Development of transitivity in a language without/with object clitics: English vs. Greek (A diachronic contrastive study)

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Abstract
In this historical study, I test the hypothesis of a relationship between the changes in the null definite objects and the development of the D-system and clitics. In Lavidas (2013), I have shown that the grammaticalization of the viewpoint aspect in English has progressed in parallel with activity/event-noun cognate objects, but it does not appear to have affected the development and loss of null object constructions in English. The diachronic examination of null objects in the present study searches for the absence/presence of a link between the emergence of new types of personal pronouns in the history of a language without clitics, English, and in the history of a language with clitics, Greek. The paper offers new data from the historical corpora of English and Greek, and analyzes both the grammaticalization of the D-system in English and Greek and its link to the loss of null definite objects in both languages. The loss of the definite null objects in English follows the changes in the D-system but does not directly follow the development of the personal pronouns. The relationship between the development of personal pronouns in the object position, the changes in the D-system, and the loss of definite null objects is evident for Greek.

Keywords: null objects, D-system, language change, English, Greek

1. Introduction
Cross-linguistically, transitive verbs can appear with an empty/null object, whereas intransitive verbs can accept objects (see examples in 1a and 1b–d). Hence, it appears that transitivity cannot be described as a lexical characteristic; transitives can omit their object and intransitives can accept an object. For instance, unergatives can accept cognate objects, measure DPs, or even regular DPs (Massam 1990). According to the traditional approach, a transitive verb subcategorizes for and selects a direct object. The traditional approach to objects is different from the approach followed for subjects where the subject

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position (EPP feature) is always present in the structure and dissociated from the selection of the subject and the interpretation of its role (Pirvulescu & Roberge 2005). An optimum solution to this problem would be to assume a single transitive lexical entry for all verbs and to derive intransitive uses through a theoretical approach to null objects (Cummins & Roberge 2004, 2008). In this way, transitivity is a (universal) syntactic characteristic (not an idiosyncratic characteristic) (Cummins & Roberge 2004, 2008; Lambrecht & Lemoine 1996; Larjavaara 2000). According to this idea, and similarly to Borer (2004),\(^1\) the projection of arguments does not depend on the characteristics of the lexical items.

(1) a. There are those who annihilate Ø...with violence - who devour Ø. (Cummins & Roberge 2004)
   b. She slept a restless sleep.
   c. She ran a good race.
   d. She ran a mile.

If transitivity is a (universal) syntactic characteristic, null objects are significant for any theoretical approach. Null objects can have (i) a generic interpretation or (ii) a definite/specific anaphoric function (see examples in 2). Cummins & Roberge (2004) have related the relevant examples of null objects to a distinction between two types of null objects: pro (following Sportiche 1992, 1998, for clitics; see also examples in [5]) and null N type.

(2) i. During my sabbatical I mainly intend to read Ø.
    
    ii. A: Do you want this book?
        B: *Oh! I’ve already read Ø. (Cummins & Roberge 2004, 2008)

<table>
<thead>
<tr>
<th>Example (2ii B) is</th>
<th>(\rightarrow) ungrammatical in Modern English</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\rightarrow) grammatical in Old English</td>
</tr>
<tr>
<td></td>
<td>(\rightarrow) grammatical in Modern French: a language with object clitics</td>
</tr>
<tr>
<td></td>
<td>(\rightarrow) ungrammatical in Modern Greek: although Modern Greek is again a language with object clitics</td>
</tr>
<tr>
<td></td>
<td>(\rightarrow) grammatical in Ancient Greek</td>
</tr>
</tbody>
</table>

\(\text{Table 1. Availability of definite null objects cross-linguistically and diachronically}\)

\(^1\) See also Hale & Keyser (2002); according to them, denominal unergatives are transitive VPs.
Modern English and Modern Greek allow the null N type of objects. On the other hand, examples in (3b) and (4b) need reference to an antecedent; they need the use of a pronoun in Modern English and Modern Greek (see 5a and 5b). Old English\(^2\), Ancient Greek\(^3\), as well as Modern French (and Modern Slavic languages, Portuguese, Chinese, among other languages; see below) allow the null \textit{pro} type of null objects, too (Pérez-Leroux, Pirvu\v{c}escu & Roberge 2006, 2008, 2011; Authier 1992).

