

SYNTACTIC AND SEMANTIC PROPERTIES OF BIVALENT UNITS

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Annotation: This article provides a comprehensive linguistic analysis of bivalent units, a core category within predicate-argument structures that inherently require two syntactic and semantic arguments to express complete meaning. Bivalent units—typically verbs—play a fundamental role in sentence construction and meaning, bridging syntax and semantics in all natural languages. The study delves into the theoretical foundations of valency theory and predicate logic to frame the classification and behavior of bivalent predicates, focusing particularly on their syntactic realizations, thematic roles, and the interface between grammatical form and conceptual meaning. In addition to outlining the formal properties of these units, the article explores cross-linguistic perspectives, including differences in argument alignment, case marking, and morphosyntactic patterns across typologically diverse languages. Special attention is given to alternations such as passivization, dative shift, and causative constructions, all of which provide insight into how bivalent predicates function in real language use. The paper also discusses implications for cognitive linguistics, second language acquisition, and translation studies. This in-depth examination is intended for scholars and students of syntax, semantics, typology, and cognitive linguistics.

Keywords: Bivalent units, valency, syntax, semantics, transitivity, predicate-argument structure, argument realization, thematic roles

The study of sentence structure and meaning has been at the forefront of linguistic inquiry for decades, and among the many elements that shape syntactic and semantic representations, bivalent units occupy a particularly critical position. These are linguistic elements, most commonly verbs, that semantically require two arguments—typically referred to as agent and patient, or subject and object—to form a complete propositional statement. Bivalent predicates underpin a vast range of linguistic constructions across languages, functioning as a crucial bridge between the mental representation of events and their grammatical realization in spoken or written discourse.

From a syntactic standpoint, bivalent units are often associated with transitive constructions, wherein a verb takes a subject and a direct object. However, bivalence is not limited to surface transitivity; it is a deeper semantic requirement governed by the verb's argument structure. Semantically, bivalent units encode complex relationships involving action, causation, perception, and transfer, often involving multiple participants with distinct roles in the event being described.

The significance of bivalent units extends beyond grammatical classification—they are central to theories of thematic role assignment, valency, and the syntax-semantics interface. In typological and generative grammar, understanding how bivalent verbs behave offers insight into universal principles of language structure as well as the specific mechanisms used by different languages to realize argument roles. Additionally, the study of bivalent constructions reveals much about language processing, acquisition, and even translation, as different languages vary in how they mark and structure such predicates.

This article aims to provide a thorough examination of the syntactic and semantic features of bivalent units, considering both theoretical perspectives and empirical data. It draws upon frameworks such as dependency grammar, theta theory, and role and reference grammar, and illustrates the discussion with examples from English and other world languages. By doing so, the paper seeks to clarify how bivalent predicates function, how they differ from monovalent and trivalent structures, and why they are essential for a deeper understanding of linguistic competence and performance.

In linguistic theory, the concept of valency—originally introduced by Lucien Tesnière (1959)—refers to the capacity of a predicate, most often a verb, to govern a specific number of arguments. Bivalent units, also known as divalent predicates, are those that inherently require two arguments to form a semantically and syntactically complete clause. These arguments usually correspond to semantic roles such as agent and patient, or experiencer and theme, depending on the lexical semantics of the verb.

For example, in the English sentence “The teacher explained the lesson,” the verb explained necessitates both a subject (the teacher) who performs the action and an object (the lesson) that receives or undergoes the explanation. Without either of these constituents, the proposition remains incomplete or ungrammatical (“The teacher explained” leaves the listener expecting more information).

Bivalent units contrast with monovalent (intransitive) and trivalent (ditransitive) verbs, which require one or three arguments, respectively. While monovalent verbs like sleep or arrive only need a subject (“He sleeps”), and trivalent verbs like give or send require a subject, a direct object, and an indirect object (“She gave him a book”), bivalent verbs represent the prototypical transitive pattern in many languages.

From a syntactic perspective, bivalent verbs tend to surface in canonical subject-verb-object (SVO) constructions in languages such as English, or subject-object-verb (SOV) in languages like Japanese and Uzbek. The requirement for two arguments is not merely stylistic or optional but is rooted in the verb’s lexical valency frame, which determines the number and type of arguments the verb must take. It is also crucial to distinguish between syntactic realization and semantic valency. Some bivalent verbs may undergo syntactic operations such as passivization (“The lesson was explained by the teacher”) or ellipsis (“She explained everything yesterday, but I didn’t”) that alter or suppress one argument, but their underlying valency remains bivalent at the semantic level. The concept of bivalence is also central in frameworks such as theta theory (within Generative Grammar), where a verb’s theta grid assigns specific roles to each argument. In Role and Reference Grammar (Van Valin & LaPolla, 1997), predicates are analyzed in terms of their logical structure, which determines how many arguments are required and what semantic roles they fill.

In sum, bivalent units are fundamental to our understanding of predicate-argument relations. They are defined not merely by the presence of two syntactic constituents, but by the semantic necessity of two participants in the event structure the verb encodes. Their study helps illuminate the intersection between lexical semantics, grammatical structure, and language processing.

