

Quantifying semantic animacy in Persian

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Abstract

In a direct replication of Radanović et al.'s (2016) work, the typical goal of this paper is to reproduce their experimental results by comparing the distribution of animacy in two languages coming from different language branches within the Indo-European language family, namely Persian and Serbian, with a new but comparable sample of participants. This study comprised of verb-agreement experimental task and a normative study which helped to describe the underlying distribution of semantic animacy in Persian. The findings of this study support the idea that semantic animacy is language independent due to its biological grounding and is more likely to be similar to linguistic animacy compared to pure biological animacy. Moreover, graded nature of semantic animacy was shown by the present results and is in line with Radanović et al.'s (2016) study.

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" Quantifying semantic animacy in Persian. "

1.Introduction

The semantic property of nouns indicating the extent to which a noun referent is alive, is called animacy. The fundamental distinction between living and non-living entities, is regarded as a crucial factor in language processing. According to Opfer and Gelman (2010), the ability to distinguish human beings and animals from non-living entities emerges innately at the very early age and it is a cognitive categorization which has an extensive effect on human behavior. More generally, a number of scholars (Johansson, 1973; Abrams & Christ, 2003; Pratt, Radulescu, Guo, & Abrams, 2010) argue that animate beings evoke visual attention in a faster pace than inanimate entities which typically remain stationary, and the attention span that can be held by an animate stimulus is much longer. Also, Nairne et al. (2013) indicate that animate nouns are much easier to be remembered compared to inanimate nouns; as well as pictures that represent animate stimuli capture attention quicker than those illustrating inanimate objects (Bonin, Gelin, & Bugaiska, 2014; VanArsdall, Nairne, Pandeirada, & Cogdill, 2014).

Based on the animacy realization in language, there are different notions of animacy used by linguists. For instance, linguistic animacy which highlights the role animacy plays in different linguistic phenomena, were introduced and were treated as a graded property by linguists. While semantic animacy refers to a notion investigating semantic knowledge. According to Radanović et al., (2016) semantic animacy is widely used in the psychological research but it has never been defined in a clear and detailed manner. Generally, animacy has been treated the way it is explicated in biology. However, Radanović et al., (2016) empirically tested the degree to which semantic animacy is whether similar to biological animacy or it can be assumed to be the same as linguistic animacy in being graded and language dependent.

In the present study, which is the replication work of Radanović et al., (2016), the aim is to empirically carry out a research and find out whether semantic animacy categorization influenced by language and culture, and whether the representation of semantic animacy differs among speakers of Farsi (in Iran and in the Netherlands (Bilinguals)), as well as speakers of English and Serbian. Finally, by using an experimental task, the relation between animacy categorization and the language use in terms of agreement will be investigated.

Organization of the thesis

This thesis is divided into ten sections. Chapter two to five reviews the relevant literature related to the topic of animacy and gives a detailed account of subject-verb agreement and the ways in which agreement is affected by animacy in English and Persian. Chapter 6 gives an overview of Radanović et al.'s (2016) work. Chapter 7 discusses the methodology of the study, and Chapter 8 presents the results from the present study. The results are related back to the research questions in chapter 9. Finally, a short conclusion is given in chapter 10, and in the same chapter, the limitations of the study as well as suggestions for further work is provided.

Theoretical background

This chapter reviews the theoretical background of the research based on previous literature and gives an overview on the different concepts surrounding animacy and subject-verb agreement. In the first part of this chapter, the nature of animacy are discussed to give clearer insight of how human distinct animate and inanimate entities since it affects their decision in subject-verb agreement. Next, the fundamental approaches of subject-verb agreement will be continued introducing as well as the comprehensive method that will be used in the thesis. In the fourth and fifth section, the influence of animacy on subject-verb agreement in Persian and some other languages will be presented. Later on, the study from Radanović et al., (2016) regarding the measurement of semantic animacy is provided, as well as the hypotheses are presented in the last section.

2.The nature of animacy

Animacy plays a role in natural language processing, different language phenomena in various languages, last but not least, has a definite outline in sentence grammaticality as well as sentence acceptability. For instance, a sentence like (1) does not violate any grammatical rule but is not acceptable as it seems unnatural to some extent, while the sentence (2) would be correct if some animal or bird, was the being that noticed the cage.

1. The cage noticed the bird, that was just flying there.
2. The bird that was just flying there noticed the cage.

Understanding the way human differentiate animate/inanimate subjects would advance the perception in the language processing, especially decision in subject-verb agreement. In fact, the intrinsic nature that distinguishes between animate and inanimate for humans is fundamental to cognition. It creates the primitive ground for understanding the surrounding world in connection with causal interpretation of actions, attribution of mental states, and the feature of biological processes. Six-month-old offspring are already able to distinguish between animate-inanimate distinction in the basic level, and by the age of two, they have developed the caution characterizing animate beings (Rakison & Poulin-Dubois, 2001).

According to the brain researchers, the division takes place in the brain's organization (Tao Gao, Scholl, & McCarthy, 2012). These studies support the idea that the animate/inanimate distinction is an intuitive perception of how humans see the world.

The standpoint that defines animate and inanimate entities has been argued by research scientists from diverse fields. Firstly, it is due to the reason that not all languages consider animacy to the similar entities in different grammatical categories. Several languages such as English, differentiate between human and not-human for pronouns selection, while other languages, such as Russian, make the differences between animate including human and animals versus non-animate entailing the remaining part for their interrogative pronouns (Comrie, 1989). Secondly, it can be explained from the view that animacy and aliveness have been scrutinized as relative stances rather than fixed states in the world (Dennett, 1996). Particularly, people use various cognitive strategies to clarify and forecast actions of the entity based on whether they think that entity is animate. Psycholinguistic researchers have also supported the point that animacy is considered to be more cognitive recognition and not a completely extra perceptive (Nieuwland & van Berkum, 2005).

In linguistic studies, there is no clear-cut notion for animacy (Swart et al., 2007). Especially, biological distinctions are not the only factors in which animacy can be defined in linguistics (Yamamoto, 1999). In Algonquian languages, although the gender system goes along with the scope of animate-inanimate membership of which rely on biological differentiation, there is an exception that involve in pure idiosyncrasy (Mithun, 1999). One of the examples is the noun for 'raspberry' is categorized animate gender while 'strawberry' lies into the inanimate gender class in the Algonquian language Fox (Anderson, 1997). Hence, animacy has ambiguous categories, or is lacking transparent boundaries. In line with this argument, Cormie (1989) claims that the reflection of animacy (a.k.a. the distinction between animate and inanimate) is not a single linear scale in which all entities are categorized neatly, but presents a natural human interaction between various parameters. Animacy, in other words, is mostly examined from a semantic, cognitive and ontological perspective (Yamamoto, 1999; Dahl, 2008). Such parameters including General Animacy Scale (aka. cognitive scale), Hierarchy of Persons, Individuation Scale and Participant (Semantic) Roles create the notion of animacy (Yamamoto, Comrie 1989). The most fundamental, ontologically oriented parameter, General Animacy Scale, demonstrates a hierarchical scale of animate and inanimate as a product of anthropocentric human cognition. In this scale, the distinction between animate and inanimate relies on the view that humanness (including human and non-

human entities) is the principal representative of all animate entities (Miller & Johnson-Laird, 1976; Myhill, 1992). Living creatures that possess the consciousness or receive the “empathy” (i.e. the speaker’s identification with different degree towards an entity that participates in the event) of having consciousness would fall into a variety of animate categorizations (Kuno & Kaburaki, 1977; Langacker, 1991). Due to human’s perception, Yamamoto (1999) has argued that not all animate entities are all equally comparable. Some entities are more centrally animate (e.g., biologically alive, intelligent, domestic, etc.), while others are considered more peripherally animate (e.g., plants and primitive creatures such as amoebae). There are also some other differences are found in the inanimate class, some of which are likely more animated than others (e.g., human-like machines versus physical objects like furniture).

Likewise, a deeper insight into the nature of animacy following the cognitive, ontological approach is analyzed in Dahl and Fraurud's papers (Dahl & Fraurud, 1996; Dahl, 2008). From their perspective, animacy is at the last ground of the questions of the distinguish between “persons, that is, principally human beings perceived as agents, and the rest of the universe [...] Indeed, the notion of “personhood” seems to embody what is quintessential to animate beings, both the roles as agent and experiencer, and the focus on the individual” (Dahl, 2008:145). The reason behind is the tie of animacy to individuation, i.e reference types (Dahl, 2008:146). The author assumes that animate beings are likely to grasp as individuals than inanimate entities. Among the class of animates the self and other individuals who perceive the world and act upon it as myself are the core. According to Dahl, humans use themselves as models for others. In other words, animacy is obtained through a graded cognitive scale, responding to an elaborate nominal hierarchy: the self with his/her properties (e.g. human, 1st person, definite, singular, countable, etc.) is the model for others. In this scale, the determination for the position of a category depends on the grade of its similarity to the self, i.e. by the amount of properties it links to the self. This provides a better understanding of the interaction between reference types and animacy in language processing.

2.1.1 Biological and semantic animacy

In principle, biological animacy separates all entities into either living (animate) or non-living (inanimate). The biological status of animacy does not define this concept thoroughly but instead the nature of animacy in language can be tied up to linguistics and defined properly by semantics and syntax. Animacy in semantics is conceptualized universally, in that human beings are perceived to be more animate than the rest of living entities.

Semantically speaking, natural forces are considered to be as non-livings (inanimate), but studying their behavior reveals their similarity to animates rather than inanimates in that, they are capable of changing courses without warning, often they cause damages, injury, death and destruction as well as having the power of commencing a movement. Buss (1991, 2009) demonstrates that natural disasters and extreme climates are two factors which are highly likely to played a role in shaping the prehistoric evolution of human behavior. In line with Buss' (1991, 2009) study, Guthrie (1993) mentions, due to recorded historical evidence from classical mythology to modern religion about the beliefs on supernatural phenomena, humans attribute volitional acts and characteristics to inanimate natural forces the same way they do to living entities. This claim proposes that the cognition is guided by the perception from agentivity of an entity and not its animacy notion. Moreover, the cognitive potencies and abilities that animate beings have, is not merely dependent on their alert observation in the environment for unexpected happenings and events but it is due to providing explanations which is adaptive since they make events to be more predictable. Furthermore, the casual clarification of events in language analysis, can provide a linguistic encoding in the process of subject and verb combination in sentences. Chomsky (1981), according to standard linguistic accounts, suggests that a verb determines thematic roles, that semantically signifies the combination between the arguments introduced with the help of NP and the actions instigated by the verb. On this account, Lowder and Gordon (2012) propose that the thematic role of 'agent' is assigned to the subject by the verb *injure* in sentences like '*The criminal injured the farmer in the field beside the barn.*' in which the animacy of the subject is required while, in a sentence like '*The revolver injured the farmer in the field beside the barn.*' having an inanimate subject makes processing the sentence quite difficult even though the sentence still may seem understandable. To put it another way, when it comes to animacy versus thematic role, a verb determines the thematic role (agentivity in this case) to its subject, which the verb postulates having an animate subject that should play an agent role at the same time. Thus, the act of injuring requires an agent which clearly needs to be animate.

2.1.2 Grammatical animacy

Unlike semantic animacy, grammatical animacy is commonly arbitrary and grammatical. In grammatical animacy, animacy status is not fully predictable from biological animacy and it is not evident where an entity is located in the animacy hierarchy. For instance, there are some ambiguous cases in which there is no clear-cut categorization of animacy such as *they* and *one*. More importantly, it is lexically specific and the function is similar to a noun classification system such as gender even though syntactic animacy still can make allusion to notion of animacy intuitively (Maclaughlin, 2014). In languages that grammatical animacy influence can be found, grammatical characteristics can be indicative of the animacy feature of a stimulus. However, such characteristics cannot be observed in English as it is a language that is more likely to be heuristic in its animacy implementation, in that, general formulation serves to determine the animacy status of an entity rather than grammatical diagnostics.

2.2 Animacy hierarchy

Class labels need to be clarified, in order to construct models of language that can be utilized to carry out language processing and classification tasks, however, regarding animacy, this is rather intricate. Semantically speaking, animacy can be perceived as a hierarchy, referring to the most animate being (human) and a noun which is something not animate (inanimate). There exists a number of miscellaneous categories and subcategories between these two extremes. According to historical and evolutionary linguistics, language changes over time and also different languages implement various selection of animacy and category boundaries. An example of representing primitive animacy hierarchy is through Silverstein (1976), HUMAN > ANIMAL > INANIMATE. A range of linguistic phenomena have been accounted for by hierarchies or scales (cf. Richards & Malchukov 2008). Some studies concern with pronouns and personal names and regard them as mere animate nouns. Such variety of hierarchies, ranging with varying categories, have been named differently by a number of literatures, as it is shown in the following (Lockwood et al., 2012):

Sample prominence hierarchies

1. (a) *Empathy Hierarchy* (DeLancey, 1981: 644)

SAPs (the speech act participants) > *3rd pronouns* > *human* > *animate* > *natural forces* > *inanimate*

2. (b) *Hierarchy of Reference* (Zwicky 1977)

$1 > 2 > 3$

3. (c) *Personal Hierarchy* (Siewierska, 1993: 831)

$1 > 2 > 3$ *human* > *higher animals* > *other organisms* > *inorganic matter* > *abstracts*

4. (d) *Animacy Hierarchy* (Comrie, 1989: 128)

1st/2nd person pronouns > *other human NPs* > *animal NPs* > *inanimate NPs*

5. (e) *Hierarchy of Grammatical Persons for Algonquian Languages* (Dawe-Sheppard & Hewson 1990)²

$2 > 1 > 3 > 3\phi$

6. (f) *Navajo Noun Ranking* (Young & Morgan 1987: 65)

humans/lightning > *human infants/larger animals* > *medium-sized animals* > *small animals* > *insects* > *natural forces* > *plants/inanimate objects* > *abstractions*

As was discussed by Lockwood et al. (2012), the local persons (i.e., SAPs, the speech act participants) are included in most of the above hierarchies (also the third category) however, just the subcategories of third person, is included in the last hierarchy.

The importance of prominence hierarchies is highlighted by Lockwood et al, from three distinct perspectives. Firstly, various phenomena in language families are described and manifested through the usage and employment of a hierarchy. Second, morphosyntactic patterns as well as cross-linguistic alignments and differences are controlled by hierarchies

which make hierarchies to appear in typological interest. Lastly, the majority of formal approaches to grammar face theoretical problems due to prominence hierarchies, given that, the relationships between the arguments are encoded by hierarchies that can be hard to represent based on the present-day assumptions about agreement, features, etc.

When animacy plays a part in a linguistic phenomenon, according to de Swart et al. (2008), particularly, the phenomenon is applicable only to a specific cut-off point in the hierarchy, for instance, it applies only to nouns that refer to animals or even higher animate beings. In the Empathy hierarchy (case marking model) by DeLancey (1981) (shown above, 1a), the cut-off point, generally lies between first, second, as well as third person pronouns, despite Comrie's (1989) argument that indicates person property is better not to be conflated with animacy. Moreover, de Swart et al. (2008) argues that animacy hierarchy could be regarded as gradient, in that there are no clear-cut boundaries of animacy hierarchy. In some languages, as far as animacy categories are concerned, there is a 'grey area' where some nouns can lie between two extremes of being both animate or inanimate for instance, in Russian nouns such as *микроб* 'microbe', *личинка* 'larva', *бактерия* 'bacterium' *куколка* 'chrysalis', can be referred to as both animate and inanimate. This mentioned rule, already demonstrates the probabilistic nature of animacy, however, in general, it hasn't been implemented in grammar concerning the study of animacy effects, which precisely marked in terms of rules functioning on categories (Lockwood et al. 2012).

3.The notion of agreement

3.1 What is agreement?

In the world's languages, agreement phenomena are believed to be pervasive. Probably the most widespread agreement phenomena in different languages could be subject-verb agreement. An agreement of one sort or another can be observed in most human languages. The cornerstone rule that forms the background of agreement states that subjects and verbs must agree in number. Different particular features like number, gender and animacy are required in many languages that agree with particular elements in a sentence. Particularly, the agreement is controlled by one element which controls the other coming elements. Typically,

there are some other elements like prepositional phrases and dependent clauses that play a role of intervening elements which separate the agreeing elements; however, these words and phrases themselves typically convey agreement features which infuses a challenge to the sentence processing system as the brain has to process so many agreement features of the same kind. In theory, the intervening elements in a sentence might be lengthy to some degree. For instance, in a sentence like ‘the children are hungry’ the verb shares a common border with the subject and the adjective while in a sentence like ‘the children from the orphanage center are hungry’ the verb does not need to be contiguous with the subject and there is no restricted limit for the number of elements occurring between subject and predicate.

3.1.1 Concord (and/or agreement)

The grammatical encoding gives an insight of the ways in which concord is constructed. By older grammarian’s concord often called agreement. Quirk et al. (1972) stated that agreement is a relationship between two grammatical elements where one of them exhibits a particular feature (e.g., plurality) that accords with the exhibited (or semantically implicit) feature on the other unit. Concord is defined as regular syntactic feature specifically languages that display a variety of morphological shapes like number, gender, tense, aspect, number and person in verbs as well as case in nouns and adjectives designating the mentioned syntactic function of words. In English, subject-verb concord is often confined to the third person and the present tense; however, in both cases, *to be* is an exception. In the concord relationship feature, one form lays the pattern and the other complies; it is mentioned implicitly one form “displays a feature” that agrees with a “displayed feature” in the other forms Quirk et al.’s (1972). To put it differently, it can be interpreted as copying relationship in which the copier is placed in a lower spot in hierarchical scale than the copied. It is typical of such scales that the noun is always placed at the top of the hierarchy thus it is always the noun that exhibits the concord feature if a noun exists in a concord pair. Pronouns, adjectives, verbs and noun-attributes copy nouns. Therefore, when a singular or plural form of a verb is mentioned, it means the form that is a suitable copy of correlated noun in respect of a particular feature, which is often considered to be number, (the verb *to be*, is not included). The fundamental rule is frank, as Quirk et al. (1972:576) defines ‘a singular subject requires a singular verb and a plural subject require a plural verb’.

As a matter of fact, the number of a subject does not only indicate singularity and plurality by a morphological feature, alternatively, there are three variations on number as a type of subject-verb concord, viz. notional, proximity and grammatical. The grammatical concord notion is morphologically based and it appears when the subject matches the verb in number.

While the Notional concord is said to be semantically based, Quirk et al. (1985:757) state that "according to the notion of number rather than the actual presence of the grammatical marker while attraction or proximity is positionally based." As an illustration, in "three birds" the -s agrees with the notional "three", however, if the word preceding the noun was "one" then there would be no presence of plural -s, in other word, it's the actual content and notion of the adjective "three" rather than its mere presence, Quirk et al. (1985:757). With respect to the proximity concord, Quirk et al. (1985:757) define it as agreement of the verb which is precedes the noun phrase in preference to agreement with the head of the noun phrase that works as subject.

