

## Towards ontology of states: Experiencer verbs in Bulgarian

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*The internal structure of the situations described by verbs or verbal phrases determines the lexical aspect (or Aktionsart) of the particular predicate. The main topic of our study is the syntactic structure of verbal predicates denoting perceptions, emotions and mental states, e.g. гледам (see), чувам (hear); обичам (love), обожавам (adore), радвам се (be happy/glad), безпокоя се (worry), плаша се (be afraid/scared); желая (desire), вярвам (believe). The objectives of our study are to propose syntactic model of state predicates represented by verbs of perception, emotions and mental states and to determine the number, type and semantics of their arguments (subject, direct and indirect objects). Our aim is also to test the hypothesis of dependence between lexical semantics and syntactic realizations of state predicates.*

Keywords: syntax, lexical meaning, experiencer verbs, argument structure, Bulgarian

### 1. Introduction

Ontology is a philosophical discipline, part of metaphysics, and investigates the essence of being, the reality. The basic principles of everything that exists and their categorical expression are also part of its subject. Philosophical tradition of ontology is based on Aristotle's ten categories: (i) a substance; (ii) a quantity; (iii) a quality; (iv) a relative; (v) where; (vi) when; (vii) being in a position; (viii) having; (ix) acting upon; or (x) a being affected<sup>3</sup>. Initially the distinction was meant as a classification of predicates. *Kategoria* was used as technical term for predication in the sense of to assert something about something or what predicate says about its subject. This corresponds directly to the basic notion of traditional grammar about syntactic sentence structure. Principles of ontological classification based on predication can also be found in formal theories dividing

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<sup>3</sup> <https://plato.stanford.edu/entries/aristotle/#Cat>, accessed on September 1, 2022.

sentences into subject noun phrase and predicate verbal phrase. Nowadays, applied ontologies are also being developed, mostly in computer science, in order to represent and define categories, properties, and relations between the concepts, data, and entities. In our research we are guided by the second definition of ontology understood as a system of characteristics and features of predicates denoting states.

The main object of our analysis is the formal structure of perception, mental and emotional state predicates. The central topic of description is the syntactic realization of central (external) and internal arguments to experienter predicates in Bulgarian. Theoretical framework of our study follows the model, proposed in Van Valin and LaPolla (1997). We adopt this model taking into account the language specific features of Bulgarian and different semantic subtypes within each formal type. The objectives are to compare the syntactic realization of different semantic subtypes of experienter verbs, to represent the number, type and semantics of arguments, mainly the central participant marked by the semantic role of experienter and to test the hypothesis whether the argument structure of experienter verbs could be inferred from their lexical semantics.

The study of experienter predicates is empirical. Our observations are based on data from two representative corpora of modern Bulgarian language: Bulgarian National Corpus<sup>4</sup> (cf. Koeva, Blagoeva, and Kolkovska 2011) and Corpus of Bulgarian Political and Journalistic Speech (sf. Osenova and Simov 2012)<sup>5</sup>. The article is organized as follows. In Section 2, we present a general overview of the ontological classifications of predicates, semantic structure of state predicates and the thematic groups of verbs denoting states in Bulgarian. Then in Section 3, we present description of perceptive state predicates, their thematic frame and clause structure. In Section 4, we discuss the structure of two-argument emotive predicates. Volition predicates are represented with illustrative examples in Section 5. In Section 6, we discuss the syntactic features cognitive predicate. Then in the last section we conclude, summarizing the results that have been achieved.

