Experimental Data Drives Linguistic Theory*

Tübingen: University of Tübingen

<https://publikationen.uni-tuebingen.de/xmlui/handle/10900/87132>



# Genericity in Greek: An Experimental Investigation

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## 1 Background and aim

Despite the abundance of semantic literature on genericity (Krifka et al., 1995; Mari et al., 2013), the typological aspect of genericity has rarely been tackled systematically (see though Behrens, 2005; Dahl, 1985; Dayal, 2004). Moreover, there is very little experimental research on the topic in Greek. Different languages employ diverse grammatical devices to express genericity (Chierchia, 1998; Longobardi, 1994, 2001). Among the languages that apply presence or absence of a determiner to express genericity, Romance and Germanic languages present two different patterns. Greek patterns with Romance languages in disallowing bare plurals in preverbal position with a generic interpretation and in using definite plurals to express generic readings (Alexiadou et al., 2007; Giannakidou, 2012; Giannakidou & Stavrou, 1999; Lazaridou-Chatzigoga, 2009; Marmaridou-Protopapa, 1984; Roussou & Tsimpli, 1994), while in Germanic languages such as English bare plurals are the most common way to express a generic meaning.

The present study is part of a research program that aims to fill the gap of systematic cross-linguistic experimental work on the topic by going also beyond Germanic/Romance languages, where the majority of studies have been conducted (Ionin et al., 2011; Leslie et al., 2011; Serfati et al., 2009). A growing cross-linguistic body of work would help determine the language-specific and language-general features of generics. We adopted Ionin et al.'s (2011) acceptability judgment task and extended their experimental approach to Greek.

### 1.1 Noun phrase interpretation in English

In order to illustrate the relevant facts, we will start by discussing noun phrase interpretation in English and then move on to discuss Greek. The sentences in (1a-e) are *episodic* sentences that refer to particular episodes or events. Definite singulars and plurals (1a,d) refer to specific individuals that are contextually salient, for instance, the unique starling/the unique group of starlings that the interlocutors have adopted and take care of in their garden. On the other hand, indefinite singulars and bare plurals (1b,e) are used existentially, that is, they state that there exists a starling that is sleeping (1a) or that there exists a group of starlings that are sleeping (1e). The bare singular (1c) is ungrammatical.

- (1) a. The starling is sleeping.
- b. A starling is sleeping.
- c. \*Starling is sleeping.
- d. The starlings are sleeping.
- e. Starlings are sleeping.

The same forms of NPs do not only occur in episodic sentences, but can also appear in sentences that describe habitual or characteristic events (Krifka et al., 1995). Thus, the generic force of a characterising sentence does not depend on the type of subject NP. Characterising statements can be about specific individuals, for instance, my pet starling that is called Miles, as in (2).

(2a) characterises Miles as a starling, while (2b) reports a regularity which summarises groups of particular episodes of Miles mimicking phone ringtones. (3d) makes a characterising statement about a specific group of starlings, that is, the ones that the speaker is looking at outside the window. Singular NP subjects, as in (3a) and (3b), can be interpreted as statements about starlings in general (although arguably they could also be about a specific starling). The bare plural subject in (3e) has only one interpretation, the one where the speaker refers to starlings in general. Thus, definite singulars (3a), indefinite singulars (3b) and bare plurals (3e) can have generic readings within characterising sentences, whereas definite plurals (3d) cannot. The bare singular (3c) remains ungrammatical.

- (2) a. Miles is a starling.  
b. Miles mimics phone ringtones.
- (3) a. The starling is a bird.  
b. A starling is a bird.  
c. \*Starling is a bird.  
d. The starlings are birds.  
e. Starlings are birds.  
f.  $GEN_{x,s}$  [starling(x) in s] [bird(x) in s]  
g. 'For each appropriate situation s, if x is in s, then x is a bird in s'

As stated above, according to Krifka et al. (1995) the source of the generic force in the sentences above is not the NP itself, but a covert generic operator that is called 'GEN'. Under this quantificational analysis, this operator quantifies over individuals or situations. The exact treatment of 'GEN' is currently under debate, but it seems similar to universal quantification with restrictions based on pragmatic or modal grounds. As illustrated here with English, an indefinite singular can appear in a characterising sentence, as in (3b) above, and the indefinite may be bound by the generic operator. Thus, the sentence is not interpreted as referring to a specific starling, as in (1b), but rather to starlings in general. In one implementation of such an account (Zamparelli, 2002), (3b) has the semantics of (3f) with the paraphrase of (3g). In the generic examples discussed above, the source of genericity is argued to be 'GEN'.

There is also a different source of genericity, that is, NP-level genericity with kind predicates in the sense of Carlson (1977). As Krifka et al. (1995) discuss, the diagnostic test for this source of genericity in the subject position is compatible with a kind predicate such as *be extinct*, *be common*, *be widespread*. This is so, because only kinds can be extinct/common/widespread, whereas individuals or groups of individuals cannot. As illustrated below, in English, kind reference at the NP level is available to bare plurals (4a) and definite singulars (4d), but not to definite plurals (4c) or indefinite singulars (4e). Bare singulars (4b) are ungrammatical.

- (4) a. Dodo birds are extinct.  
b. \*Dodo bird is extinct.  
c. #The dodo birds are extinct.  
d. The dodo bird is extinct.  
e. #A dodo bird is extinct.<sup>1</sup>

The fact that indefinite singulars such as *a starling* or *a dodo bird* can have generic readings, as in (3b), but cannot appear with kind predicates, as in (4e), has been taken as support for the view that the generic reading in (3b) comes from the sentence level rather than from the NP itself. Bare plurals and definite singulars in English on the other hand can denote kinds at the NP-level, as we observe in (4a) and (4d).

