



## Research Article

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# Gradient Effects of Animacy on Differential Object Marking in Turkish

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**Abstract:** Animacy is a pervasive cognitive category that is displayed in the grammatical behavior of the world's languages through categorical or gradient effects. We argue in this paper that animacy is a crucial parameter for Differential Object Marking (i.e., the optional marking of the direct object) in Turkish. DOM languages are typically categorized according to their dependency on definiteness and animacy. Turkish has thus far been assumed to depend only on definiteness; however, we present the first set of empirical evidence based on perceived acceptability judgment measures that show a significant effect of animacy on Turkish DOM. Moreover, we show the gradient nature of this effect. This original finding provides further evidence for the assertion that animacy is a crucial linguistic parameter in Turkish DOM and illustrates how the conceptual category of animacy is deeply entrenched in the grammar of Turkish.

**Keywords:** animacy; gradience in grammar; prominence hierarchy; specificity; case marking; overt accusative marking; Turkish DOM; direct object; optionality; grammaticality judgment data

## 1 Introduction\*

In this paper, we are concerned with instances in which languages mark only some direct objects based on their semantic-pragmatic properties, and not others. Most of the languages that partially mark direct objects use overt accusative (ACC) case marking on direct objects, but it is possible to find languages that use other markers and forms, as well (e.g., the preposition 'et' in Hebrew, the postposition 'ko' in Hindi, the preposition 'a' in Spanish, and the particle 'pe' in Romanian). In line with Bossong (1985), this phenomenon of optionally marking the direct object has been termed Differential Object Marking (henceforth DOM). In light of functional and typological studies on DOM, it is widely accepted that the animacy and definiteness properties of direct objects are the most basic semantic-pragmatic factors that condition DOM and that the occurrence of DOM correlates with the degree of these notions: the higher the animacy and/or definiteness, the higher the chances for DOM to appear overtly (Aissen 2003: 435). DOM systems typically use overt

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marking on highly prominent direct objects (e.g., specific animates) and leave less prominent direct objects (e.g., non-specific inanimates) unmarked (Bossong 1985: 125). The direction in this generalization is always consistent; therefore, it is never possible for a less prominent object to receive overt marking while a more prominent object does not (Aissen 2003: 449).

This paper investigates animacy effects on Turkish DOM, which have thus far been argued to play a minor role (Erguvanlı & Zimmer 1994: 552) or have no effects on Turkish DOM (Bossong 1985, Aissen 2003). In the following, we present characteristics of Turkish DOM along with examples of a possible animacy effect on it in 1.1, we briefly present the animacy and definiteness notions that are involved in the occurrence of DOM in 1.2, and we discuss two theories with respect to the function of DOM in 1.3. In Section 2, we re-evaluate the data from a recent study taking animacy into consideration (von Heusinger & Bamyacı 2017). In section 3, we outline the aims of the study. In section 4, we present our experiment on animacy in Turkish DOM and its results. Finally, in Section 5, we discuss the gradient animacy effects on Turkish DOM.

## 1.1 Characteristics of Turkish DOM

Turkish selectively marks only some direct objects with ACC marking  $-(y)I$  and its vowel harmony variants  $-(y)i$ ,  $-(y)ı$ ,  $-(y)ü$ , and  $-(y)u$  (for a brief description of vowel harmony rules in Turkish, see Göksel & Kerslake 2005: 22). Turkish marks all definite direct objects, including proper names, personal pronouns, and demonstrative and definite common nouns, irrespective of their animacy level, as shown in Example (1) below. The overt ACC marking is obligatory in all NPs in this example (Enç 1991: 9).

- |     |  |                |                                |                     |
|-----|--|----------------|--------------------------------|---------------------|
| (1) | Zeynep                                       | Ali'-yi/*-Ø    | on-u/*-Ø                       | adam-ı/*-Ø          |
|     |  | Ali-ACC/*-Ø    | she/he-ACC/*-Ø                 | the man-ACC/*-Ø     |
|     |  | Proper name    | 3 <sup>rd</sup> person pronoun | definite animate NP |
|     | o  | masa-yı/*-Ø    | gör-dü.                        |                     |
|     | that   | table-ACC /*-Ø | see-PST.3SG                    |                     |
|     | demonstrative                                | inanimate NP   |                                |                     |
|     | 'Zeynep saw Ali/him/her/the man/that table.' |                |                                |                     |

However, previous studies have shown that the relevant notion for Turkish DOM is not definiteness alone, but rather the specificity of the direct objects. Thus, an indefinite direct object receives case marking if specific and does not if it is not specific. This finding is evidenced by the co-occurrence of the indefinite article *bir* with the ACC case-marked direct object. More precisely, the occurrence of the ACC case marking on the indefinite direct object is characterized as a DOM phenomenon (e.g., Enç 1991; Aissen 2003, von Heusinger & Kornfilt 2005). As Example (2) below reveals, in addition to the definite direct object in (2b), the indefinite direct object is free to take overt DOM (as in (2c)) or not (as in (2d)) (Kornfilt 2008: 82) (see also; Sezer 1972; Erguvanlı 1984; Dede 1986; Enç 1991; Kornfilt 1997; Aydemir 2004; von Heusinger & Kornfilt 2005; Öztürk 2005; Kornfilt & von Heusinger 2009; Özge 2011).

- |     |                        |             |              |
|-----|------------------------|-------------|--------------|
| (2) | a) (ben)               | kitap-Ø     | oku-du-m     |
|     | I                      | book-Ø      | read-PST-1SG |
|     | 'I read book / books.' |             |              |
|     | b) (ben)               | kitab-ı     | oku-du-m     |
|     | I                      | book-ACC    | read-PST-1SG |
|     | 'I read the book.'     |             |              |
|     | c) (ben)               | bir kitap-Ø | oku-du-m     |
|     | I                      | a book-Ø    | read-PST-1SG |

‘I read a book.’

- d) (ben)            bir kitab-ı       oku-du-m  
 I                    a book-ACC     read-PST-1SG  
 ‘I read a (specific) book.’

The accusative marking in (2b) indicates that the direct object is definite, that is, it is identifiable to the speaker and hearer. However, the absence of the ACC in (2a), in which the noun phrase consists of a bare noun, signals that the object is non-referential; it cannot be pronominalized as it resembles a type of pseudo-incorporated construction (see Tura 1973; Erguvanlı 1984; Kamali 2015; Seidel (to appear)). The indefinite article *bir* in (2c) indicates that the direct object is indefinite, and the lack of an ACC marker indicates that the object is more likely to be nonspecific. In (2d), however, we see both the indefinite article and accusative marking, which implies that the object is more likely to be specific indefinite in the sense that the reference is to a particular object that is identifiable to the speaker, but not to the hearer. Thus, both a definite noun phrase and a specific indefinite noun phrase refer to a particular referent. The difference is that the hearer can clearly identify the referent of a definite noun phrase, but not that of an indefinite specific noun phrase. (For an extensive discussion of DOM and specificity in Turkish, see von Heusinger & Kornfilt 2005, von Heusinger & Bamyacı 2017, von Heusinger, Kornfilt & Kizilkaya (to appear)).