## **2. Aspectual types (Aktionsart) and verbal meaning**

The use of a particular verb in a given context is influenced by two main factors: the event schema/event type and the verb's idiosyncratic semantic content. It is assumed that the core semantic content is carried by the verbal roots (Beavers and Koontz-Garboden 2020). In our study, we do not propose

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<sup>4</sup> <http://dcl.bas.bg/bulnc/>

<sup>5</sup> <http://political.webclark.org>

decomposition of verbal forms, nor do we assign semantic features to the verbal roots alone. In the analysis, however, we follow the idea that verb semantic content carries information about “grammatically relevant ontological category, such as result (or state) or manner. This category largely governs the event schemas the root is paired with and hence the associated verb’s argument realization options.” (Levin 2017, 572). The verbs that we will analyze carry information about the ontological category of state and our goal is to observe how the stative eventuality structure is syntactically expressed syntactically.

Languages systematically divide states of affairs into categories based on event structure. Vendler (1957) classifies verbs into four categories: activities, accomplishments, achievements and states. State predicates together with activities are one of the basic ontology classes. Duration and lack of change are the main features of states, demonstrated by verbs like *desire*, *want*, *love*, *believe*, *own*, *resemble*, *be in New York* (Vendler 1957, 98). D. Dowty develops Vendler’s classification of verbs according to their logical entailments, interactions with temporal modifiers and progressive tenses. Two crucial aspectual properties were considered to distinguish the aspectual classes: whether or not they naturally head telic verbal phrases [ $\pm$ telic] and whether or not they naturally occur with the progressive [ $\pm$ stages]. There are no stages or periods in the event structure of states, therefore stative predicates are characterized as [ $-$ telic] [ $-$ stages]. For our analyses it is important to mention that states are treated as semantic primitives and their description involves only the predicate and its arguments with no further decomposition.

Classifications of verbal predicates into aspectual classes built on Vendler’s and Dowty’s works have been used for the analyses of several language phenomena. Here we will note only Lakoff and Johnson’s contribution to the interpretation of each of the four aspectual types as an ontological class. This is based on the idea of conceptual metaphor – one of the most important concepts (and terms) in cognitive linguistics. The essence of the metaphor is “understanding and experiencing one kind of thing in terms of another” (Lakoff and Johnson 1980, 5). Conceptual metaphors arise when cognitive links between several conceptual structures from different domains are established. These metaphors consist of three overlapping categories: structural, orientational and ontological metaphors. An ontological metaphor is a type of figurative expression in which something concrete is projected onto something abstract. “Our experiences with physical objects (especially our own bodies) provide the basis for an extraordinarily wide variety of ontological metaphors, that is, ways of viewing events, activities, emotions, ideas, etc., as entities and substances.” (Lakoff and Johnson 1980, 26). Regarding the types of predicates, the authors state that events and actions are

conceptualized metaphorically as objects, activities as substances, states as containers. The notion of a container is based on the fact that people are individual objects, bounded and set off the rest of the world. Therefore, each individual is a container in which various cognitive processes take place. Physical and emotional states are entities within a person – something/state in a bounded area (within a container). To illustrate this claim Lakoff and Johnson give examples like *He's in love. We're out of trouble now. He has a pain in his shoulder. My cold has gone from my head to my chest. He could barely contain his joy. His fears keep coming back* (Lakoff and Johnson 1980, 32; 50). Spatial orientation of sentences expressed by in-out prepositional phrases also confirms the claim that physical, mental and emotional states are viewed as containers with an inside and an outside. Although there are no exact correspondences for some of the examples in Bulgarian, we accept the idea of states as events with boundaries, related to or defined by the subject of the stative predicate.

Verbs are part of the lexicon with their basic aspectual type (or *Aktionsart*). Van Valin and LaPolla (1997, 92) define *Aktionsart* as a term denoting the inherent temporal properties of verbs. All verb classes can be defined in terms of three features: [ $\pm$ static], [ $\pm$ punctual] and [ $\pm$ telic], which refer to whether the verb has an inherent terminal point or not. From this point, states are non-dynamic and temporally unbounded; they are [+static], [-telic], [-punctual]. Each aspectual type corresponds to one of the basic state-of-affairs types. State predicates correspond to situations. This is the only group of predicates marked positively by static feature. Predicates from other aspectual types are non-static. An additional distinction concerning temporal duration, however, is shown between state predicates which code inherent properties and those denoting temporary states: *\*Sandy was tall/thin/short/fat for an hour. – Max was tired/ill/happy for/\*in an hour* (Van Valin and LaPolla 1997, 96).

