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Encoding Vertical Space in Language: A Cognitive-Semantic Study of the English *below* as Compared to the Lithuanian *žemiau*

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Abstract. Motivated polysemy manifests an interesting line of inquiry from a cognitive perspective. This paper contributes to it by (1) identifying the senses, (2) analysing their relations and (3) comparing the semantic networks of the English *below* and the Lithuanian *žemiau*. 261 concordance lines from fiction in the Corpus of Contemporary Lithuanian Language and 1000 from the same register from the British National Corpus were examined. The Principled Polysemy Model (Tyler and Evans 2003) was used to distinguish between senses and their contextual variants. The findings show that the primary sense based on a proto-scene of the Figure beneath the Ground gives rise to the remaining senses of the prepositions. Some of them are concrete, while the others emerge through metaphors enabling abstract usage. The differences between *below* and *žemiau* are concerned with the frequency instantiation of concrete vs abstract senses. The paper also considers how the meaning of the Lithuanian preposition interacts with the noun case it governs.

Keywords: motivated polysemy, prepositions, English, Lithuanian

Vertikalios erdvės raiška kalboje: anglų k. *below* ir lietuvių k. *žemiau* reikšmė iš kognityvinės perspektyvos

Santrauka. Prielinksnių motyvuotoji polisemija dažnai tampa tyrimo objektu kognityvinėje kalbotyroje. Šio darbo tikslas (1) nustatyti anglų k. *below* ir lietuvių k. *žemiau* reikšmes, (2) išanalizuoti jų tarpusavio ryšius bei (3) palyginti semantinius tinklus. Siekiant šių tikslų, buvo ištirta 1000 konkordanso eilučių iš Britų nacionalinio tekstyno ir 261 – iš Dabartinės lietuvių kalbos tekstyno grožinės literatūros registro. Tyrime taikytas Principinės polisemijos modelis (Tyler ir Evans 2003), leidęs atskirti reikšmes ir jų kontekstines variacijas. Tyrimo rezultatai parodė, kad pirminė reikšmė, grindžiama prototipine erdvine scena, kurioje figūra yra fono apačioje, tiesiogiai ir/arba netiesiogiai lemia kitas reikšmes. Kai kurios jų yra konkrečios – jas lemia figūros ir fono tipai bei jų geometrinė konfigūracija, o kitos atsiranda dėl metafora grindžiamo reikšmės perkėlimo į abstrakčius kontekstus. Tyrimo metu pastebėti skirtumai daugiausia susiję su konkrečių ir abstrakčių reikšmių vartojimo dažniu, kurį gali nulemti gretimos ir/arba kontrastuojančios kategorijos bei tipologiniai veiksniai. Be to, nagrinėjama, kaip *žemiau* reikšmė sąveikauja su linksniu, kurį jis valdo.

Raktažodžiai: motyvuotoji polisemija, prielinksniai, anglų k., lietuvių k.

1. Introduction

Prepositions have always generated problems for learners, teachers and linguists due to "the intricacy and seeming capriciousness of their behaviour" (Herskovits 1988: 27), which is reflected in two main lines of research on their semantics (for a comprehensive review of the studies, see Stasiūnaitė 2016). For instance, the classical treatment focuses on the meaning of prepositions with respect to other words. Following this tradition, the syntagmatic approach deals with the context in which the items occur. In contrast, paradigmatic studies define their meaning in terms of substitutional or oppositional relationships with other prepositions. However, the classical approach seems to suffer from at least two problems. First, it hardly escapes cross-referential definitions, especially in dictionaries of smaller languages like Lithuanian, where a fine-drawn distinction between synonymous prepositions is often disregarded. Second, it fails to account for the relationship between numerous senses, which leads to a multitude of polysemous cases being presented as arbitrary and idiomatic in dictionaries and reference grammar books.

A more recent framework, adhering to the principles of cognitive linguistics, when prepositions are viewed as organizing conceptual content based on bodily experience, is believed to provide a better treatment of the situations which proved problematic in earlier studies. For instance, cognitivists rule out the possibility of absolute synonymy within a language and strict one-to-one cross-linguistic correspondences. Another difference pertains to their attempt to account for numerous senses, advocating systematically motivated polysemy, when senses are derived either from the prototypical meaning or any other sense related to it and arranged in a network. However, such works are mainly supported by qualitative examination, the majority of them drawing on empirical evidence from one language, while quantitative research relying on data from several languages is still rather scarce. To address this gap, the present paper therefore examines the senses of the English *below* in relation to the Lithuanian *žemiau*, its primary translation equivalent, drawing on actual language usage and supported by statistical analysis within a contemporary cognitive framework.