Although it has thus far been largely overlooked (Erguvanlı & Zimmer 1994: 552, Bossong 1985, Aissen 2003), there are examples that imply the influence of animacy on Turkish DOM. For instance, (3a) reveals that the inanimate indefinite object cannot move to the sentence-initial position unless it undergoes additional modification as in (3b) (Erguvanli 1984: 27).

- (3) a) ?Bir kitab-ı            Murat-Ø                    acele-yle                    oku-yor.  
 A book-ACC            Murat-Ø                    hurry-with                    read-PRS.CTN.3SG  
 ‘Murat is reading a book hurriedly.’
- b) Mavi kaplı                bir kitab-ı                Murat                    acele-yle                    oku-yor.  
 with a blue cover        a book-ACC                Murat                    hurry-with                    read-PRS.CTN.3SG  
 ‘Murat is reading a book with a blue cover hurriedly.’

In contrast to (3a), the indefinite direct object referring to a human entity in (4) is free to move up to the sentence initial position with or without ACC marking.

- (4) Bir            öğretmen-i/-Ø            selamla-dı-m.  
 A                teacher-ACC/-Ø            greet-PST-1SG  
 ‘I greeted a teacher.’

Another example that displays the relevance of animacy to Turkish DOM is the obligatory ACC marking on the animate interrogative pronoun *kim* (‘who’) when used as a direct object (as in 5a), unlike the optional DOM marking on the inanimate interrogative pronoun *ne* (what) (as in 5b), examples taken from Comrie (1975: 14).

- (5) a) Hasan            kim-i/\*kim-Ø            gör-dü?  
 Hasan                who-ACC/\*who-Ø        see-PST.3SG  
 Whom did Hasan see?
- b) Hasan            ne-yi/ne-Ø                gör-dü?  
 Hasan                what-ACC/what-Ø        see-PST.3SG  
 What did Hasan see?

In addition to these implications regarding a possible interaction of animacy with DOM in Turkish, there are various other structures in Turkish grammar that show sensitivity to animacy. For instance, Bamyacı et al. (2014) showed a correlation between the level of animacy of plural subjects and preference for the optional verb number marking in Turkish. A plural subject denoting an animal is less likely to take a verb with overt number marking as in (6a) than a plural subject denoting a human entity as in (6b). In sentences such as (6a), zero verb number marking is preferred, whereas in sentences such as (6b), both zero and overt verb number marking are permissible.

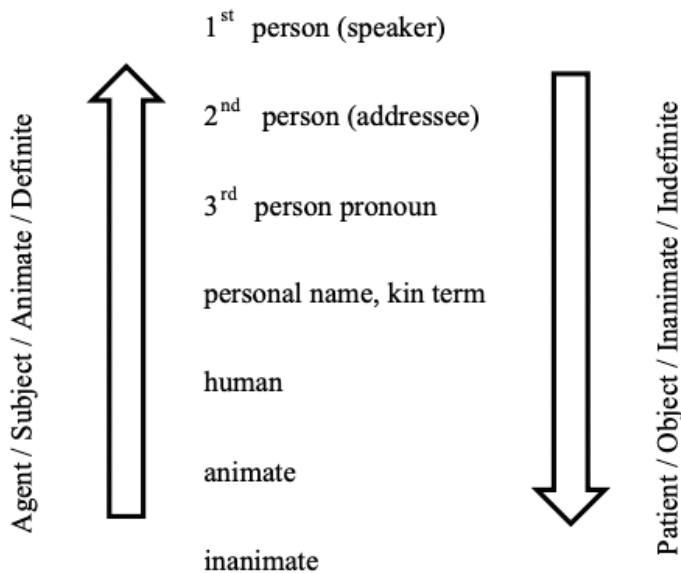
- (6) a) Kedi-ler miyavlı-yor-Ø / miyavlı-yor\*-lar  
 Cat-PL meow-PRS.CTN-Ø / meow-PRS.CTN\*-PL  
 ‘Cats are meowing.’
- b) İnsan-lar yürü-yor-Ø / yürü-yor-lar  
 Human-PL walk-PRS.CTN-Ø / walk-PRS.CTN-PL  
 ‘People are walking.’

Based on the examples that imply a possible interaction between animacy and DOM in Turkish and the role of animacy in other areas of Turkish grammar, we expect Turkish DOM to show sensitivity to animacy effects. In this study, we asked whether there is an animacy effect in the distribution of DOM on specific indefinite direct objects –to answer this question we conducted a perceived acceptability judgement study on monolingual Turkish speakers.

## 1.2 Definiteness and animacy dimensions of DOM across languages

Silverstein’s (1976) often-cited prominence hierarchy (displayed in Figure (1) below) presents seven cut-off points in accordance with the likelihood of the occurrence of optional DOM in case languages.<sup>1</sup>

(1) Prominence hierarchy adapted from Silverstein (1976)



<sup>1</sup> There are also similar instances in ergative systems, but this paper focuses solely on the accusative system as found in Turkish.

Both animacy and definiteness are represented in the hierarchy in Figure 1: the higher ends of this scale distinguish personal pronouns and personal names that are relevant to definiteness, whereas the lower ends of the scale distinguish human, animate, and inanimate levels that are relevant to animacy. The general assumption is that the prototypical direct object tends to have properties that lie at the lower ends of this scale while the prototypical subject has properties at the higher ends; once a direct object deviates from this pattern and displays properties at the higher ends of the scale, the likelihood of overt marking increases. This pattern is in accordance with the principle of ‘markedness reversal’, which suggests that what is ‘marked’ or ‘atypical’ for objects is unmarked for subjects, and vice versa.

The category of personal pronouns at the high end of this hierarchy is usually simultaneously animate and definite (Blake 2004: 120). Even though there is no animacy difference between proper names and personal pronouns or between 1<sup>st</sup> person and 2<sup>nd</sup> person pronouns in the literal sense, in some languages there is an animacy distinction regarding these pronouns, such as the distinction of ‘s/he’ and ‘it’ in English. Moreover, the categories at the high end of the prominence scale overlap with animacy and definiteness features. Furthermore, there might be cases in which noun phrases referring to animals could be perceived as being lower in prominence than common nouns referring to humans (Comrie 1989: 195, 196). A further factor that may contribute to pronominals’ and proper names’ being at the highest levels of the prominence hierarchy is the higher pronominalization propensity of animates due to their topicality. Namely, animates frequently appear as topics and therefore have a higher likelihood of being pronominalized (Givón 1983).

In the languages where animacy and definiteness intersect and both dimensions are taken as determining factors for the overt marking of DOM, such as in Romanian (Chiriacescu 2014, Tigau 2012), Hindi (McGregor 1972: 48), Mongolian (Comrie 1975: 18), Spanish (von Heusinger & Kaiser 2003, Leonetti 2004), the DOM systems are ‘two-dimensional’. On the other hand, languages that only take animacy or definiteness as the factor that controls DOM have ‘one-dimensional DOM systems.’ For instance, regardless of their level of animacy, definite direct objects take obligatory case marking in Hebrew. Therefore, inanimate proper names are marked, but human indefinites are not (Givón 1978). Likewise, in Persian all definites are obligatorily marked, regardless of animacy, and indefinites are marked when they are specific (Lazard 1984).