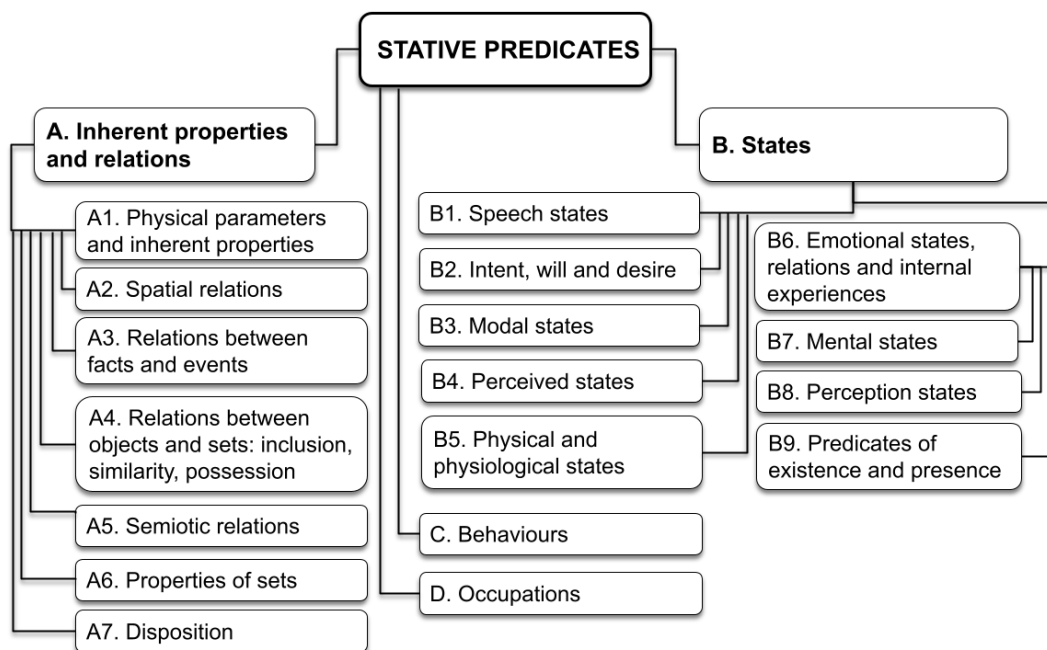
States of affairs, static situations, events or activities represented by different types of predicates are implemented by a certain number of participants. Participant's (thematic) roles result from their functions on the level of the eventuality structure and do not exist independently. Interestingly, only primitive (ontological) predicates – states and activities, define thematic relations. Thematic structure of predicates from other types is derived from the primitive ones. Regarding the argument structure and the semantic features of core elements, Van Valin and LaPolla (1997, 114) define the thematic relations in terms of argument positions in the logical structure of the predicating element (or logical form of thoughts). Each argument position in the logical structures defines a thematic relation. The interpretation of an argument is a function of two factors: the class or subclass of the predicate and its position in the logical structure. To describe the

state predicates within the RRG framework, they are divided into two major subclasses – verbs with one argument (verbs denoting state or condition and predicate of existence) and verbs with two arguments. There are no universal tests to distinguish various subtypes of state predicates, and accordingly it must be determined from the meaning (or context) whether a verb denotes perception, cognition or possession.

