

SYMMETRICAL AND ASYMMETRICAL RELATIONS IN LINGUISTICS: ANALYSIS ON ENGLISH PREDICATES

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Abstract. *This article is devoted to the comparative study of the asymmetrical and asymmetrical relations in linguistics. Firstly, the universal terms symmetry and asymmetry were defined linguistically and their peculiarities of these two relations were investigated. Basically, we tried analyze symmetrical and asymmetrical relations of predicates in the English language.*

Keywords: *symmetry, asymmetry, predicate, asymmetrical relationship, symmetrical relationship, linguistic analysis.*

СИММЕТРИЧНЫЕ И АСИММЕТРИЧНЫЕ ОТНОШЕНИЯ В ЛИНГВИСТИКЕ: АНАЛИЗ НА АНГЛИЙСКИХ ПРЕДИКАТАХ

Аннотация. Данная статья посвящена сравнительному изучению асимметричных и асимметричных отношений в языкознании. Во-первых, были лингвистически определены универсальные термины симметрия и асимметрия и исследованы их особенности этих двух отношений. В основном мы попытались проанализировать симметричные и асимметричные отношения сказуемых в английском языке.

Ключевые слова: симметрия, асимметрия, сказуемое, асимметричное отношение, симметричное отношение, лингвистический анализ.

INTRODUCTION

Our main empirical finding concerns the role of language, or, more specifically, grammar, in effecting and maintaining the distinction between symmetric and asymmetric cognitive structures. Specifically, whereas symmetric structures devoid of thematic-role assignment more commonly occur in a non-grammatical and usually also non-verbal medium, asymmetric structures involving thematic-role assignment are more likely to be associated with a grammatical medium.

MATERIALS AND METHODS

Its point of departure is an abstract distinction between two kinds of cognitive structures: symmetric and asymmetric. A cognitive structure of the form XY is symmetric if X is to Y as Y is to X with respect to all relevant features. Conversely, XY is asymmetric if there is one or more relevant features applying differentially to X and Y, thereby effecting an ordering, ranking, or imbalance between X and Y.

A crucial characteristic of the distinction between symmetric and asymmetric structures is its *privative* nature. Asymmetric structures are derived from symmetric ones by adding features that effect the asymmetry. Thus, symmetric structures are architectonically prior to asymmetric ones; they provide the foundations on which asymmetric structures are constructed.

As we shall demonstrate below, the processes by which asymmetric structures are built on top of symmetric ones are associated with the introduction of language. Although, as noted above, thematic-role assignment is part of general conceptual structure, it is through the medium of grammar that it assumes its role as a central feature underlying asymmetric cognitive

structures, thereby providing the basis for the distinction between non-grammatical and grammatical levels of cognition.

The distinction between symmetry and asymmetry in the domain of compositional semantics is not categorical but rather gradated. Thematic-role assignment is not something that is either present or absent; instead, it can be present to various degrees, depending on a wide variety of factors, both grammatical and extra-linguistic. In order to capture this effect, we posit two distinct levels, or tiers, of cognition: *non-grammatical cognition*, more commonly associated with symmetric structures, and *grammatical cognition* more conducive to asymmetric structures. These two levels of cognition are not on a par; rather, grammatical cognition is derived from non-grammatical cognition by the introduction of thematic-role assignment, which has the effect of transforming symmetric structures into asymmetric ones.

RESULTS

Symmetry helps one make systematic inference about relations in the world and is a fundamental property of natural language (Gleitman, Senghas, Flaherty, Coppola, & Goldin-Meadow, 2019). A symmetrical predicate describes a reciprocal relation and collective participation between entities. For instance, knowing *John met Mark* one can systematically infer that *Mark met John*, and vice versa. Here *meet* is perceived as symmetrical, because a *meeting* is implicitly reciprocal and occurring collectively with both participants. Conversely, *Gab kissed Anna* does not imply that *Anna kissed Gab*. Here *kiss* is perceived as asymmetrical. However, symmetry inference concerns beyond a predicate. In particular, context can make *kiss* symmetrical, e.g., *Anna and Gab kissed simultaneously* implies that *Anna kissed Gab and Gab kissed Anna*.

We present a framework for automated inference of verb symmetry in naturalistic sentences. Empirical studies from psycholinguistics have taken two main approaches to sentence-level symmetry:

1) a feature-based approach (Gleitman, Gleitman, Miller, & Ostrin, 1996); 2) a contextbased approach (Tversky & Gati, 1978).