Animacy-sensitive DOM languages, on the other hand, usually differentiate either animate from inanimate direct objects or human from non-human direct objects. For instance, Sinhalese optionally case-marks only animate direct objects (Gair 1970), Yiddish only marks common nouns that are human and worthy of respect (Aissen 2003: 456). Bayungo, on the other hand, marks all animates and two inanimate nouns (i.e., meat and vegetable food) (Austin 1981). However, the range of possibilities is much wider than this generalization. Languages that make finer distinctions under the class of animals include Ritharngu, in which all human-referring direct objects and a few high animals, such as kangaroos and dogs, are marked, unlike low animals, such as fish and raccoons (Heath 1980). Similarly, Yidiny marks higher animals more frequently than lower animals (Comrie 1989: 197). These examples illustrate the finer distinctions within the human category (e.g., kinship terms and other humans, or noun phrases referring to individuals worthy of respect) and the animal category (e.g., high vs. low animals). The cut-off point for the sub-categories under the class of animals seems to be located on the person boundary. The class of animals is rather frequently split into two subclasses according to the “personness” (in sense of human resemblance) of the animal in question. Evidently, horses have much more personness than do ants or flies, but there may be intermediate cases in which usage varies according to context (Bossong 1983: 14). In some languages, the animals are split into categories according to their size; the big animals belong to the high category and the small ones to the low.

Although inanimates are often left as a single category, there are cases in which some inanimate entities are regarded as being higher than others, as in Navaho, in which inanimate entities that are capable of spontaneous motion, such as wind and rain, are perceived as higher than other inanimates. This finding is in keeping with the manner by which Folli & Harley (2008) differentiate teleological entities that are capable of initiating and performing an action on their own (e.g., washing machine can wash clothes) from

other inanimate entities that are not capable of this (e.g., a chair).<sup>2</sup>

As the above examples illustrate, along with the factors that play a role in the occurrence of DOM, another relevant dimension is that of optionality. The examples given above reveal that it is possible to find obligatory overt marking of DOM (e.g., specific human), optional overt marking of DOM (e.g., indefinite human, definite inanimate), and obligatory unmarking of DOM (e.g., non-specific inanimate). Thus, we understand that definiteness and animacy does not always make clear-cut splits resulting in categorial distinctions, and these factors may display gradient effects as well.

### 1.3 Distinguishing and identifying functions of DOM

There are two views accounting for the function of DOM. The distinguishing view suggests that DOM aids comprehension by means of differentiating semantically marked direct objects, which are ‘unusually’ high in animacy and/or definiteness, from both subjects and ‘prototypically’ unmarked direct objects in order to resolve the ambiguity among them (Comrie 1975: 19). Indeed, there are a few languages that mark the accusative on the object only when the subject has a lower level of prominence than the direct object (Blake 2004: 141). Therefore, the use of DOM is restricted to cases for which the risk of ambiguity arises because of a deviation of the arguments from their typical semantic features. The identifying view, on the other hand, suggests that DOM identifies the subject and object arguments rather than disambiguating them (de Hoop & Narasimhan 2005). The crucial difference between the discriminatory and the identifying functions, also referred to as coding or indexing functions in the literature, is that the former reflects the relative prominence between the subject and the object (e.g., it verifies whether the object is higher than the subject in prominence, and if so, marks it), whereas the latter marks all objects above a certain language-specific cut-off point on the prominence scale, be it the animacy scale, the definiteness scale, or both. It is not always possible to know clearly whether DOM has a discriminatory/distinguishing function or an identifying function in a certain language. It might be that one function appears to be at play in some but not all cases. As a result, taking both functions into account helps provide a more comprehensive account of the unified function of DOM (Kibrik 1985; Comrie 1989). Rather than alternating or competing with each other, the differentiating function and the identifying function might both be essential (Malchukov 2008: 208).

More recently, Bornkessel-Schlesewsky & Schlesewsky (2009) investigated the role of prominence in real-time comprehension from a cognitive perspective, focusing on how the human language comprehension system identifies semantic roles and argument structure as well as the degree to which the prototypicality of arguments facilitates online comprehension. By evaluating various online studies, such as those measuring Event Related Potentials (ERPs) and eye movements, the authors demonstrate that animacy – as a prominence feature – is functionally equivalent to information types like word order and case marking, which have typically been considered syntactic (Bornkessel-Schlesewsky & Schlesewsky 2009: 20, 25). This new evidence contrasts with previous views that considered animacy to be involved in the evaluation of role prototypicality only after syntactic processing. For instance, it has been established in the psycholinguistic literature that object relative clauses are more difficult to process than subject relative clauses. They may take longer to read, and may be prone to more errors as well. However, more recent studies using eye-tracking methods have shown that when the object relative clause has an animate subject head noun, the difficulty in processing is cancelled out (for English, see Traxler et al. 2002; 2005; for Dutch, see Mak et al. 2002; 2006; for Awtuw, see de Swart 2007). This outcome has been taken to suggest that animacy serves to guide readers’ initial analyses of a relative clause and plays a crucial role in the comprehension of complex structures. Hence, the classic view that syntactic structure and working memory determine the ease of processing has been challenged by the new data and claims. Some researchers even assume that thematic role identification is performed solely on the basis of an argument’s animacy level, regardless of syntax (for

<sup>2</sup> Finally, some languages differentiate inanimates with respect to their gender; however, these examples are left out as they lie beyond the focus of the current paper.

a proposal on the animacy-based assignment of thematic roles, see Kuperberg et al. 2003; 2007; Hoeks et al. 2004).

The most important contribution of animacy to language processing is its facilitative effect on the role identification of arguments at earlier stages of sentence processing without the need to wait for the verb to appear in verb-final languages (Bornkessel-Schlesewsky & Schlewsky 2009: 25). The significance of this contribution becomes apparent when we consider the claim that SOV is the most frequent basic word order across all languages (Dryer 2005). As language processing takes place incrementally, or more precisely, as each word is perceived and immediately integrated into an existing representation, disambiguation of the arguments that appear earlier in the sentence enables ease of comprehension (Bornkessel-Schlesewsky & Schlewsky 2014: 322). Thus, animacy cues interpretation without delay and grants more efficient communication (Bornkessel-Schlesewsky & Schlewsky 2009: 41). In Bornkessel-Schlesewsky & Schlewsky (2014: 329), this phenomenon is called “the interface hypothesis of incremental argument interpretation” and is achieved by the semantics-syntax interface (i.e., with reference to a cross-linguistically defined set of prominence scales and their language-specific weighting).