State predicates and Bulgarian verbs denoting stative situations are not often considered as main subject of detailed syntactic studies. When analyzing the complementation in Bulgarian, Koeva (2019) proposes a systematization of stative predicates. She outlines the following groups:

- Propositional attitude: positive – *вярвам* (believe); neutral – *мисля* (think), *приемам* (accept), *смятам* (consider); negative – *отричам* (deny), *опровергам* (disprove)
- Imaginary reality – *предполагам* (guess), *въобразявам си* (imagine), *мечтая (си)* (dream), *фантазирам (си)* (fantasize)
- Emotional reaction or evaluation – *харесвам* (like), *съжалявам* (regret), *радвам се* (be happy; rejoice), *страхувам се* (fear), *притеснявам се* (worry)
- Cognition – *зная* (know), *разбирам* (understand), *откривам* (discover, reveal), *помня* (remember), *чудя се* (wonder), *удивлявам се* (be surprised; be impressed)
- Volition – *искам* (want), *желая* (wish), *възнамерявам* (intend), *стремя се* (strive), *надявам се* (hope)
- Direct perception – *виждам* (see), *чувам* (hear), *усещам* (feel), *забелязвам* (notice), *чувствам* (feel).

In order to create an ontology of stative situations, Leseva and Stoyanova (2022) propose generalized model of statives in Bulgarian. They offer classification of stative predicates into two big groups: properties and relations vs. states. Within each groups the thematic subtypes are presented.



**Figure 1.** Semantic (thematic) classification of stative predicates (Leseva and Stoyanova 2022, 75)

Apart from lexical (semantic) categorizations, stative predicates have been classified with regard to the number of arguments they can have. The formal model consists of two main groups:

- One-place predicates, e.g. *седя* (sit), *лежа* (lie), *стоя* (stand), *спя* (sleep), *блестя* (shine), *мириша* (smell)
- Two-place predicates:
  - a) With subject and direct object: *обичам* (love), *харесвам* (like), *виждам* (see), *чувам* (hear), *чувствам* (feel), *желая* (wish), *искам* (want), *мразя* (hate), *помня* (remember)
  - b) With subject and indirect object: *вярвам* (believe), *нуждая се* (need), *тревожа се* (worry), *радвам се* (be happy), *вълнувам се* (be excited), *притеснявам се* (worry), *гордея се* (be proud), *плаша се* (be afraid), *страхувам се* (fear)

Our study is limited to analyses of two-place predicates with subject and direct object. In Bulgarian, this type of state predicates are represented by verbs from

two taxonomic classes: permanent states and temporary states which correspond in large part to individual-level and stage-level predicates (Carlson 1977). The syntactic structure of predicates will be further exemplified by looking at verbs from four thematic groups: perception: *виждам* (see), *чувам* (hear); emotion: *обичам* (love), *харесвам* (like); volition: *желая* (wish), *искам* (want), and cognition: *зная* (know), *помня* (remember).

For generalizations about state predicates, it is important to note that two groups of arguments are formed according to thematic roles and semantic relations: first (central) argument and second argument(s). First argument of state predicates that will be analyzed here is always marked as Experiencer: semantic (thematic;  $\theta$ -) role of a person whose mental faculties are involved in the psychological, mental or emotional state denoted by the predicate. First (central) argument takes the subject position and is syntactically realized by noun phrase or pronoun denoting the essential or focal participant in an experiential situation. Apart from Experiencer, the conceptual frames of stative verbs include Topic, Object or Stimulus that provoke certain physical, mental or emotional states of the Experiencer. Second argument is expressed by noun phrases, nominalizations (pronouns) or complement clauses.

Since Experiencer is an obligatory element of syntactic structure of statives in question, they are also known as Experiencer or Psychological predicates (sf. Belletti, Rizzi 1988; Rozwadowska 2017). There are two groups of Experiencer verbs: Subject Experiencer verbs (*fear*-type) and Object Experiencer verbs (*frighten*-type). Fear-type verbs describe static states whereas, in certain contexts, frighten-type verbs can denote events. The analyses in this text are limited only to verbs of the first group with Experiencer role assigned to the element in subject position, e.g. *виждам* (see), *чувам* (hear); *обичам* (love), *обожавам* (adore), *мразя* (hate); *зная* (know), etc.