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<sup>1</sup> We use the diacritic \* to indicate ungrammaticality and the diacritic # to indicate semantic deviance.

Focusing on definite singulars, we observe that their distribution is restricted (Carlson, 1977; Krifka et al., 1995; Vergnaud & Zubizarreta, 1992). Vergnaud & Zubizarreta (1992) argued on the basis of the following examples that (5) is fine because it denotes a species, whereas (6) cannot have a generic reading according to which the species ‘wounded tiger’ is dangerous because there is no corresponding species (it is fine on the non-generic reading where the speaker refers to a unique and contextually salient tiger that is wounded). This has been described as a restriction on definite singulars to be well-established (Krifka et al., 1995) or well-defined (Ionin et al., 2011) and we will adopt the latter from now on, referring to it as the Well-Defined Kind (WDK) restriction.<sup>2</sup> There is no similar restriction for bare plurals and indefinite singulars, which are fine in the subject position irrespective of the status of the species they are referring to, as seen in (7) and (8).

- (5) The Bengali tiger is dangerous.
- (6) The wounded tiger is dangerous.
- (7) Bengali tigers are dangerous/ A Bengali tiger is dangerous.
- (8) Wounded tigers are dangerous/ A wounded tiger is dangerous.

The same seems to hold not only of natural kinds such as tigers but also of artefacts such as Coke bottles (Krifka et al., 1995). While the definite singular in (9) can receive a kind interpretation, the definite singular in (10) cannot, presumably because it does not denote a WDK. Dayal (2004) and Borik & Espinal (2015) argue, though, that this restriction is pragmatic in nature and can be overridden with the appropriate contextual manipulation or accommodation on behalf of the hearer. Bare plurals and indefinite singulars, as in (11) and (12), are not subject to the same restriction.

- (9) The Coke bottle has a narrow neck.
- (10) The green bottle has a narrow neck.
- (11) Coke bottles have narrow necks / A Coke bottle has a narrow neck.
- (12) Green bottles have narrow necks / A green bottle has a narrow neck.

## 1.2 Genericity in Greek

Greek is similar to Romance languages (e.g., Spanish, Catalan, French, Italian, etc.) in the expression of genericity (Chierchia, 1998; Dayal, 2004; Longobardi, 1994, 2001). In contrast to Germanic languages illustrated by English above, Greek disallows bare plurals with a generic interpretation (in line with the general observation that unmodified bare plurals in preverbal position are ungrammatical in Greek), as seen in (13a). Bare singulars, as in (13b), are also ungrammatical in preverbal position. Greek mainly uses definite plurals to express generic readings. (13c) is potentially ambiguous, as it can be interpreted as a statement about starlings as a kind (the generic reading, similar to the reading of English bare plurals) or as a statement about a specific group of starlings (the non-generic or anaphoric reading, similar to the reading of English definite plurals in the context of canonical definiteness). Definite singular generics, as in (13d), in Greek behave similarly to English, while indefinite singulars, as in (13e) are generally considered not possible. For more discussion see Alexiadou et al. (2007), Giannakidou (2012), Giannakidou & Stavrou (1999), Lazaridou-Chatzigoga (2009), Marmaridou-Protopapa (1984) and Roussou & Tsimpli (1994).

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<sup>2</sup> Krifka et al. (1995: 11) do not give any analysis of the notion of ‘well-established kind’, because they argue that “the distinction is real enough and is quite striking in its effect on example sentences, but we (sic) have no well-formed thoughts as to what the contrast owes its origins”. It seems that a well-established kind is a canonical kind based on the common classificational criteria and the background encyclopaedic knowledge of the interlocutors.

- (13) a. \**Psaronia ine pulja.*  
           starlings are birds
- b. \**Psaroni ine puli.*  
           starling is bird
- c. *Ta psaronia ine pulja.* [√ generic √ anaphoric]  
           the starlings are birds  
           ‘Starlings are birds.’
- d. *To psaroni ine puli.*  
           the starling is bird  
           ‘The starling is a bird.’
- e. \**Ena psaroni ine puli.*  
           a starling is bird

In the context of NP-level genericity with kind predicates such as *be extinct* below, Greek singular NPs behave similarly to English: definite singulars can denote kinds (14d) as we observe with a kind predicate below, whereas indefinite singulars cannot (14e) (but note here that indefinite singulars in sentence-level genericity as above are not good in Greek either). Definite plurals can denote kinds (14c), while both bare plurals and bare singulars are ungrammatical (14a) and (14b).

- (14) a. \**Pulja dodo ehun pleon afanisti.*  
           birds dodo have already disappeared
- b. \**Puli dodo ehi pleon afanisti.*  
           bird dodo has already disappeared
- c. *Ta pulja dodo ehun pleon afanisti.*  
           the birds dodo have already disappeared
- d. *To puli dodo ehi pleon afanisti.*  
           the bird dodo has already disappeared
- e. #*Ena puli dodo ehi pleon afanisti.*  
           a bird dodo has already disappeared

An issue arises with respect to definite singulars in Greek. While for English, there seems to be a consensus that the WDK restriction holds, for Romance (and remember that Greek is similar to Romance languages) the status of the WDK restriction is disputed in the theoretical literature. Vergnaud & Zubizarreta (1992) argue that this restriction holds only for English and is not present in French, while Dayal (2004) argues that the WDK restriction is universal and thus holds for Romance languages too. Ionin et al. (2011) have tested the WDK restriction experimentally and argue that the WDK is universal relying on data from English, Spanish and Brazilian Portuguese.

Related to indefinite singulars, while Alexiadou et al. (2007) argue that they are not possible in sentence-level genericity, Lazaridou-Chatzigoga (2009) has pointed out that when there is more descriptive content present, i.e., some kind of modification or emphatic stress, indefinite singulars become licit.