Beyond this theoretical motivation, the inclusion of the two prepositions in the analysis is instigated by several other factors as well. First, in English, *below* can be classified under two headings, functioning either as a preposition or as an adverb. Etymologically, the word is directly related to Gothic *be + low* (OED). In Lithuanian, likewise, depending on its syntactic and semantic properties, *žemiau* may be employed as a preposition or as an adverb from which the prepositional use is derived (Ambrazas 1997: 406, 2005: 438; see also Zinkevičius 1996: 171). Due to its etymological origins, the word is attributed to a group of secondary prepositions (Ambrazas 2006: 284; see also Zinkevičius 1981: 185). The diachronic evidence thus highlights the historical depth and grammatical versatility of both items, confirming their relevance for cross-linguistic semantic comparison.

However, the centrality of *below* and *žemiau* may be not only historical but also conceptual. The prepositions prototypically involve a vertical axis, or *vertical space* (see Dirven 1993: 74), which is a domain that plays a crucial role in human experience due to the all-pervasive influence of gravity (Engberg-Pedersen 1999: 362). The salience of the vertical dimension also aligns with their locative function, as the items typically denote the relative position of an object rather than its kinetic behaviour in space, an aspect which is fundamental to human cognition and communication.

The selection of the prepositions is further justified by how their semantics is treated in previous research. For instance, in some classical treatments, *below* is explicated through such general concepts as "lower than", "locative lower", or "holding/moving to a lower position" (Bennett 1975; Lindkvist

1976). In the tradition of Lithuanian linguistics, Kilius (1973), Šukys (1998), Ambrazas (1997, 2005, 2006) also refer to these partially true notions as if *žemiau* expressed exclusively spatial relations, which in fact does not reveal the semantic intricacy of the preposition.

As to dictionaries, especially Lithuanian (DCLL, DLL, DSLL), they also rely on intuitive explication, which is not supported by any corpus data. For instance, the semantics of *žemiau* is reduced to a single sense in the entry list, defined by widely exploited concepts, such as "indicating what is beneath" and "indicating a lower position", which makes it difficult to distinguish from the synonymous preposition *po* 'under'. Modern English dictionaries, e.g., CED, on the other hand, are based on corpus data; however, they also have their own pitfalls. In particular, they fail to explicitly motivate the relations between the senses of *below*, a feature that is crucial for understanding how polysemy works.

While lexicographic treatment tends to overlook semantic relatedness, cognitive studies place it at the centre of their analysis, yet even this approach faces challenges. For instance, Coventry *et al.* (2001) prove by means of experiments that *over* and *under* are more sensitive to functional relations than *below* and *above*. In the same light, Šeškauskienė (2001) examines the relevance of geometry or functional relations, or the interplay of both, in the interpretation of concrete senses of *under*, *below* and *po*, *žemiau***,** their approximate translation equivalents in Lithuanian. However, research on abstract senses and their relations with concrete ones across various conceptual domains seems to be scarce. For instance, according to Wege (1991), *below* does not prove to be amenable to a necessary and sufficient description. Tyler and Evans (2003) analyse the item according to the Model of Principled Polysemy, but the treatment lacks argumentation, as compared with their discussion of other prepositions, e.g., the amply researched *over*.

Thus, the relevance of a cross-linguistic analysis of *below* vs *žemiau* in line with the principles of cognitive linguistics is indisputable. Since English and Lithuanian may differ in the degree of granularity with which they partition physical and non-physical space, the present study seeks to (1) identify both concrete and abstract senses of the items, (2) explicate their relations, and (3) compare the established semantic networks across the two languages.

2. Methodology and Data

This chapter outlines the data and methodology on the basis which the semantic structure of the English *below* and the Lithuanian *žemiau* has been defined. To refer to actual usage rather than intuition alone, data with *below* and *žemiau* were accessed from the British National Corpus (BNC) and the Corpus of the Contemporary Lithuanian Language (CCLL). Only the fiction register was selected as it is believed to offer a relatively balanced representation of both concrete and abstract senses of the items. More details about the utterances are provided below:

Table 1. Absolute frequencies of the items in the study

Preposition	Corpus: register	
	BNC: fiction	CCLL: fiction
Below	1,000 (out of 2,047)	-
Žemiau	–	261 (out of 673)
Total	1,261	

As shown in Table 1, a total of 1,261 concordance lines were randomly collected. Out of 2,047 utterances with *below* in the BNC, only 1,000 were retained as no new usage of the item as a preposition was identified during the data extraction procedure. Another reason to exclude the remaining 1,047 utterances (51.15% of all the cases) was that *below* occasionally functioned adverbially in these contexts. Regarding *žemiau*, out of 673 concordance lines in the CCLL, as few as 261 (38.78% of all the cases) were selected as prepositional tokens, while the remaining 412 (61.22% of all the cases) illustrated adverbial usage and were therefore excluded from the analysis.

The research methodology followed a qualitative approach as it involved an in-depth examination of meaning, focusing on identifying and classifying the distinct senses of *below* and *žemiau*, which cannot be adequately captured through quantitative measures alone. In the selected data, the simplest type of spatial scene consisted of two entities: one being located, or the figure (F), and the other serving as a reference object for it, or the ground (G) (Talmy (2000). For instance, in the utterances *a skirt below the knees* and *temperature below zero*, the skirt and temperature become F, while the knees and zero function as G. During the annotation process, each spatial scene was examined to determine the type of F and G, which may be not only concrete objects, people or human body parts, but also abstract entities, actions and processes. So, space was given here a broad interpretation and included, apart from physical, also a number of other spaces (see the Theory of Mental Space by Fauconnier 1985; Lakoff 1987; Dirven 1993). In addition to these parameters, the analysis also took into account the spatial configuration of F and G, their idealized geometric shapes and/or internal structure, as well as their functional interaction, if any, that could reveal the semantics of the prepositions under study.