### 3. Perceptive predicates

Perception verbs have a two-argument structure. The first (central) argument is an animate perceiver denoted by the subject of the sentence. Since Bulgarian is a pro-drop language subject position can be empty, but Experiencer is obligatory presented in predicate's argument structure. This is valid for verbs from all thematic groups analyzed in this text.

(1) Децата / Те / Всички / Някои виждаха морето за пръв път през живота си.  
The children / They / All / Some of them saw the sea for the first time in their lives.

(2) Змиите чуват през челюстната кост и през вътрешното ухо.  
Snakes hear through the jawbone and the inner ear.

The second argument is a stimulus signified by the direct object. This argument obligatory has to be expressed overtly in the syntactic structure. The head of the stimulus noun phrase can be a referential noun denoting an object with perceptual properties.

(3) Виждам птиците / полета на птиците / ги.  
I see the birds / (litt. the flight of the birds) the birds flying / them.

(4) Чувам песента на птиците / нещо / я.  
I hear the song of the birds / something / it.

When stimulus is a proposition, it is expressed by *da-*, *che-* or *wh-*complement clauses. Although different complementizers are used, this does not lead to semantic changes. Complement clauses represent a fact; they have factive reading.

(5) По радиото чух да / че / как се шегуват с него // тази шега.  
I heard on the radio that / how they joke with him // this joke.

(6) Виждам да / че / как се усмихваш.  
I see you smiling.

Perception verbs can also denote mental states of the Experiencer. This interpretation is usually signaled by changing the way the second argument is expressed. In such cases, a complement clause or *за* (*za*) prepositional phrase (nominalization of proposition) can be used in object position.

(7) Чух за срещата / за това.  
I heard about the meeting / about that.

(8) Виждам, [че си добър човек]. Трябва да видя [как да го оправя].  
I see that you are a good person. I need to see how to fix it.



#### 4. Emotive predicates

The cognitive scenario of emotions comprises of two obligatory elements: a subject of emotion and an object or a stimulus for the status described by the verb. The first argument expressed by the subject of the sentence is marked as Experiencer. The second argument in direct object position represents the object of emotion denoted usually by a referential NP or a pronoun.

Noun phrase in subject position can have referential or generic interpretation. It has to denote an animate entity.

(9) Мария / Тя беззаветно обичаше мъжа си.  
Maria / She loved her husband unconditionally.

(10) Всички деца обичат сладолед.  
All kids love ice cream.

A variant of a generic subject are the patterns of metonymic or metaphoric transfers. The head of the noun phrase in subject position signifies an inanimate entity. The experiencer must, by definition, be an animate object. Place names are connected to the people living in these places. New links between distinct contents are established since people's characteristics are transferred and attributed to the place where they live.

(11) Холивуд обича самотниците.  
Hollywood likes loners.

(12) Милано обича операта.  
Milan loves the opera.

(13) Планината обича добрите хора.  
Mountains like good people.

Object of emotions can be expressed by a referential noun phrase.

(14) Тя мразеше баща си, защото беше напуснал майка й.  
She hated her father for leaving her mother.

(15) Мария ме мрази.  
Maria hates me.

Syntactic realizations of the direct object also include generic noun phrases: *кучета/кучетата* (dogs/the dogs), *котки/котките* (cats/the cats), *лоши/лошите хора* (bad people) in examples below. Definiteness does not affect the choice of the noun in direct object position. In this configuration, though, we observe a change in the verb's meaning. *Обичам* (love) is synonym of *харесвам* (like).

- (16) И двамата обичаха кучета / кучетата и не обичаха котки / котките.  
They both loved dogs and disliked cats.
- (17) Децата не обичат лоши / лошите хора.  
Kids don't like bad people.
- (18) Котките обичат валериан / валериана и отиват къде ли не заради него.  
Cats love valerian and will go everywhere for it.