## 2 The animacy-DOM interaction in Turkish

As explained above, specificity has been taken as the main factor controlling the use of overt DOM in Turkish whereby the case marking of the direct object signals specificity, and the lack of marking indicates non-specificity. In a recent study, von Heusinger & Bamyacı (2017) investigated the kind of specificity marked by the direct object case in Turkish. In particular, the study tested whether the specific reading conveyed in transparent and opaque contexts provides the same semantic contrast reflecting similar semantic and pragmatic effects. Transparent contexts lead to ambiguity with regards to the specificity of the direct objects, as to whether the speaker has a particular referent in mind or not, even though there are no intensional or extensional operators. This is generally called ‘epistemic specificity’. Here, the ambiguity is considered to be pragmatic rather than semantic (Lyons 1999, Ioup 1977). The opaque contexts, on the other hand, represent certain grammatical contexts such as verbs of propositional attitude and intensional verbs presenting a proposition as potential or hypothetical rather than factual, and provide a set-up which creates a scope ambiguity regarding the specificity of the referents (for detailed theoretical background regarding these conditions see von Heusinger & Bamyacı 2017).

In the study, experimental sentences were presented in four different conditions distributed across transparent and opaque contexts and were followed by two alternative continuation sentences, one being coherent with a specific reading, as in (7a and 8a) sentences, and another one with a non-specific reading, as in (7b and 8b) sentences, of the direct object in the test item. Please see examples taken from von Heusinger & Bamyacı (2017) for transparent and opaque contexts below.

### Transparent Context

- (7) Mustafa    bir            sandalye(-yi)    al-dı.  
 Mustafa    a                chair(-ACC)    buy-PST.3SG  
 ‘Mustafa bought a chair.’

a) *epistemic specific*: This is a very similar one to the rocking chair I bought last month.

b) *epistemic non-specific*: But I have not yet seen what type of chair this is.

### Opaque Context (with an intensional verb)

- (8) Zeynep    bir            elbise(-yi)    ara-dı.  
 Zeynep    a                dress(-ACC)    look.for-PST.3SG  
 ‘Zeynep looked for a dress.’

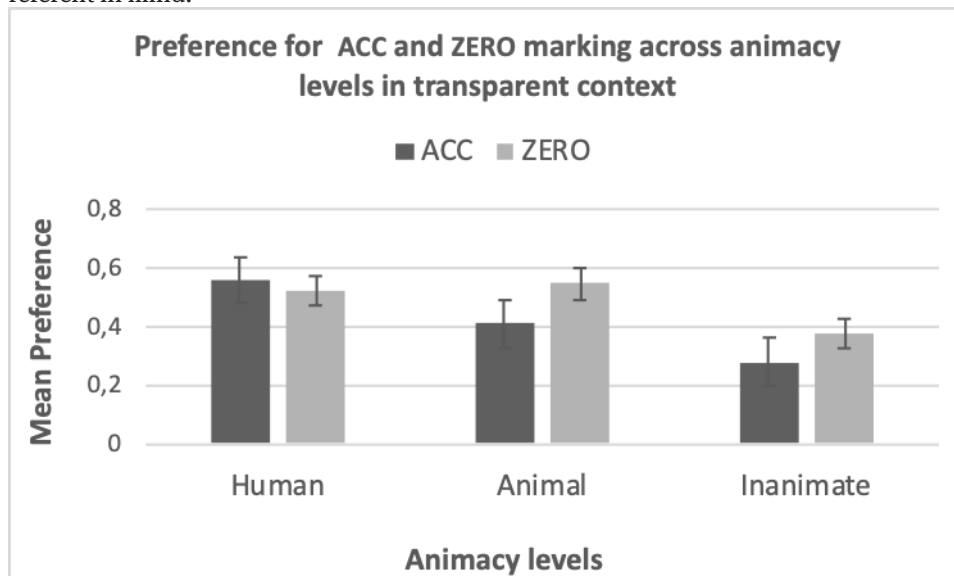
- a) *referential specific*: This was a one of a kind dress made for her size and taste.  
 b) *referential non-specific*: She tried many dresses but none of them were beautiful enough.

The experimental stimuli in Heusinger & Bamyacı (2017) included 48 sentences each consisting of singular NPs as subjects, transitive verbs in past tense and an indefinite singular direct object. The direct objects were selected from human (e.g., teacher, doctor), animal (e.g., cat, dog) and inanimate (e.g., table, chair) categories and were equally distributed across conditions. There were 4 test items for each animacy category. Each participant saw each direct object either with or without accusative case. 34 filler sentences consisting of bare plural subjects were added to the experimental stimuli. Thus, each participant saw a total of 82 sentences. Participants were presented with two different versions of the item lists in which the order of experimental items as well as specific and nonspecific continuations were differently randomized. The participants were instructed to select the ‘most natural’ continuation for each experimental item. The experimental layout was put into an online experimental design in which each item appeared on a separate screen and the links to the experiment were sent to the participants. 62 monolingual adult native speakers of Turkish<sup>3</sup> took part in the study.

The results showed a discrepancy between transparent and opaque contexts. In the transparent context, specific and nonspecific readings were preferred to a similar extent both for DOM marked and unmarked sentences. This result was taken to indicate that overt DOM does not trigger a higher preference towards epistemic specificity.

In the opaque contexts, on the other hand, i.e., intensional verbs, a sharper distinction of the specific and nonspecific readings was observed in the zero and overt DOM conditions. The specific reading received higher preference when DOM was overtly marked. The two opaque conditions did not differ from each other, but they did both differ significantly from the transparent context (for statistical output see von Heusinger & Bamyacı 2017).

Overall, these data indicated that effects of Turkish DOM are observed in opaque contexts, creating contrasts of referential specificity, i.e. the expression is a direct referential term and is like a deictic expression interpreted according to the utterance context; whereas it does not show such an affect in transparent contexts, and does not create contrasts of epistemic specificity, i.e. the speaker has a particular referent in mind.



**Figure 2.** Preference for sentences with indefinite direct objects belonging to different animacy levels with zero and overt DOM marking used in transparent context. Error bars represent +/- 2 standard errors (SE).

<sup>3</sup> They were between ages 22-43 (M = 32,8) and were university students or graduates.



Based on the data of von Heusinger & Bamyacı (2017), we created the graph in Figure 2 in order to show that for the transparent context, which is shown to be free from specificity effects, there is a trend whereby human direct objects with overt DOM receive higher ratings for the specific reading when compared to the non-human categories. Here we took animacy as a factor and re-ran the statistical analysis using Linear Mixed Effects models (lme models) in R on the data.

In our statistical analysis, the data did not produce any significant main effects when animacy was taken as a factor. However, a marginally significant three-way interaction effect is found for animacy and DOM when the transparent context is compared with the condition of verbs of propositional attitude ( $p = 0.063$ ). The lack of significance in comparisons of animacy levels may have two different explanations. The first reason could be that the number of items for each animacy category in each experimental condition ( $n = 4$ ) lacked power. Despite the large number of participants ( $n = 62$ ), more experimental items might be needed to obtain significant differences across the animacy levels. Another reason for not finding an animacy effect could be that specificity is a stronger factor than animacy influencing case selection in Turkish. These outcomes motivated our current study. In the new study presented in the next section, we aimed at teasing apart these two factors and determining whether animacy by and of itself has an influence on Turkish DOM.