Finally, it is worth keeping in mind that the definite article is used in Greek to express canonical definiteness too (see Alexiadou et al., 2007; Lazaridou-Chatzigoga, 2009, among others for discussion).

### 1.3 Capturing cross-linguistic semantic variation in the expression of bare nouns / generics

Two main semantic proposals have been presented in order to capture the cross-linguistic variation in the interpretation of bare nominals/generics in the literature. The first one is Chierchia (1998), which has proven highly influential, while the second one is Dayal (2004).

We outline here the assumptions we adopt from the semantic framework of Chierchia (1998) and Dayal (2004), including Partee's (1998) type-shifting semantic operators. The operators that are relevant for the phenomena under discussion here are the iota operator ( $\iota$ ), defined in (15), which is used to form canonical definites and the down operator ( $\overset{\circ}{\cdot}$ ), defined in (16), which is used for kind formation.

(15) iota operator:  $\lambda P \iota x [P_s(x)]$

(16) For any property  $P$  and world/situation  $s$ ,  
 $\overset{\circ}{P} = \lambda s \iota P_s$ , if  $\lambda s \iota P_s$  is in  $K$  (the set of kinds)  
 undefined, otherwise

Iota applies to the denotation of a noun and yields the largest member included in this denotation, if there is one. Iota is defined with respect to a given world or situation. The down operator is an intensional maximality operator that applies to a property of pluralities and yields a kind, that is, the largest member of the extension (in each given world/situation of that property).

Languages like English lexicalise the  $\iota$  operator via the definite article. An integral part of Chierchia's (1998) account is the *Blocking Principle*, according to which, if a language has an overt determiner that lexicalises a certain operation, one is not expected to find a covert application of the same operation, because it is blocked. The Blocking Principle ensures that bare NPs in English lack a definite interpretation.

Chierchia proposed the *Nominal Mapping Parameter* to account for the cross-linguistic variation in determiner use with plural kind terms between English and Italian (and by extension other Romance languages). English allows bare NPs in argument positions, while Romance languages do not. Bare plurals in Romance are actually DPs with a null determiner in the restricted cases they occur as such. The *Nominal Mapping Parameter* has proven very useful, but has also received criticism, because some languages like Brazilian Portuguese do not fit neatly into any of the categories outlined by Chierchia (see for instance Ionin et al., 2011, and Schmitt & Munn, 1999).

(17) Blocking Principle ('Type shifting as last resort'): For any type shifting operation  $\tau$  and any  $X$ :  $*\tau X$ , if there is a determiner  $D$  such that for any set  $X$  in its domain,  $D(X) = \tau(X)$

On the other hand, Dayal (2004) offers an account that can capture cross-linguistic data including English, Spanish and Brazilian Portuguese (as shown in Ionin et al., 2011). For Dayal, the difference between English and Spanish (and by extension other Romance languages) lies in whether the  $\overset{\circ}{\cdot}$  operator applies overtly (via an overt determiner) or covertly (via a bare NP). English does not lexicalise  $\overset{\circ}{\cdot}$ , so definite plurals lack kind readings, while bare plurals have them. On the contrary, Romance languages such as French and Spanish lexicalise both  $\iota$  and  $\overset{\circ}{\cdot}$  and the blocking principle applies to both. As a consequence, definite plurals have both definite and kind readings, while bare plurals lack both readings. It is the iota operator that is central to definiteness, while the down operator is peripheral. As a result, any language with definite article is expected to lexicalise  $\iota$ , whereas the  $\overset{\circ}{\cdot}$  operator may be lexicalised or not and the Blocking Principle has to apply to  $\iota$ , while this is only an option for the  $\overset{\circ}{\cdot}$  operator. According to Dayal, three different options are predicted for the interpretation of plural NPs in languages that have articles: (a) the 'English' option:  $\iota$  is lexicalised, while the  $\overset{\circ}{\cdot}$  operator is not, so that definite plurals have canonical definite readings and bare plurals have kind readings, (b) the 'Romance' option: both  $\iota$  and the  $\overset{\circ}{\cdot}$  operator are lexicalised and the Blocking Principle applies to both. As a consequence, definite plurals have both definite and kind readings, while bare plurals lack both readings, and (c) the 'German' option: both  $\iota$  and the  $\overset{\circ}{\cdot}$  operator are lexicalised, but the

Blocking Principle applies only to  $\iota$ , so that definite plurals have both canonical definite readings and kind readings, but bare plurals are also allowed to have kind readings. This third option captures the Brazilian Portuguese data too.

Even though Chierchia (1998) proposes a theory of how to deal with cross-linguistic variation, when we focus on definite singular generics, he only discusses English and it is not clear how his proposal extends to other languages. He assigns a specific semantics to definite singular generics that differentiates them from non-generic definite singulars. This is obtained via an operation that induces a mass reading on the noun it combines with and not by the iota operator. It is not straightforward how this operation would be extended to cover definite singular generics in languages other than English. Dayal (2004) on the other hand offers a view that goes beyond English and tries to capture the cross-linguistic data. She proposes that definite singular generics cross-linguistically are obtained via the taxonomic interpretation of count nouns and that they are derived via the same operator as non-generic singular definites. That is, the generic reading of a definite singular is derived via the iota operator (as canonical definites do) that additionally combines with a taxonomic NP. Assuming for instance that *tiger* denotes a property of species, *the tiger* on this analysis denotes the unique taxonomic entity that is the species ‘tiger’ (a collection of all subspecies of ‘tiger’). This analysis of definite singular generics is linked to the fact that they are restricted to a WDK and this is seen as a pragmatic consequence of the fact that they denote taxonomic entities.