(3) Modern English
   a. \textit{-We have to get rid of all the ugly dishes before your date arrives.}
      \textit{-Okay, you wash N and I’ll dry N.} (Goldberg 2001: 515)
   b. \textit{-What did you do with the dirty dishes?}
      \textit{*She washed pro\(_i\) and I dried pro\(_i\).}

(4) Modern Greek
   a. \textit{-Prepi na ksefortothume ta aplita piata prin erthi i fili su.}
      \textit{-Egine. Esi plenis N ke egho skupizo N.}
   b. \textit{-Ti ekanes ta aplita?}
      \textit{* (Ta) eplina pro\(_i\) ke *(ta) pro\(_i\) skupisa.}

(5) a. \textit{She washed them and I dried them.}
   
   b. \textit{Ta katharise, ta eplina.}

Modern English and Modern Greek -in contrast to Old English and Ancient Greek (and Modern French; see section 2 for a more analytical presentation of characteristics but also differences between languages that allow null objects) do not show an empty pronoun category. From the above discussion, one can conclude that the default universal transitivity property includes the availability of (the type of) null bare N as an object: V systematically merges with an object, but this object can be a bare N and lack lexical features (only being a semantic hyponym of V). Table 2 presents Cummins & Roberge’s (2004) analysis of the two basic types of null objects. A rich number of studies have shown that children demonstrate a stage of acquisition when objects are optional (and many null objects appear in the children data) (Jakubowicz et al. 1997; Wexler, Gavarró & Torrens 2004, among others). It seems that children start with a broad syntax, which

\(^2\) See, for instance, Visser (1963: 525) for object drop in Old English.

can contain all types of null objects, and develop to a grammar that can only have generic null Ns in the case of languages such as Modern English or Modern Greek.

<table>
<thead>
<tr>
<th>Reference</th>
<th>referential</th>
<th>non-referential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedent</td>
<td>reference to antecedent</td>
<td>no reference to antecedent</td>
</tr>
<tr>
<td>Contextual recovery</td>
<td>recovered by clitic</td>
<td>clitic-drop (&quot;delinked&quot;)</td>
</tr>
<tr>
<td></td>
<td>deictic</td>
<td>contextual clues present</td>
</tr>
<tr>
<td></td>
<td>contextual clues absent</td>
<td></td>
</tr>
<tr>
<td>Syntax</td>
<td>pro</td>
<td>N</td>
</tr>
<tr>
<td>Semantics</td>
<td>(\phi) features of clitic</td>
<td>via antecedent</td>
</tr>
<tr>
<td></td>
<td>via deixis</td>
<td>lexical semantics of V (i.e. Null Cognate Object)</td>
</tr>
<tr>
<td>Pragmatics</td>
<td>I-principle on linguistic context</td>
<td>I-principle on extralinguistic context</td>
</tr>
<tr>
<td></td>
<td>I-principle (less stereotype, more context)</td>
<td>I-principle (more stereotype, less context)</td>
</tr>
</tbody>
</table>

*Table 2. Types and characteristics of null objects (Cummins & Roberge 2004)*

The aim of this historical study is to test the hypothesis of a relationship between null definite objects and D-system and clitics (see above examples that are recovered with the use of a clitic: *She washed them and I dried them; Ta katharise, ta eplina*). In Lavidas (2013), I have shown that the grammaticalization of the viewpoint aspect in English has progressed in parallel with the activity/event-noun cognate objects, but it does not appear to have affected the development and loss of null object constructions in English.\(^4\) The diachronic examination of null objects in the present study will search for the absence/presence of a link between the emergence of a new type of personal pronouns in the history of a language without clitics (and actually without clitics in any of its stages),

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\(^4\) Due to space restriction, I will have to avoid any detail on other hypotheses about the development of null objects; I refer to Lavidas (2013) where other possible hypotheses are examined and the relation between the development of aspect and the development of null objects is not confirmed in contrast to the relation between the development of aspect and the development of cognate objects.
English, and in a language with clitics from an early point in its history, Greek. The paper offers new data on the comparison between the development of pronouns (= D elements; see below), articles (= D elements too; see below) from historical corpora of English and Greek, and further remarks on their comparative analysis. Section 2 discusses the hypothesis of the present study—the connection between the development of null objects and the changes in the D-system. In Section 3, the results of a corpus study are presented and discussed. Section 3.1 shows that the grammaticalization of the D-system in English is a later phenomenon and that the loss of null objects follows the development of the D-system, but not the changes in the frequency of the use of personal pronouns (this fact can be related to the absence of clitics in English). On the other hand, the relation between the development of the personal pronouns in the object position (and the clitics) and the changes in the D-system is evident for Greek (Section 3.2). Section 4 summarizes the main conclusion of this study.