### 3 Aims of the current study

This study has two aims: first, to investigate animacy effects on Turkish DOM and identify which animacy levels are recognized, and second, to investigate how Turkish DOM implements optionality in the occurrence of DOM conditioned by animacy. We tested Turkish speakers using a perceived acceptability judgment test in order to provide answers to these questions.

## 4 Study

### 4.1 Methods

#### 4.1.1 Experimental stimuli

The experimental stimuli consisted of short isolated sentences. Animacy and definiteness of the subject arguments in these sentences were kept constant by using proper names. Verbs were chosen from among those that create a transparent context in the past tense form in order to avoid any influence of the verb's lexical semantics on the interpretation of the direct object. Verbs were chosen among those that typically take a direct object for which ACC case marking is optional. The indefinite direct objects in the experimental sentences denoted entities belonging to three animacy categories (Human, Animal, and Inanimate), with a further distinction between two sub-animacy categories for each (i.e., Human (Relation Terms & Profession Terms), Animal (Wild Animals & Domestic Animals), and Inanimate Entities (Concrete Entities & Abstract Entities)). The experimental sentences were of the same structure and length. Examples for each condition are presented below in (9-11).

## Experimental Conditions

### 1.HUMAN

#### (9) a.Relation terms<sup>4</sup>

İpek	kadınlar gününde	bir	teyze(-yi)	kutla-dı
İpek	on Women's Day	an	aunt(-ACC)	congratulate-PST.3SG

'İpek congratulated an aunt on Women's Day.'

#### b.Profession terms

Ayça	dün	evinde	bir avukat(-ı)	ağırla-dı
Ayça	yesterday	at her place	a lawyer(-ACC)	host-PST.3SG

'Ayça hosted a lawyer at her place yesterday.'

### 2.ANIMAL

#### (10) a.Wild animals

Ali	hayvanat bahçesine	bir	zürafa(-yı)	satın al-dı
Ali	for the zoo	a	giraffe(-ACC)	buy-PST.3SG

'Ali bought a giraffe for the zoo.'

#### b.Domestic animals

Kemal	tavan arasında	bir	fare(-yi)	yakala-dı
Kemal	in the attic	a	kedi(-ACC)	catch-PST.3SG

'Kemal caught a cat in the attic.'

### 3.INANIMATE

#### (11) a.Concrete entities

Cengiz	yatak odasına	bir	sandalye(-yi)	getir-di
Cengiz	to the bedroom	a	chair(-ACC)	bring-PST.3SG

'Cengiz brought a chair to the bedroom.'

#### b.Abstract entities

Beril	sabah	yüzünde	bir	korku(-yu)	gör-dü
Beril	in the morning	at her face	a	fear(-ACC)	see-PST.3SG

'Beril saw fear on her face in the morning.'

## FILLER CONDITIONS

Filler sentences consisted of simple transitive sentences in SOV word order. In these sentences the use of the ACC marking was obligatory. Half of the filler sentences were grammatical and the other half was not, due to the absence of ACC marking on the direct object.

#### (12) a.Grammatical

Ben	Murat'-ı	öp-tü-m
I	Murat-ACC	kiss-PST-1SG

'I kissed Murat.'

<sup>4</sup> Here the terms such as 'aunt' do not necessarily refer to a kinship relation between the subject and the object – therefore we stick to the category label 'relation terms' rather than the more strict category label 'kinship terms'.

**b. Ungrammatical**

Ben Murat\*-Ø öp-tü-m  
 I Murat\*-Ø kiss-PST-1SG  
 'I kissed Murat.'

Each of the 6 conditions consisted of 12 items yielding 72 test items in total. The direct object was used once with and once without DOM, and the two versions of the direct object were presented in different item lists so that one participant saw only one version of each object. Each experimental sentence was presented separately on a single page. Twenty-four filler sentences – including grammatical and ungrammatical sentences – were added to the stimuli in order to check the reliability of the participant responses as well as to serve as a distraction. Each participant saw a total of 96 items. Each item list was introduced in two different randomized orders and the two lists with their two different versions were distributed equally across the participants.

**4.1.2 Experimental procedure**

Each experimental sentence was presented individually on a single page on the computer screen. Participants were instructed to select a value on a scale depending on 'how natural they found the sentence they read'; once they had selected the value, they clicked on 'continue' and saw the next item. A 7-point scale was used to measure the perceived acceptability of the short and isolated sentences. '1' represented 'unacceptable' and '7' represented 'acceptable,' with numbers between 1 and 7 ranging in acceptability between these two extremes. The participants were free to select any number they wanted and were also not forced to respond to the experimental items within a certain time limit, but they were encouraged to provide the first response that occurred to them in order to tap into their intuitive judgments.

The experiment was comprised of three parts: the first part consisted of a questionnaire evaluating the language background and the characteristics of the participants; the second part contained detailed instructions explaining the experimental procedure via examples and a short training session; and the third and main part consisted of the experimental items. The experiment took about 20 minutes on average for each participant.

Participants were recruited according to the criteria set for this experimental research. Only after the completion of the participant recruitment was the experimental layout presented to the participants via an online form. Importantly, the links from the online experimental forms were not made public in order to avoid responses from participants who may not have fit into the participant criteria set for this study.

**4.1.3 Participants**

18 monolingually raised Turkish speakers (aged 20-36,  $M= 25$ ) were tested. The participants lived in Turkey and spoke the standard variety of Turkish. They had not been exposed to a second language before the age of 12, though some of them had learned English and other languages in a school setting after this age. The participants were university students and graduates who had received at least 11 years of formal education in Turkey.