#### 1.4 Predictions

Ionin et al. (2011) developed an acceptability judgment task in order to test the predictions that arise from the theoretical literature and employed it in three different languages: English, Spanish and Brazilian Portuguese. As mentioned above, Chierchia’s proposal does not capture all of the cross-linguistic facts, for instance, Brazilian Portuguese does not fit neatly into any of his categories. Furthermore, his account of definite singular generics cannot be straightforwardly extended to languages other than English. With respect to Greek, some have argued that Greek follows the Romance pattern (Marinis, 2003; Sioupi, 2002), but others have claimed that it also diverges from it, given that we do find bare nominals in the object position (see Lazaridou-Chatzigoga & Alexandropoulou, 2013, for discussion). Dayal’s proposal seems to offer testable predictions on the issue of definite singular generics. Ionin et al.’s (2011) results provided support for Dayal’s proposal that plural generics cross-linguistically denote kinds and definite singular generics denote taxonomic entities.<sup>3</sup>

In our study we adopted the task that Ionin et al. (2011) developed, and extended the

<sup>3</sup> For reasons of space we cannot elaborate on Ionin et al.’s results, but we provide a summary here (Table 1).

**Table 1.** Mean acceptability ratings for each condition

Context/Nominal	NP-level genericity (WDK)			Sentence-level genericity (no WDK)		
	Eng	Spa	BrP	Eng	Spa	BrP
<b>Definite Singular</b>	3.55	3.77	3.47	2.01	2.52	2.46
<b>Indefinite Singular</b>	1.47	1.70	1.26	3.70	3.58	3.51
<b>Bare Singular</b>	1.32	1.38	2.34	1.33	1.36	3.00
<b>Definite Plural</b>	2.26	3.63	3.88	1.81	3.89	3.70
<b>Bare Plural</b>	3.96	1.61	3.80	3.92	1.70	3.92



experimental investigation of these predictions to Greek, while adding a fourth one.<sup>4</sup> Based on the theoretical background laid out above and the empirical data, we outline here four predictions:

*Prediction 1:* Given that definite singular generics on Dayal's (2004) account are derived by the iota operator, every language that has definite articles (and hence lexicalises  $\iota$ ) is predicted to have definite singular generics. Definiteness marking with both singular kind terms and canonical definites is obligatory.

*Prediction 2:* The WDK restriction on definite singular kind terms is predicted to be universal (on Dayal's account, a pragmatic consequence of their taxonomic reading).

*Prediction 3:* The WDK restriction is not expected with definite plural generics.

*Prediction 4:* Modified indefinite singulars are predicted to be accepted with sentence-level genericity but not with NP-level genericity.

Notice that because we adopted the design and exact materials of Ionin et al. (2011) that included only modified indefinite singulars, we did not test the acceptability of unmodified indefinite singulars in Greek, which are considered not possible, as noted above.

## 2 Experiment

### 2.1 Design

The experiment had a  $2 \times 5$  within-subjects design. There were two factors: *context* had two levels, while *nominal* had five levels. Context investigated two distinct sources of genericity: (a) sentence-level genericity (henceforth the *generic condition*) (b) NP-level genericity with kind predicates like *be extinct* (henceforth the *kind condition*). There were five target sentences that were identical except for the nominal in the subject position (and the agreement on the verb). The five levels of the factor nominal were: (a) bare plural, (b) bare singular, (c) definite plural, (d) definite singular, and (e) indefinite singular, as will be shown below.

### 2.2 Participants

The participants were 40 Greek native speakers (19-60 years old;  $M = 31.7$ ; 26 male, 14 female). All participants were recruited via Prolific Academic, provided informed consent and received payment for their participation.

### 2.3 Materials

The study met the guidelines for ethical research with human participants of Humboldt-Universität zu Berlin. The study was identical to the study used in Ionin et al. (2011) except for the fact that it was in Greek. The Greek stories were translations of the English stories, with minor changes such as names and some rewording in order to make the stories sound more natural in Greek. It consisted of 40 items (20 test items and 20 filler items). Each item consisted of two parts: the first part was a short story and the second part was a continuation of that story by five target sentences, as shown below. (18) exemplifies the generic condition, where we have sentence-level genericity, and (19) exemplifies the kind condition, where we have NP-level genericity. In order to make it easier for the reader, we present the target sentences following each

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<sup>4</sup> Instead of modifying the task that Ionin et al. (2011) developed, based on some methodological issues we identified we opted to adopt it without any modifications in order to yield comparable results in Greek. This involved (a) accepting the fact that the scale used was from 1 to 4, even though it is more common to use scales with an odd number and (b) using a design where each participant saw each item in each condition instead of manipulating the factors within items and within participants. Both issues have been addressed in the bilingual study we designed (see Lazaridou-Chatzigoga & Alexiadou, 2018).

story in the following order: bare plural, bare singular, definite plural, definite singular, indefinite singular. In the actual experiment, the order of the target sentences following each story was randomised.

(18) Sentence-level genericity, with non-well-defined kind:

*O adherfos mu teleftea ehi kaki dhiathesi. Dhen me ekplisi katholu: to dhiamerisma tu ine poli avolo. Prepi na ine poli psihoplakotiko na meni kanis eki. Ke ehi ena poli skotino ke dhisaresto fotistikio. Tu ipa lipon oti prepi na aghorasi mia kenurja lamba. Ki afto, ghiati ksero oti...*

‘My brother has been in a bad mood lately. And no wonder: his apartment is so uncomfortable, it must be very depressing to live there. And he has a very dim and unpleasant overhead light. I told him he should buy a new lamp, something pleasant. For example, I know that...’