2. D-system and null objects: A hypothesis for the diachrony of null objects

The hypothesis of this study is that, contrary to cognate objects and their development (Lavidas 2013), the absence of null objects is a phenomenon related to their formal status as D-elements (Tsimpli 1999, 2003, 2004; Kowaluk 2001). Hence, the development of the English and Greek D-system should reflect the development of null objects. This argument is based on cross-linguistic observations: Slavic languages or Turkish, for instance, do not have definite determiners (Kornfilt 1997; Franks & Holloway King 2000) and allow null objects (Turkish, Russian, and Polish allow null objects with a specific reference) (Kowaluk 2001). For Kowaluk, the object drop in Slavic languages is allowed because of the absence of a D-system that poses spell-out constraints on formal features (see Franks & Holloway King [2000], for a similar suggestion). As shown in Kowaluk, languages without object agreement (such as Slavic languages—and we can add Old English or Ancient Greek, too) need a different approach to analysis than the one used for Chinese or Japanese (according to Huang [1984]: “discourse-oriented” languages, such as Chinese or Japanese, allow object drop). Furthermore, in Slavic

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languages, in contrast to discourse-oriented languages, object drop is available within island constructions, too (and this also holds true for Old English again). Modern Polish, Modern Russian, and Modern Turkish allow null objects, do not show object agreement, and lack articles; that is, they lack a grammaticalization of the [+/-Def] features on D. This, of course, is related to the status of pronouns in these languages, too. According to Kowaluk (following Tsimpli & Stavrakaki [1999]), it is logical to assume that languages that lack [D] should have pronouns represented not as (functional) DPs, but as (lexical) NPs.

Hence, the distinction and the hypothesis for a diachronic development, according to Kowaluk’s (and Tsimpli & Stavrakaki’s) approach would be between languages that:

(a) have clitics that are D elements and strong pronouns that are N elements; these languages do not allow null definite/referential objects; and
(b) do not have D elements (lack articles), but may have full personal pronouns and clitics of N-type (according to Kowaluk’s analysis for Modern Polish); these languages allow null definite/referential pronouns.

Note that pre-Modern Greek clitics are similar to Modern Polish clitics in a clear aspect—the optionality of positions where they appear (see the discussion below of the development of clitics in Greek). Hence, one can hypothesize that neither Modern Polish

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6 See examples in Denison (1993: 189):

(1) a. *het hiene tha niman & thaeron bescufan*
   ordered him then take and therein cast
   ‘He ordered him then to be taken and case inside’ (Or. 34.13)
   b. *ic Beda Cristes theaw... sende gretan thone*
   I Bede Christ’s servant send greet the
   *leofastan cyning & halettan Ceowulf*
   most-beloved king and honor Ceowulf
   ‘I, Bede, Christ’s servant, send people to greet and honor the most beloved King Ceowulf’. (Bede 417.7)

7 Modern Polish NPs for Kowaluk are as follows in (1). A hypothesis can be that NPs in Old English and Ancient Greek are also of the same type. See below for a discussion of Old English and Homeric and Classical Greek NPs. Modern Polish NPs have deictic and referential characteristics; they do not distinguish between definite and indefinite but between animate and inanimate.

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nor pre-Modern Greek pronouns are “severely deficient clitics” as they are in Modern Standard Greek. We follow Kowaluk and claim that these (clitic) pronominals of Modern Polish (and pre-Modern Greek) are N-type elements that do not need to attach to a (verbal) functional head. The empty objects in these cases (Modern Polish and pre-Modern Greek) are empty pronominals too.

<table>
<thead>
<tr>
<th>Modern Polish</th>
<th>No D-system⁸</th>
<th>N-type pronouns</th>
<th>empty pronominal objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern Greek</td>
<td>D-system</td>
<td>severely deficient clitics</td>
<td>*empty pronominal objects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(grammatical clitics, attached to the verbal functional head)</td>
<td></td>
</tr>
<tr>
<td>Modern English</td>
<td>D-system</td>
<td>No clitics</td>
<td>*empty pronominal objects⁹</td>
</tr>
</tbody>
</table>

*Table 3. D-system, clitics, and null objects cross-linguistically and diachronically: Distribution and hypotheses*

Following the above remarks, our hypothesis is that null objects in Old English and Ancient Greek and their loss could be accounted for in a similar way, in terms of emergence of a new D-system. In contrast to Slavic languages or Turkish, Modern Greek has a D-system with definite and indefinite determiners (their inflection expresses case and phi-features).¹⁰ Tsimpli (2003) has shown that Modern Greek, for instance, has clitics and determiners that share all other formal features, except for person.