Likewise, there are some constructions similar to proximity concord that need to be discussed. A collective noun is defined as a noun that can take either a plural or singular form which is followed by a phrase that embodies a plural noun. Plurality and singularity of the verb has an impact on the sentence meaning. In some cases, the plural verbs result from notional concord in which the collective noun is considered as a group of individuals rather than a single unit thus, in some sentences the proximity to a plural noun does not always result in having plural verbs. Particularly, there are some collective nouns like *number* and *lot* that have always been inferred as plural while following with a plural noun so it sounds ungrammatical if followed by a singular verb. Noticeably, *a number of* and *a lot of* behave as *several* and *many* and have become plural quantifiers; the latter can be used as mass nouns with singular concord and the former can be used either with mass nouns or count nouns, for instance in sentence like "a lot of snakes *is/are green" the plural noun have come to be interpreted as plural when followed by a plural noun.

Virtually, *lots of* as morphological plural when is used with mass nouns takes singular concord, this can be seen in a sentence such as "lots of coffee was spilt on the floor". Normally, in coordinate constructions in conjunctions, two or more singular nouns are interpreted as a plural and go with plural concord unless conjoined nouns form a single semantic unit then its interpreted as a close lexeme by notional concord and takes singular concord. In case of having more of the nouns as plural, this still might be the case. All the

aforementioned exceptional cases testify that notional concord overrides the grammatical concord (Lehmann 1986).

3.1.2 Theoretical perspectives on agreement

The grammatical agreement phenomena or concord needs to be somehow treated intensively in any grammatical theory. Generally, agreement phenomena have been dealt with marginally and incidentally by some linguistics theorists. However, a number of scholars took agreement seriously and not secondary by scrutinizing it as a descriptive issue in particular types of languages and an established problem in theory construction (Barlow, Ferguson (1988), Langacker, Brentari, Larson, and MacLeod, (1988); Anderson (1984); Darlymple (1995) Siewierska (2004); Enger (2004); Fehri (1993); Thornton (2016)). The theoretical perspectives vary between the theory of neutral typological structure to the premise of the validity of formal model. Moreover, the degree of generality extends from the universal nature of human language interaction to involve another aspect of grammatical agreement or with agreement solely in a language or languages that share similar patterns. The likelihood of presenting a general account in the phenomena of agreement is highlighted prominently since Moravcsik's (1978) study on agreement.

The existence of hierarchies, as it would be expected, has been revealed by the work on universals and typology that led to discoveries about comprehensive generalizations in agreement. The scope of various agreement constructions is exposed by the broad-based work of Moravcsik (1978) and Lehmann (1982). The impact of typological and universal approaches can be seen evidently in the research with functional perspective, done by Croft, Corbett, Lapointe, Lehmann and Moravcsik. From the communicative perspective, Lehmann (1986), in particular, gives an insight of functional account of agreement.

Agreement in terms of specific grammatical frame works can be classified under different theoretical perspectives; for instance, Standard and Government Binding Theory in which the former corresponds to the model of generative grammar laid out by Chomsky (1957-1965) and the latter (GBT) is a theory of syntax in transformational grammar (1980). Also, in the above-mentioned theories a numerous research has been done by different scholars namely: Chung and Georgopoulos (1990), Doron (2010), Lapointe (1988). From the lexical-functional theoretical perspectives, the scholars like Kaplan (1975) and Bresnan (1982), Bresnan and Mchombo (1986), Fassi Fehri (1993) can be mentioned. There are two other approaches that contributed to research on agreement, Relational Grammar (Perlmutter

& Aissen, 1983) and Generalized Phrase Structure Grammar and Categorical Grammar (Sag & Klein, 1982), Gazdar et. al (1983), Timberlake (1988), Steele (1981), Zwicky (1986), Pullum (1985). In addition to the mentioned groups, a related area of research on agreement comes from the field of historical linguistics (Greenberg, 1978; Naro, 1981; Givón, 1976), sociolinguistics research (Corbett, 1979; Poplak, 1980; Guy, 1987) as well as language acquisition research (Karmiloff-Smith, 1979; Demuth, 2008).

The cross-linguistic aspects of agreement have been the focus of many recent papers. The research on universal and typology regards agreement that is problematic in linguistic comprehension of objects and in such works, the center of discussion is on the pragmatic aspects of agreement. The effect of gender and noun classes on taxonomies and individuation of objects was explored by Heine (1982) and Walter (1982). In connection with number, Biermann (1982) examines the agreement and, with that general framework Ostrowski (1980, 1981) focuses on the functions of agreement and the emphasis is laid on the syntagmatic aspects of agreement.

3.1.3 Working definitions of agreement

In a purely traditional statistic way and on a merely structuralistic basis, Lehmann (1982: 206) offers a working definition of the notion of agreement as an asymmetric and unidirectional grammatical relation in which one category, for which an element is identified clearly, is expressed on another element. The definition is as follows:

An element (i.e, element B, like verb, adjective, pronoun, object, numerals etc.) agrees with the other element (i.e, element A, like noun phrase, verb phrase, adposotinal phrase) in lexical and syntactic categories (i.e, category C) if the following statements holds true, Lehmann (1982:206):

1. *There is a grammatical or semantic syntagmatic relation between A and B.*
2. *A grammatical category C with a form paradigm of subcategories exists.*
3. *A belongs to a subcategory c of C, and A's belonging to c is independent of the presence or nature of B.*
4. *is expressed on B and forms a constituent with it.*

Lehmann states the above definition embraces only those grammatical phenomena that have been traditionally considered as agreement. With the help of this definition, a decision procedure comes to serve us to claim whether a stated phenomenon is agreement or not. This provide us with various conceptions of agreement. He specifies the exclusion of *government* from his proposed definition and states that *government* is not subsumed under agreement. Virtually, government can be either the relation A or relation B mentioned above in condition (a) thus, agreement can show up in government relation, that is to say, in governing terms. It should be noted that the conjunction of the conditions may result in an arbitrary and unnatural concept given that the conditions of the definitions are entirely specific and work independently of each other. The reason for that may be the statistic and structural nature of the definition which does not give a clue about what actually agreement is for and what does it do.

A number of comments on the conditions is provided by Lehmann (1986). First of all, the first condition will be fulfilled, if and only if, two constituents are not grammatically or semantically related when there exists a coincidental categorial conformity thus, agreement is not going to be taken into account. As for condition 2, by having a form paradigm for C, Lehmann describes the distinctive feature of certain phenomena as borderline cases of agreement in C. Some markers relating to other categories than C emerge on B if A belongs to a particular subcategory c of C. This might be the case when the verb and object agree in number if the object is definite (Moravcsik, 1971). In the condition 3, C being a grammatical category of A, is presupposed by its first clause. A complex theoretical issue may arise here, regarding this formulation, first, according to the rules of syntax and morphology C may 'land' on A; second C maybe lexically inherent in A. If A is a noun then the latter is true, if C is a gender and noun class, but if C is number, case and definiteness then the former is true. Concerning the former situation, A might be included in a certain category, without this being operated on A. Thus, Lehmann specifies that condition 3 does not require element C and c to be expressed on A. Furthermore, likewise condition 3, it should be refused, that the categorization of A as c need to be depended on B, if not, in a case of subject and verb agreement, direct and indirect object, it might be assumed that in case function or syntactic function the verb accords with its arguments. In this condition, definiteness agreement with the NP is designated as a peripheral form of agreement, that is to say, to such an extent, agreeing arguments play a role in the definiteness of the NP.

Making the extension to Lehmann's work, Krámsky (1968) argues that the definiteness of agreement within the NP, can be visible particularly by the inflection of its adjective

attributes in Croatian, Slovenian and Latvian, as well as German, apart from other things that are involved in these languages. Definiteness and indefiniteness of the noun, in Arabic, is shown exclusively on the attributive adjective Ostrowski (1982). In condition 3, agreement is not included by the first clause, for German and Balto-Slavic definiteness, in contrast, in all of the mentioned cases inclusive Arabic, the attribute does not contribute to the determination of the head noun, in the second clause.

As for condition 4, c needs to be theorized that is expressed on B, if this is not the case, Lehman (2015) suggests that in English we need to consider number agreement of the adjective with the head noun. As a substitute, the condition conveys that c is expressed on B, then the expression of c, to a certain extent, morphologically needs to confine to B.

In order to prevent the occurrence of agreement agglutinative marking of c on the sub-component of a phrase, the second clause of condition 4 is essential. Lehmann clarifies by some examples from Persian and Yucatec in which the first clause of condition 3 diverges in that B and c do not make up a constitute, *ab-e garm-ra* ([water- AT warm] ACC) ‘warm water’, *he? Kacal-oob* ([egg-broken]-PL) ‘broken eggs’. Further, Lehmann discusses that in one might rule out such kind of constructions from agreement by condition 3 given that here A does not hold by c, for instance, *ab* is not considered to be in accusative form and *he?* is not in plural form.

In line with the syntactic role of participating elements, a bulk of examples of agreement were given by Lehmann (1982) and Lapointe (1988); which is grouped by Melčuk (2006: 67) according to the parts of speech of the controller and the target groups. He proposes three types of agreement from the surface syntax perspective, as follows:

If the target **w₁ (word)** (constituents that their form is determined by agreement) and the controller **w₂** (which particularly determines the agreement) are SSynt(surface-syntax)-linked, we have *contact* agreement; more specifically:

The target **w₁** is a SSynt-Dependent of the controller **w₂**: *upward* agreement; the controller **w₂** is a SSynt-Dependent of the target **w₁**: *downward* agreement (the terms are from Nichols 1986).

If the target **w₁** and the controller **w₂** are not SSynt-linked, we have *distact* agreement; another current term is *long-distance agreement*. (Nichols, 1986:36)

Lapointe (1980) proposed a broad definition of agreement and government. The following definition gives an insight of government from Lapointe's point of view:

Constituents A rules constituent B if the following holds true:

1. B is subordinate to A;
2. This syntagmatic relation between A and B is semanto-syntactically inherent in A so that A determines the syntactic function which B has in the construction. This entails that if this syntactic function is expressed by morphological categories appearing on or with B, then their selection is also determined by A.

Lehmann (1986) criticizes that the above definition is open to interpretation that other phenomena, as well, might be called government. He gives an example of the phenomenon of verbal mood that can be ruled by a conjunction in a subordinate clause, thus in case this is a statement in accordance with reliable facts, the definition is not able to cover it.

Lehman argues that in the intention of the Lapointe's definition an object may be ruled by its verb, or a complement is governed by its preposition despite the fact that the object or complement are not case marked. On one hand, the characteristic of syntagmatic relation between A and B is particularized more marginally for government than for agreement, on that, as condition 1; on the other hand, in the case of government, that the necessity of operating a morphological relation on B (condition 4) which needs to be imposed on agreement, seems unnecessary.

3.2 Forms of agreement

Lehmann divides agreement into elements and grammatical categories, which need to be differentiated. Elements are said to be agreement markers holders while grammatical categories constitute agreement markers. The classification of elements can be into parts of speech or in components that have specific syntactic functions.

Generally speaking, according to Lehmann, verbs can agree with all parts of speech belonging to the nouns, the major word classes for instance, are adjectives, numerals, all types of pronouns, articles, auxiliary verbs, substantives and pre- or postpositions (adpositions), as

well as minor word classes like particles, interjections, conjunctions and the like. The classification of syntactic constituents displays that agreement can take place in verb phrase, noun phrase and adpositional phrase. Inside the noun phrase (NP) attributes and determiners always agree with the head noun, which are demonstratives, nominal appositions, relative clauses, adjective attributes, articles, numerals, possessive attributes (possessive pronouns, nominal possessors). However, in contrary, with the attributive genitive, the posessum which is the head noun, agrees with its nominal possessor. Furthermore, if only the noun phrase comprises of substantival pronoun, in that case, it agrees with repraesentatum.

Inside the verb phrase, the agreement of the auxiliary verb or the full verb with its arguments is required for example with the subject, direct and indirect object and sometimes with others. Occasionally, a nominal predicate agrees with the subject and last but not least in the nominal complement the Appositional Phrase (AdpP) the adposition agrees with it. First of all, in grammatical categories agreement, Lehmann differentiates between two major groups namely the lexical and the syntactic taxonomies. Lexical agreement category comprises all classification of nouns: nominal classification, verbal classification, possessive classification, article classification, gender and noun classes. On the other side, number or case and person belongs to syntactic categories.

A number of examples were exemplified by Lehmann (1982), however, most of them will be excluded as they are not related to the topic of discussion in this paper. Agreement of the predicate was shown in a few languages. For instance, in Turkish, verb always agrees with its subject in both number and person while in Russian the past verb agrees with its subject in number and gender. The examples are Turkish and are taken from Wendt (1972:56):

1. Adam çalış-ıyor - adam-lar çalış-ıyor-lar

man work-PRS Man-PL work-PRS-PL

“The man works” “The men work”

2. žurnal gorel (m) – kniga gorela (f) – pis'mo gorelo (n) - knigi goreli

“The journal burnt” “The book burnt” “The letter burnt” “The books burnt”

Lehmann (1982) states that the verb in Arosi agrees with its object in number and person whereas, in case of having either animate and inanimate object, Swahili displays class agreement with its object. Furthermore, in Woleaian (Sohn, 1975: 107f) verb shows agreement in animateness as well as person and number. Some examples of verbs with direct object are as follows:

3. a) au ome-si-a i noni.

ARO SBJ.1.SG. see-TR-OBJ.3.SG NTOP. Man

“I see the man”.

b) iraau na mwaninonirau ome-si-i i mwanihaka.

they TOP PL man SBJ.3.PL. see-TR-OBJ.3.PL NTOP PL. ship

“The men see the ships” (Capell 1971:67)

4. a) Ni-li-mw-ona m-toto.

SWA SBJ.1.SG-PRT-OBJ.CL1-see CL1-child

“I saw the/a child”

b) Ni-li-ki-ona ki-tabu.

SBJ.1.SG-PRT-OBJ.CL7-see CL7-book

“I saw the book”

The verb in Basque agrees with its direct object in person and number. The Abkhaz verb displays gender agreement; the illustrations can be seen in the below examples taken from Biermann (1980: 9) (5) and Hewitt (1979: 105) (6):

5. ni-k zu-ri liburu-a da-kar-kizu-t.

BAS i-ERG you-DAT book-DEF ABS.3.SG-carry-DAT.2.SG-ERG.1.SG

“I bring you the book”

6. (sarà) a-x°aş'-k°à a-š°q°'-k°à Ø-ra`-s-to-yt'.

ABK i ART-child-PL ART-book-PL ABG.s-DAT.s.PL-ERG.1.GG-give.DVN-

"I give the books to the children."

Lehmann (1982) proposes two types of agreement, case- domain and person-domain agreement, which correspond to the kind of constituents that may trigger agreement in different grammatical categories. Amongst a variety of constructions like determiners of the noun and nominal predicate, appositions and attributes, the agreement in the case and person are in interdependent distribution, given that in the mentioned construction there does not exist agreement in person but in case.¹ On the contrary, there is agreement in person but not in case, between verb, possessum, preposition, postposition and their nominal complements, as well as in the anaphoric pronoun and its repraesentatum.¹ Therefore, agreement constructions mainly fall into two groups, according to these two agreement categories;

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1. ¹ Lehmann mentions an exception here which is the quantifier *w-ote* “all”, in standard Swahili which is supposed to display only class agreement. Whereas, it shows person agreement in modern colloquial Swahili, often when the construction is with a personal pronoun.
 2. Here Lehmann offers one possible exception which is called Proto-Romance construction as *Petrus habet scriptam epistulam* “Peter has written a letter”, here the transitive verb seems to have an agreement with its object in gender and number as well as case.

furthermore constructions which exhibit case agreement fall under the domain of case agreement and those in which person agreement is shown, fall in the domain of person agreement.

Furthermore, Lehmann (1982) gives a better insight about the fact that agreement between case and person is in the complementary distribution: first of all, the constructions in the domain of case agreement are incapable of having agreement in person and also the constructions in domain of person agreement formation is unable to agree in case; secondly, a bound relationship can be found between two categories due to the complementary distribution of person and case. Lehmann presents separate explanations for each fact in both groups. Firstly, there is no qua generic category of person, for both determiners and attributes of a noun, in which they might agree and there is no category of person that would be stimulated by the head noun: given that the first and second persons cannot take any attributes and determiners as they are definite (Moravcsik, 1971: 37). The same may be plausible for the nominal apposition, or otherwise it needs to be perceived as nominal predicate. If it agreed in person therefore it would not be conceived as nominal predicate and by definition, agreement in person is kept out. Likewise, Lehmann states that for the possessum, the verb and the adposition, their nominal complements may not be determined by case and there is no case in which they might agree. However, the agreement construction is determined independent of the case in the possessum and the personal pronoun.

Yet again, the general account of agreement is assessed by Lehmann (1982) by concentrating on similarities as well as differences among the constructions which involve agreement. Lehmann scrutinizes the constructions in the domain of person agreement and case agreement and deals with the sort of element that triggers the agreement (the nature of A in the definition I), show the agreement (the nature of B in the definition I), as well as, sort of constructions that is determined by elements A and B and their syntagmatic relations.

3.2.1 The constructions in the domain of person and case agreement

At first glance, the element which triggers the agreement in the domain of person agreement, is said to be a noun phrase (NP). To be specific, the possessor in constructions with possessive agreement, the repraesentatum which triggers personal pronoun agreement, the constructions which trigger

subject-verb, object-verb, etc. agreement, and finally, the governing adposition agreement which is triggered by the complement, are all considered to be NPs. Some illustrations given by Lehmann in Spanish and Yapese (the Federated States of Micronesia):

7. Nadie lo vimos.

SPA “Nobody of us has seen him” (Moravcsik, 1978: 351, Lehmann, 1982:20)

8. walaag-meew ea rea piin neey

YAP brother-POSS.2.DU CONN SG woman this

“The brother of you [sg.] and this woman” (Jensen, 1977: 1880)

Lehmann indicates that in each of the above examples, an argument of the agreeing term B, is an NP A and it is also the argument that the agreement affixes associate with depending on the number. Nonetheless, on one hand, there is a differentiation between A and B regarding the categories of person and number which shows no agreement strictly, on the other hand it cannot be said that if the categories of person and number that is exhibited by B are triggered by term A. In the mentioned examples, only by the agreeing term B, the grammatical categories in question are presented fully and correctly whereas, term A is assumed to trigger the agreement which is inadequate in this sense. Lehmann clarifies that in order for the agreement to be recognized, the expression of the agreement categories on A is not required. After all, condition 3 in definition I sounds to be as problematic as the term A seems not to be in the property of grammatical categories in question. Hale (1973) suggests a transformational way of solving this problem, he states that person and number are both conceptual aspects of NPs which are conveyed by rules into auxiliary and might possibly be deleted on the NP. Hence, in this case, condition 3 of the definition I can be fulfilled. Correspondingly, the term A is entirely not present in the majority of person-domain agreement cases in sentences and even constructions. Lehmann proposes that the agreement affixes possibly supposed to have pronominal and anaphoric functions and they belong as

arguments to term B, such as a simple Latin clause does not necessitate an overt subject concerning person and number indication in the verbal ending.