Emotives can also take complement clauses as their second arguments if the verbs signify preferences, likes or dislikes. There are no semantic restrictions observed. Subjects can be referential or generic nouns.

The subjects of main and complement clauses can be co-referential like in examples (19)-(21) or not co-referential like in (22).

- (19) Татко обичаше [да танцува].  
Dad loved dancing.
- (20) Човек обича [да изследва далечни пространства].  
Humans love to explore distant territories.
- (21) (Аз) Не обичам [(аз) да лъжа].  
I don't like to lie.
- (22) Не обичам [(те / децата) да ме лъжат].  
I don't like (it) when they / the kids lie to me.

## 5. Volition predicates

Verbs denoting desire, e.g. *искам* (want), *желая* (wish), *надявам се* (hope), *жадувам* (crave), *очаквам* (expect) also have a two-argument structure. The first

argument is the experiencer indicated by the noun phrase in subject position signifying an animate entity.

- (23) Мария / Тя искаше по-дълга рокля.  
Maria / She wanted a longer dress.

An interesting feature of desiderative verbs is the possibility generic nouns to be used in subject position. This confirms the homogeneity of the Experiencer.

- (24) Когато хората искат / желаят / се надяват да изглеждат по-умни, си слагат очила.  
When people want / desire / wish to look smarter, they put on glasses.

The second argument denotes the object of desire. The information about it is carried by referential or generic noun phrases in direct object position or complement *da*-clauses. In examples like (25), the head of an object noun phrase is referential; in (26) and (27), it has generic reading.

- (25) Искам точно такава раница.  
I want a backpack exactly like this.
- (26) Искаме повече свобода.  
We want more freedom.
- (27) Искаме природа, не искаме бетон.  
We want nature, not concrete.

Similarly to argument realization of emotive verbs, an accusative pronominal clitic can be used in an object position to desiderative verbs: *искам те*, *желая те* (I want you), *жадувам те* (I crave you), *очаквам те* (I am expecting you). For *искам* (want) and *желая* (wish) this is the only possible pattern; they can have direct object only. *Жадувам* (crave) however can be used as intransitive verb also: *Жадувам за тебе* (I crave you).

Most desiderative verbs have *da*-clauses in second argument position with infinitive-like reading. The object of desire is a state of affair, a situation or an action that can be carried out.

- (28) Искам [да се завърна в България].  
I want to go back to Bulgaria.

(29) Искях [да бъдем щастливи].  
I wanted us to be happy.

(30) (Той/Тя) искаше [нещата да са различни].  
(He/She) wanted [things to be / were different].

The verb *надявам се* (hope) does not follow the patterns shown in (28)-(30). It can take *da-* or *che-*clauses as its second complement. There is neither a complementizer contrast nor semantic differences. Both type of complement clauses represent concepts not interpreted as having a referent.

(31) Надявах се [да ми бъдеш най-добрият приятел].  
Надявах се, [че ще ми бъдеш най-добрият приятел].  
I hoped you would be my best friend.

## 6. Mental state predicates

When analyzing verbs from this group, we follow the theoretical framework proposed by R. Nitsolova (2001) in her work on argument structure of cognition predicates in Bulgarian. The basic structure of verbs from this group consists of two arguments: a subject and a direct object expressed by NP or a complement clause. Under certain conditions, a third element can be included in the structure. Most often, it is a prepositional *za-*phrase. The content and the cognitive object are always co-referential (cf. Koeva 2021). If the second argument presents the content (what the knowledge or thoughts are about), a referential noun phrase is used in the direct object position. The thematic relations set by verbs of cognition are Experiencer (or cognitive subject), cognitive object and content (information about the cognitive object). The epistemic subject of the predicate is referential or generic noun phrase marked [+animate]. It takes the subject position.

(32) Тя още помнеше ваканцията в Пампорово.  
She still remembered the vacation in Pamporovo.

(33) Хората знаят всичко за мен.  
People know all about me.