- |    |  |                       |
|----|--|-----------------------|
| a. | <i>Prasines lambes ine poli halarotikes.</i>   | [bare plural]         |
|    | green lamps are very relaxing                  |                       |
| b. | <i>Prasini lamba ine poli halarotiki.</i>      | [bare singular]       |
|    | green lamp is very relaxing                    |                       |
| c. | <i>I prasines lambes ine poli halarotikes.</i> | [definite plural]     |
|    | the green lamps are very relaxing              |                       |
| d. | <i>I prasini lamba ine poli halarotiki.</i>    | [definite singular]   |
|    | the green lamp is very relaxing                |                       |
| e. | <i>Mia prasini lamba ine poli halarotiki.</i>  | [indefinite singular] |
|    | a green lamp is very relaxing                  |                       |

(19) NP-level genericity/kind reference:

*Mu aresi poli na pigheno ston zoologhiko kipo. Distihos, iparhun pola zoa pu dhen mpori na ta vri kanis ute eki ute puthena alu. Ine poli stenahoro. Ghia paradhigma...*

‘I really like going to the zoo. Unfortunately, there are many animals that can’t be found in a zoo, or anywhere else. It’s very sad. For example, ...’

- |    |   |                       |
|----|---|-----------------------|
| a. | <i>Pulja dodo ehun pleon afanisti.</i>    | [bare plural]         |
|    | birds dodo have already disappeared       |                       |
| b. | <i>Puli dodo ehi pleon afanisti.</i>      | [bare singular]       |
|    | bird dodo has already disappeared         |                       |
| c. | <i>Ta pulja dodo ehun pleon afanisti.</i> | [definite plural]     |
|    | the birds dodo have already disappeared   |                       |
| d. | <i>To puli dodo ehi pleon afanisti.</i>   | [definite singular]   |
|    | the bird dodo has already disappeared     |                       |
| e. | <i>Ena puli dodo ehi pleon afanisti.</i>  | [indefinite singular] |
|    | a bird dodo has already disappeared       |                       |

There were also two control categories that tested canonical definiteness: (a) anaphoric singular and (b) anaphoric plural. These were included in order to make sure that our participants had a good understanding of how the definite article works in Greek and to confirm that in line with the consensus in the literature (and as predicted partly by Prediction 1 above) Greek native speakers consider definiteness marking to be obligatory both with singular and plural nominals in the context of canonical definiteness.

Examples of the control categories are given below in (20) for the anaphoric singular category and in (21) for the anaphoric plural category. Each item consisted of a short story that mentioned two nominals, one in the singular and the other one in the plural. The control categories followed the same structure as the test categories. Each story was followed by five target

sentences, all of which included second mention of the original singular NP (in the anaphoric singular context) or the original plural NP (in the anaphoric plural context), while the others were variants with nominals in the opposite number with or without the definite article. Both the singular and plural anaphoric contexts always discussed unusual properties of the relevant individual(s), such as a dog that climbs trees or two trains that swim. This was done in order to make sure that the possible kind-reading of the subject NP would be unavailable, i.e., that the generic interpretation would be blocked. For example, if (20) discussed a dog that barked instead of tree climbing, then the bare plural sentence variant, ‘Dogs bark’, would have been acceptable with the generic interpretation. This is not possible when tree-climbing dogs are discussed, so the bare plural variant is not acceptable.

## (20) Anaphoric singular context:

*O Dhimitris ehi tria katikidhia: enan skilo ke dhio pulja. Ta katikidhia tu Dhimitri ehun poli perierghes sinithies. Ghia paradhigma...*

‘Dimitris has three pets: one dog and two birds. Dimitris’s pets have very unusual habits. For instance, ...’

- |    |                 |                   |                   |                 |                     |                       |
|----|-----------------|-------------------|-------------------|-----------------|---------------------|-----------------------|
| a. | <i>Skili</i>    | <i>skarfonun</i>  | <i>se</i>         | <i>dhentra.</i> | [bare plural]       |                       |
|    | dogs            | climb             | on                | trees           |                     |                       |
| b. | <i>Skilos</i>   | <i>skarfoloni</i> | <i>se</i>         | <i>dhentra.</i> | [bare singular]     |                       |
|    | dog             | climbs            | on                | trees           |                     |                       |
| c. | <i>I skili</i>  | <i>skarfonun</i>  | <i>se</i>         | <i>dhentra.</i> | [definite plural]   |                       |
|    | the dogs        | climb             | on                | trees           |                     |                       |
| d. | <i>O skilos</i> | <i>skarfoloni</i> | <i>se</i>         | <i>dhentra.</i> | [definite singular] |                       |
|    | the dog         | climbs            | on                | trees           |                     |                       |
| e. | <i>Enas</i>     | <i>skilos</i>     | <i>skarfoloni</i> | <i>se</i>       | <i>dhentra.</i>     | [indefinite singular] |
|    | a               | dog               | climbs            | on              | trees               |                       |

## (21) Anaphoric plural context:

*O tetrahronos ghios mu ehi mia tenia kinumenon shedhion, stin opia ksehorizun dhio trena ki ena aeroplane. O ghios mu tin vriski poli astia, afu dhen miazun me praghmatica. Ghia paradhigma, ...*

‘My four-year-old son has a cartoon about two trains and one airplane. My son thinks that this cartoon is very funny: it’s not like real life at all. For instance, ...’