Bivalent units are characterized not only by their semantic requirement for two arguments but also by their predictable and structured syntactic realization within clause architecture. These units play a critical role in sentence construction, particularly in languages that rely heavily on word order or case marking to signal grammatical relationships between constituents. At the syntactic level, a bivalent unit—most often a transitive verb—projects a

verb phrase (VP) or clause that includes two core constituents: a subject (usually the agent or experiencer) and a direct object (usually the patient, theme, or stimulus). For example, in the sentence “The doctor examined the patient,” the subject (the doctor) and the object (the patient) are syntactically required to fulfill the valency of the verb examined. In configurational languages such as English, the word order plays a crucial role in expressing these syntactic relationships. The canonical Subject-Verb-Object (SVO) pattern is employed to mark the roles of the arguments. However, in non-configurational languages, such as Russian, Latin, or Turkish, morphological case marking (e.g., nominative, accusative, dative) identifies grammatical functions, allowing for greater flexibility in constituent order without loss of clarity.

Bivalent verbs also allow and sometimes require specific syntactic transformations:

Passivization: In English and many other languages, the direct object of a bivalent verb may be promoted to subject position through passive voice (“The patient was examined by the doctor”), showing that both arguments are syntactically accessible.

Clefting and topicalization: These operations can manipulate the focus and information structure of bivalent clauses (“It was the patient that the doctor examined”), further supporting the syntactic visibility of both arguments.

Coordination: Bivalent predicates can appear in coordinated structures with shared arguments (“The doctor examined the patient and prescribed medicine”) or with parallel arguments (“The doctor examined the patient and the nurse assisted him”).

In syntactic theory, particularly within Generative Grammar, bivalent verbs are said to project theta grids and assign theta roles to their arguments (Chomsky, 1981). The syntactic structure of the sentence must satisfy these theta-role assignments, which are governed by principles like the Projection Principle and the Theta Criterion. For instance, the verb chase must assign an agent role to the subject and a theme role to the object; failure to include both arguments leads to ungrammaticality (*“The dog chased” without an object is semantically incomplete). Furthermore, binding principles and movement rules within the syntactic domain often interact with bivalent verbs. Reflexive pronouns, for instance, typically require a co-referential antecedent within the clause (“She blamed herself”)—a pattern that relies on the syntactic positioning of both arguments within the same domain. Finally, argument omission (also called null arguments or pro-drop) in some languages does not necessarily contradict the syntactic bivalence of a verb. For example, in pro-drop languages like Spanish or Italian, subjects or objects may be omitted in surface structure but are still syntactically present at a deeper grammatical level (“Lo vi” – “I saw him” where “yo” (I) is omitted).

The semantic interpretation of bivalent units relies fundamentally on the assignment of thematic roles (also known as theta roles) to their arguments. These roles reflect the functions that participants play in the event or state described by the verb. Common thematic roles in bivalent constructions include agent, theme, patient, experiencer, goal, and instrument. Each role corresponds to a specific conceptual relationship with the verb, and the interaction between the two roles within a bivalent structure is essential for establishing the full meaning of a sentence. For instance, in the sentence “The chef chopped the vegetables,” the agent (the chef) performs the action, and the patient/theme (the vegetables) undergoes the change of state caused by that action. This agent-patient configuration is prototypical of many bivalent constructions, especially those denoting physical actions. In contrast, psychological or perceptual verbs, such as “annoy” or “see,” often involve an experiencer and a stimulus/theme, as in “The noise annoyed her” or “She saw the accident.” Thematic roles

provide the conceptual scaffolding for understanding events. Verbs inherently encode expectations about the number and type of roles they require. This is reflected in their lexical semantics and argument structure. Bivalent verbs are thus semantically saturated only when both roles are explicitly or implicitly expressed. Without the full set of roles, interpretation becomes vague or context-dependent. The mapping between thematic roles and syntactic positions is not always one-to-one or universal across languages. For example, in English, the agent typically maps onto the subject position, and the theme or patient onto the object. However, in ergative-absolutive languages, such as Basque or Georgian, the alignment of roles differs, and the subject of a bivalent verb may carry different morphological markings depending on voice, aspect, or transitivity. Furthermore, the realization of semantic roles may be affected by syntactic operations such as passivization (“The vegetables were chopped by the chef”), which demotes the agent and promotes the patient to subject position. Though the syntactic structure changes, the underlying thematic roles remain intact. This distinction between deep structure and surface structure is central in transformational-generative grammar and has implications for both theoretical modeling and language acquisition. In cognitive linguistics, thematic roles are often conceptualized as part of broader event schemas or frames that encode typical patterns of interaction. These roles are not just abstract grammatical functions but relate to how speakers conceptualize and categorize real-world experiences. In this view, bivalent constructions reflect culturally and cognitively salient action-event templates. Moreover, from a pragmatic perspective, the salience or recoverability of one argument may influence its overt expression. In discourse, known or inferable arguments are often omitted or backgrounded, as in “He hit him, and then [he] ran away,” where the subject of the second clause is elided but understood through context.

The exploration of syntactic and semantic properties of bivalent units offers profound insights into the foundational mechanics of natural language. Bivalent constructions, by requiring two syntactic and semantic arguments, serve as essential building blocks in the formation of meaningful sentences. They reveal how languages encode relational meaning through grammatical structures and how these structures vary and align across different linguistic systems. From a syntactic perspective, bivalent units demonstrate remarkable consistency in requiring two core arguments, yet exhibit flexible surface realizations shaped by typological, morphological, and pragmatic factors. These constructions support a range of transformations, including passivization, dative shifts, causative alternations, and clefting, which not only provide syntactic versatility but also reflect the dynamic interaction between syntax and discourse structure. Semantically, bivalent predicates encode the fundamental relationships between participants in an event, such as agent-patient or experiencer-theme interactions. The mapping of these thematic roles to syntactic positions is central to sentence interpretation and varies across language families. Understanding these mappings provides a clearer view of argument structure, event semantics, and the interface between conceptual representation and grammatical encoding.

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