Gleitman and colleagues, after obtaining predicate-level symmetry ratings, had participants assess the degree of discrepancy in meaning between a sentence and its reversed counterpart (where the positions of the entities are switched). The logic behind this approach to symmetry inference can be demonstrated in the pair of sentences, *Gab kissed Anna* and *Anna kissed Gab*, which do not have the same meaning. The difference score for the pair would be high, rendering *kiss* asymmetrical.

Symmetrical relationship is made up of exactly similar parts facing each other or around an axis; showing symmetry. While asymmetrical relation means having parts or aspects that are not equal or equivalent; unequal. When we concern about symmetrical and asymmetrical relations of a language, it will be focused on the ways of relations of the linguistic units, whether they can be replaced, equal or unequal. In this article, we are going to analyze symmetrical and asymmetrical relations of predicates in English language.

“Symmetrical predicates” have distinctive linguistic properties in many languages. But the concept of “symmetry” merits closer examination, especially in the light of the controversial claim by the psychologist Amos Tversky [1] that the concept ‘similar’, a standard example of a symmetrical predicate, is in fact not symmetrical. Tversky’s evidence includes the fact that experimental subjects generally rate (1a) as holding to a higher degree than (1b).

- (1) a. *North Korea is similar to Red China.*
 b. *Red China is similar to North Korea.*

Lila Gleitman and colleagues argue in an interesting paper [2] that ‘similar’ is symmetrical, and that the difference in judgments reflects the independent contribution of figure-ground differences encoded in the syntax. They argue in support of a robust linguistic distinction between symmetrical and “asymmetrical” predicates. Gleitman *et al* use a semantic paraphrase test as a central property in characterizing linguistically symmetrical predicates in English: does the *intransitive* version of a given predicate have a meaning close to the meaning of an overt reciprocal with the corresponding *transitive* version? This test is illustrated in (2) and (3) below, where (2a) and (2b), with symmetrical *meet*, are close in meaning, but (3a) and (3b), with the “asymmetrical” *drown*, are not.

- (2) a. *John and Bill meet.*
 b. *John and Bill meet each other.*
 (3) a. *John and Bill drown.*
 b. *John and Bill drown each other.*

Gleitman *et al*’s paper analyzes symmetrical and what I will call “quasi-symmetrical” or “sometimes-symmetrical” predicates in English, including verbs (*meet, kiss*), and adjectives (*similar*), to which I will add nouns (*sibling, brother*). Their paper addresses and solves the mysteries raised by Tversky’s work concerning the apparent non-symmetrical behavior of symmetrical predicates like *similar*.

DISCUSSION

The component parts of a linguistic structure are related to one another; for example, the subject is related to the verb in a sentence structure. Syntactic structures are characterized by asymmetric relations between the parts, in almost all respects. For instance, the various relations between a verb and its subject are asymmetric because the subject is higher in the structure than the verb, and also because the verb takes the subject as its argument. Most relations in a sentence are asymmetric, but there are some relations which appear not to be asymmetric. One potential example of symmetry in syntax might be conjunction: in the conjunction “*John and Mary*”, each item is conjoined to the other, which is a symmetric relation. If we now return to the asymmetries in a syntactic structure, those between for example a verb and subject, or verb and object, or modifier and modified element, we might note that these asymmetries do not appear to combine in any significant way with the symmetries of poetic form. Here apparently there is little to say about any aesthetic ‘contradiction’ between the asymmetry of language and the symmetry of form. There are two reasons for this.

The first is that some kinds of poetic form, such as the kind of rhyme we see in Dryden’s text, hold between any two words and there is neither a requirement nor prohibition on the two words being linguistically related: for example, it seems that rules for rhyme never stipulate that two words must be in the same sentence. The second reason is that other kinds of poetic form, such as lexical and syntactic parallelism, actually work by discouraging hierarchical asymmetry.

CONCLUSIONS

We present to our knowledge the first formal framework for modelling sentence-level predicate symmetry and demonstrate that automated inference of verb symmetry is possible in natural context. Contributing the symmetry inference sentence dataset, we show how existing approaches to symmetry, based on linguistic features and contextualization, are by themselves

insufficient to explain sentence level symmetry judgment, but a hybrid approach improves systematic symmetry inference in state-of-the-art language models.

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