**4.1.4 Data analysis**

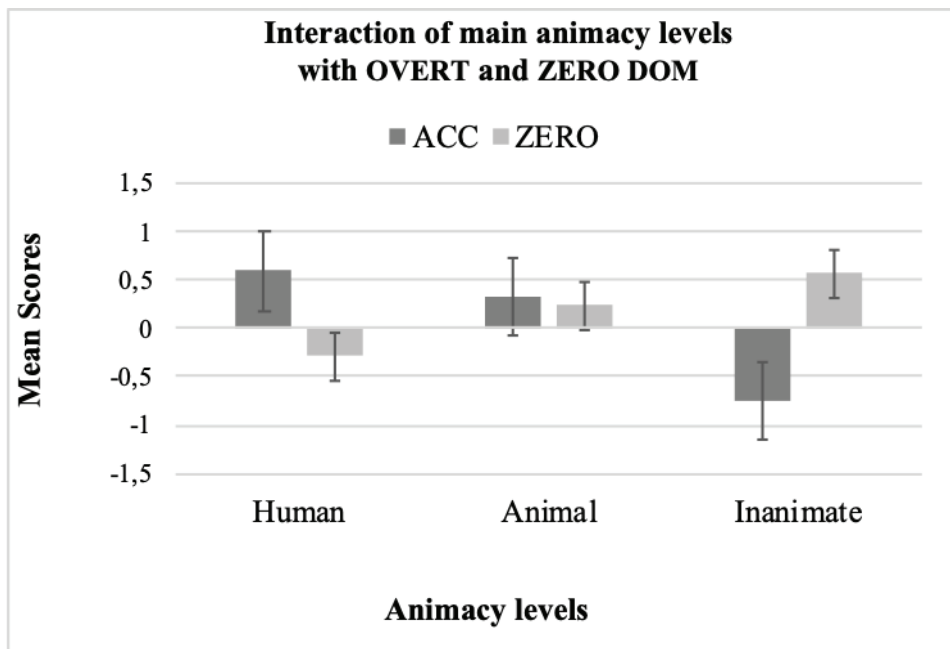
The raw data based on the 7-point scale were transformed into z-values. The procedure of z-transformation is achieved by first centering the data for each participant (i.e., subtracting the participant's mean score from each individual rating). Second, the values were re-scaled using the standard deviation as the scaling factor. The absolute value of a z-score indicated the number of standard deviations of the original score

below or above the mean of the distribution. In other words, a z-score close or equal to '0' indicated that the corresponding stimulus represented the average rating in the study. Negative z-scores indicated that the corresponding stimulus received ratings below the mean, and positive z-scores indicated ratings above the mean. This method enabled us to see the distribution of acceptability rates across conditions more precisely and to apply advanced statistical methods to the data.

The z-values were entered into Linear Mixed Effects models (lme models) for statistical analysis in R (R Core Team 2012), including the R packages *lme4* (Bates et al. 2012) and *languageR* (Baayen 2008). The factor DOM had two values, namely overt marking (ACC) and zero marking. Animacy was taken as a fixed effect with its corresponding values, namely 3 levels in the analysis of the main animacy categories and 6 levels in the further analysis of the sub-animacy categories. In addition to these independent variables, participants and items were included in the statistical model as random effects (see Baayen 2008). Where appropriate, pairwise comparisons were conducted using t-tests with Bonferroni correction (Westfall et al. 2001: 29).

## 4.2 Results

### 4.2.1 Analysis of main animacy levels



**Figure 3.** Acceptability of sentences with indefinite direct objects belonging to different animacy levels with overt and zero DOM used in transparent context. Error bars represent +/- 2 standard errors (SE).

Linear Mixed Effects (*lme*) analysis revealed a significant main effect of animacy and revealed that the acceptability of DOM varies across the three main animacy categories. More precisely, as Figure 3 above illustrates, the acceptability of overt DOM is higher than zero for objects denoting human entities; both overt and zero marking of DOM are optional to similar extents for objects denoting animals; and the zero option becomes more acceptable for objects denoting inanimate entities. These observations are supported by the *lme* results shown in Table 1 below.

**Table 1.** *lme* results for the interaction of DOM and main animacy levels

	Estimate	SE	t-value	p
(Intercept)	0.116	0.044	2.619	0.009
DOM (ACC-ZERO)	0.094	0.079	1.185	0.237
ANIMACY (HUMAN-ANIMAL)	0.129	0.107	1.208	0.229
ANIMACY (ANIMAL-INANIMATE)	0.368	0.110	3.346	0.001
DOM*ANIMACY (HUMAN-ANIMAL)	0.800	0.214	3.731	0.000
DOM*ANIMACY (ANIMAL-INANIMATE)	-1.339	0.184	-7.276	0.000

Table 2 below shows the pairwise comparisons of the preference for the overt and zero option for each category. Overt DOM is significantly preferred over zero for the human category. The difference in preference between the overt and zero options was not significant for the animal category, and the zero option was significantly more acceptable than the overt option for the inanimate category. Please refer to the corresponding t-test results with Bonferroni correction in Table 2 below.

**Table 2.** Pairwise comparisons of overt and zero occurrence of DOM for each main animacy level.

	Participant Analysis				Item Analysis			
	t	df	MD	p	t	df	MD	p
HUMAN	10.166	17	0.885	0.000	6.311	23	0.885	0.001
ANIMAL	1.003	17	0.085	0.329	0.503	23	0.085	0.619
INANIMATE	-14.265	17	-1.316	0.000	-10.074	23	-1.316	0.000

The line graph in Figure 4 below illustrates the interaction in the data, whereby a higher animacy level results in a higher acceptability of overt DOM, and a lower animacy level results in a higher acceptability of zero DOM.

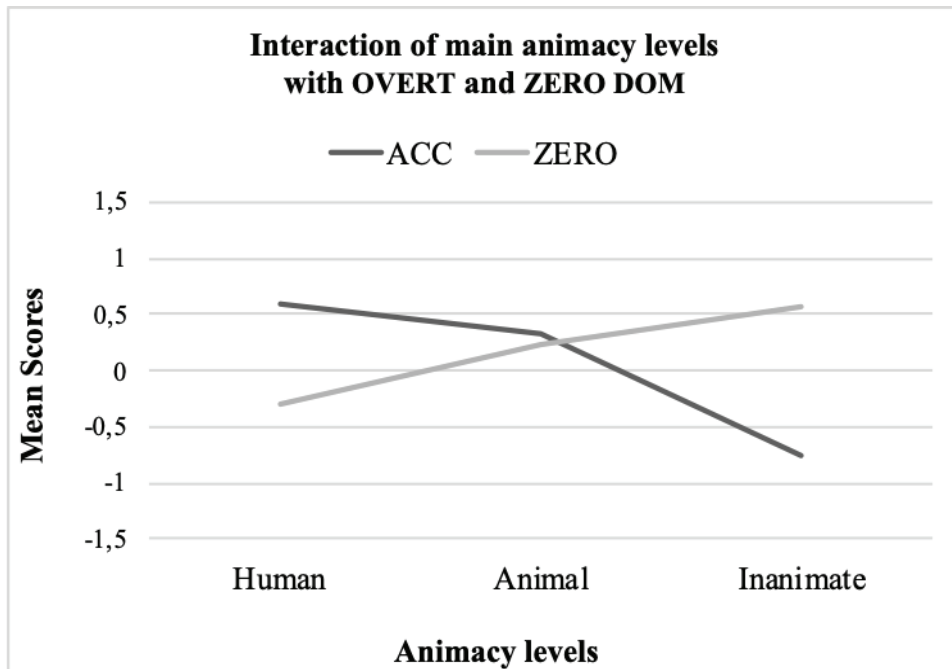


Figure 4. Interaction of the animacy categories with overt and zero marking of DOM.