- |    |                 |                  |                 |            |               |                     |                       |
|----|-----------------|------------------|-----------------|------------|---------------|---------------------|-----------------------|
| a. | <i>Trena</i>    | <i>kolimpane</i> | <i>se</i>       | <i>mia</i> | <i>limni.</i> | [bare plural]       |                       |
|    | trains          | swim             | in              | a          | lake          |                     |                       |
| b. | <i>Treno</i>    | <i>kolimpai</i>  | <i>se</i>       | <i>mia</i> | <i>limni.</i> | [bare singular]     |                       |
|    | train           | swims            | in              | a          | lake          |                     |                       |
| c. | <i>Ta trena</i> | <i>kolimpane</i> | <i>se</i>       | <i>mia</i> | <i>limni.</i> | [definite plural]   |                       |
|    | the trains      | swim             | in              | a          | lake          |                     |                       |
| d. | <i>To treno</i> | <i>kolimpai</i>  | <i>se</i>       | <i>mia</i> | <i>limni.</i> | [definite singular] |                       |
|    | the train       | swims            | in              | a          | lake          |                     |                       |
| e. | <i>Ena</i>      | <i>treno</i>     | <i>kolimpai</i> | <i>se</i>  | <i>mia</i>    | <i>limni.</i>       | [indefinite singular] |
|    | a               | train            | swims           | in         | a             | lake                |                       |

Finally, a fifth test category tested mass nouns in generic contexts and we do not discuss it here since it falls outside the scope of this paper. The filler items tested tense and aspectual interpretation in different contexts. The order of the test, the control and the filler items and the five target sentences of each item were randomised.

## 2.4 Procedure

The study was presented in the online platform Qualtrics. The task for the participants was to rate each sentence for its (un)acceptability in the context of the story, on a scale from 1 ('unacceptable') to 4 ('acceptable') indicated by numbers on the computer screen. Instructions prior to the experiment made it clear to the participants that the task was not to rank the sentences and that two or more sentences could potentially receive the same rating. There was no time limit.

## 2.5 Predictions

### 2.5.1 Test categories: Two sources of genericity

As discussed above, there are two sources of genericity. In this experiment, the category of sentence-level genericity involved a nominal denoting a non-well-defined kind (e.g., *a green lamp*), as exemplified in (18), and the category of NP-level genericity involved a nominal denoting a well-defined kind (e.g., *a dodo bird*) followed by a kind predicate (e.g., *be extinct*), as exemplified in (19).

Based on Prediction 1, we expect definite singular nominals to be rated high in the context of NP-level genericity, as in (19d). We also expect definiteness marking to be obligatory for singular kind terms, so that bare singulars are rated low in the context of NP-level genericity, as in (19b). Based on Prediction 2, we expect the WDK restriction to be attested for definite singular generics: definite singulars are expected to be rated low in the context of sentence-level genericity, where the kind is not well-defined, as in (18d). Based on Prediction 3, we expect lack of a WDK restriction on definite plural generics, that is, we expect definite plural generics in sentence-level genericity to be rated high (even) when the kind is not well-defined, as in (18c). Based on Prediction 4, we expect that modified indefinite singulars will be rated high with sentence-level genericity, as in (18e), but not with NP-level genericity, as in (19e).

### 2.5.2 Control categories

In the context of canonical definiteness, in the anaphoric singular category, we expect the definite singular, as in (20), to be rated high and all other nominals to be rated low. In the context of canonical definiteness, in the anaphoric plural category, we expect that the definite plural, as in (21), should be rated high and all other nominals should be rated low with the possible caveat about the possibility of interpreting the indefinite singular as a partitive, e.g., in the context of (21) where two trains are mentioned, it is acceptable to interpret *ena treno* 'a train' to refer to one of the two trains. Bare singulars and plurals in both contexts are expected to be rated low, as they are considered ungrammatical in Greek.

## 2.6 Results and discussion

### 2.6.1 Results

We provide first Table 2 with the mean acceptability ratings in each condition in order to give an overall picture, even though we will not be discussing all of them in detail. The analyses were performed on subsets of the data. We will first discuss the control categories (anaphoric singular and plural) briefly and then the test categories (generic and kind) at length.

The control conditions confirmed the predictions. As we can see in Table 2, in a scale from 1 to 4, in the anaphoric singular condition, the definite singular was rated higher (3.58) than each of the four other nominals, which were all below 2.1. In the anaphoric plural condition, the definite plural was rated higher (3.73) than each of the four other nominals, which were all below 2.5, except for the indefinite singular, which was at 3.08 (possibly due to a partitive interpretation).

**Table 2.** Mean acceptability ratings for each condition

Context/Nominal	Anaphoric Singular	Anaphoric Plural	Generic condition	Kind condition	Mass
<b>Definite Singular</b>	3.58	2.45	3.29	3.69	3.99
<b>Indefinite Singular</b>	2.06	3.08	3.60	1.54	1.71
<b>Bare Singular</b>	1.33	1.15	1.44	1.32	1.38
<b>Definite Plural</b>	2.03	3.73	3.84	3.89	2.05
<b>Bare Plural</b>	1.31	1.51	1.49	1.62	1.21

Moving to the test categories, we used R (R Core Team, 2016) and the ordinal package (Christensen, 2018) to perform a cumulative link mixed model analysis of the relationship between nominal and context.<sup>5</sup> First, we fitted a full model with nominal and context as fixed effects (with an interaction term) and with random intercepts for subjects and items (see Table 3 for details). We then performed a likelihood ratio test of the full model with an interaction term against a model without the interaction term and the comparison did not prove significant ( $p = .943$ ). Including an interaction term did not improve model fit, so we used the model without the interaction term for all subsequent analyses/comparisons.

The factors were contrast coded in order to obtain main effects. To test the main effect of nominal we looked at the first coefficient for nominal, which was highly significant. Thus, we concluded that there was a main effect of nominal ( $p < .001$ ). To test the main effect of context we looked at the coefficient for context, which was not significantly different. Thus, we concluded that there was no main effect of context ( $p = .1112$ ).