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⁸ “No D-system” or “D-system” here means absence or presence of a D-system that poses spell-out constraints on formal features.

⁹ And the hypothesis would add the following:

<table>
<thead>
<tr>
<th>Pre-Modern Greek</th>
<th>No D-system</th>
<th>N-type pronouns</th>
<th>empty pronominal objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Modern English</td>
<td>No D-system</td>
<td>N-type pronouns</td>
<td>empty pronominal objects</td>
</tr>
</tbody>
</table>

¹⁰ Note that D-system and pronoun are interrelated: in either way of analysis of the pronouns (analysis of movement or base-generated pronouns), the pronouns are in D:

(i)  

```
   DP   
  / \  
 D   NP
  `--`
    she

(ii)  

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Furthermore, there can be no co-existence of articles and pronouns:

(1) *o ego; *the I  
(2) *i esi; *the you
### Table 4. Articles and clitics in Modern Greek, from Tsimpli (2003)

<table>
<thead>
<tr>
<th></th>
<th>Article</th>
<th>Clitic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subject</td>
<td>Object</td>
</tr>
<tr>
<td>Singular</td>
<td>o (masc.), i (femin.), to (neuter)</td>
<td>ton, tin, to</td>
</tr>
<tr>
<td>Plural</td>
<td>i, i, ta</td>
<td>tus, tis, ta</td>
</tr>
</tbody>
</table>

In Modern English, the lack of marking of case and phi-features has probably blocked the emergence of clitics that would be associated with definite articles.

### Modern English: 
- definite determiners with no marking of case, gender, or number
  - (definite article: *the*)
  - no clitics
### Modern Greek: 
- definite determiners with marking of case, gender, number
- clitics

### Table 5. Articles and clitics: Modern English vs. Modern Greek

According to Tsimpli & Stavrakaki (1999), definite articles and object clitics in Modern Greek are both associated to referentiality that derives from a feature-matching relation between the Def(initeness) head (for the Modern Greek articles) and an antecedent (for the Modern Greek object clitics):

(6) \[\text{DefP...} \ [\text{DP}_{\text{case}}][\text{phi-}...][\text{NP...}]]\] (from Tsimpli 2003)

On the other hand, indefinite articles and demonstratives in Modern Greek are inherently specified with the feature of referentiality, and they appear on Def. head (Tsimpli 2003). Modern Greek indefinite articles (and demonstratives) consist of interpretable features. Furthermore, there is a contrast between personal pronouns of 1st and 2nd person that have phi-features (interpretable person feature) and 3rd person...
personal pronouns that have uninterpretable features (and can vary cross-linguistically and diachronically) (Cardinaletti & Starke 1999; Tsimpli & Stavrakaki 1999; van Gelderen 2011, among others).

Accordingly, in our corpus study below, we will distinguish between definite and indefinite articles as well as between 3rd and 1st/2nd person object pronouns (and clitics for Greek). Note that with regard to language change, interpretable features tend to change into uninterpretable—except for the case of replacement of an element (where we can have the emergence of a new element with interpretable features) (see van Gelderen 2000, 2011). For English, the changes in the D-system have been analyzed as a reanalysis of interpretable features into uninterpretable in the case of determiners (change of demonstratives into determiners). With regard to pronouns, the Old English pronouns are replaced by a new system of pronouns (through contact with Scandinavian languages) (van Gelderen 2000, 2011). (See below for details).

To summarize, pronouns, and mainly clitics, and definite articles are associated with uninterpretable formal features (case and phi-features). With regard to object clitics, modern languages with null objects that lack a D-system (that poses spell-out constraints on formal features), such as Slavic languages or Turkish, lack pronominal clitics, too. This can hold for Old English (see the discussion and the relevant bibliography below); it may hold for Ancient Greek (see the discussion below), but it also shows that a “new” D-system, of course, does not mean the same new D-system for English and Greek. English developed a new D-system without clitics and Greek a new D-system with clitics. Both languages lost the null definite objects after the emergence of the new D-system.

3. A corpus study: Development of articles and personal pronouns (in the object position) in English and Greek

I conducted a corpus search of all texts in the York-Toronto-HelsinkiParsed Corpus of Old English Prose (YCOE), the Penn-Helsinki Parsed Corpus of Middle English (PPCME2), and the Penn-Helsinki Parsed Corpus of Early Modern English (PPCEME) (Kroch & Taylor 2000; Taylor et al. 2003; Kroch, Santorini & Delfs 2004; Kroch, Santorini & Diertani 2010) to test the major hypothesis presented above in this paper. Furthermore, to compare the results from the English data, a language without clitics, to
the Greek data, a language with clitics, I conducted a corpus search in the PROIEL annotated corpus and in the material found in the Perseus under Philologic (Homer, Herodotus, New Testament). The purpose of the corpus searches was to count:

(i) personal pronouns (and clitics for Greek) in object position;
(ii) the contrast between 3rd vs. 1st and 2nd person personal pronouns;
(iii) definite vs. indefinite articles were examined since the hypothesis will be that change in D-system affects the presence of null objects; and
(iv) full NPs/DPs in object position.

3.1 The English data

In Lavidas (2013), I have presented the stages of development of null objects. Since there is no coding for null objects (in contrast to null subjects) in the corpora, I have decided to count the presence/absence of overt direct objects in the relevant corpora. A Pearson chi-square test was performed to assess the relationship between the periods and the development of overt direct objects. The results were statistically significant for the comparison between O4 and M1 ($\chi^2=35.46$, $p<.001$), with an effect size of $\phi=.42$, which is a large size effect. The corpora (see Figure 1) confirm Visser’s (1963) remarks regarding the increase in the presence of overt direct objects during the Middle and Early Modern English periods, but the primary change in overt direct objects can be observed at the beginning of the Middle English period (Lavidas 2013).

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11 For English, the search was carried out automatically using the program Corpus Search 2 (Randall 2005-2007).
12 The chronological periods (according to the York, Helsinki, and Pennsylvania corpora) in all figures and tables for English are the following: O2 (Old English; 850–950); O3 (Old English; 950–1050); O4 (Old English; 1050–1150); M1 (Middle English; 1150–1250); M2 (Middle English; 1250–1350); M3 (Middle English; 1350–1420); M4 (Middle English; 1420–1500); E1 (Early Modern English; 1500–1569); E2 (Early Modern English; 1570–1639); E3 (Early Modern English; 1640–1710); MBE (Modern British English; 1700-1914).
With regard to the D-system and its development in English, Figure 2 presents the emergence of definite articles in the first period of Middle English. Indefinite articles have a “modern” frequency only after 1350, as seen in Figure 3. A Pearson chi-square test was performed to assess the relationship between the different periods of the history of the English language and the development of the definite and indefinite article. The results with respect to the use of the definite article were statistically significant for the comparison between O4 and M1 ($\chi^2=19.672$, $p<.001$), with an effect size of $\varphi=.314$, which is a medium size effect.\(^{13}\)

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13 Due to space restrictions, the discussion of the statistical results in the whole paper has to be indicative and short.
Figure 3. *Use of definite articles and use of indefinite articles (compared to the total number of nouns) in the history of English*

Figure 4 shows a variation in the frequency of the use of 1\textsuperscript{st} and 2\textsuperscript{nd} person personal pronouns that appears to follow the tendencies for the overt objects (see above). The 3\textsuperscript{rd} person personal pronouns, however, appear to be stable in their frequency in the different periods of the history of the English language. In Figure 5, the main observations with regard to the development of articles and 3\textsuperscript{rd} person personal pronouns are presented in a comparative way: the frequency of the 3\textsuperscript{rd} person personal pronouns in the accusative case is stable, whereas the emergence of the definite articles is shown for Early Middle English. A Pearson chi-square test was performed to assess the relationship between the different periods of the history of the English language and the development of the personal pronouns in the object position. The results with respect to the 1\textsuperscript{st}/2\textsuperscript{nd} person personal pronouns in object position were statistically significant for the comparison between O4 and M1 ($\chi^2=18.233$, $p<.001$), with an effect size of $\phi=.302$, which is a medium size effect.
Figure 4. Frequency of use of 3rd person personal pronouns in the accusative/objective vs. frequency of use of 1st and 2nd person personal pronouns (compared to the total number of NPs in the accusative/objective) in the history of English

Figure 5. Frequency of use of definite articles and frequency of 3rd person personal pronouns in the accusative/objective in the history of English

Changes in the D-system of English, obviously represented in the results of the corpus study, include the following: in late Old English, the demonstrative pronouns (see Table 6) are reanalyzed as definite articles (van Gelderen 2000, 2011); and in late Old English (middle of the 12th century), a new 3rd person plural personal pronoun (*they*) and a new 3rd person feminine singular (*she*) are attested (van Gelderen 2000, 2008, 2011).