Lehmann argues whether it is justified to consider person and number both as nominal categories (see example 8 above). Most importantly, a nominal category is supposed to be expressed on nouns which is never the case in person. However, as far as number is concerned, it is expressible on nouns and to such an extent it can be expressed on a nominal category. Some of the above-mentioned examples by Lehmann, are uncommon and belong to the realm of verbal number as well as the phenomenon of plurality marking of action on the verb itself, in which either the plurality of participants in the action is shown, or the repetitive action is expressed. According to Dressler (1968) and Moshinsky (1974, 1985), the plurality of action phenomenon which may be marked on the verb, can be found in many languages. As mentioned, alternatives are not formally distinguishable, and no plural marker can be seen on the noun. Thus, Lehmann concludes that a form of verbal plurality can be noticed in the plurality of participants, therefore number may lie between two extremes of verbal and nominal category simultaneously.

In traditional grammar, person was generalized as a verbal category. There are a number of languages, namely Japanese, Indonesian and Chinese in which person does not come into view only as verbal category; besides there are a bulk of examples that person appears as adpositions and even possessed nouns. There seems to be no possibility to claim that person is pronominal category, neither a nominal and nor a verbal. If person appears in many languages that is to say it appears in the pronoun. For this reason, in accordance with the above explanation, Lehmann states that person-domain agreement is not triggered by an NP, and more appropriate formulation for avoiding potential problems in this domain might be stated as: person-domain agreement conveys a relation of agreeing term B to a term A, that is constrained to be an NP, if openly presented. There seems to be no obligation that the grammatical category which is conveyed by B to be similar to the category to which A is assigned. To be on the safe side, it is better to presume that the two are more or less compliant. In the following, the consequence of the mentioned fact will be more clarified according to Lehmann's study.

Within person-domain agreement, Lehmann gives comments on a distinction which is worthy to mention. If the agreeing element is present simultaneously with the NP that it agreed with, in the same construction, i.e. if a syntactic place for the NP can be found in the agreement

construction, syntactic agreement takes place. Nonetheless, if the occurrence does not happen with this NP, an anaphoric agreement occurs. For instance, syntactic agreement can be seen in a verb which agrees with its object whereas agreement between a personal pronoun and its repraesentatum is anaphoric agreement. There is possessed noun, adposition and personal agreement on the verb in many languages. On one hand, we would say that there is no syntactic agreement if the NP is not included as part of the construction, on the other hand we would not claim that the verb agrees with its arguments, the same goes with the cases like agreement of the possessum with its possessor and the adposition with the complement.

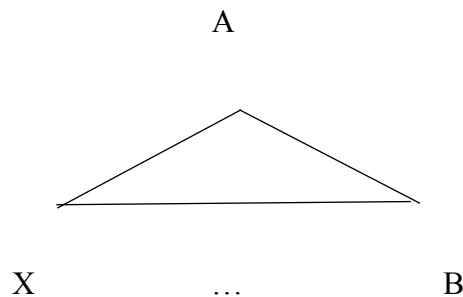
The sort of elements in which the domain of case agreement is triggered, and essential characteristic of the agreeing elements and its syntagmatic relation to the emergence of case domain agreement, will be described below alongside with a preparatory discussion.

Syntagmatic relations in case domain agreement construction have nothing in common with those in person-domain construction. While a noun is the head of the construction in case-domain agreement, this is not the case in person-domain agreement. Generally speaking, what is interpreted semantically as category of a noun, is syntactically as well a category of its NP; and a category of an NP semantically, can be a category of its head noun grammatically (Lehmann, 1982: 353). There is no comparability in this sense in the constructions of person-domain agreement, to put it differently, semantically a category of an NP and object noun is not syntactically a category of its VP and vice versa.

Further, Lehmann (1986) highlights that number, definiteness, noun class, gender and case that can at the same time be categories of an NP and also its head noun. He explains that there is noticeable non-uniformity with the mentioned distribution which has something to do with dissimilarity between nominal categories in which lexical attachment to a noun (noun class, gender) can be seen and those that may be appointed to it by the grammar rules (case, number, definiteness). All these categories can be considered as the categories of NP semantically. All the mentioned categories are presumed to belong semantically to the categories of NP whether or not being expressed on the NP in the same manner that was discussed. Semantically speaking, it is not the noun that is indefinite or definite, that carries a definite case relationship and possesses certain number, but it is the NP; and the NP is linked to its head noun to the same noun class and gender. Despite that, it is highly dependent on the grammar system of each language that whether regards number, definiteness and case as categories of the noun even if lexically inherent categories are inevitably believed to be

grammatical categories of the noun; that being the case if for the nouns in a language, there exists a pattern of these categories. Additionally, Lehmann states that irrespective of this being the case, with regard to the meaning of the noun, it is not semantically pertinent, yet it is relevant to the semantics of the syntax. Despite the fact that Arabic nouns exhibit the probable presence of definite and indefiniteness as well as Latin that displays signs of case, still it is better not to say that in Latin and Arabic languages, the case is related semantically to the noun.

Observably, the sort of elements in which the domain of case agreement is triggered is an NP that is shown in a figure such as 2. (Lehmann, 1982). The NP is particularized for categories like definiteness or case, number, gender and noun class, and where these specifications originate from has nothing to do with agreement role. Thus, in the case domain agreement in configuration proposed by Lehmann X in the configuration I might be taken as a nominal expression (either a nominal NP or a noun), and B may be thought of as an expression modifying X; and both B and X are constituents of A which as an NP in the cases under consideration, consequently there is agreement between A and B in a configuration like 2 (Lehmann, 1982: 24).



1.The source of case-domain agreement

Another key point underlined by Lehmann, is the characteristic of the agreeing element and the syntagmatic relation of the element to the origin of agreement. The elements in which case-domain agreement involvement can be identified as predicates nominals, attributes, determiners and appositions, which all possess a nominal nature. Nominals, in the traditional

sense are classified as elements that associated with one grammatical class with nouns that their intrinsic nature, if essential, qualifies to function as NPs or nouns. An NP will be formed together with the head noun, if there is any head noun available. As far as semantic concerns, denoting elements determine the head noun which leads to a complex nominal concept formation relying on its basis. However, they are not ruled by the head noun or being dependent on it in the same way that an object is determined by its verb or a nominal complement grammatically dependent on preposition. Markedly, the head noun and its modifiers together account for the NP by which the agreement is triggered. Important to notice, in the triangle-shaped configuration I, not only is a relation between the head noun and its modifiers is represented, but also a triangular relationship between the NP and each of these elements is presented. The mentioned relationship may exhibit the interpretation of having the head noun and its modifiers as components of the same NP. Syntactically speaking, this is what that is actually conveyed by case-domain agreement (Lehmann, 1986).

4. Agreement in Persian

In a general manner, there should be an agreement between subject and verb in many languages that feature verb inflection. To put it differently, the subject and verb must agree with one another in number (either singular or plural). Therefore, if a subject is assumed to be singular, its verb must be also singular and vice versa. However, there are some languages that do not comply with all the requirements of the agreement regulations and that mainly depends on the language users whether to implement these rules and regulations in daily interactions. Hence, it is considered to be dependent on the preference of the speaker only. Thus, in some inflected languages, subject predicate agreement is not seen in all cases. Likewise, in Middle Persian the transitive verbs dictate accusative case rather than nominative case, while in Modern Persian transitive verbs agree with subjects. Still in some dialects in Modern New Persian, this phenomenon can be found.

Precisely, it seems that there is an agreement between subject and verb in Modern New Persian (NP), whereas, in some cases there is not such an agreement at all. For instance, Mansour (2010), argues that if the subject is plural and animate, it typically agrees with a plural verb, but if the subject is plural and inanimate, it usually has a plural verb, while in

some cases singular might be considered a correct match. In Persian, if personification applies to inanimate substances or abstract qualities then the noun is regarded sentient and animate.

4.1.1 Verb

As explained in the work of Rezai (2003), two basic stems, namely present and past is used in formation of Persian verbs. Indeed, aspect is of as great significance as tense; in particular, all Persian verbs characterized as perfective and imperfective. These two verb forms are presented in present, past and future tenses. In Persian, verbs agree with their subjects in number and person and have the characteristics of tense and aspect marking.

(1) Sang-ha. Shisheh ra shekast-and.

stone-PL glass ra.Obj break.PAST-3PL.

‘The stones broke the glass.’

According to the verbal morphology of Persian, the subject-verb agreement clitic is more likely to emerge on the verbal part and almost never appears on the non-verbal element (Darzi, 1995). Within this example below (2), the verbal element of the verb *az yad bordam* which is *bordam*, is taken as the host of the agreement in which the subject is *man*.

(2) Man u ra [az yad bord-am]

1SG 3SG ra.Obj from mind take.P AST-1SG

‘I forgot him/her.’

4.1.2 Number in Persian

Different scholars have underlined that, verbs agree in number and person with the structural subject in Standard Persian (Khanlari et al., 1976; Meshkat-al dini, 1987, among others). As far as current minimalist terms concern, it seems as though that basically just number and person are among the semantic features (Φ -features) that require to be treated in the sense of Chomsky (2001). There is an unproductive dual marker (-eyn) that can only be utilized with the plural verb and it is not commonly found in many nouns.

Persian is a language which is rich in honorifics and is akin to Japanese with regards to honorifics (Beeman, 2001). There are some dissimilarities in honorifics system of these two languages in that, Persian has a complex morphological system, according to Beeman (2001). Utilization of plural pronouns to refer to a singular addressee, plural forms of the verb to address a singular person to agree with plural subject, as well as changing the second person to the third person pronoun to implicate to the addressee, are among some of the usage of grammatical honorifics in Persian. Moreover, number is used for honorific purposes also with the help of pronouns. This usage may have dual implication resulting in agreement mismatches and sometimes it may not. For pronouns and their verbs, in Persian language, agreement between ‘the controller’ and ‘the target’, cannot always be seen. These two terms were first proposed by Corbett (2000). The controller is defined as an element that prompts the agreement whereas, the target form is elucidated by agreement. Hence, in Persian, the pronoun which determines the agreement is the controller and the verb ending whose form is determined by agreement, is the target.

4.1.3 Number values

Persian consists of three number values: general, singular and plural (Lotfi, 2006). Lotfi (2006) proposes a configuration (3) in which a combination of general number with singular number has an outcome of a general/singular versus plural system, that is shown in the following:

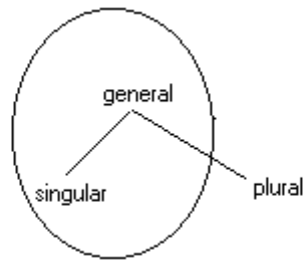


Figure 2: Persian system with general/singular versus plural (Lotfi, 2006)

In order for different entities to be specified as a mere category, the nominal is marked with zero inflection by general number. Lotfi, furthermore, argues that, intrinsically, the number of entities is not identified by the form in the real world but it specifies a whole class of things. It seems unlikely that a possible definite or indefinite article to be able to perform and predict the distinctness between general and singular.

4.1.4 Plurality marking mechanisms

For marking plurality, Persian makes use of verb inflection and nominal marking (Lotfi, 2006). Plurality marking mechanisms are quite different than that of English, as Persian uses more inflection in order to indicate plurality. In the English language, only the noun is pluralized and the verb stays unaltered, whereas, in Persian both suffixation and verb inflection are involved in plurality marking. Furthermore, there exist a difference between animate and inanimate nouns in Persian in case of suitable suffixation.

4.1.5 Nominal marking

The singular is an unmarked number on the nominal, that is in line with Corbett's study (2000:17) "the singular is not the marked number comparing to the plural". As a general rule, nominal belongs to the semantic category which plural marking has no sensitivity to it, thus, it can be as if the plurality marking on nominal does not split the language, according to Lotfi.

As it was mentioned already, nouns have two numbers, namely plural and singular which is shown by an unmarked stem. Plurals are marked and there are two different plural suffixes in Persian: /-ha/ and /-an/ (Fazel, 2010). All nominal classes belong to /-ha/

whereas, / *-an*/ only marks animate plurality and denotes humanity. It should be noted that in colloquial Persian, the suffix /*-an*/ barely occurs and both suffixes are reduced to / *-a*/ when it comes to informal speech. Moreover, in formal Persian some parts of the body that are in pairs, higher animals (e.g, mammals and other vertebrates), and some other entities are also marked with the suffix / *-an* /. Noticeably, there is an exception in the statement discussed by Lotfi, in the previous paragraph, that is the disparity between "*-ha*" and "*-an*" in formal varieties of Persian in which *-ha* mainly goes with all categories of nominals in comparison with *-an* that only restricted to animates. A number of examples are given in the table (1) below:

	Animates Informal	Inanimates formal
-	Daneshamooz-ha (students) / shamooz-a Dokhtar-ha (girls) /	Lebas-ha (clothes) / s-a Xane-ha (houses) / -a
-	Daneshamooz-an Dokhtar-an	Lebas-an* Xane-

Table 1: Plural markers for animates and inanimates in formal & informal Persian

The proposal regarding the ‘split’ of languages at some points in company with Animacy Hierarchy (which was explained in detail in the latter chapter), matches well the above-mentioned indications and makes a good harmony (Corbett, 2000; Smith-Stark, 1974; Forchheimer, 1953; Silverstein, 1976); yet again, this idea is scrutinized by Lotfi in Persian and is illustrated by him in the Figure 3.

Lotfi (2006) gives in his paper an overview of Smith-Stark’s statement (1974:657), regarding plurality splitting the language, he claims that "it is a significant opposition for certain categories but irrelevant for others”. In his study, Smith-Stark states that in Georgian language nouns are considered split occurring between animates and inanimates. For instance, the verb is marked plural if a plural subject signifies an animate noun in Georgian, however, for the plural subject denoting an inanimate the verb will be marked as singular. In the same manner, Lotfi indicates that Persian nominals get split by the plural morpheme ‘an’ and the division occurs between animates and inanimates:

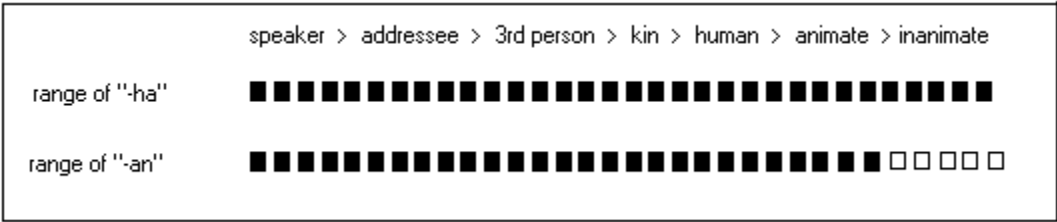


Figure 3: Range of plural marking suffixes on nominals in formal Persian (Lotfi, 2006)

In his article, Lotfi provides an overview of figure 3, in fact, the semantic categories have a consequential hierarchy at the top of the configuration in which an element such as suffix -ha (plural marking suffix), is authorized to mark any nominal that is placed in any spot in the hierarchy. To put it differently, if a noun is assigned to a specific category such as *human*, then it should be eligible for the nominal marking suffix to a category that is located to the left of *human*, which is *kin* in this case, however, it does not necessitate for a noun to be permissible for the suffix to a category to the right (e.g. *animate*). The Persian plural marking suffixes "-ha" and "-an" seem to be in perfect harmony with this hierarchy in that, for either of the suffixes, no break can be found in the employment range. Further, Lotfi explains that the split corresponding "-an", falls at the right end of hierarchy that is to say, semantically speaking, the occurrence of the split of "-an" in the application at the left end of hierarchy, would sound unusual due to the ways in which the semantic categories have been arranged at the top of the configuration. The universality of Animacy Hierarchy has been supported by the compelling evidence provided by plural suffixes in Persian.

4.1.6 Verb inflection

In Persian, a verb is typically inflected for number, tense and person and is also marked for singular and plural. Whilst, in English, plurality is expressed by noun inflection, in Persian, inflection is indicated with plurality and singularity in present, past and future tense for all persons. Further, in both plural and singular, the right suffix can be chosen according to the person feature of the subject and the subject in third person singular has always the bare form (Lotfi, 2006).

Similar to nominal marking that splits the noun, verb inflection behaves the same in Modern Persian. The verb always is marked plural when it comes to plural animate subjects, unlike plural inanimates where the verb may be marked singular (see the examples below). This is in line with Smith-Stark's study regarding Georgian system of verb inflection. Noteworthy, that here the division happens between animates and inanimates that is also in harmony with Animacy Hierarchy.

3. Bacheha umad-an madrese.

children come-PAST-PL school

"The children came to school."

4. xaneha bad sakhte shod.

houses bad built become-PAST-SG

"The houses were built badly."

5. Animacy and agreement

At the level of theoretical and descriptive level, the effect of animacy on agreement have been analyzed in different languages (Corbett, 1983, 2009, for Georgian; Comrie 1989 for Mundari (a language of east India), Kirchner, 2001 and Bamyaci et al., 2014 for Turkish; Harwood, 2012 for English; Leko, 2010 and Puškar & Murphy, 2015 for Serbo-Croatian, i.e. Bosnian). The studies of Corbett (1983, 2009) for Slavic languages, and Leko's (2010) for Bosnian

present the evident influence of animacy on subject-verb agreement. In fact, the corpus study from Corbett shows that animacy, as well as the subject's precedence regarding the predicate, nearly eliminates the occurrence of singular agreement in number with conjoined subjects, although inanimate subjects and predicate preceding subjects have similar percentages between singular and plural agreement (Corbett 1983, 2009). Bock and Miller (1991:81) state that “animacy matters to subject designation, which in turn matters to agreement”. Barker, Nicol and Garrett (2001:91-114) point out that animacy together with semantic relatedness reveal the substantial effects on error rates, “indicating that the mechanism involved in implementing agreement cannot be blind to semantic information”.

Besides, with regard to the theoretical notion of animacy, descriptive findings have confirmed that animate nouns trigger both singular and plural agreements, whereas inanimate nouns only support singular agreement (Bamyaci et al., 2014, Stevanović, 1979). Moreover, Bhatt and Walkow (2003) identified that masculine agreement can go with morpho-syntactically feminine animate nouns, but not apply for morpho-syntactically feminine inanimate nouns. As a property of noun, animacy not only demonstrates marked effect on the agreement, but also shows the ability to limit the range of influence of other aspects such as precedence (Corbett, 2002, 2009).