Content (information, thoughts, knowledge, etc.) is presented by noun phrase in direct object position. The head of this phrase is always referential.

- (34) Все още помня първия си концерт.  
I still remember my first concert.
- (35) Зная те още от началното училище.  
I know you from my trainee years.
- (36) (Той/Тя) Знаеше много забавни истории.  
He / She knew funny stories.

As the cognitive content is a proposition, a complement clause also can be part of this thematic relation. In such configurations, we observe selection of complementizers. *Знам* (know) functions as mental predicate if *che-* or *wh-*clauses are used. *Da*-clauses have different interpretation: *знам да = I can; I am able to do something*.

- (37) Знам, [че изпитът е през февруари].  
I know that the exam is in February.
- (38) Знам [как да стигна до спирката].  
I know how to get to the bus stop.
- (39) Знаехме много добре [какво се беше случило с кучето].  
We knew very well what had happened to the dog.

Although verbs of cognition are typical two-place predicates, they also can be used in sentences with three arguments. A prepositional phrase or a complement clause take the third argument position. Thematic relation links the verbs and its argument, signifying the content of cognition. It is usually a prepositional *za*-phrase or a complement *che-* or *wh-*clause.

- (40) Знам истината (content) за тях (cognitive object).  
I know the truth about them.
- (41) Какво (content) знаеш за нея (cognitive object)?  
What do you know about her?
- (42) Едва 14 на сто от Софиянци знаят нещо (content) за втората вълна на приватизацията (cognitive object).  
Only 14 percent of Sofia residents know something about the second phase of privatization.

If the complement clause is used, the direct object of the matrix predicate (verb of cognition) is co-referential with an argument from the complement clause.

(43) Още го помним как влизаше в пощата, отваряше прозорците и надуваше единствения селски грамофон.

We still remember him going into the post office, opening the windows and turning up the volume on of the only gramophone in the village.

There is a possibility of using other prepositions to introduce the object of cognition. Our data shows that *относно*- and *по*-phrases can take the object position. The noun marked as content is pronominalization.

(44) Какво знаеш за тях // по въпроса?

What do you know about them // about this topic?

(45) По-долу са посочени важните неща, които трябва да знаете относно инсталирането на тази актуализация.

Below are the important things you need to know about installing this update.

## 7. Conclusions

Our observations confirm that state predicates are not homogeneous in respect to their syntactic realization. Semantic structure is coded by linguistic means, organized to language specific grammar parameters. In summary, two-place stative predicates with a subject and a direct object as their arguments belong to four semantic sub-types: cognition, perception, emotion and desire. The expression of the first argument (subject of the sentence) through noun phrase marked [+animate] is common for all groups. No restrictions concerning referentiality were observed. The subjects could be either referential or generic nouns.

Verbs of perception, emotion and desire function as two-place predicates only. They select an accusative/direct object as their second argument that introduces several relations (content, stimulus or object of perception, emotion or desire). Only mental state predicates vary in respect to their argument structure. They allow the content and the cognitive object to have a separate syntactic realization. As a result, verbs of cognition are realized in three-argument structures. The only condition is that the content is a proposition and the cognitive object coincides with one of the arguments of the complement clause expressing the content. Concerning the referentiality of the object argument, desiderative and

emotive verbs allow referential as well as generic objects to be used, whereas generic objects are not allowed with cognitive and perception verbs.

The analysis of Bulgarian statives denoting perceptive, emotive or cognitive states carried out in this article confirms the general notion that the syntactic behavior of verbs depends on their meaning. Semantic structure is coded by linguistic means, organized to language specific grammar parameters. States are an ontological category. To understand the way we can indicate stative eventualities, we have adapted to some extent the core concept of ontological formations that relations between elements of given structure are central to understanding bigger or dominant formations. We derived a formal syntactically motivated model of state predicates based on the number and type of their arguments and thematic relations linked to arguments.

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