**Table 3.** Estimates, standard errors,  $z$  values and  $p$  values of the full cumulative link mixed model

Intercept	Estimate	Std. Error	$z$ value	Pr(> z )
<b>(definite plural, generic)</b>				
<b>Bare plural</b>	10.1840	1.1337	8.983	<2e-16
<b>Bare singular</b>	-6.8708	0.6439	-10.671	<2e-16
<b>Definite singular</b>	-8.1408	0.6629	-12.296	<2e-16
<b>Indefinite singular</b>	4.9534	0.6260	7.913	2.51e-15
<b>Kind</b>	0.5974	0.3751	1.593	0.1112
<b>Bare plural:kind</b>	-3.6190	2.1461	-1.686	0.0917
<b>Bare singular:kind</b>	-2.0309	1.0236	-1.984	0.0472
<b>Definite singular:kind</b>	-0.1219	1.0099	-0.121	0.9039
<b>Indefinite singular:kind</b>	-4.9287	1.0456	-4.714	2.43e-06

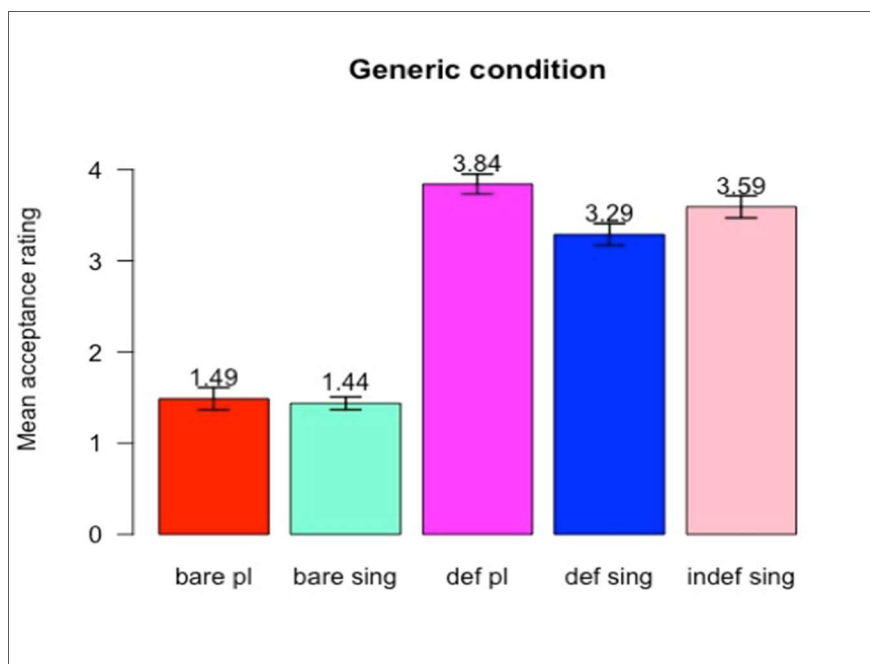
In the test conditions, the results largely confirmed the predictions (see Table 4 for the predicted ratings and the obtained result). Definite plurals were rated equally high in both the generic

<sup>5</sup> Our data are ordinal and thus we analyse them accordingly with a cumulative link mixed model for ordinal data. For descriptive statistics however, we treat our data as interval data and present means instead of median values. This apparent discrepancy in data treatment can be couched in Endresen & Janda's (2016) discussion of different statistical models for Likert-scale experimental data.

(3.84) and the kind condition (3.89) without a significant difference ( $p = .1112$ ). Then, we fitted versions of the cumulative link mixed model to obtain the relevant comparisons by releveling the levels of the factor nominal. Definite singulars were rated significantly higher ( $p < .05$ ) in the kind condition (3.69) than in the generic condition (3.29), whereas the reverse was the case for indefinite singulars, which were rated significantly higher ( $p < .05$ ) in the generic condition (3.60) than in the kind condition (1.54). Bare singulars were rated equally low across both conditions (1.44 in the generic; 1.32 in the kind condition). Bare plurals showed a similar pattern (1.49 in the generic; 1.62 in the kind condition).

**Table 4.** Predictions and mean acceptability ratings for each condition

<b>Generic condition</b> (Sentence-level genericity, no WDK)	<i>prediction</i>	<i>result</i>
<b>Bare plural</b>	low	1.49
<b>Bare singular</b>	low	1.44
<b>Definite plural</b>	high (Prediction 3)	3.84
<b>Definite singular</b>	low (Prediction 2)	3.29
<b>Indefinite singular (modified)</b>	high (Prediction 4)	3.60
<b>Kind condition</b> (NP-level genericity, with WDK)	<i>prediction</i>	<i>result</i>
<b>Bare plural</b>	low	1.62
<b>Bare singular</b>	low	1.32
<b>Definite plural</b>	high	3.89
<b>Definite singular</b>	high (Prediction 1)	3.69
<b>Indefinite singular (modified)</b>	low	1.54



**Figure 1.** Results in the generic condition. Error bars represent (two times) the standard error

Within the generic condition (see Figure 1), definite plurals and indefinite singulars were rated both high and significantly above all other conditions ( $p < .05$  for all comparisons) and definite singulars were rated significantly lower than both definite plurals ( $p < .05$ ) and indefinite singulars ( $p < .05$ ). Within the kind condition (see Figure 2), definite plurals and definite singulars were rated equally high and significantly higher than any other condition ( $p < .05$  for all comparisons) and indefinite singulars were rated low.