However, some uses of *below* and *žemiau* appeared to be motivated by non-linguistic factors, such as the speaker's dispositions or other constraints, which allowed the construal of the same situation from different perspectives (see linguistic topology, or what Talmy (1983: 269-271) defines as a disjunct character of schematization). In other words, language seems to offer a range of options, and the speaker chooses what best matches their communicative intentions. Therefore, specificity and salience assigned to different aspects of the same scene were also considered in the procedure of sense-identification, in line with Schmid's (2007) discussion of *salience* and related notions such as Langacker's (1987) *focal adjustments* and Talmy's (2007) *attention phenomena*.

Thus, the process of meaning construction was understood as conceptualization, whereby the prepositional usage of *below* and *žemiau* prompted an array of conceptual operations and the recruitment of background encyclopaedic knowledge, all entering into various types of relations with each other (Evans 2007: 131; Cruse 2000; cf. Taylor 1995: 29-37). However, it was also necessary to distinguish between distinct senses and their contextual variants produced for local understanding. For this purpose, the analysis employed Tyler and Evans' (2003) model of word meaning termed Principled Polysemy. Even though it has received substantial criticism, it remains one of the few frameworks offering a systematic, explicit methodology for identifying senses of prepositions. First, for a sense to be distinct, or instantiated in our memory, it must contain an additional element not apparent in any other senses. In other words, a distinct sense must involve (A) a successive change in the set of concepts, such as (a) strong interdependencies between the preposition and the dynamic, or kinetic, and/or geometric characteristics of G (e.g., static/dynamic, dimensional/adimensional, etc.), (b) features very much like those for G that define F, as required by the specific relation expressed, (c) the relationship (topological, such as contact, proximity, etc., and/or functional) between the two entities, and/or (B) projection onto a new domain (Tyler and Evans 2003: 42-43; cf. Wesche 1986/87; Lakoff 1987). The first operation applies to concepts within the same domain, so a locative concept may give

rise to another locative one, a temporal concept to another temporal one, etc. In other words, a transition between concepts, or what Navarro i Ferrando (2006: 176) describes as a *shift*, takes place gradually. The second operation of meaning construction involves a change of domains. It is based on the principle that the new is conceptualized in terms of the familiar, so abstract domains are understood in analogy to concrete (see the Theory of Conceptual Metaphor by Lakoff and Johnson 1980/2003; Lakoff 1987; Kövecses 2010). Furthermore, according to Tyler and Evans (2003: 42-43), a distinct sense must be context independent. In other words, it cannot be inferred from another sense and the context in which it occurs but must instead stand as a stable, conventionalized unit in its own right.

In addition, the Principled Polysemy model establishes which of several competing senses should become the primary sense in a network. Following Tyler and Evans (*ibid*. p. 52), it is distinguished by referring to a proto-scene, or "an idealized mental representation across the recurring spatial scenes" associated with a preposition. The researchers also suggest prompts for such sense identification, the order and importance of which were modified in the present paper to reflect the actual semantic tendencies (*ibid*. pp. 47-50): (1) the physicality of F and G, related to such principles of cognitive linguistics as the experiential approach and embodiment, stating that the primary sense is usually more physical, closer to bodily experience (Johnson 1987; Lakoff 1987; Steen *et al.* 2010); (2) contextual clues associated with a reasonably stable frequency of occurrence (Sinha and Kuteva 1995); (3) frequency of use in a network; however, it cannot be a determining factor (cf. the overwhelming frequency of occurrence of the Lithuanian *po* 'under', when designating temporal relations in Stasiūnaitė 2020); (4) the earliest attested sense, which falls in line with other cognitively-oriented works on inflecting languages (Pawelec 2009; Tabakowska 2010); (5) the use of a preposition in composite forms; (6) relations to other prepositions that form compositional, or contrast, sets, dividing various spatial dimensions, e.g., *above* vs *below*.