For van Gelderen (see also the results from the corpus search above), the English D-system changed at the end of the Old English period. This can be clearly shown in the changes from the Preface of the Anglo-Saxon Chronicle that included no articles and few demonstratives, to a part from the year 1130 of the Chronicle with articles and demonstratives (and an increase of their use), to a part from the year 1137 with clear articles and new personal pronouns (replacing the old system of personal pronouns). According to van Gelderen, Old English personal pronouns are not deictic/referential. Early Middle English pronouns are deictic/referential. Old English personal pronouns are also attested with a reflexive interpretation. Pronouns of Old English could be described as having characteristics of clitics, according to Pintzuk (1996), but this probably means their reduced referentiality because they do not show clitic behavior (Bech 2001, among others). The new 3rd person plural and the new 3rd person feminine singular pronouns are attested in the middle of the 12th century.

<table>
<thead>
<tr>
<th></th>
<th>Singular, Masculine</th>
<th>Singular, Feminine</th>
<th>Singular, Neuter</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom.</td>
<td>se</td>
<td>seo</td>
<td>þæt</td>
<td>þa</td>
</tr>
<tr>
<td>Gen.</td>
<td>þæs</td>
<td>þære</td>
<td>þæs</td>
<td>þara</td>
</tr>
<tr>
<td>Dat.</td>
<td>þæm</td>
<td>þære</td>
<td>þæm</td>
<td>þæm</td>
</tr>
<tr>
<td>Acc.</td>
<td>þone</td>
<td>þa</td>
<td>þæt</td>
<td>þa</td>
</tr>
</tbody>
</table>

Table 6. Demonstratives in Old English

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$^{14}$ se (masculine nominative) is reanalyzed as the definite article the in later English, and þæt (neuter nominative) is reanalyzed as the demonstrative that (Wood 2007). The demonstrative pronouns in Old English are not definite articles because the demonstrative pronouns are in complementary distribution with the possessive pronouns (and until the end of the Old English period).
Table 7. Personal pronouns (singular and plural) in Old English

<table>
<thead>
<tr>
<th></th>
<th>Nom.</th>
<th>He/Heo/Hit</th>
<th>Ge</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>'hu</td>
<td>he/her/his</td>
<td>eower</td>
</tr>
<tr>
<td></td>
<td>'hin</td>
<td>his/his/hir</td>
<td>eow</td>
</tr>
<tr>
<td></td>
<td>'he</td>
<td>him/him/hir</td>
<td>eowic</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>he/heo/hit</td>
<td>hi</td>
<td></td>
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<tr>
<td></td>
<td>his/hire/his</td>
<td>hira</td>
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<tr>
<td></td>
<td>him/hire/him</td>
<td>him</td>
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</tr>
<tr>
<td></td>
<td>hine/heo/hit</td>
<td>hi</td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Personal pronouns (singular and plural) in Old English

Table 8 summarizes the changes in articles and pronouns in the history of English. For these changes in terms of features, see Figure 6 from van Gelderen (2011) (van Gelderen provides a detailed presentation of the changes).

Old English: “articles” = demonstratives = deictic/referential →
→ Early Middle English (middle of the 12<sup>th</sup> cent.): definite articles and demonstratives

Old English: “personal pronouns” = demonstratives →
→ Early Middle English: personal pronouns = deictic/referential

Table 8. A summary of the changes in English

<table>
<thead>
<tr>
<th>Demonstrative</th>
<th>= person and deixis</th>
</tr>
</thead>
<tbody>
<tr>
<td>[i-phi]</td>
<td>[i-loc]</td>
</tr>
<tr>
<td>article</td>
<td>pronoun</td>
</tr>
<tr>
<td>C (that Complementizer)</td>
<td></td>
</tr>
<tr>
<td>[u-phi]</td>
<td>[i-phi]</td>
</tr>
</tbody>
</table>

Figure 6. Feature changes in English; van Gelderen (2011)
If the D-system is responsible for the change as our hypothesis states, then the different status of articles and pronouns should have affected the subject (its presence and omission), too. Indeed, Old English allows subject pro-drop as well as the use of personal pronouns to express the continuing topic and the use of personal pronouns with a reflexive interpretation (see, for instance, Walkden 2013).

If null objects are caused by the changes in the D-system, then object (and subject) drop would follow the development of D, both in English and Greek. The corpus study reveals very interesting results: it appears that there is a corresponding increase in the use of personal pronouns in the object position (and mainly of the 1st/2nd person personal pronouns), but not an increase of the 3rd person personal pronouns for English, as expected (if we distinguish them from the 1st/2nd person pronouns).

3.2 The Greek data

In this section, I will present the corpus study that I conducted for Greek. There are no previous studies on the development of null objects in the history of the Greek language. The problem is again that the coding for null objects is not a simple task, and it is not available in large corpora of Greek. For this reason, I counted overt direct objects in the accusative case in Homeric Greek (Odyssey and Iliad), Herodotus, and the Greek New Testament.\(^{15}\) Note that the tendency of loss of the null objects is evident even though other parameters obviously interfere in this case, such as the increase of the number of accusatives in later Greek (Figure 7).

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\(^{15}\) I conducted a corpus search in the PROIEL annotated corpus and in the material found in the Perseus under Philologic (Homer, Herodotus, New Testament). I also made use of the ANNIS corpus search tool.