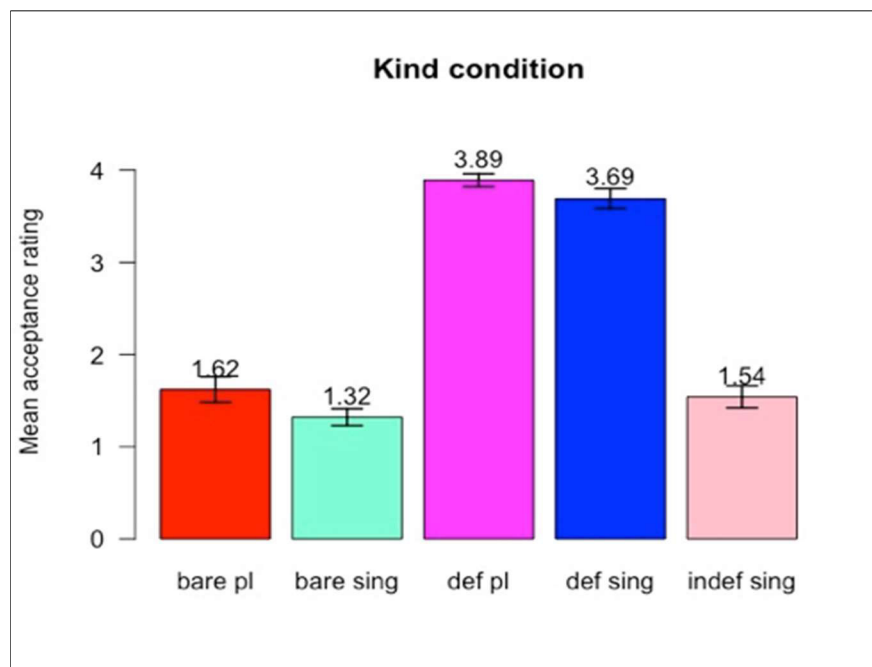


Figure 2. Results in the kind condition. Error bars represent (two times) the standard error

## 2.6.2 Discussion

Revisiting the four predictions we laid out above, repeated here for convenience, we find that they were largely confirmed.

*Prediction 1:* Given that definite singular generics on Dayal's (2004) account are derived by the iota operator, every language that has definite articles (and hence lexicalises  $\iota$ ) is predicted to have definite singular generics. Definiteness marking with both singular kind terms and canonical definites is obligatory.

*Prediction 2:* The WDK restriction on definite singular kind terms is predicted to be universal (on Dayal's account, a pragmatic consequence of their taxonomic reading).

*Prediction 3:* The WDK restriction is not expected with definite plural generics.

*Prediction 4:* Modified indefinite singulars are predicted to be accepted with sentence-level genericity but not with NP-level genericity.

In line with Prediction 1, we found that definiteness marking with singular kind terms is obligatory. In the context of NP-level genericity Greek native speakers rated definite singulars high (3.29) and bare singulars low (1.44). Canonical singular definites also receive an obligatory definiteness marking (3.6). As started above, in Dayal's account,  $\iota$  is central to definiteness and any language that has definite articles and, in that sense lexicalises  $\iota$ , is predicted to use them obligatorily. Furthermore, given that singular definite generics are derived by the same operation as canonical definites (that is, the *iota* operator), the obligatory definite marking we find in both cases in Greek is accounted for.

Concerning Prediction 2, the results are not clear and should be explored further in future

research. Even though definite singulars were rated significantly higher in the kind condition than in the generic condition ( $p < .05$ ), definite singulars were rated higher than expected in the generic condition, where there was no WDK. The rating in Greek was 3.29, which is high compared to the 2.01 for English, 2.52 for Spanish, 2.46 for Brazilian Portuguese in the Ionin et al. (2011) data. These results question the universality of the WDK restriction on definite singular kind terms and are in line more with Vergnaud & Zubizarreta (1992) than with Dayal (2004). The differences across languages might be attributed to the different status determiners have in each language, an issue that merits further investigation.

Prediction 3 was largely confirmed: definite plural generics in Greek were largely unaffected by the WDK restriction, as predicted. The ratings were very similar between conditions (3.84 in the generic condition; 3.89 in the kind condition) and their difference was not statistically significant ( $p = .1112$ ). In Dayal's account, it is only definite singular generics that are derived via the iota operator applied on a taxonomic NP.

Prediction 4 was largely confirmed: modified indefinite singulars were rated significantly higher in the generic than in the kind condition ( $p < .05$ ). It still remains to be seen though if unmodified indefinite singulars would behave similarly. According to our intuition unmodified indefinite singulars in the generic condition would be less acceptable than their English/Spanish/Brazilian Portuguese counterparts, which were all above 3.5.

### 3 Conclusions and future steps

The experiment served to highlight the importance of extending experimental work beyond Germanic/Romance languages. Our predictions were largely confirmed except for the one concerning the universality of the WDK restriction on definite singulars. This has to be addressed in further detail in future work in order to understand whether this restriction is specific to English or whether it concerns other/all languages too.

This experiment is the first step in a broader project that investigates generics experimentally in mono- and bilingual Greek speakers. In the bilingual study we tried to make the task less metalinguistic and follow a more reliable design by manipulating the factors both within items and within participants (see Lazaridou-Chatzigoga & Alexiadou, 2018). The aim of the bilingual study is to address whether there would be any cross-linguistic transfer/attrition effects in L1-Greek L2-English speakers. Given the different distribution that nominals have in English and Greek, we might find that L1-Greek L2-English speakers who have been exposed to English over a protracted period of time will begin to accept nominals that are ungrammatical for monolinguals (such as bare plural generics).

### Acknowledgments

We would like to thank Tania Ionin for sharing her materials and for insightful discussions on the topic. Many thanks to our reviewers and the editors of this volume for their comments. This study was supported by the DFG award AL 554/8-1 to Artemis Alexiadou.

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