#### 4.2.2 Analysis of the sub-animacy levels

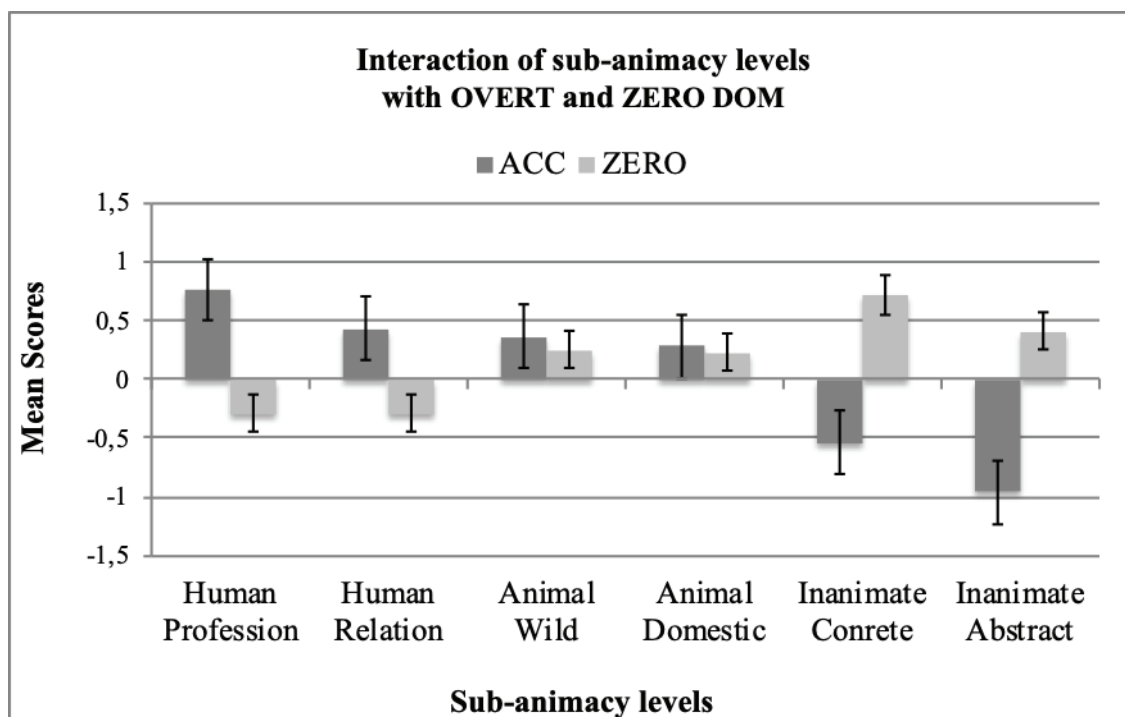


Figure 5. Acceptability of sentences with indefinite direct objects belonging to different sub-animacy levels with overt and zero DOM marking used in transparent context. Error bars represent +/- 2 standard errors (SE).

The same pattern reported above for the main animacy levels also persisted when the animacy levels were broken down into fine-grained animacy levels, whereby the sub-animacy levels did not differ from each

other significantly. The graph in Figure 5<sup>5</sup> above reveals similar output for pairs of animacy categories for each main animacy level (i.e., Human, Animal, and Inanimate). Table 3 shows the *lme* output, which confirms these observations.

**Table 3.** *lme* results for the interaction of DOM and sub-animacy levels

	Estimate	SE	t-value	p
(Intercept)	0.109	0.044	2.487	0.0141
DOM (ACC - ZERO)	0.094	0.081	1.161	0.247
SUBANIMACY (HUMAN: PROFESSION – RELATION)	0.169	0.150	1.128	0.261
SUBANIMACY (ANIMAL: WILD – DOMESTIC)	0.052	0.150	0.348	0.728
SUBANIMACY (INANIMATE: CONCRETE – ABSTRACT)	-0.390	0.158	-2.459	0.015
DOM * SUBANIMACY (HUMAN: PROFESSION – RELATION)	-0.328	0.300	-1.094	0.276
DOM * SUBANIMACY (ANIMAL: WILD – DOMESTIC)	-0.064	0.300	-0.213	0.831
DOM * SUBANIMACY (INANIMATE: CONCRETE – ABSTRACT)	-0.001	0.243	-0.007	0.994

The pairwise comparisons of overt and zero options for each sub-animacy level also replicated the results of main animacy levels. Even though there is a significant main animacy effect when concrete and abstract inanimate categories are contrasted ( $p= 0.015$ ), interaction of these categories with DOM does not produce a significant result ( $p= 0.994$ ). Overall, overt DOM was considered more acceptable compared with zero DOM for human categories (Relation & Profession Terms), similar preferences for overt and zero options for the animal categories (Wild & Domestic animals), and higher preferences for the zero option for the inanimate categories (Concrete & Abstract entities). Please refer to the t-test results with Bonferroni correction in Table 4 below.

**Table 4.** Pairwise comparisons of overt and zero marking of DOM for each sub-animacy level.

	Participant Analysis				Item Analysis			
	t	df	MD	p	t	df	MD	p
HUMAN RELATION	7.741	17	0.000	0.721	4.242	11	0.721	0.001
HUMAN PROFESSION	8.442	17	1.049	0.000	4.766	11	1.049	0.000
WILD ANIMAL	1.151	17	0.117	0.265	0.661	11	0.117	0.522
DOMESTIC ANIMAL	0.487	17	0.053	0.632	0.179	11	0.053	0.861
CONCRETE INANIMATE	-11.703	17	-1.255	0.000	-9.270	11	-1.255	0.001
ABSTRACT INANIMATE	-11.348	17	-1.377	0.000	-6.01	11	-1.377	0.087

<sup>5</sup> Please see the graph in the Appendix for an illustration of the categories based on the raw data.

## 5 Discussion and conclusions

Animacy is a basic conceptual category that is deeply entrenched in our understanding, categorization, and perception of objects in the world as well as in (linguistically) communicating about these objects. Furthermore, animacy is also a linguistically encoded category that determines diverse grammatical phenomena in the world's languages. In this paper, we focused on the animacy effects of DOM in Turkish, which is generally believed to be a DOM language along only one dimension, namely the referentiality hierarchy, or more precisely, specificity. The animacy dimension of Turkish DOM has thus far remained unexplored. In order to fill this gap in the literature, we carried out an empirical investigation and focused solely on the interaction between the animacy of direct objects and the occurrence of DOM in Turkish. Our results reveal that Turkish DOM is sensitive to animacy effects and that optional DOM marking is modulated by the animacy level of direct objects in the absence of any other factor, such as specificity, that may influence the occurrence of overt DOM.

In this study, the animacy and definiteness of the subjects were kept constant by using personal names so that the subjects in these sentences were easy to distinguish from the indefinite objects. The semantic-pragmatic properties of the objects as well as the sentential context in which they were used were also kept constant in order to exclude the effect of factors other than the animacy of the objects on the occurrence of DOM. Hence, we were able to examine the interaction of animacy with the occurrence of DOM – or the lack of DOM – on indefinite direct objects. The findings reveal that the occurrence of DOM is in accordance with the levels of animacy presented in the cross-linguistically valid animacy hierarchy. Human-denoting objects displayed the highest likelihood to take overt DOM, and overt marking was preferred significantly over the zero option. Animal-denoting objects had an equal likelihood of both overt and zero options and did not display a significant difference between the two, whereas the inanimate-denoting objects displayed a higher likelihood to take the zero marking. Moreover, these three categories (i.e., Human, Animal, and Inanimate) differed significantly from each other. The same pattern persisted when the animacy levels were split into finer grained animacy categories, but the sub-animacy categories were not distinguished from each other. In light of these findings, we introduce the scale in (13), which predicts the likelihood of the occurrence of Turkish DOM.