Apart from that, the sub-animacy levels have generated substantial impact on the choice of subject-verb agreement (Corbett, 1991; Braun & Haig, 2010). In particular, animacy has been brought about individuation and the prominence of pluralities. “The higher in scale a noun type is, the more salient the interpretation becomes” (Grimm, 2013). Grimm (2013) has claimed that semantic properties and syntactic features of the noun accounted for the accessibility of units. Animate nouns and their behavior link to the individuation generate agreement strategies. The higher on hierarchy scale animate entities are, the more clearly individuated they are (Grimm, 2013).

5.1.1 Case marking

Besides, one phenomenon controlled by animacy, is overt case marking of objects (Bossong, 1985; 1991), which will be discussed below. Commonly, in languages with overt case marking of objects, not all the objects are marked, it depends on which semantic and pragmatic features an object displays. In Differential Object Marking languages the direct object is categorized into two separate

categories: one of the categories is marked and the other is unmarked; however, according to Aissen (2003:436) this definition is quite broad as each language has its own dimensions of divisions. For instance, in a language like Malayalam, de Swart (2007) states that the differential object marking is triggered by animacy that is to say, the object is marked with the accusative case when is animate but it is unmarked if the object is inanimate. Hence, in the example below, the animate noun (2.a) (cow) is marked with accusative case and the inanimate object (2.b) (coconut) is unmarked:

Malayalam (De Swart 2007:1)

(2). (a) avan oru paSuvin-e va>>i

he a cow-ACC buy.PST

‘He bought a cow’

(b) >aan tee>>a va>>i

i coconut buy.PST

‘I bought a coconut’

In a language like Catalan, personal pronouns used for direct objects and are always marked with -a, however, NP direct objects in Catalan are not marked, according to Aissen (2003). According to Dixon (1994), this is representative of a hierarchy in which pronouns are ranked over other kinds of nominals. Following are examples from Catalan:

Catalan (Aissen 2003:451–2)

(3). (a) no m’havien vist a mi

NEG CL they.have seen ACC 1SG

‘They had not seen me’

(b) É l te telefoneará a ti
 He CL will.phone ACC 2SG
 ‘He’ll phone you’

(c) A ell no el vull
 ACC 3SG.MASC NEG CL I.want
 ‘Him, I don’t want’

(d) No. havien vist l’alcalde
 NEG they.have seen the mayor
 ‘They had not seen the mayor’

Bossong (1991:158–60) gives three semantic categories in typologizing Differential Object marking, namely: inherence which is animacy; reference refers to individuation and definiteness; and constituency showing whether the object is dependent to verb or not.

Similarly, object agreement in Bantu languages (Woolford, 1999; Nash, 1992) is another observation showing how animacy is combined with other concepts cross-linguistically.

Nash (1992) argues that in object constructions, there are various factors which triggers object agreement such as specificity, focus, Θ -role and animacy. Further, he indicates if there is not an animate object in a sentence, the object is considered not to be particular, whereas the existence of object agreement shows that the object is particular (4.a,b; 5.a,b). But, in inanimate objects, no information is provided about the particularity of the object only if object agreement is absent (Nash 1992: 565).

Bantu (Nash 1992: 565)

(4). a. ku+ kimb muntu
 INF+ look-for person
 To look for a [any] person

b. ku+ mu+ kimb muntu

INF+ OAGR+ look-for person

To look for a/the person (a specific person in mind)

(5). a. ku+ kàt atûbu

INF+ like dogs

To like dogs [not any specific dog]

b. ku+ yi+ kàt atûbu

INF+ OAGR+ like dogs

To like the dogs (some specific dogs in mind)

(Nash 1992: 565)

In morphologically rich languages, languages that have sufficiently significant information about syntactic units and relation, (e.g, Basque, German, Hebrew, French, Hindi, Korean), the degree of agentivity is shown by case marking. Regarding case markers, some scholars (Hopper & Thompson, 1980; Butt, 2006) claim that the degree of control a referent has in a context, is apprehended by case markers. In such languages, animacy is affected directly by grammaticality such as voice selection and case-marking. For instance, in a morphologically rich language like Navaho, in a sentence like “At’éeéd nímasi bi-díílíd, the potato burnt the girl.” an yi-form is not used whenever the agent is non-living and the patient is a living entity, instead a bi-form is used (Comrie 1989: 193). As it is shown in thematic role hierarchy *Ergative* > *Genitive* > *Instrumental* > *Dative* > *Accusative* > *Locative*, the nominals are ranked on a continuous sequence in which the extremes are quite distinct and the nominals that are marked with ergative case are ranked as highest degree of control whereas the locatives seem to have the lowest control of agency (Choi, 2001).

5.1.2 Verbal agreement marking

With the help of different arbitrary ways, animacy is coded in grammars, not only in differential case marking but also in verbal agreement marking. As an example, in Japanese, animate subjects have a different copula compared to inanimate subjects thus, there should be agreement between the copula and animacy of the subject. In Russian, nouns are not considered to be intuitively or biologically animate but syntactically animate. In the case marking system of Russian language, animacy has been manifested as syncretism in which the case marking determines which noun is animate or inanimate. Hence, animacy influences the Russian language syntactically rather than semantically and it is shown as noun categorization. The typical form of the argument's animacy is commonly employed to describe the distinctive nature of animacy and case in differential case marking. Comrie (1981) states that if the animacy of an argument is atypical then it is more likely and probabilistic that the argument will have an overt case. For instance, in Persian and some other languages (e.g, Hindi, Spanish, spoken Japanese and Afrikaans), animate objects are overtly marked more as the prototypical animacy for objects suggested to be inanimate (Aissen, 1999). However, according to Aissen (1999), in some other languages like Japanese and Hua, the prototypical subject is said to be animate thus, inanimate subjects are overtly marked.

5.1.3 Number marking

Another phenomenon related to agreement and animacy is, overt number marking of noun phrases (e.g., Haspelmath, 2013; Corbett, 2000; Croft, 1990). Corbett (2000) demonstrates that languages that mark number in the NP, can vary in their use. A number of factors are involved in a language with overt number marking. Firstly, the higher the referent of the NP is on the Animacy Hierarchy, the higher the chance of being marked for number (Corbett ,2000:90); Secondly, the more topical the referent is, the more likely the possibility of getting number marking (Smith-Stark, 1974), or the non-singular character of the noun phrase is marked if a numeral modifier is present in a sentence.

We see from the below examples 1.a&b that Movima is a language in which plural marking is obligatory with all animate and inanimate nouns irrespective of having a numeral higher. It should be noted that in Movima language, number is marked by elements that are referential. Following are examples from Movima:

Movima (Haude 2006:150,208)

(1). (a) *is kwe:ya*

ART.PL woman

‘(The) women’

(b) *tas-poy is paj'i*

three-BR:animal ART.PL dolphin

‘There are three dolphins.’

Yet, animacy plays a determinant role in subject-verb agreement phenomena in numerous languages of the world (e.g., Comrie, 1989; Corbett, 2000). Typically, as Comrie (1989:191) states, verbs may agree with NPs that represent animate beings and may not agree with NPs that denote inanimate beings. For instance, in work of Bamyacı (2014), the notion of animacy was investigated as a constraint on system of number marking on Turkish verbs. In Turkish, there is an optionality in the singular and plural verb as long as the subject is an animate plural noun (Sezer, 1978), while inanimate plural subjects only take singular verbs. In this matter Bamyacı (2014) refers to some examples from Sezer (1978):

Subject-verb number agreement in Turkish (Sezer, 1978:26)

6. Animate plural subject:

Çilingir-ler kapı-lar-ı aç-tı-(lar).

locksmith-PL door-PL-ACC open-PST-(3PL)

‘Locksmiths opened the doors’.

7. Inanimate plural subject:

Anahtar-lar kapı-lar-ı aç-tı-*lar.

key-PL door-PL-ACC open-PST-*3PL

‘Keys opened the doors’.

Bamyacı (2014) clarifies that optionality doesn’t exclusively mean randomness but rather it descriptively indicates the existence of two grammatical options namely singular and plural for Turkish verbs with an overt subject which is third person plural. In Turkish, subject-verb agreement in number is systematically restricted to the semantic features (level of animacy) of plural subjects. Irrespective of not observing a transparent interaction of semantic or discourse pragmatic in use of structure, these factors directly affect the optionality of grammar in structures that are not randomly assigned in language (Kilgarriff, 2005).

Generally, a reciprocal influence is observed between animacy and number marking across languages. Comrie (1989: 188) claims that the way animacy splits plural entities is different in each language but commonly all languages have a general trend in marking plural with respect to animacy, in which animate entities are more likely to take overt number marking.

Therefore, if plurality is said to be a significant opposition in the case of some nominals but it does not fit some other nominals, in the animacy hierarchy it splits the language (Smith-Stark, 1974:657). Let’s take a look at a few examples: In Bengali language, the split happens between nouns and pronouns: plural suffixes are not obligatory but rather optional while number is expressed obligatorily (Corbett, 2006b:726, referred to in Masica,1991:225). Likewise, Peruvian language (Quechua) as well as Korean the number is marked only in the pronoun system (Cruse, 1994:2859). In some dialects in Australia (Bininj Gun-Wok) the humans are marked on the verb by pronominal affixes but inanimates and non-humans are not marked (Evans, 2003:234-235). Moreover, in an Australian language spoken in Queensland (Warrgamay), the verb gets no number marking and number marking is obligatory in pronouns that refer to human beings. For instance, first and second person pronouns need to be particularized for singular, dual or plural number referring to humans whereas the number is obligatory for the third person’s pronouns (dual, plural) and they can be reversed for humans. But in case of the third person singular pronoun there is no number marking and it includes

humans, non-humans and all persons (Corbett, 2006b:725). In line with the mentioned studies, Corbett (2000:70) also states that there is no language that has no number marking for animate entities but marks it for inanimate ones. By comparing languages, the mentioned split is not only seen in number marking on an NP but also in verbal number agreement (Corbett, 2000: 55). More precisely, the occurrence of number marking is categorized by Haspelmath (2013) based on two dimensions namely obligatoriness which comprised of obligatory non-occurrence, obligatory occurrence, and optional occurrence and as well as animacy notion.

Another key point to discuss in animacy and plural marking interaction, is the verbal number agreement. For instance, nouns in Georgian need to be discerned based on their animacy properties (i.e., distinguishable on the basis of being animate or inanimate beings) (Corbett, 2000: 55; Smith-Stark, 1974: 657). A similar division is observed, according to Bhattacharya (1976:191) and Corbett (2000: 60), in Mundari (a Munda language of east India), in which agreement in number is only seen between verbs and animate nouns but there is no such agreement between verb and inanimate entities. Whereas, in a Mayan language of Guatemala (Quiché), Croft (1990:112) mentions that just for animate subjects and objects number distinction can be found. In particular, in Quiché, for animals there is distinctive singular and plural absolutive agreement prefixes unlike inanimate entities.

Putting aside the obligatory overt marking and its lack in categorial classification of animacy notion, Baymaçi (2014) remarks the existence of a gray area with respect to optional number marking, therefore, he suggests that there might be a correlation between optional marking and the animacy hierarchy. For instance, as Berg (1989) cited, in an Austronesian language (Muna), there is an obligatory singular marking system in verbs that take plural inanimate nouns (8) but verbs are marked as plural when they co-occur with plural nouns which are humans (9). On the other hand, animate nouns that are not human can take both singular and plural marking on the verb (10). Corbett (2000:71) represents the mentioned rules by giving the following examples:

8. bara-hi-no no-hali
 good-PL-his 3SG.REAL-expensive
 ‘His goods are expensive.’

9. ihintu-umu o-kala-amu

2-PL 2-go-PL

‘You go.’

10. o kadadi-hi no-rato-mo do-rato-mo

ART animal-PL 3SG.REAL-arrive-PFV /3PL.REAL-arrive-PFV

‘The animals have arrived.’

5.2 Animacy and agreement in Persian

Noticeably, many studies examine the function of animacy in Persian subject-verb agreement focus on the optional agreement in animate and inanimate subjects. Mahootian (1997:5) states about the exception in Persian agreement: “Subject must be coded on the verb via personal endings, which agree with the subject in person and number. The subject must be coded on the verb even if the subject NP is pro-dropped. There is an exception to subject - verb agreement when it comes to inanimate plural subjects, which can take a singular verb.” Particularly, the exception between singular/plural verb is only applied with plural subjects denoting inanimate entities, and singular subjects denoting collective animate entities (‘groups/institution’). Within these examples below, Mahootian (1997:5) has illustrated the optional decision between singular and plural verb with inanimate plural subject:

3. chæmedun-ha tu-ye mashin-e

suitcase-PL in-EZ car.is

‘The suitcases are in the car.’

4. chæmedun-ha tu-ye mashin-ænd

suitcase-PL in-EZ car-are

‘The suitcases are in the car.’

The interaction between animacy and subject-verb agreement can be summarized in Table 2 that suggested from the work of Lazard (1992).

Subject	Verb
Plural animate beings (having will or feeling)	Plural
Inanimate beings (or things considered as inanimate)	Singular
Things that are conceived as endowed with a certain activity, or such there is cause to insist on their plurality and the individuality of each item	Plural
Animate beings which are not conceived of as the agents of the process affected by it	Singular
Collective noun (human collectivity)	Most often plural
Numerals and expressions of quantity	Plural, but rarely the singular
Certain plurals with a collective value	Singular
Distributive expression (har kas(-i), har yeki 'each', etc.)	Singular/plural

Table 2: Animacy and subject-verb agreement in Persian

Saadat (1996) points out that in Old Persian inanimates are not considered as real agents in the sense of having control over their actions thus, restrict singular verb form for plural inanimate subjects. He uses lots of examples from classical texts to present that verbs of inanimate nouns were singular, and there are only a few unusual examples where the inanimates plural nouns take plural verbs. In these cases, he explains the inanimate nouns can have plural verbs because they are used metaphorically (e.g., personified as living creatures).

Sedighi (2005, 2007) argues inanimate subjects generate a constraint on subject-verb agreement and cause the verb to come with singular/default morphology. The restriction is explained from the impoverishment rule (blocking across positions) cross out the number feature in the context of inanimate subjects (or when the subject holds animate feature) (Halle & Marantz, 1993).

Nevertheless, Modern Persian displays the possibility of using both agreeing non-agreeing form for inanimate plural subjects (Meshkat al-dini, 1987). The author explains that the optional decision between singular or plural verb is affected by the individuality and the unity of the inanimate plural subject. When the subject entities focus on the individuality, the plural verb is likely to be picked. In contrast, if the entities of the subject emphasize the unity, the verb is supposedly singular. Likewise, Windfuhr (1979) points out the implicit or explicit character of human subjects will present the verb's agreement, whereas, the agreement for non-human subjects illustrates the stress on the individual items' number. In addition, in the diachronic studies of subject-verb agreement in Persian, Lotfi (2006) explains the preference between singular or plural verbal endings related to how autonomous the nominal elements of the plural subject are², i.e. whether the group's members play the role of plural subject are interpreted as controlling the course of the event independently or not. On one hand, if the entities comprising the subject are understood to be autonomous, there are plural verbal ending which marks a distributive interpretation of the event. On the other hand, the singular verbal signals collectivity and distributiveness for individuated entities that are conceived as non-autonomous elements. According to Lotfi, the autonomy of animates is always given for the Modern Persian speaker, while for the inanimate plural subjects, the decision how

2. As it was explained earlier, this is a supplementarily semantic feature that Lotfi has added to Corbett (2000) Animacy Hierarchy although different languages make a split at various points along the animacy hierarchy. For example, the division between animate and inanimate is made in Georgian nouns since the plurality spits occur if "it is a significant opposition for certain categories but irrelevant for others" (Smith-Stark, 1974). A plural verb will go with a plural animate subject while a singular verb will be taken by a plural inanimate subject. The hierarchy of animacy has reorganized in Lotfi's study. The *autonomous* and *non-autonomous* characteristic replace the *inanimate* in initial hierarchy: speaker > addressee > 3rd person > kin > human > animate > autonomous > non-autonomous. Generally, verb's number marking in Persian are recognized with the differentiation between autonomous and non – autonomous.

autonomous of the elements rely on the speaker's conceptualization of the entities and how they function in the event. Moreover, the autonomy in Lotfi's argument is the subjective reflections from human's mind rather than the objective perspective from the outside world. This is also in line with with Langacker's perspective regarding to semantics of which "[m]eaning is ... sought in the realm of cognitive processing rather than residing in objective reality" (Langacker, 1990). For example, 'the rolling stones' and 'the burning sausages' can both take singular or plural verbs in Persian depending on the human's conception of autonomy. For example, if gravity causes the stones to roll down to the hill without any influence of the stones themselves on the course of the event, and the sausages in the same pan all burn without any exception, a singular verb is applied to mark uniformity in these cases (Diagram a). However, if the gravity is ignored so that the stones roll down by their own will, and the cause of the burning sausages is neglected and instead, the speaker only pays attention to the changes of state that separate sausages experienced, plural verbs are preferred (Diagram b). The cognitive experience is illustrated in the two diagrams below.