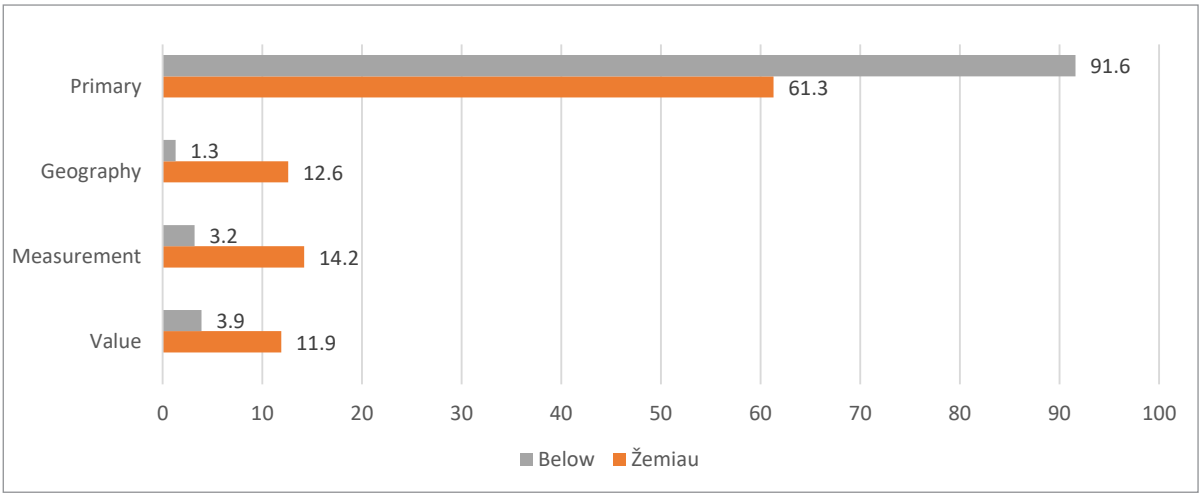
Finally, having established the senses of *below* and *žemiau*, this study employed a radial category approach (Lakoff 1987), grounded in the Prototype Theory (Rosch 1975, 1978; Taylor 1993), to illustrate their motivated relations. Image transformations, which are direct reflections of our visual or kinaesthetic experiences, and metaphor played a major role in forming networks organized around the primary sense. The quantitative method was employed to determine the occurrence of each sense in the corpora, with the results presented in both absolute and relative frequencies due to the unequal number of the utterances with the prepositions. The contrastive method was applied to examine cross-linguistic tendencies in the semantics of the items under study.

3. Results and Discussion

The semantic peculiarities of *below* and *žemiau* are discussed in the following way. First, the primary sense is established and its extensions related to physical and non-physical space are examined. Next, motivated relationships between the senses, or major use types, that differ in status are highlighted in the form of a network. Moreover, this section focuses on comparing the senses of the two prepositions and their networks across the languages, and interpreting the observed semantic trends in the context of previous studies, along with a discussion of wider implications.

Chart 1 displays the relative frequencies of instantiation of each sense of *below* and *žemiau*, as distinguished in the BNC and the CCLL data during the annotation procedure.

Chart 1. Relative frequencies of each sense of *below* vs *žemiau*

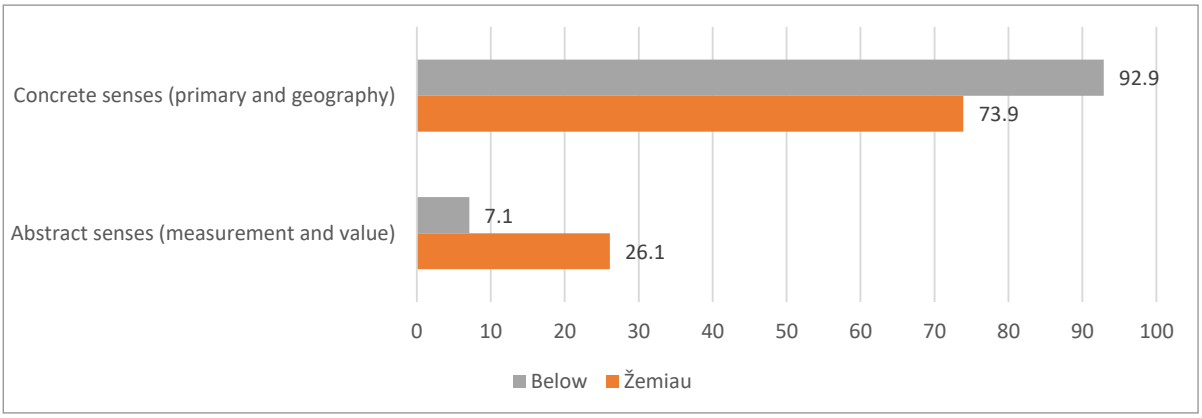


As shown in the chart, both prepositions profile four senses: two related to physical space (the primary sense and a geography-based sense) and two pertaining to non-physical space (measurement and value). This lack of semantic complexity could be linked with a relatively low occurrence of each preposition, especially *žemiau*, in the corpora, which supports Langacker's (1987) view that infrequently used forms remain semantically restricted as they have fewer opportunities to be entrenched in new conceptual domains. More frequent lexical items, on the other hand, tend to develop a broader range of senses over time (see the discussion of *po* 'under' by Stasiūnaitė 2020).

As for the occurrence of the primary sense, it is encountered in the majority of cases in the data (see 91.6% for *below* and 61.3% for *žemiau* in Chart 1). Thus, the frequency of instantiation, as outlined by Tyler and Evans (2003) in their primary sense identification procedure, is also a valid parameter in the present study. However, an interesting constrast is evident as to the least dominant sense, reflecting its limited conventionalization and entrenchment across the languages. In the case of *žemiau*, it is abstract because of being value-oriented (11.9%), while for *below*, the most sparsely represented sense is geography-based (1.3%) and thus relatively concrete.