### (13) The animacy scale for Turkish DOM

Human [Relation and Profession Terms] > Animal [High and Low Animals] > Inanimate [Concrete and Abstract Entities]

Interestingly, Bamyacı et al. (2014) also presented the same ternary scale for the likelihood of the occurrence of optional verb number marking in Turkish. This scale additionally portrays the gradient nature of the animacy feature yielding optionality, which does not make clear-cut distinctions leading to categorial splits and instead lies on a continuum. In the use of Turkish DOM, the optionality manifests itself in three ways: through i) a tendency towards overt marking, ii) equal chances for both options, and iii) a tendency towards zero marking. Here, we would like to caution the reader and prefer to describe this pattern as a tendency rather than obligatoriness because we know that for contexts in which the specificity feature of the objects is manipulated, an animate-denoting object may become ungrammatical with DOM whereas an inanimate object may take overt DOM. Therefore, in light of these data we suggest that animacy of the object referent affects Turkish DOM alongside the widely accepted factor of specificity. We can however, not yet determine the relative weight of these two factors. The data we have re-analyzed from a recent study show a trend whereby the specificity factor may dominate animacy but these results are thus far inconclusive.

When these findings are evaluated in line with the 'differentiating' approach, namely by adopting the view that DOM functions to differentiate subject and object arguments from one another, it becomes possible to argue that the human-denoting objects are most similar to the subject arguments. Therefore, DOM is predicted to mark human-denoting direct objects to avoid any ambiguities that may arise, whereas it should not mark inanimate direct objects because these are already typical objects and do not cause any confusion. More precisely, human referents are most likely to be subjects, and therefore human objects



are most likely to cause ambiguity. Based on the current findings one could argue that Turkish DOM also has a differentiating function, because the data show a pattern whereby the direct object receives higher preference when marked with overt DOM as its animacy level increases.

The data also lend themselves to arguments in favor of the ‘indexing’ approach, which suggests that DOM marks objects that are above a certain cut-off point on the prominence scale. In our data, Turkish allows DOM when the direct object denotes entities higher than the inanimate level. Animals are free to take overt or zero DOM, and the likelihood of DOM marking increases towards the higher end of the scale in the human category. Given that the animal category allows both zero and overt marking, without a significant tendency towards any of them, the differentiating approach may not account fully for this category, but the indexing approach does.

Taken together, we observe that DOM is triggered by the animacy level of the entities denoted by the direct objects, and we can conclude that Turkish DOM encodes the semantic properties of the direct object. In addition to the relatively well-known specificity effects of Turkish DOM, animacy appears to be another factor that contribute to the salience and topic-worthiness of direct objects marked with DOM. Overall, we find that the animacy effects in DOM are complex, which can result from both the differentiating and the indexing functions. The effects observed here are amenable to both differentiating and indexing views of DOM, which is in line with the recent findings considering the two views to be complementary rather than competing or alternating.

Looking from a cognitive perspective, we could suggest that the animacy feature, being one of the important prominence features determining the prototypicality of arguments, may facilitate comprehension of sentences (Bornkessel-Schlesewsky & Schlewsky 2009; Bornkessel-Schlesewsky & Schlewsky 2014). In line with “the interface hypothesis of incremental argument interpretation” of Bornkessel-Schlesewsky & Schlewsky (2014: 329), we could argue that the animacy feature of the arguments may guide the readers in assigning thematic roles and determining the subject and the object arguments. This would especially enable faster comprehension when the verb most frequently appears in the final position, as is the case for Turkish. Based on the animacy level of the arguments, the thematic roles could be assigned in advance without the need to wait for the verb to appear. Here, DOM could function to disambiguate the arguments when both the subject and the object are of the same animacy level and, by doing so, DOM could enhance comprehension and avoid delays.

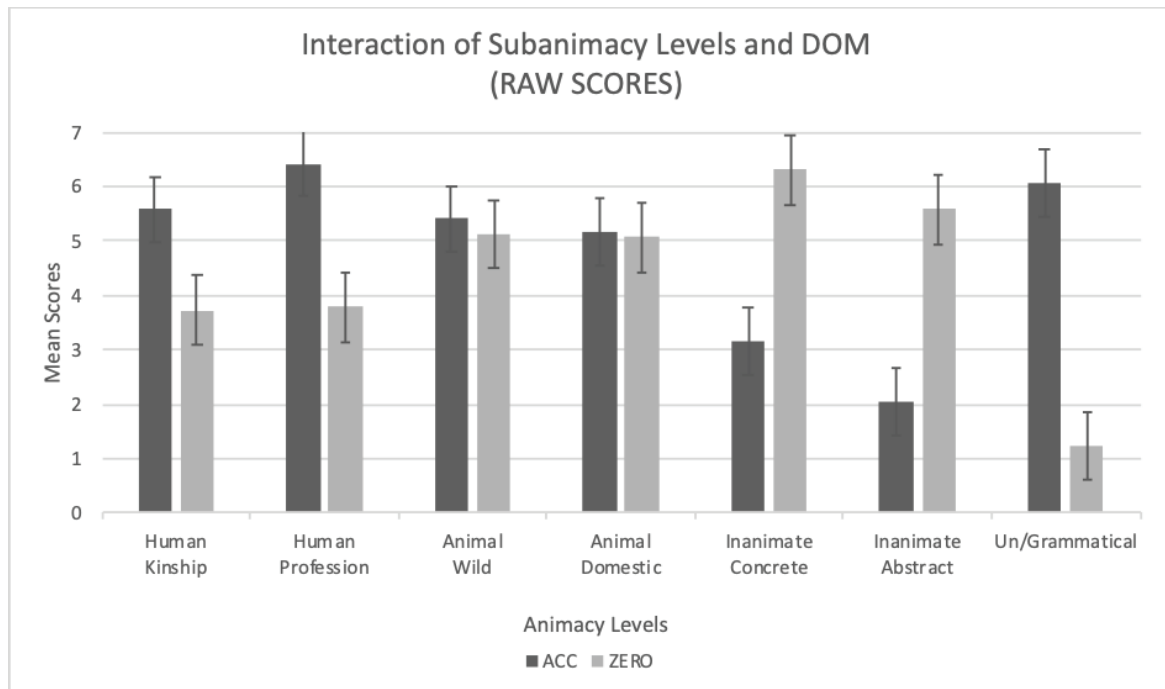
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## APPENDIX



**Figure A1.** The acceptability of sentences with and without DOM on direct objects that denote entities with varying animacy levels based on raw scores. Error bars represent +/- 2 standard errors (SE).