Cognitive experience of autonomy

5. *Form: N-PL --- V-SG*

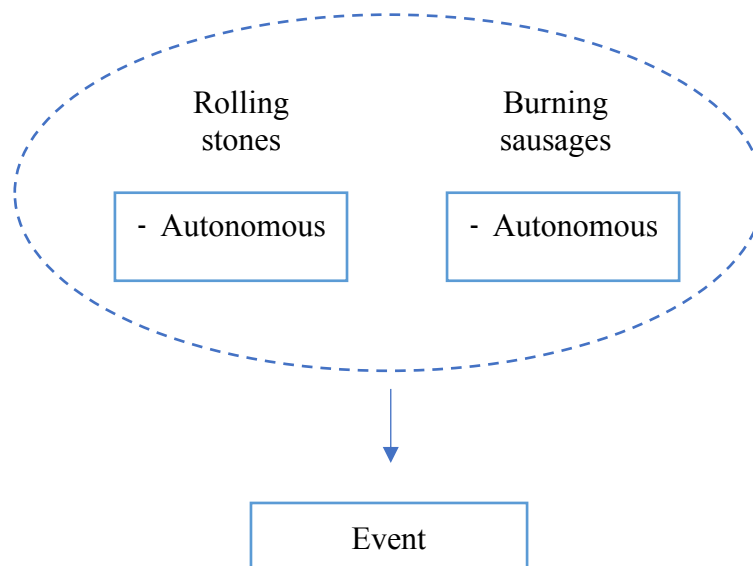


Diagram a: Collective experience

6. *Form: N-PL --- V-PL*

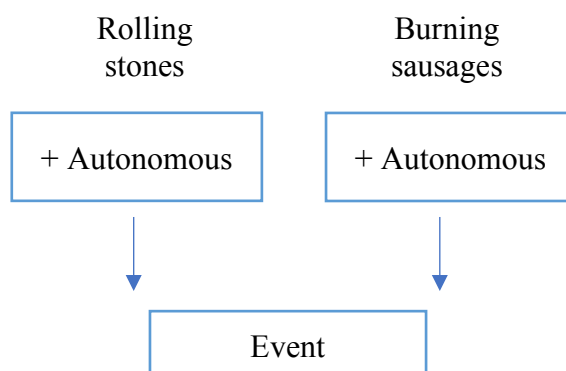
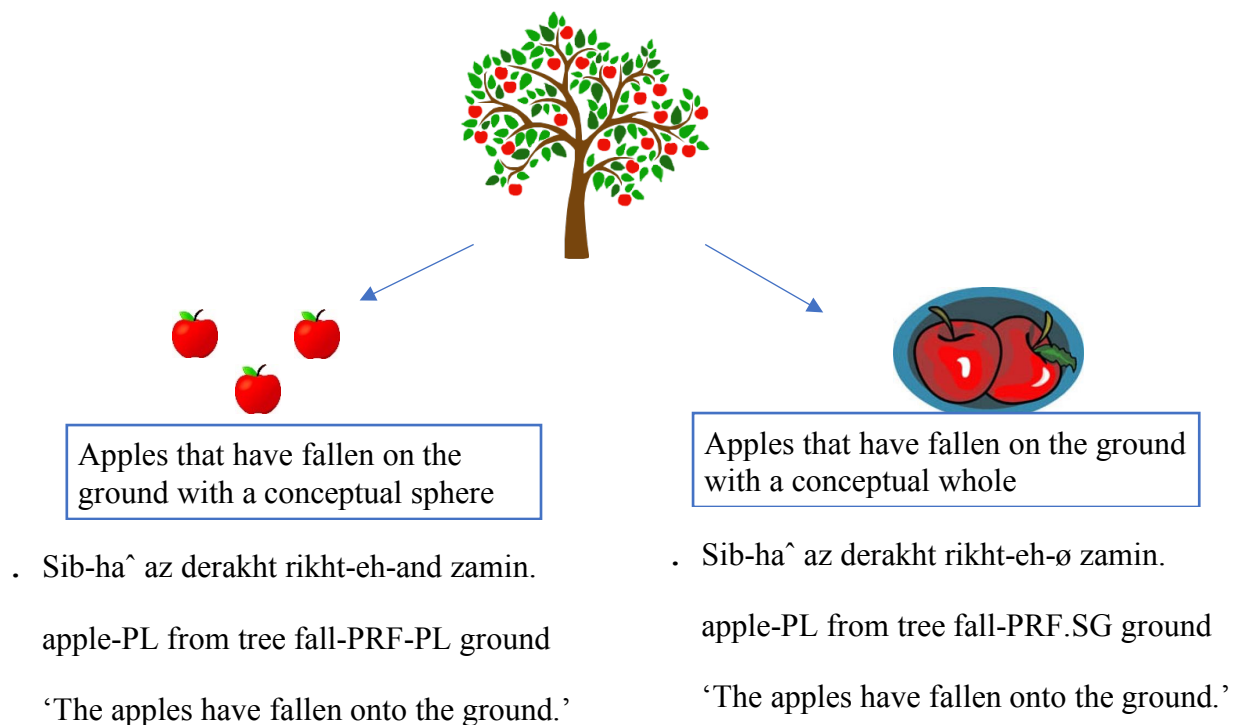


Diagram b: Distributive experience

In line with the study of Lotfi and making the extension to Lazard's work, Sharifian and Lotfi (2007) argue that the optionality between singular and plural choice for inanimate plural subjects is sensitive to conceptualisation of experience by conducting three experiment tasks (preference task, completion task and picture – description task). The sense that plural and singular verb endings are not completely free for speakers in the case of inanimate plural subjects because of the level of schematicity (construal resolution) that characterized Persian user's conceptualisation of an event. For instance, apples falling from a tree can be conceptualized as at least two probable schemes. One is construing apples as a conceptual whole and the other is the conceptual sphere. For Persian speakers, only the conceptual sphere of apple goes with a plural verb ending although both different conceptual apples are encoded as plural in sentences. The higher level of schematicity of the event is likely to interest a plural verb ending. The human conceptual faculty, together with a diverse degree of influence and external input factors to human cognition decide the level of schematicity.

Different conceptual schemes of 'falling apples'

External world



The two factors that determine the level of schematicity are analyzed in the experiments of Sharifian and Lotfi (2007). First, it is claimed that the more inanimate entities reveal animate characteristics, the more likely it provokes a plural verb ending (e.g. the case of clouds and boats moving). Since Persian animate plural nouns take plural verb ending, it is reasonable when inanimate subject share the certain features. Another determinant is the degree of which entities are mentioned by the plural subjects are packed together (e.g. inanimate plural subject such as ‘houses’, ‘shops’, and ‘balloons’ likely go with plural verb ending because they are displayed very separately from each other in the picture-description task).

Following the conceptual “autonomy” from Lotfi, Feizmohammaddpour (2013) uses empirical experiment to test the effect of syntactic and non-syntactic effects on subject-verb agreement, and add more contribution to the study of “optionality” in Persian. One of his experimental results shows participants prefer singular verbs only for non-agent plural inanimate subjects. It implies Persian users agree the singular form of verb (a.k.a the mismatched form in the author’s study) with the inanimate subject nouns whose thematic role is not “agent -like”. In comparison to the Classic Persian’s perspective which claims singular verbs are applied for inanimate plural subjects unless the nouns are

personified for an action that only animate beings could generate, Feizmohammaddpour extends the old view by arguing that inanimate entities perform activities. Inanimate entities are debated as agent of the action. For example, Persian speakers has illustrated the view through the subjects of verbs of emission (e.g., *The lamps give light*; or *the glasses are gleaming*). Despite the involuntary reveal of not perform action of the subject noun, Persian speakers recognize them as an agent of the sentence and prioritize not to use singular verbs for them. According to the author, the choice of matched (plural) or mismatched (singular) verbs relies on speaker's conceptualization of the subject in the sentence. If they consider the plural inanimate subject is "agent-like", their preference is not using mismatched verb. Nonetheless, in case of their conceptualization shows the contrast view, they feel free to accept mismatched verb.

As it has been discussed above, subject-verb agreement has been influenced by animacy in most of the languages (e.g., Comrie, 1989; Corbett, 2000). Yet, according to crosslinguistic research, in various ways, interaction can be found between different grammatical phenomena and animacy (Yamamoto, 1999; Croft, 1990; Corbett, 2000). Generally, animacy level of nouns has restricted many grammatical phenomena namely thematic roles (Van Valin and LaPolla, 1997), overt number marking of noun phrases (e.g., Haspelmath, 2013; Corbett, 2000; Croft, 1990) as well as case marking (e.g., Comrie, 1989; Kittilä et al., 2011).

To sum up, the effect of animacy in Persian subject-verb agreement depends largely on the subjective perspective of human being and it can be interpreted in different concepts such as agent, autonomy or the level of schematicity. Based on these explanations above which have further differences to biological grounding, this thesis will focus on the effect of animacy on subject-verb agreement and will make use of Radanović method (Radanović et al., 2016) that is also discussed in the next section to analyze the "graded property" of semantic animacy.

6. A work from Radanović et al., (2016)

As mentioned before, linguistics animacy is defined by the role animacy plays in a variety of linguistic phenomena. Radanović et al., (2016) introduce the notion of semantic animacy in which the semantic knowledge of entities is under investigation. While semantic animacy plays a part in psychological research, an explicit definition of it is barely available. According to neural investigators, some inanimate categories do not stimulate maximum response areas where the activity of other inanimate categories can be seen, whereas, they actually stimulate activity in the areas for animate categories (Ungerleider, Martin, Schouten, & Haxby, Ishai, 1999; Chao, Weisberg, & Martin, 2002;). This research proposed that animacy feature representation can be circulated across the cortex; this idea attracted more research in recent years in establishment of semantic systems (Vigliocco, Vinson, Lewis, & Garrett, 2004; Tyler, Stamatakis, et al., 2003). Thus far, it can be interpreted from the previous works, that typically scholars treated animacy as binary property which is defined in biology, however, whether semantic animacy can be defined similar to biological animacy, is investigated by the work of Radanović et al. (2016).

The genesis of Radanović et al.'s (2016) paper is the proposal that the characterization and representation of animacy varies across languages, as well as, empirically elaborating the conceptualization of semantic animacy. Their paper aims to scrutinize a discrete (binary) or a continuous property of the underlying distribution of semantic animacy by elucidating whether semantic animacy is language dependent or not. The authors took account for different measurements of semantic animacy, examined their cognitive relevance and evaluated these findings across English and Serbian languages which come from different language branches within the Indo-European language family.

By juxtaposing the distribution of animacy in two languages, the authors hoped for shedding some light on the concept of semantic animacy and hypothesized that no difference can be found in animacy judgments in languages, if semantic animacy is an inherent biological representation of the entities referred to, on the other hand, linguistic phenomena might have a part in case, animacy judgments in Serbian and English do not tally. Ultimately, this paper endeavors to detect the behavioral effects of their measures of semantic animacy in cross language experimental evaluation. For this purpose, two experimental tasks were chosen namely a lexical decision task and a semantic categorization task. The effects of semantic variables are measured by these experimental tasks that have been widely used by

psycholinguists. As far as lexical processing concerns, according to Radonović et al., (2016) the true nature of these tasks seems to be dissimilar, given that, semantic categorization believes to be much demanding with respect to semantic, that consequently is more likely to be sentient to the influence of the semantic variable in animacy.

In the Serbian part of the study, the measurements of semantic animacy were estimated using three norming studies such as subjective rating, pairwise comparison method and finally, a checklist of biological characteristics of living entities. The first method subjective rating, measures the total animacy of noun referent, while the second method, gives a relative insight of animacy of noun referent but, however, the degree to which biological criteria of animacy can be observed in an entity, is provided by the third method.

The stimuli presented in this study, consisted of 72 Serbian nouns denoting a variety of living and non-living entities such as human beings, animals, plants, tools, etc. Moreover, some problematic exemplars were included such as *amoeba* which in the animacy hierarchy is considered to be less animate than an animal; the idea of including such examples comes from the work of Yamamoto (1999). Even though animacy is the property of word referents and nouns usually need to be concrete, in this experiment a number of nouns seem to be not concrete (e.g, *God* or *witch*). Also, half of the nouns were chosen to be masculine gender and half were chosen as feminine gender. According to the results from Radanović et al.'s previous work (Radanović & Milin, 2011), it was not expected to see neither processing differences between two genders, nor reciprocal action between gender and animacy.

The first method, subjective rating, was adopted from psycholinguistic studies (Schutze & Sprouse, 2014) and simplifies the assessment of psychological attributes. In subjective rating method, absolute measurement of animacy is provided, and the reason for calling it absolute, in that, without regarding other stimuli, each single word referent's animacy is assessed and rated by participants evaluating stimuli on a single scale. A numerical judgment of the animacy of a noun referent were arranged to be given by 100 participants (82 females, 18 males), on a 7-point Likert-type scale, in which 1 stands for *the least animate* while, 7 represents *the most animate*. The questionnaire was prepared with the help of the LimeSurvey application (LimeSurvey Project Team/Carsten Schmitz, 2012). Stimuli have been rated by all participants and the order in which compared entities appeared for each respondent were displayed in a randomly.

The second method used, was pairwise comparison method, in which participants were asked to compare each entity in pairs to judge which word referent seems more alive (animate). This task, also, was adopted from Schütze and Sprouse (2014), which is a forced-choice task with two alternatives. This task was chosen due to the relative measure of animacy of a noun referent, that in each stimulus, it needs to provide the relative position of each word. One hundred participants (76 females, 24 males) took part and were told to choose between two entities, the one which sounds more animate. The pair words were simultaneously displayed. Pairwise comparison method exposes the respondents to all possible pairs of the entities and it functions with a smaller set of entities.

Finally, as the last method, a checklist of biological characteristics of living entities were created. This checklist shows the degree to which animacy estimation and rating by participants meets the biological criteria of animacy. Thirty-two participants (28 females, 4 males) took part, none of whom participated in the last two norming methods. They were told to inspect whether all the attributes, namely: nutrition, respiration, movement, excretion, growth, reproduction, and sensitivity; is eligible to be applied to a word's referent. The list of elements was borrowed from a standard biology textbook (Kadhila, 2005). Respondents were randomly assigned to complete each of the two questionnaires that had distinct order of features which has been randomized for each respondent. The questionnaires were developed by the online web application (LimeSurvey Project Team/Carsten Schmitz, 2012).

Involving three normative studies in this paper, the authors made a claim that any of the three mentioned measurements, is able to be employed and operationalized alternately for graded semantic animacy. Noticeably, the authors chose to combine three normative studies in an optimal and composed manner by making use of principal component analysis (Dunteman, 1989; Jolliffe, 2002), rather than choosing one of the studies randomly.

Additionally, in the Serbian part, the cognitive relevance of the generated measures of semantic animacy in the normative part of the study, were presented by testing two experiments. The two experimental tasks: lexical decision task and semantic categorization task, have been used regularly in psycholinguistic experiments for exploring cognitive effects of semantic variables.

The primary goal of experiment one was investigating the cognitive effects of animacy and was tested by a visual decision task. Irrespective of the fact that lexical decision differs from semantic task, the former has some sensitivity characteristics to semantic features of words (Baayen, Feldman, & Schreuder, 2006; Balota, Cortese, Sergent-Marshall, Spieler, &

Yap, 2004) which comes to serve as an appropriate option for measuring cognitive effects of animacy.

In experiment one, stimuli were 144 nouns: 72 real words and 72 pseudo-words; and stimuli were displayed using visual decision task. Participants were expected to answer accurately whether the string of letters they observe, can be considered as a word in Serbian or not. Moreover, eight practice trials were designed preceding the main experiment, with four noun and all the nouns were presented randomly. Likewise, the semantic categorization task was performed by participants, with deeper processing as some semantic information differs from that of information in the other task (cf. Tyler, Russell, Fadili, & Moss, 2001). In order to be sure that information related to semantic animacy is taken into account in task performance, the authors asked the participants to discern whether the noun referent was living or non-living. The stimuli were similar to the previous tasks with having the same similar characteristics. Each session was preceded by eight practice trials and randomly sequenced.

Experiments 1 and 2 show a high correlation between three norming animacy measures, namely mean rating, pairwise comparison and checklist of biological characteristics of living entities and the finding confirms the interconnection between three norming measurements.

To have a full comparison, the study was replicated in English as well, comprising a norming study (the most frequent used one) and two experiments. A lexical decision task (in experiment 3) and a semantic categorization task (experiment 4) were used in the experiments. The procedure for these experiments differs from that of Serbian. One hundred twenty-six (58 males, 68 females; 17–28 years old) students took part in the experiments and the similar stimuli (72 words in Serbian experiment) were used, translated into English. In the lexical decision task, the pseudo-words generated with help of pseudoword generator Wuggy (Keuleers & Brysbaert, 2010), using English phonetic rules. A rating task was taken by each participant as well as, one of the two experiments. In the semantic categorization task, each respondent was expected to rate each of the 72 words on the Likert scale (a 7-point scale) labeled from *definitely animate* to *definitely inanimate*. Whereas, in the lexical decision task, participants were told to distinguish whether each string of letters can be considered an English word or not.

In this study, the authors address whether the semantic animacy regarded as a graded property and language independent. Markedly, the high correlation observed between English and Serbian measures, confirmed the hypothesis that animacy is most likely to be language

independent due to its biological grounding. Degrees of animacy were measured by three scaling techniques which were all highly correlated signifying that semantic animacy measurement is not restricted to a specific method of measurement. Additionally, a significant association were found between these measures and biological properties measurement, which permits the authors the withdrawal of a conclusion, like actuality of a highly correspondence between the nature of semantic animacy and its biological features. Therefore, linguistics animacy (Aissen, 2003; Dahl & Fraurud, 1996; Dixon, 1979; Silverstein, 1976; Yamamoto, 1999; Zaenen et al., 2004), and semantic animacy both have graded properties however, they determinants differ in some degrees due to their respective continuum (Radanović et al. 2016).

7. Methodology

Present study

In the current study, not only the concept of semantic animacy is empirically investigated, but also the degree to which the representation of animacy differs in Persian from that of Serbian and English. As replicated from Radonović et al., work (2016), different measurements of semantic animacy were constructed in Persian language and the findings were compared across Serbian and English. In the present study, the subjective rating method in Persian was measured which is relatively similar to the work of Radanović et al., followed by verb-agreement experiment which differs from two experiments carried out by Radanović et al., (2016). In total 5 surveys were administrated.

7.1.1 Stimuli

Similar to the Radonović et al., (2016) study, the stimuli presented in this study, consisted of the same 72 nouns that had been rated in Serbian. All the nouns were translated into Persian denoting a variety of living and non-living entities such as human beings, animals, plants, tools, etc. Moreover, some problematic exemplars were included in the experiments replicating from work of Yamamoto (1999) concerning linguistic animacy. On the other hand, the concreteness of the nouns was taking into account and controlled, as the animacy is considered to be the property of word reference.

7.1.2 Measurement of animacy

Following procedure, data collection occurred online via Qualtrics surveys (which contained an anonymous link (internet address) to the online survey) through participants' computers as well as phones, as the surveys were designed to be mobile-friendly. By clicking on the link, participants were directed to a page that initially explained the purpose of the survey, as well as the researcher's contact information were provided in case the participants had questions. In order for respondents to proceed with the survey, an affirmation of their consent was expected.

In the first survey, 90 participants (34 females, 56 males) were recruited, 50 of whom residing in the Netherlands (Dutch-Iranian) and 40 residing in Iran. Respondents were offered a choice of seven pre-coded responses with the middle point being neither animate nor inanimate. Individuals were asked to give an assessment of the animacy of a noun referent on a 7-point Likert-type scale (1= the least animate (totally inanimate), 2= somewhat inanimate, 3= slightly inanimate, 4= neither animate, nor inanimate, 5= slightly animate, 6= somewhat animate, 7= the most animate (totally animate)). All the stimuli were judged by each participant and the order was presented randomly per participant. For each of the stimuli across subjects, mean and standard deviation were calculated.