Figure 7. Development of presence of overt direct objects in Greek

Figure 8 presents the emergence of the definite article in Classical Greek, and the contrast between Classical and Homeric Greek with regard to articles; there is no regular use of the definite article in Homeric Greek. The situation in New Testament Greek is very similar to Classical Greek. In Figure 9, the emergence of indefinite articles is also represented; it appears that the emergence of indefinite articles is completed in a later stage in the Greek New Testament. A Pearson chi-square test was performed to assess the relationship between the different periods of the history of the Greek language and the development of definite and indefinite articles. The results with respect to the new definite articles were statistically significant for the comparison between Homer and Herodotus ($\chi^2=50.439$, $p<.001$), with an effect size of $\phi=.502$, which is a large size effect.

Figure 8. Use of definite articles vs. absence of definite articles in Greek (Homer, Herodotus, New Testament).
Figure 9. Use of indefinite articles (compared to all NPs) in Greek (Homer, Herodotus, New Testament)

Figure 10 presents a different development for 3rd person personal pronouns in Greek than in English: probably because of the clitic behavior (from a certain period and then) of personal pronouns in Greek in contrast to English. Hence, the use of 3rd person personal pronouns in Greek is not stable and there appears to be an increase in their use in Classical Greek, and mainly in the Greek New Testament. 1st and 2nd personal pronouns follow the increase of 3rd person pronouns, but with a small delay (the Greek New Testament is the text where a high increase in the frequency of the use of 1st and 2nd person personal pronouns can be observed). In Figure 11, similar tendencies for definite articles and personal pronouns in Greek (but not in English—see above) are evident: the increase in the frequency of the definite articles is attested in a parallel path with the increase in the use of the 3rd person personal pronouns (and the change of the personal pronouns into clitics) in Greek. A Pearson chi-square test was performed to assess the relationship between the different periods of the history of the Greek language and the development of the use of personal pronouns in the object position. The results with respect to the 3rd person personal pronouns were statistically significant for the comparison between Homer and Herodotus ($\chi^2=5.018, p<.05$), with an effect size of $\phi=.158$, which is a small size effect. The results with respect to the 1st/2nd person personal pronouns were statistically significant for the comparison between Herodotus and the
New Testament ($\chi^2=6.575, p=.01$), with an effect size of $\varphi=.181$, which is a small size effect.

**Figure 10.** Frequency of use of 3rd person personal pronouns in the accusative vs. frequency of use of 1st and 2nd person personal pronouns in the accusative (compared to the total number of NPs-accusative): Homer, Herodotus, and the New Testament

**Figure 11.** Use of definite articles and 3rd person personal pronouns in the accusative in Homer, Herodotus, and the New Testament

The definite article is assumed (in the relevant bibliography) to have developed between Homer and Classical Greek, whereas the indefinite article appears in Hellenistic Greek (first cent. AD) (Guardiano 2003, 2013; Manolessou 2001; Bakker 2009). The etymology of the Greek definite article connects it to an Indo-European demonstrative (see the relevant remarks for English, above: a change is evidenced from demonstrative into definite article, for English, too). In Homer, no definite (or indefinite) article is
Development of transitivity in a Language without/with object clitics

present. The anaphoric/non-anaphoric, count/mass, kind/existential, and proper/common nouns are attested as bare Nouns.

\[(7) \text{éntha kai ématiē mèn huphaînesken mègan histón} \]

‗Then day by day she would weave at the great web.‘ (Hom. Od. 2, 104; from Guardiano 2013)

Guardiano (2013: 78) observed that Homeric Greek is similar to many other Indo-European languages and that “for instance [...] the spoken Slavic varieties observed by Trovesi (2004) [...] make systematic use of a phonologically reduced form of a distal demonstrative in typically definite contexts [...].” Note that, according to our basic hypothesis, Slavic languages allow null objects because they do not have a D-system with definite/indefinite determiners. Homeric Greek ho/hē/tó appear in some definite contexts, but not systematically, and do not occur with a demonstrative, showing characteristics of demonstrative pronouns themselves (Guardiano 2013). Hence, definiteness is not grammaticalized in Homeric Greek, and all (types of) Ns can be bare. Classical Greek and New Testament Greek ho/hē/tó, on the other hand, are systematically present in all definite contexts (and bare nouns are not definite; see Guardiano 2011, 2013 for details). Definiteness is grammaticalized in Classical and New Testament Greek, but