Chart 2 shows the relative frequencies of the established concrete and abstract senses of the prepositions under study.

Chart 2. Relative frequencies of concrete vs abstract senses of *below* and *žemiau*



As seen in the chart, the distribution of concrete and abstract senses of *below* (92.9% vs 7.1%) and *žemiau* (73.9% vs 26.1%) demonstrates a strong bias towards physical space-related extensions. This tendency in the semantic development of the prepositions forecasts multiple senses of their synonymous counterparts *under* and *po* 'under' away from physical space. Chart 2 also reflects another distinct pattern in the data set, mainly involving the instantiation of abstract senses. Although *below* prefers concrete senses more than the Lithuanian preposition, it is notably less represented in its abstract uses, with only 7.1%, compared to 26.1% for *žemiau*. Such variation underscores the importance of language-specific factors in conceptualizing concrete (spatial) versus abstract (non-spatial) relationships. For instance, in English, *below* shares a semantic territory with *under*, *beneath*, *underneath*, which limits the extension of the target preposition into abstract senses. Lithuanian, on the other hand, has fewer lexical items that directly overlap with *žemiau* (e.g. *po* 'under', sometimes *apačioje* 'at the bottom'), leaving more space for it to expand into abstract domains (for additional insights into how adjacent or contrasting categories may shape the extension of a category, see Lakoff 1987: 17; cf. Taylor 1988: 309). Moreover, *below* is morphologically unmarked and therefore shows a reduced potential for abstract extensions. By contrast, *žemiau* co-occurs with the Genitive, a feature that may facilitate more abstract interpretations as relational structure is already grammaticalized in the morphology. A possible typological precedent for the claim is Fokashchuk's (2025) discussion of how Polish and Ukrainian often omit spatial prepositions and rely on case marking to express what in English would be on/above/under/etc. Besides competition with alternative expressions and case selection, factors such as corpus composition and register-specific choices may likewise contribute to the differing patterns.

The semantic peculiarities of *below*, as attested by the corpus data, are discussed in the following manner. First, the primary sense is established and its extensions associated with physical and non-physical space are examined. Next, semantically motivated relationships between the senses that differ in status are highlighted in the form of a network. Even though the present paper keeps the English preposition central, references to the earlier analysis of the Lithuanian *žemiau* (see Stasiūnaitė 2018) are made to pinpoint any necessary similarities and/or differences across the two languages.

3.1 Defining the Primary Sense: Key Components of the Proto-Scene

To understand the semantic structure of the preposition *below*, it is first necessary to identify the primary sense, functioning as the conceptual foundation for all related meanings. Figure 1 provides its graphic representation, or the proto-scene, capturing the spatial relation between F and G, which reveals cross-linguistic alignment with *žemiau*.

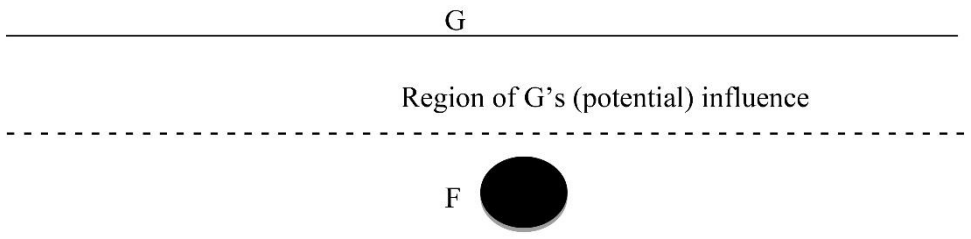


Figure 1. Proto-scene for the spatial scenes of *below* and *žemiau*

Similar to the Lithuanian data, the BNC utterances attest to several features of the proto-scene above. First, F is located lower than G along the vertical axis in Euclidean space, reflecting an absolute frame of reference as it uses a fixed external reference, independent of viewer or object orientation:

(1) *(...) muscles clenched below the rolled-up sleeves (...)*
(2) *(...) each paper cylinder hovers below their nostrils (...)*

In the given text segments, G, which may be reduced to a line (sleeves, nostrils), serves as the position of 'zero', establishing a reference point from which the location of F (muscles, a paper cylinder) is mentally traced down. The interpretation relies on background world knowledge, whereby reference is *implicitly* made to the lower part of G, represented by the bold line in Figure 1. However, *below* can also *explicitly* situate F lower than G, as attested by combinability patterns with *the bottom of/lower part of* 'žemiau dugno/apačios' and *the upper part of* 'žemiau viršutinės dalies'. Both phrases illustrate a metonymic shift when a part of G stands for the whole referent, emphasizing its role as an encompassive reference object (Talmy 1983: 245-246):

(3) *(...) a wide opening just below the top of the wall.*

When a geometric reference is implied through background world knowledge or stated explicitly, F (muscles, a paper cylinder, or a wide opening), being situated below G, marks the boundary of space along the vertical axis. However, the entities do not necessarily form a precise linear arrangement in the primary sense of *below*. For instance, the location of the opening below the top of a wall remains vague. Likewise, the place of a paper cylinder relative to the nostrils is not specified, nor are the exact whereabouts of muscles below the sleeves. What matters here is not the direct position of F beneath G, but its location with respect to a specific boundary of G. It is well illustrated by the utterance *žemiau pašto ženklo (...) adresas* 'an address below a stamp', which is found in the Lithuanian corpus, where the address (F) occupies more space than the stamp (G) but is interpreted as *below* only in relation to the stamp's upper or lower boundary.