Moreover, comparisons are provided in the experimental design, with results from Radanović et al.'s (2016) work in which two languages (Serbian and English) from different language branches were tested, so as to elucidate whether semantic animacy is language dependent or not. It should be borne in mind that similarities can correspond between animacy judgments in various languages if the biological animacy status of the noun referent characterizes semantic animacy whereas, if different animacy judgments are observed across languages the role of linguistic factors should be considered.

7.1.3 Verb-agreement experiment

Furthermore, as it was mentioned earlier, in Radanović et al., (2016) work, two experimental tasks - namely a lexical decision task and a semantic categorization task were used. However, in the present study, after realizing the degree to which the 72 nouns are animate, an alternative test (verb-agreement) to the lexical decision task was conducted in order to figure out how actually the animacy of these nouns influences verb-agreement . In the verb agreement test (singular-plural task), the higher the animacy categorization is, the higher the possibility of having plural marking in Persian.

In verb agreement task, 300 participants (170 females, 130 males) (78 Iranian, 222 Dutch- Iranian) took part, who had not participated in the subjective ratings method. For the purpose of this task the stimuli were the same however, 72 nouns were reduced to 40, given that, this task comprised of sentences and having more than 40 sentences would be time consuming to respondents. While selecting the sample of 40 nouns from 72, diversity and consistency of nouns based on the Mean average of 72 nouns calculated previously in subjective rating method, were taken into account. In verb agreement task, sentences were

made quite short with simple structure of subject and verb predicate. This task is more about rating rather than presenting the concept, and sentences were rated in terms of acceptability and not in terms of animacy, of course. The participants were asked to provide a judgment of the acceptability of each sentence by considering whether having singular or plural verb seems grammatically correct. Due to having Latin square design, each survey was split into two parts, half sentences (20) having singular verb and the other half (20), having plural verb. Likewise, in the subjective ratings method, the assessment was made on a 7-point Likert-type scale (1= extremely acceptable, 2= acceptable, 3= slightly acceptable, 4= neither acceptable, nor unacceptable, 5= slightly unacceptable, 6= unacceptable, 7= extremely unacceptable). The presentation order was randomized per participants and participants saw an equal number of sentences but they did not see the same noun (subject) both with plural and singular predicate. The verb agreement experiment comprised of 4 Qualtrics surveys. For controlling the variation in two different direction and having a balanced design, two surveys were designed for Iranian living in the Netherlands and two surveys for Iranian who reside in Iran. Furthermore, the mean and standard deviation of responses were measured across subjects.

8.Results

The first survey was designed to replicate Radanović et al.'s (2016) subjective norming method. The analysis on the first experiment focused on animacy rating. This was necessary as an absolute measure of the animacy of a noun referent of 72 stimuli were given by this rating.

Once the data was collected, in the preparatory step of the analysis, all the responses were converted numerically in order to calculate the mean and standard deviation of the nouns and compare them with Radanović et al.'s (2016) mean ratings. The mean rating measures in the present study were highly correlated with that of Radanović et al., (2016)

By testing the first survey and calculating the mean ratings, we have the grasp of the degree to which a noun is animate or inanimate, therefore we can give ratings on how animate all the nouns are. Based on the comparison of the mean ratings (see Table. 3, at the end of this section), it is shown that some of the nouns were rated the same in Serbian and Persian (i.e, fruits and vegetables) while in most of the nouns a close rating can be observed. However, there are some words namely *fly*, *crab*, *prince*, *bacteria*, *virus*, *orchid*, *giant*, *God* and *witch*, which are performing differently than the words in the Radanović et al. paper, in that the mean differences vary compared to those in Radanović et al., and the above-mentioned nouns are rated higher in being animate. Besides, as in the case of Persian, one item (Dragon) is deviated from the animacy distribution, for more clarity we will return to this in the discussion section. On the whole, the majority of mean ratings given to Serbian nouns don't vary widely with that of Persian nouns.

Furthermore, in Dutch-Iranian and Iranian surveys, the two populations did not rate some of the nouns similarly which shows they have a different perception of each noun. For instance, nouns such as *queen*, *dragon*, *giant*, *God*, and *ocean* were rated nearly 5 by Persians in Iran while Persians-Dutch rated the mentioned nouns around 4. Moreover, nouns like *fly*, *snow* and *cloud* have a higher mean rating (almost 4) in Persian surveys whereas Dutch-Persian surveys show a rating of almost 3. Also, other nouns like *ball*, *table*, *dress*, *cup* and *house* were rated higher by Iranians who are residing in the Netherlands than those who live in Iran. Yet, some of the nouns namely, *plate*, *rainbow*, *lemon*, *watermelon*, *apple*, *cactus*, *virus*, *cook*, *pigeon*, *elephant*, *squirrel*, *girlfriend*, *brother*, *mother* and *baby* were rated within a relatively tight range by both populations.

Additionally, humans and animals almost granted the same ranking (all above 6) by both Iranian and Dutch-Iranian populations while in Radanović et al.'s study all animals were rated below 6 except *dog* and *horse* that were rated like humans (above 6). Noticeably, contrary to the present study, in the work of Radanović et al., some of the nouns referring to humans such as *uncle*, *teacher*, *professor*, *cook*, *sailor*, and *queen* have the same rating range as animals except *prince* which is rated nearly 4 which is below the rating level for animals. Furthermore, as it was mentioned already vegetables and fruits share almost the same ranking in both studies, however, *cabbage* and *olive* have the higher rating level compared to Radanović et al.'s measures thus, it can be said that *cabbage* and *olive* are perceived more animate by Iranian and Dutch-Iranians. On the whole, the general expectation was met as the words whose referents are clearly animate were rated high in animacy (i.e, *mother*, *uncle*, etc.) while the words with inanimate referents were rated low in animacy (i.e, *computer*, *lamp*, etc.)

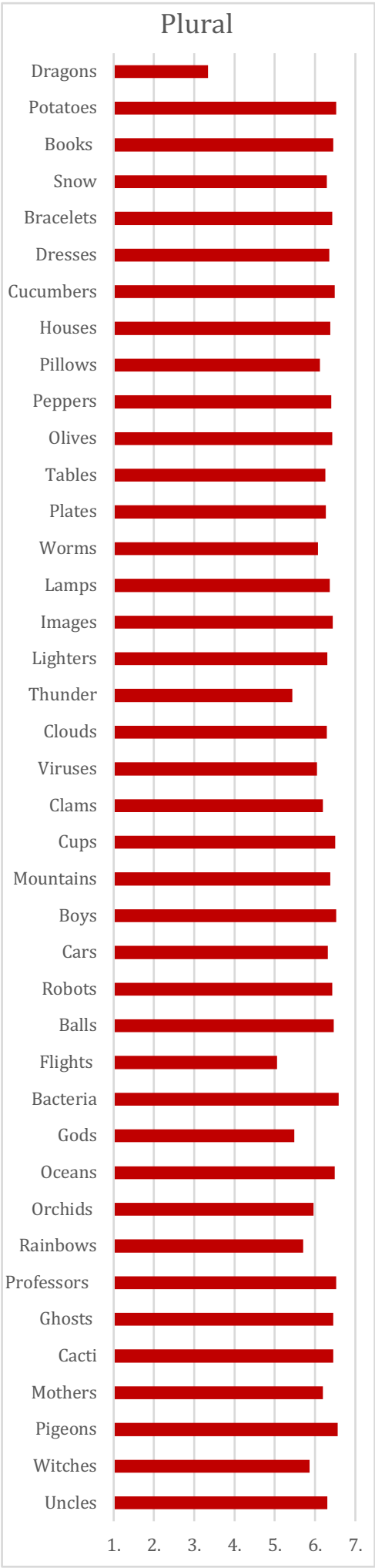
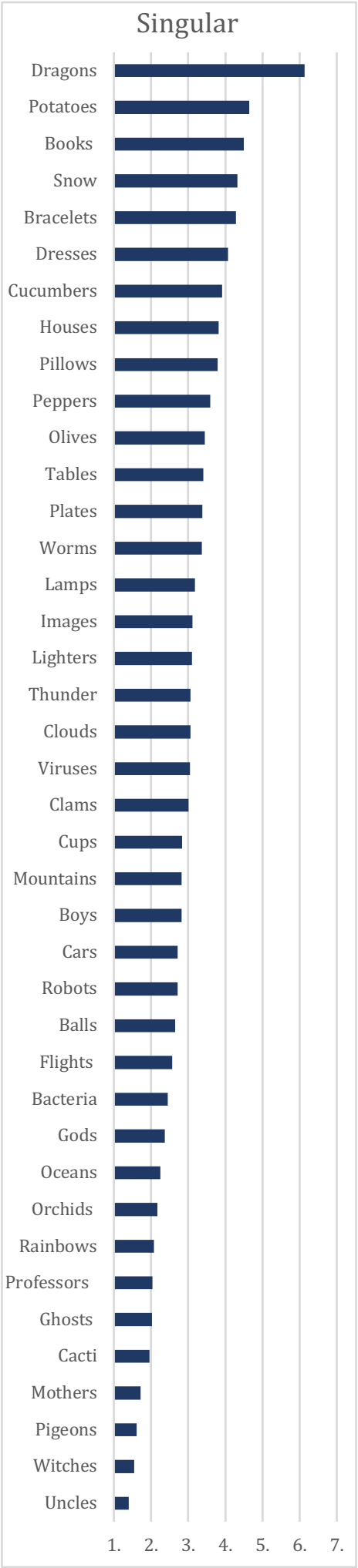
Once the mean rating analysis was done, the verb-agreement surveys tested the acceptability ratings and based on the results, different plots and graphs illustrated the concept, which will be presented in the coming sections.

8.1.1 Dutch-Iranian data

Mean acceptability ratings for the first and second survey (Dutch-Iranian) are shown in Figure 4. There were always plural subjects in all the questionnaires determining whether singular and plural verb forms (or both) agree with plural animate and inanimate subjects. As it can be seen in plural graph below, the pattern seems to be normal in that we are using plural subjects and plural verbal agreement. For instance, according to the red graph, in Persian, if there is plural potatoes and plural verb then the sentence has optional choice of having plural verb. Nevertheless, there is an unusual rating for the word *Dragon* which shows the opposite of what other sentences do, but this must be an outlier which will be discussed in the discussion section (see also, the appendix). As it is apparent from the plural figure, every plural seems to be more acceptable than singular, therefore, concentrating and analysing the plural graph does not seem to be informative enough and does not give a thorough explanation about animacy.

Despite the plural graph, the singular one shows a significant pattern. It displays the relation between animacy and having a singular verb. Generally speaking, according to the hypothesis made earlier, in Persian, getting singular agreement on inanimates is considered to be more correct than having such an agreement on animates. Thus, the most obvious trend in

this graph is that the more inanimate a noun is the more it is likely to take singular verb agreement.



By testing the first survey, the degree to which a noun is animate or inanimate is clarified. Subsequently, having the other surveys on how good and practical the sentences are (Iranian and Dutch-Iranian population), enabled us to make new graphs with two axes that give a clearer picture of semantic animacy in Persian.

Figure 5 illustrates the overall pattern in two axes; the x-axis introduces the mean ratings on the first survey while the y-axis basically shows what is done in the verb-agreement survey. The word *dragon* is excluded from this chart as it seems to be an outlier.

To explain the pattern in the graph below, it can be seen that for example the noun *uncle* which is rated fully animate (7) is not really acceptable with a singular agreement (below 1) whereas, by looking at *cups* the low rating for animacy shows that people perceived this noun as inanimate. Similarly, by looking at Figure 6, the acceptability of a plural verb with *cups* can also be noticed. Generally, every acceptability rating for plural verbs is between 5 and 6 or 5 and 7 which makes the analysis of plural not as informative as possible thus, as was already mentioned in mean ratings analysis, plural graphs and ratings do not require any close analysis.

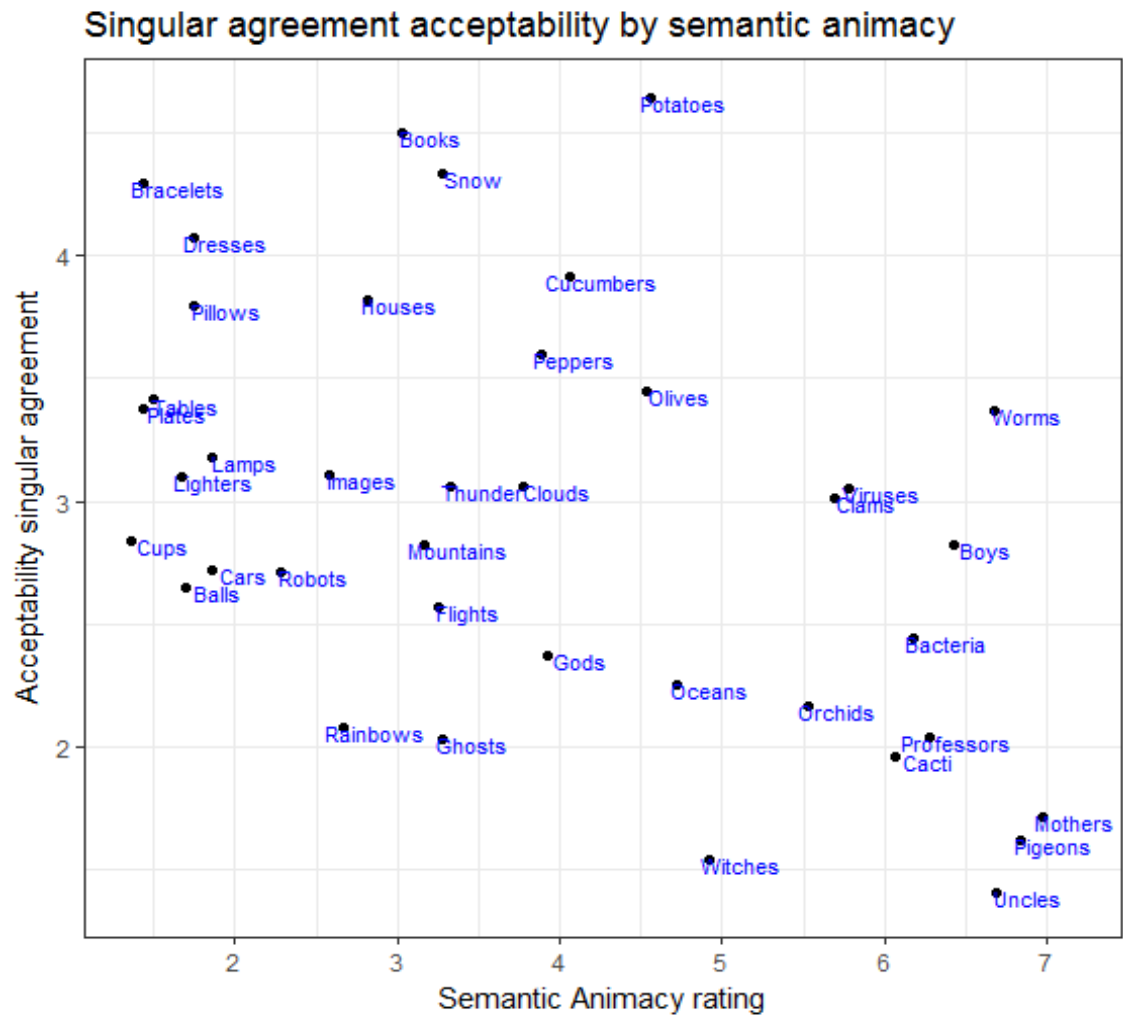


Figure 5. Singular agreement acceptability by semantic animacy

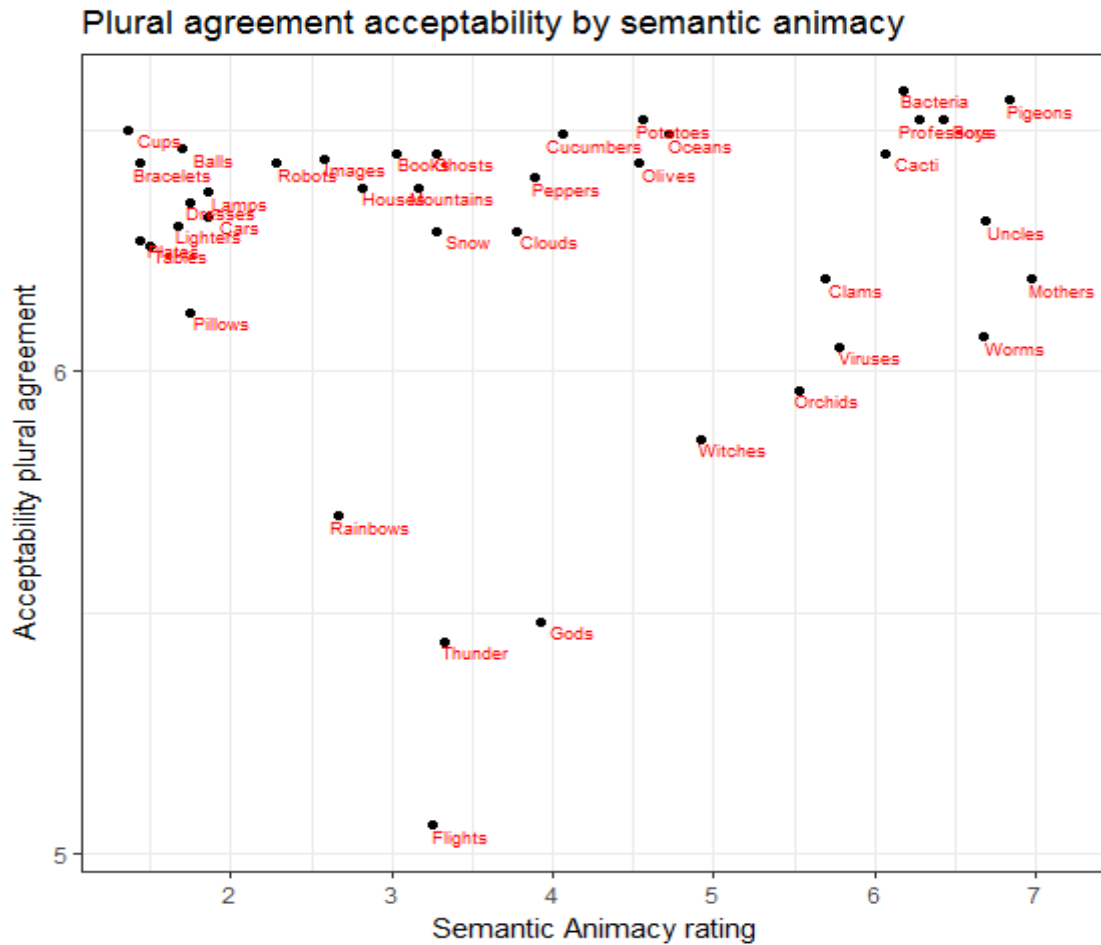


Figure 6. Plural agreement acceptability by semantic animacy.