there is not a distinction between a definite determiner and an indefinite determiner with singular count nouns until the first century A.D. After the first century A.D., a definite article occurs in all definite contexts even with proper nouns, whereas an indefinite article becomes available. With regard to personal pronouns in the history of Greek, most of the studies examine aspects of the development of clitics in Greek with regard to their position (from post- to preverbal in Modern Standard Greek). We would like to argue that the first change in the history of Greek pronouns, the change that resulted in the “verb-centrality” of pronouns, should be distinguished from the other phonological changes (as they have been correctly described) that refer to the post- or preverbal position of the clitic. We would like to claim, then, that in Greek (similar to English, see above) we first have a categorical change in the pronouns from demonstratives into referential pronouns. The subsequent changes that concern the position of the pronouns are possible because -in contrast to English- Greek marks case (and phi-features) in object pronouns and their
function can be recoverable even if their position changes. Hence, we have to distinguish between the first change in Greek pronouns and the rest of the changes: object pronouns in Homeric Greek are not related to the verb, their position follows Wackernagel’s law (1892), and they tend to appear together with other “light” elements in a clause-second position. So, they are not (typical) object clitics.

Janse (1993, 2008) has shown that object pronouns in Homeric Greek must be defined with reference to intonation units, because they are attracted to foci (new or contrastive information). What happens in Classical Greek and mainly in post-classical Greek (New Testament Greek) is a clear syntactic change in the features of object pronouns. What changes is not mainly their position (depending on the context, they can still appear before [Marshall 1987; Janse 1993, 1995-96, 2008] or after verbs), but their status. Now, object pronouns are “verb-centered” and they have a new role—they are (real) objects that refer to an antecedent. In New Testament Greek, their position depends on phonological parameters again (focused elements can cause preverbal position of the pronoun) (Janse 1993, 2008), but the object pronouns now have a new featural composition and a new syntactic behavior (what can be described as verb-centered and deictic/referential).

(8)  

\textit{tís mou ἠπ amat?}  

‘Who touched me?’ (Mark 5.31; from Janse 1993)

What follows is that object pronouns become proclitic and appear before the verb (during the Medieval Greek period and in Modern Standard Greek): they are marked for case, they are “able” to move before V, to easily accomplish their function of referring to an antecedent N.

The Greek data derived from the corpus study are clearer than the English data in showing the grammaticalization of the D-system in Greek; the reason is that Greek continued with the emergence of pronouns with clitic behavior -in contrast to English that does not acquire clitics. However, the restrictions in the data with regard to the null objects, and mainly the type of null object that appears in the different stages of the history of the Greek language, does not allow the appearance of a very obvious parallel development for the D-system and the loss of definite null objects in Greek. Further study
that will include later texts from the history of Greek is required. What can be evidenced in Greek, in contrast to the English situation, is a link between the development of the personal pronouns, mainly the 3rd person personal pronouns, and the development of the definite articles (and the null objects).

4. Conclusion
The hypothesis of this study was that the absence of null objects is a phenomenon related to their formal status as D-elements (Tsimpli 1999, 2003, 2004; Kowaluk 2001); the development of the English and Greek D-system should reflect the development of null objects. Modern languages with null objects that lack a D-system (that poses spell-out constraints on formal features) lack pronominal clitics, too. This can hold for Old English and Ancient Greek, but English developed a new D-system without clitics and Greek a new D-system with clitics. Both languages lost the null definite objects after the emergence of the new D-system. If null objects have their cause in the changes in the D-system, then object drop would follow the development of D, both in English and Greek. The corpus study reveals very interesting results: it appears that, for English, there is a corresponding increase in the use of personal pronouns in the object position (mainly of the 1st/2nd person personal pronouns), but not an increase of the 3rd person personal pronouns, as expected. Greek presents a different development for 3rd person personal pronouns than English: probably because of the clitic behavior of personal pronouns in Greek, in contrast to English. The use of 3rd person personal pronouns in Greek is not stable and there appears to be an increase in their use in Classical Greek, and mainly in the Greek New Testament.

References