This type of positioning, even though undefined, implies lack of contact, or contiguity, which corresponds to what Cuyckens (1994) describes as a coincidence relation. So, graded distance is another meaningful component of the proto-scene in the primary sense of both *below* and *žemiau*. For instance, the data set is prolific with such modifiers as *slightly*, *a little*, *immediately*, *directly*, signalling short distance (cf. the frequent usage of *šiek tiek*, *kiek*, *vos* 'a little bit/just' when combined with *žemiau*), as well as *well* and *far* (cf. *gerokai*, *žymiai* 'rather/considerably'), which refer to a larger spatial gap between F and G:

(4) *(...) shaking her head inside the fridge, slightly below the height of the ice-making compartment.*
(5) *(...) the water had fallen well below the starlings.*

As in Lithuanian, various units of measurement denoting specific lengths of space (e.g. inches, centimetres, metres, feet, levels, floors, stairs, etc.) co-occur with *below*, highlighting the importance of segregating the two entities as boundaries of vertical space. Such usage is typically found in texts where geometric precision is of utmost importance, for instance:

(6) *(...) the surface of the space station, now only a hundred metres below the shuttle.*
(7) *Manescu estimated they must by now be three levels below the surface of the earth.*

Consequently, the proto-scene with *below*, as in the case of *žemiau*, presupposes the absence of possible functional (Vandeloise 1991, 1994), or extra-geometric (Coventry *et al.* 2001), interaction; hence

the broken line in Figure 1, distinguishing G's region of influence. In other words, the prepositions merely divide the proto-scene into discontinuous geometric regions, with one portion being lower than the other (see *geometric subspaces* in Šeškauskienė 2001, 2004). By way of comparison, the potential for such interaction between F and G can be observed in the semantics of the synonymous *under*, or *po* in Lithuanian, reflecting a different construal of the same state of affairs:

(8) *I went under/*below the table. Palindau po stalu/*žemiau stalo.*

In the example above, a person may go under the table not only to pick up something but also to hide, so under some circumstances, when G is a two-dimensional surface straight above F, *under*, as *po*, may imply cover. *Below*, however, is unacceptable in this case, for it merely encodes F's indefinite location beneath G without any functional outcomes. When G is not only a two-dimensional surface but also of a liquid or ground, i.e. non-porous, type, its relation with F results in cover through submersion, as in the title of Jules Verne's classic adventure novel "20,000 Leagues under the Seas" (cf. the Lithuanian translation "20000 mylių po vandeniu"). The usage of the adjective *deep*, which signals depth, is also compatible with *under* 'po', as in the utterance *deep under water* 'giliai po vandeniu'. However, *below*, as in *below the water* (*level*), or *žemiau vandens lygio* in Lithuanian, entails the conceptualization of G as a linear reference, so the usage of *under* 'po', which construes G as a two-dimentional non-porous entity providing envelopment, is ruled out in such contexts.

When both prepositions can be used interchangeably, as in *a skirt below/under the knees*, they evoke disparate construals of the same spatial scene, and the speaker's choice reflects the perspective taken. In the case of *below*, which is more common, knees function as a linear reference, while the skirt is understood as extending downward, possibly separated from them. *Under*, by contrast, signals closer vertical adjacency, implying that the lower hem of a skirt falls just beneath the knees, that is in close alignment with them. Moreover, the skirt is conceptualized as a two-dimensional lamina potentially providing coverage. However, in Lithuanian, such variation is constrained: when situations clearly refer to opposite spatial relations, the existence of one preposition prevents the other one from encroaching on its semantic space, e.g. *sijonas žemiau kelių*/**po keliais*. The importance of F's and G's geometrical properties is highlighted by Talmy (1983), while in Lithuanian, the role of shape and spatial configuration is discussed by Mikulskas (2016) in relation to the preposition *per* 'across'.

Thus, the proto-scene underlying the spatial relation encoded by *below* and *žemiau* involves F being positioned vertically lower than G, serving as a linear reference. Moreover, F and G are contact-free entities in Euclidean space, which precludes any interaction between them. In the present analysis, this type of proto-scene defines what will be referred to as the most representative, or primary, sense of the prepositions. Based on the data, the typicality of this sense is mainly attested by two closely interrelated criteria: (1) the physical aspect and (2) the frequency of instantiation in the corpora, both of which are discussed in more detail in the forthcoming section.