In the graph shown below (Figure 7) which is the same as latter graph but having a correlation line between the two ratings; a two-dimensional feature space of the two sets of data are presented, namely semantic animacy and verb-subject singular acceptability. The vertical axis is labelled as acceptability singular agreement which is the variable being predicted by the horizontal semantic animacy axis from which predictions are made on how acceptable a noun with singular agreement is. In brief, the black dots represent the ratings for both the acceptability of sentences in the second survey and the animacy ratings in the first survey (39 nouns excluding the outlier *Dragon*). All the 39 nouns are positioned in this space depending on their acceptability with the singular verbs and the degree to which they are perceived as animate or inanimate. Moreover, a calculation can be made in order to measure the distance between a noun and its neighbours in the feature space, such as how similar they

are in accepting a singular verb. After all, a linear relationship can be found in the graph given that the data points seem widely scattered around a straight line and it looks as if the acceptability of singular agreement with some degree of accuracy can be predicted from the other variable which is semantic animacy.

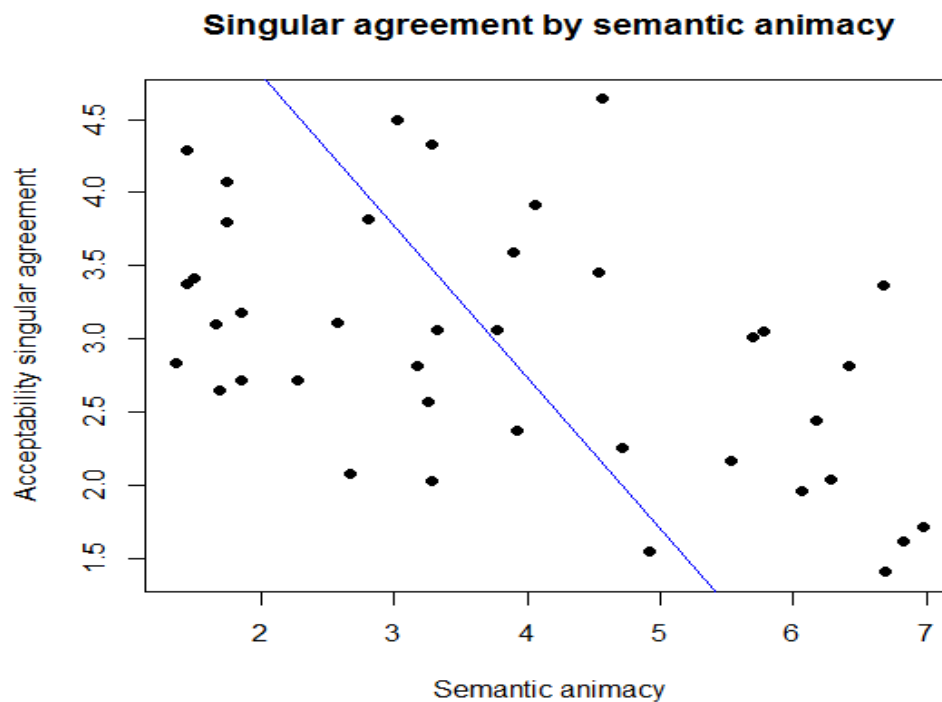


Figure 7. Singular agreement by semantic animacy

8.1.2 Iranian data

Inspection of the figures below suggests that, Iranian data sort of behaves the same as Dutch-Iranian data however, some slight differences can be observed. Noticeably, like the previous data *Dragon* is an observation that appears to deviate markedly from other observations therefore, it was excluded from the graphs.

Comparing singular acceptability data in Iranian results with that of Dutch-Iranian (Figure 5), there are only a couple of nouns that Iranian rated differently, for example *mothers*, *cacti*, *oceans*, *rainbows*, *robots*, *tables*, *houses* and *clams* were rated relatively higher by Iranians thus, the degree of acceptability of having singular verbs with mentioned nouns seems

higher for Iranians. To put it differently, these words seem to be perceived more inanimate by Iranians whereas, *viruses* and *boys* were rated higher by Dutch-Iranians. The rest of the nouns were perceived the same by both populations.

Although in the plural agreement data most of the nouns were rated by both populations nearly the same, its shown by Figure 5 that some nouns such as *flights*, *thunders*, *Gods*, *tables*, *clams*, *plates* and *viruses* apparently are perceived differently in that Iranians' ratings are below 5 for aforementioned nouns while Dutch-Iranian rated some of the nouns even above 6. As a result, it can be said Iranians are less likely to accept plural verbal agreement with these nouns and they might consider these nouns less animate.

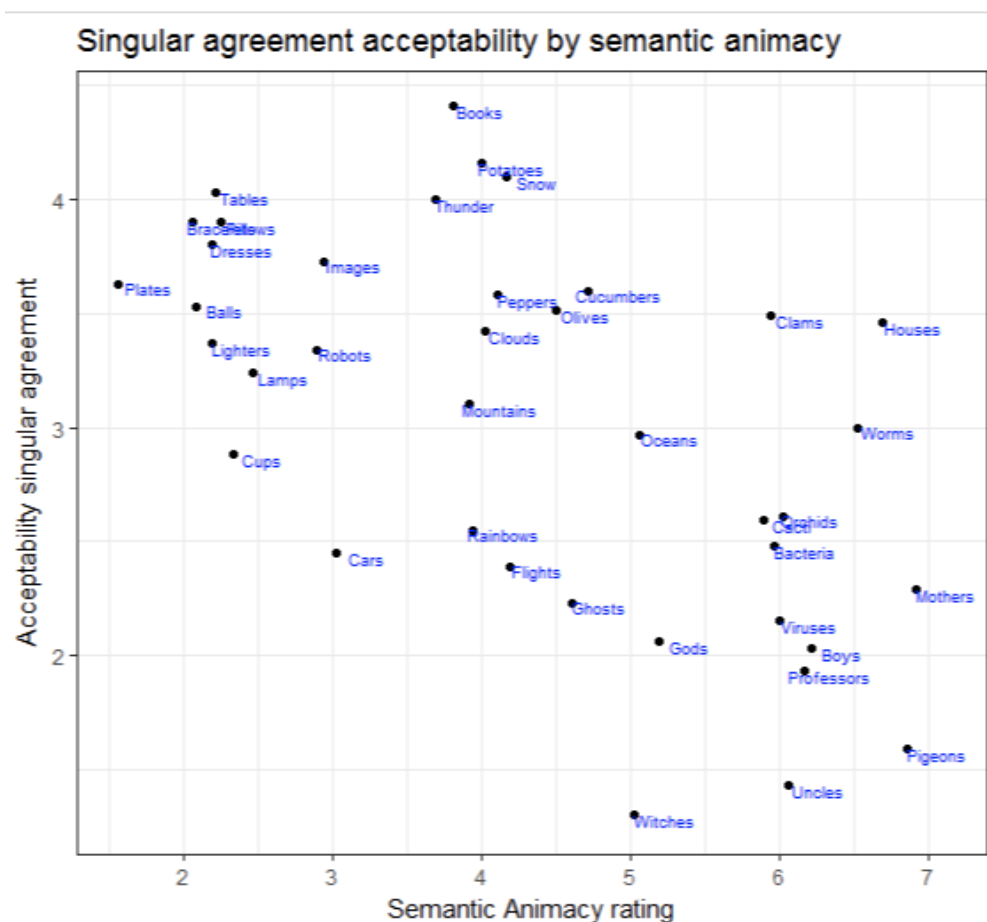


Figure 8. Singular agreement acceptability by semantic animacy

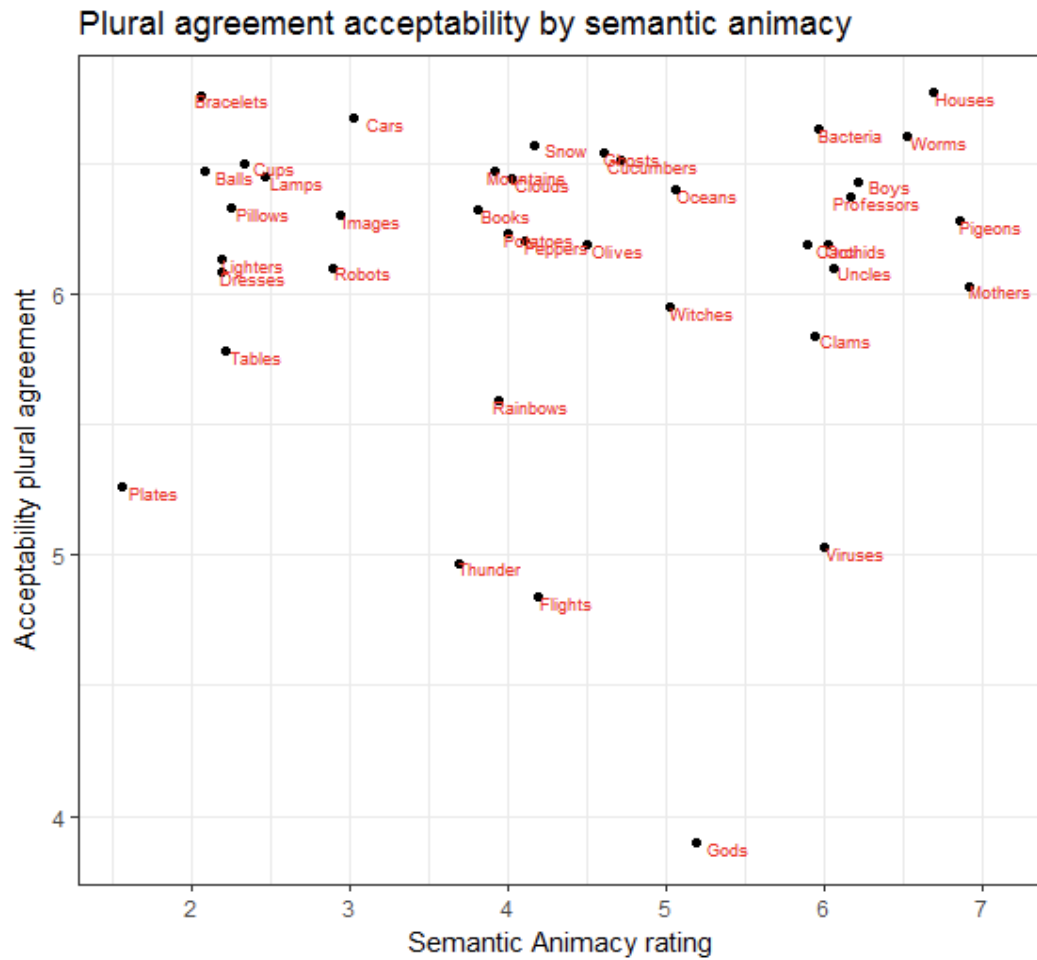


Figure 9. Plural agreement acceptability by semantic animacy

Table 3: Subjective ratings.

Averaged Serbian Subjective Ratings		Averaged English Subjective Ratings		Averaged Persian Subjective Ratings		Averaged Dutch-Persian Subjective Ratings	
Stimulus	Animacy Rating	Stimulus	Animacy Rating	Stimulus	Animacy Rating	Stimulus	Animacy Ratings
baby	6.51	baby	98.29	baby	6.75	baby	6.77
mother	6.51	mother	97.68	mother	6.92	mother	6.95
boy	6.43	boy	97.44	boy	6.22	boy	6.39
brother	6.34	brother	95.53	brother	6.75	brother	6.71
dog	6.34	dog	97.92	dog	6.69	dog	6.78
girlfriend	6.26	girlfriend	97.61	girlfriend	6.50	girlfriend	6.53
uncle	5.97	uncle	97.29	uncle	6.06	uncle	6.39
giraffe	5.46	giraffe	97.29	giraffe	6.61	giraffe	6.73
sailor	5.86	sailor	96.42	sailor	6.33	sailor	6.52
crow	5.60	crow	95.79	crow	6.42	crow	6.57
professor	5.51	professor	95.48	professor	6.17	professor	6.25
squirrel	5.91	squirrel	95.41	squirrel	6.69	squirrel	6.73
elephant	5.63	elephant	95.38	elephant	6.75	elephant	6.78
crab	4.80	crab	95.27	crab	6.58	crab	6.64
pigeon	5.69	pigeon	95.14	pigeon	6.86	pigeon	6.81
cow	5.60	cow	94.67	cow	6.28	cow	6.69
horse	6.20	horse	94.59	horse	6.69	horse	6.83
hen	5.37	hen	93.92	hen	6.58	hen	6.76
spider	5.23	spider	93.67	spider	6.42	spider	6.60
worm	5.03	worm	91.53	worm	6.53	worm	6.51
teacher	5.80	teacher	91.42	teacher	6.64	teacher	6.67

prince	4.74	prince	91.23	prince	6.17	prince	6.35
fly	5.31	fly	89.73	fly*	4.19	fly	3.78
queen	5.37	queen	89.50	queen*	5.81	queen	6.06
amoeba	4.20	amoeba	83.55	amoeba	4.39	amoeba	4.78
bacteria	4.63	bacteria	82.59	bacteria	5.97	bacteria	6.12
calm	4.23	clam	82.03	clam	5.94	clam	5.77
dragon	4.46	dragon	81.98	dragon*	5.28	dragon	4.96
witch	3.54	witch	77.06	witch	5.03	witch	5.22
cook	5.97	cook	74.17	cook	6.50	cook	6.47
giant	3.54	giant	73.70	giant*	5.06	giant	4.27
virus	4.57	virus	69.41	virus	6.00	virus	6.05
cactus	4.26	cactus	65.08	cactus	5.89	cactus	5.92
fairy	3.49	fairy	62.86	fairy	4.89	fairy	4.42
god	3.54	god	60.69	god*	5.19	god	4.53
orchid	4.54	orchid	58.59	orchid	6.03	orchid	5.84
cabbage	3.94	cabbage	44.77	cabbage	4.39	cabbage	4.23
cucumber	4.14	cucumber	42.35	cucumber	4.72	cucumber	4.31
ghost	3.29	ghost	41.83	ghost	4.61	ghost	4.00
potato	4.03	potato	41.48	potato	4.00	potato	4.19
apple	4.54	apple	41.21	apple	4.47	apple	4.40
watermelon	4.31	watermelon	40.77	watermelon	4.11	watermelon	4.16
olive	3.89	olive	40.19	olive	4.50	olive	4.36
lemon	3.31	lemon	39.39	lemon	4.11	lemon	4.05
tomato	2.20	tomato	38.86	tomato	4.28	tomato	4.25
strawberry	4.34	strawberry	38.72	strawberry	4.89	strawberry	4.54
robot	2.91	robot	33.13	robot	2.89	robot	2.51

ocean	4.71	ocean	32.67	ocean*	5.06	ocean	4.65
pepper	4.17	pepper	30.71	pepper	4.11	pepper	3.94
river	4.89	river	29.85	river	4.78	river	4.45
thunder	3.74	thunder	28.02	thunder	3.69	thunder	3.42
car	2.77	car	16.92	car	2.08	car	2.34
image	3.17	image	15.67	image	2.94	image	2.58
rain	3.43	rain	15.19	rain	4.67	rain	4.08
computer	2.49	computer	13.92	computer	2.75	computer	2.23
snow	3.00	snow	11.83	snow*	4.17	snow	3.48
cloud	3.20	cloud	9.66	cloud*	4.03	cloud	3.77
rainbow	2.94	rainbow	9.00	rainbow	3.94	rainbow	3.94
mountain	3.34	mountain	8.80	mountain	3.92	mountain	3.14
book	3.23	book	8.50	book	3.81	book	3.19
ball	2.86	ball	7.77	ball	2.08	ball*	1.82
bracelet	2.06	bracelet	7.11	bracelet	2.06	bracelet	1.71
lighter	2.06	lighter	6.03	lighter	2.19	lighter	1.87
coat	2.00	coat	5.50	coat	2.00	coat	1.80
dress	1.94	dress	5.08	dress	2.19	dress*	1.89
table	1.46	table	4.70	table	2.22	table*	1.76
lamp	1.74	lamp	4.41	lamp	2.47	lamp	2.08
cup	1.69	cup	4.38	cup	2.33	cup*	1.77
house	2.69	house	4.28	house	3.17	house*	2.81
plate	1.51	plate	3.89	plate	1.56	plate	1.51
window	1.77	window	3.66	window	2.31	window	1.84
pillow	1.80	pillow	3.35	pillow	2.25	pillow	1.90

9. Discussion

The present study replicated the underlying distribution of semantic animacy demonstrated by Radanović et al., (2016). As in the latter study, the aim was to empirically investigate the notion of semantic animacy and whether it is perceived differently in languages coming from different language branches which helps to identify whether animacy is language dependent or independent. In Radanović et al.'s (2016) work, it was mentioned that only one normative measurement would suffice as a quantitative operationalization of graded semantic animacy as measures of semantic animacy are not confined to a specific method of measurement thus, in the current study only the subjective ratings method was used.

Similar to Radanović et al.'s (2016) work, the present study is empirical and assessed the concept of animacy quantitatively. According to Radanović et al., linguists previously implicitly assumed that animacy only has binary feature and what counts for animate and inanimate entities was induced subjectively. However, in Radanović et al.'s work and in the first survey of the present study participants were asked to rate the degree of animacy for each item (72 nouns) by using the subjective norming method.

In the subjective norming method two populations, namely Iranian and Dutch-Iranian, participated. Both populations provided a numerical judgment of the animacy of a noun referent. The data taken from Dutch-Iranians did not vary broadly with that of Serbian however there were some nouns that were rated slightly differently by Iranians residing in Iran. For instance, the nouns *dragon*, *God*, *fairy*, *ghost*, *witch* and *ocean* received almost the same ratings by Dutch-Iranian as Serbian ratings, while Iranians rated them higher in scale which shows that for Persians these nouns are perceived to be more animate than by Dutch-Persians. The reason for considering these kinds of nouns more animate by Iranian, might trace back to the ancient Iranian literature, history and mythology. For example, Ferdowsi's *Shahname*, 370 BC, that is believed to be true guardian of the national traditions and the identity of the Iranian people, in which nouns like *fairy* and *dragon* etc, were taken more vivid and alive in all part of literature, besides these types of literature still plays a prominent role in society and educational system. In contrast, some other nouns such as *ball*, *table*, *dress*, *cup* and *house* are appeared to be perceived as more animate by Dutch-Persians. Yet, human, animals and vegetables are considered to have the same level of animacy in Serbian and Persian; it can be said that all these categories of nouns are seen sort of alive in most of cultures. However, the noun *olive* is given a higher rank in the animacy scale by Iranian populations and the reason might be due to

popularity of olive in Iranian culture as still there are several one thousand-year-old olive trees in south of Iran, some of which still bear fruit which made the people think about them as a sacred healing fruit.