3.1.1 Types of F and G in the Primary Sense

As to the frequency of *below* in the primary sense, it constitutes the highest percentage of instantiation in comparison to the other senses established in the BNC data (see 91.6% in Chart 1; cf. 61.3% for *žemiau*). It also manifests the following types of F-G configurations across the two languages, as shown in the table below.

Table 2. Types of F and G in the primary sense of *below* and *žemiau* (relative frequencies)

F \ G	**Human body** ***below* / *žemiau***	**Another concrete entity** ***below* / *žemiau***	**Abstract entity** ***below* / *žemiau***	**Total 2** ***below* / *žemiau***
Human body	12% / 13.8%	12.8% / 3.1%	0.4% / -	25.2% / 16.9%
Another concrete entity	24.2% / 16.9%	38.3% / 26.9%	0.3% / -	62.9% / 43.8%
Action / process	1.9% / 21.2%	1.9% / 9.4%	0.1% / -	3.8% / 30.6%
Abstract entity	3.6% / 7.5%	3.1% / 1.2%	1.4% / -	8.1% / 8.7%
Total 1	41.7% / 59.4%	56.1% / 40.6%	2.2% / -	100% / 100%

As seen from Table 2, the physical aspect in the primary sense of *below* is mainly determined by the nature of G, which is usually a person or any other concrete object; however concrete entities serve as G more frequently (56.1% vs 41.7%, see Total 1). The use of *žemiau*, on the other hand, is more often encountered with people as G in the conceptualization of the proto-scene (59.4% vs 40.6%, see Total 1). Therefore, the primary sense of the Lithuanian preposition seems to be in line with the theory of embodiment as discussed by Gibbs (2006: 9) (see also Rohrer 2007: 25-47):

> *People's subjective, felt experiences of their bodies in action provide part of the fundamental grounding for language and thought. Cognition is what occurs when the body engages the physical, cultural world and must be studied in terms of the dynamical interactions between people and the environment. Human language and thought emerge from recurring patterns of embodied activity that constrain ongoing intelligent behaviour [;] [therefore] we must (...) seek out the gross and detailed ways that language and thought are inextricably shaped by embodied action.*

Interestingly, abstractions may also function as reference entities in such utterances, but only with *below*, as they do not appear in the CCLL. However, in the BNC, the number of such concordances is significantly low compared to those in which G is human morphology or a concrete object (2.2%, see Total 1). Actions and processes do not occur as reference entities in either English or Lithuanian data and are therefore excluded from the table.

As regards the overall frequencies of types of F, the location of which is rendered with respect to the human body, any other concrete object, or even an abstract entity as G, concrete objects account for the largest number of utterances, whereas human morphology takes the second place in the case of *below* (62.9% and 25.2% of the data, respectively, see Total 2). The use of *žemiau*, however, shows a different pattern: in addition to concrete objects, actions and processes may also function as F (43.8% and 30.6%, respectively, see Total 2). Actions and processes, alongside abstract entities, are found in a significantly fewer number of concordance lines with *below* (3.8% and 8.1%, respectively; cf. 8.7% for abstract entities as F in the case of *žemiau*, see Total 2).

It is worth briefly examining specific F-G alignments with *below* in its primary sense. In the analysed BNC data, various human body parts, such as shoulder blades, knees, feet, eyes, hands, etc., typically function as G. The pattern is also confirmed by the CCLL data with *žemiau*, which highlights the relevance of what may be termed as an encompassive secondary reference object, i.e. not the whole entirety but only part of it (Talmy 1983: 245-246):

(9) *Below the knees her calf muscles stood out (...)*

(10) *(...) a sharp pain, on his left side and below his ribs (...)*

The utterances above also illustrate major types of F with *below* in the primary sense when human morphology functions as G. First of all, the location of other body parts is determined in this way; hence the use of hands, fingers, eyes, hair, mouth, bones, muscles, etc. (12%; cf. 13.8% for *žemiau* in Table 1). Fistulas, swellings, wounds, bruises, marks, scars, hollows, etc. can also become F. Such entities are inherently relational as they require G of which they form an integral part, as in the following data:

(11) *(...) the exit wound below the right shoulder blade.*
(12) *There was an area of bruising below the right eye (...)*

Other concrete objects, when used with the human body as G, are also employed in the position of F (24.2% of the utterances; cf. 16.9% in the case of *žemiau* in Table 1). They mainly include miscellaneous entities, among which there are landmarks in the landscape, both man-made, e.g. harbours, courtyards, columns, parks, or natural, for instance, stones, bays, fields, forests, rivers, etc.:

(13) *They were passing over North Gate Bridge, and below them the River Lee flowed (...)*

Another prevailing type of F to be located with respect to the human body refers to garments, e.g. dresses, jeans, skirts, trousers, or their constituent parts, all of which are frequently conceptualized as long objects:

(14) *(...) her nightdress extends far below her feet (...)*
(15) *(...) white breeches tied below the knee.*