According to Radanović et al., (2016), semantic animacy is more likely to have roots in biological notion of animacy rather than linguistic animacy that is more anthropocentric. In fact, in linguistic hierarchies, humans are always ranked higher than animals and other animates, whereas semantic animacy does not consider humans above animals. As it can be seen in the animacy rating table in the results section, in both populations, nearly all animals such as dog, elephant, giraffe, horse, pigeon, cow, squirrel, spider, etc., were ranked above 6 similar to humans.

As is clear from the ratings table, humans and animals are placed above the other creatures such as *virus*, *bacteria*, *clam* and *worm* which confirms the fact that anthropomorphism plays a role in semantic animacy (Radanović et al., 2016).

Convincingly, as a result, the information taken from participants regarding animacy reveals that semantic animacy is not binary due to the graded ranking of nouns. Thus, it can be said that *Pigeon* is more animate than is *Worm*. Accordingly, the first experiment confirms the graded nature of semantic animacy and is consistent with previous result from Radanović et al. (2016).

For the second experiment, returning to our hypothesis claiming that it is more desired to get singular agreement on inanimate nouns rather than on animates; thus, we cannot really use a singular verb with a highly animate noun. However, as the graphs showed using singular verb with inanimate nouns and plural verb with plural animates, is not always the case but there are some patterns and relationships which will be discussed below.

First of all, in Dutch-Iranian data, in Figure 5 (see also Appendix. B) noticeably, in both plural and singular verb-agreement *dragon* acts contrary to other sentences. This noun was presented to the participants in a sentence like '*Dragons are not real*'. On one hand *Dragon* has a special place in Iranian mythology and is personified in several mythical books thus, this might be a reason for getting a high rank on the scale. On the hand, *dragon* is a borrowing noun from Arabic and also a proper noun in Persian. In Persian, proper nouns do not get any plural endings. It should be noted that diachronically some proper nouns turn to common nouns and that is the case for the noun *dragon* which overtime contextually and lexically turned to common noun. Nevertheless, it is not plausible to use plural endings (-ha, -an) with *dragon* as it is a borrowing word and only it can appear in a sentence with quantifiers. The sentence that

was used for *dragon* in the second survey lacked having any quantifier which results in *dragon* to be an outlier.

Secondly, in Figure 5, there are some nouns namely *ghosts*, *balls*, *robots*, *cars*, *cups*, *flights*, *rainbows*, and *mountains* that obtained low rankings in singular agreement acceptability. Generally, this ranking should have been obtained by animate nouns whereas, the same nouns acquired a low ranking in semantic animacy scale that shows they were perceived more inanimate than animate.

Here, some factors seem to be interacting with making such choices. For instance, *ghost* was presented in sentence like '*Ghosts are wandering*', which the concept of the sentence is actually part of some traditional beliefs in Iranian culture that after death the soul of the dead person will wander around the beloved ones for a while before leaving to its next destination that is another world. However, outside this context, as a single word, this noun can be taken as an inanimate noun in that a ghost itself might not even exist unless it is clear that it's a ghost that already lived in the earth through a human body.

Moreover, the nouns *balls*, *robots*, *cups* and *cars* are the neighbouring black dots in the Figure 5 which all received a very low rank in semantic animacy; similarly, they obtained relatively low rank on acceptability axis. By looking at the context of sentences we can see that sentence like '*Balls were torn*' and '*Robots were replaced*' might give to the comprehenders the impression of a salient agent involvement in that *balls* couldn't be torn by themselves and *Robots* also couldn't be replaced without any help from an agent. Afterwards, in '*Cars broke down*', participants might have imagined the reality of a driver which is a human in the car and as an animate being led to a preference for choosing low acceptability rating for singular. But, in the sentence '*Cups were cracked*' as usually cracking happens by an outside force therefore readers might have had thoughts of an animate being who caused a crack in the cup either by dropping the cup from his/her hands or fracturing it with a tool.

Furthermore, the noun *flights* is not really preferred by a singular verb irrespective of being an inanimate entity but by looking at the context '*Flights were delayed*' we can say this could be attributed to the fact that flights cannot have control over having delay therefore a role of an agent is more prominent here than the flight itself. In a similar manner, the noun *mountains* which is located on the graph next to the *flights*, appeared in a sentence like '*Mountains downfell*' and can be said that participants imagined that the process of down falling of the stones has nothing to do with the mountain but an outside source which caused the incident.

Last but not least, the noun *rainbows* obtained a low ranking in mean ratings in semantic animacy which confirms it as an inanimate noun; even though it is an inanimate entity, an identical rank for this noun can be observed in acceptability survey which shows it might have perceived somewhat animate. The philosophy behind this might date back to old Persian traditional tales. As the rainbow looks like a half circle in some stories of ancient origin was called the arc of Satan, also in Persian mythology some of the heroes with supernatural strength had the power to use the rainbow as bow and arrow to fight the devil. Even these kinds of stories belong to the old literature but they are still taught at schools and are narrated by older generations to younger ones. Therefore, when it comes to using *rainbow* in a sentence like ‘Rainbows are round’ Iranians might conceptualize it animate to some degrees.

As it can be seen in the plural agreement acceptability graph (Figure 6) nearly all of the sentences are ranked at ends of the 7-point rating scale and less ranked in the middle, indicating animate and inanimate plural nouns can be accepted grammatically taking both plural and singular ending verbs. As was mentioned earlier, this result is contrary to our expectations as it was hypothesized that singular verb fits better with inanimate nouns. However, as was discussed earlier, Meshkat al-dini (1987) and Thacktson (1978) among others have stated that there is always the possibility of using both plural and singular forms of the verb for inanimate plural subjects in Modern Persian. Hence, current results suggest, at least, it is still plausible to have both forms of the verbs with inanimate nouns in Modern New Persian.

Although the rankings by both populations seem to be relatively identical, several sentences with singular agreement containing subjects namely *mothers*, *cacti*, *oceans*, *rainbows*, *robots*, *tables*, *houses* and *clams* were rated higher by Iranians, whereas some other sentences with plural agreement including nouns such as *flights*, *thunders*, *Gods*, *tables*, *clams*, *plates* and *viruses* are rated at ends of the 7-point rating scale by Dutch-Iranians (figure 4 & 5). These nuance differences in rankings suggest that one factor, that is to say growing up in a cross-cultural environment and its impact on people, undeniably affects the way respondents perceive the concept of animacy. Hence, a face-to-face interview would be an option in which respondents' opinions are determined through a series of questions about the reasons behind ranking levels. This suggests that an overall effective linguistic analysis should be extended beyond the constraints of an online survey.

10. Conclusion

On the basis of the results of the present study and Radanović et al.'s (2016) work, evidently semantic animacy lies somewhere between linguistic animacy and biological animacy and is not a binary property and by all means it is a graded property. According to a high correlation between Serbian, English and Persian measures, it can be said that semantic animacy might be language independent highly due to biological grounding of semantic animacy. In brief, according to Radanović et al., (2016) animacy seems to be a continuous aspect of meaning.

Furthermore, because of limitations in the available subject pool and the limited number of sentences, a further work with different sets of sentences is needed in order to confirm the findings in the present study. Moreover, verbs also played a prominent role in subjects' sentence judgments. Some verbs in this study were designed to show the physical movement, the others stillness, motion and etc. It should be noted that some verbs may be less common for use with certain animate and inanimate nouns and might be ranked higher in relation to other verbs, for instance in a sentence like 'the mother drove the car'. Nonetheless, obviously, kind of verbs like 'to drive' cannot be used with some specific nouns (i.e. inanimates) and we avoided to use such sentences in present study. Thus, in this study the types of verbs were chosen that are less typical for use with certain animate and inanimate subjects. Therefore, it can be said that the present finding maybe a function of the way the study was conducted therefore, various design might show different results.

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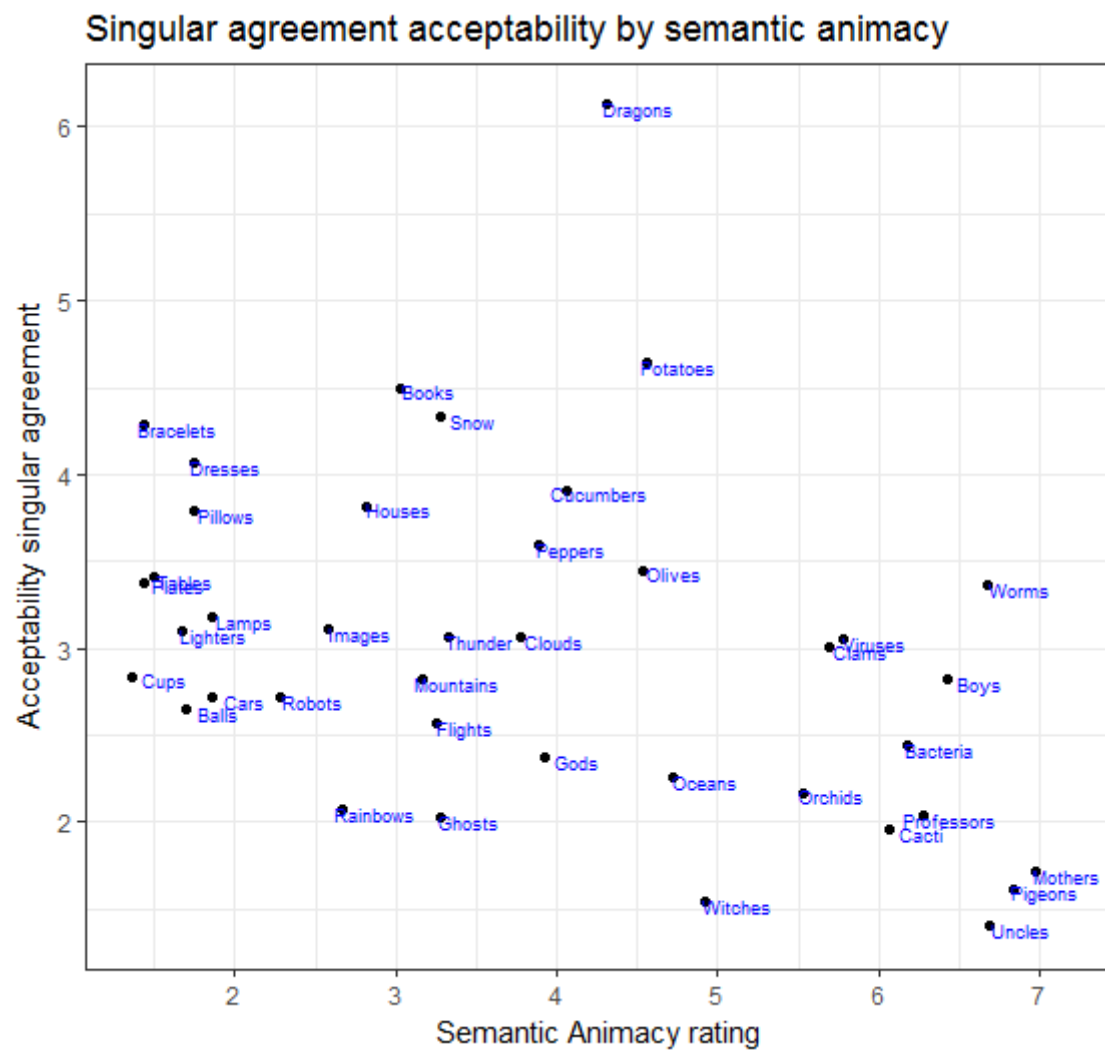
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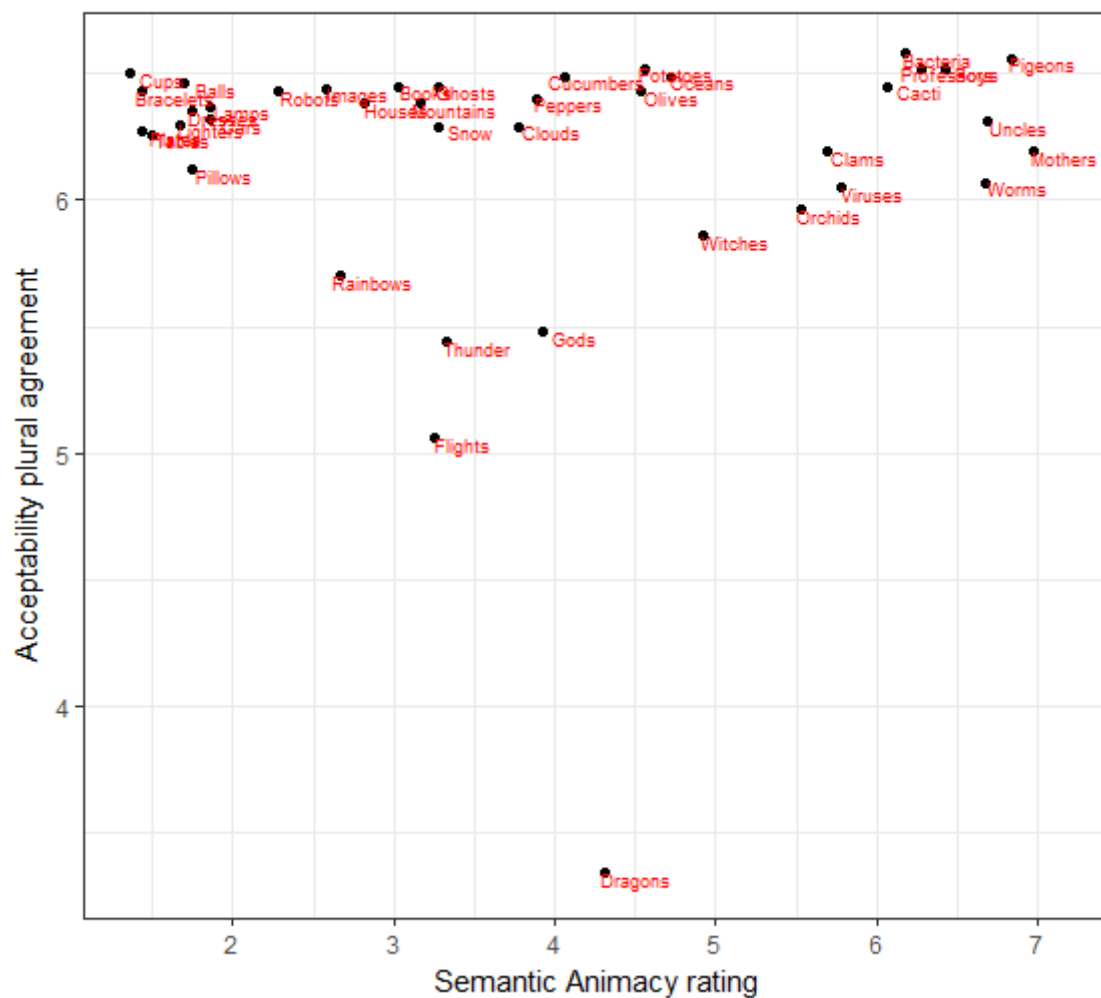
Appendix

(Dragon)

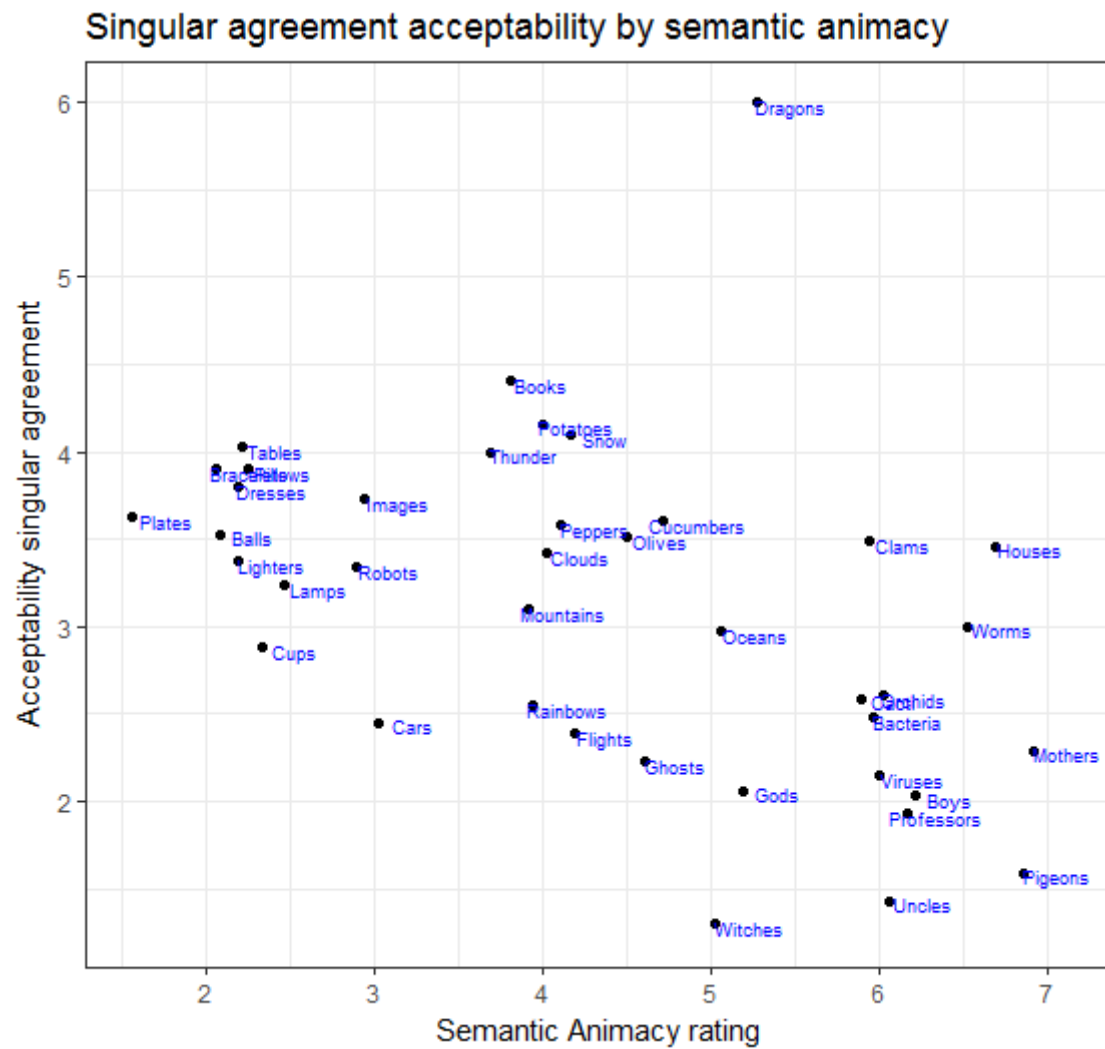
1. Dutch-Iranian data



Plural agreement acceptability by semantic animacy



2. Iranian Data



Plural agreement acceptability by semantic animacy