Other types of F should also be taken into consideration so as to give a broader picture of the semantic structure of *below*. Consider, for instance, actions and processes or abstractions, the location of which might be determined with reference to the human body. As shown in Table 2, such F-G configurations appear in 1.9% and 3.6% of the data, respectively (cf. 21.2% and 7.5% in the case of *žemiau*) and include character features (e.g. *impatience*, *respect*, *warmth*, *compassion*), attributes of appearance (e.g. *beauty*), feelings and emotions (e.g. *disbelief*), sound (e.g. *wail*, *cry*), smell (e.g. *stench*) - all classified as abstract entities. In contrast, contextual clues such as *hit*, *bite*, *think*, *movement*, *fighting*, *comings and goings*, etc. refer to actions and processes that require localization:

(16) *I did most of my thinking below the neck in those days.*
(17) *(...) the comings and goings far below her in the great house.*

However, even such types of F, both abstract and with a dynamic element, when in spatial alignment with respect to human morphology, do not affect the interpretation of *below* in the primary sense. In other words, what remains important for the comprehension of the spatial relation is purely geometric content, when F is located lower than and in an undefined place with respect to G.

On the other hand, the physical dimension of the primary sense of *below* is manifested when not only the human body but also other concrete objects become reference entities. Consider the following BNC data, in which various types of F appear in spatial configurations that do not alter the established semantic components:

(18) *(...) I was bending down with my head below the counter (...)*
(19) *(...) the courtyard below her window.*
(20) *(...) the bold black signature and the printed words below it (...)*
(21) *The air of excitement was as great below stairs as it was above.*
(22) *He rummages deep in his plastic bag, below a loaf of white bread (...)*

Utterance (18) illustrates human morphology as F in this type of spatial relationship (12.8% of the data; cf. 3.1% in the case of *žemiau* in Table 2). In utterances (19)-(20), another concrete object takes the position, either conceptually distinct, such as courtyards, or an integral part of another entity, e.g. words on a piece of paper (38.3%; cf. 26.9% in the case of *žemiau*, see Table 2). Finally, utterances (21)-(22) feature abstractions, such as the air of excitement, and actions or processes, e.g. rummaging, the location of which is determined with respect to G as a concrete object (3.1% and 1.9%, respectively; cf. 1.2% and 9.4% in the case of *žemiau*, see Table 2).

Interestingly, in the primary sense of *below*, the position of G may be occupied not only by the human body or other concrete objects, but also by abstract entities, setting the item apart from the corresponding Lithuanian preposition. The following concordance line from the BNC has the abstract type of G with an abstract entity acting as F, which constitutes the most frequent type of F-G combination (1.4% of the data in Table 2):

(23) *(...) a note of anger simmering just below his voice (...)*

An abstract type of G when employed with human morphology and concrete objects in the position of F is the second frequent configuration in the primary sense of *below* (0.4% and 0.3%, respectively, see Table 2):

(24) *(...) his arm below that pain was completely numb (...)*
(25) *(...) trails that extended far above and below the lines of sight afforded by the shuttle's windows.*

Finally, actions and processes may also combine, though very rarely, with abstractions as G in the primary sense of the English preposition (0.1% in Table 2):

(26) *I whisper to her, below the hissing of the windscreen wipers.*

Thus, in the light of the major components of the proto-scene involving the spatial relationship designated by *below* and *žemiau*, bounded vertical space is retained with all types of F and G. Moreover, the prepositions have mainly geometric content conventionalized in their primary sense, the typicality of which is attested by the frequency of instantiation and a concrete type of G, either human morphology or any other concrete object. However, an abstract G is not ruled out, either, which makes the English preposition different from the Lithuanian *žemiau*. Further in the analysis, it will be shown how less typical senses, both concrete and more abstract, are related to the primary sense by exploiting and transforming it in different ways, i.e. the underlying principle of motivated polysemy will be taken into consideration. First, *below* as confined to concrete senses will be discussed, and then the analysis will proceed to its more abstract senses**.** While *below* remains the primary focus of this paper, the prior research of *žemiau* (see Stasiūnaitė 2018) is also referenced to identify the key points of similarity and contrast in the semantic structures under study.

3.2 Geography-Related Sense

A concrete sense of *below*, which is graphically represented in Figure 2, primarily occurs in as few as 1.3% of the BNC utterances (cf. 12.6% for *žemiau* in Chart 1), mainly referring to geographic descriptions (cf. the topographical-distance sense in Tyler and Evans 2003: 130). As attested by the data from the corpora, the position of G in this sense of *below*, as in that of the Lithuanian preposition, is typically taken by such entities as cities, villages as well as mountains, hills, enclosures, vineyards and other salient, fixed landmarks in the environment. F usually designates such objects as villages, roads, streets, plantations, valleys, rivers, lakes, trees, buildings, etc., the location of which is determined with respect to G:

(27) *(...) a small boat-hire yard on the Thames below Oxford.*

(28) *(...) the two diversions below Chilete and the need to switch to the old road (...)*

As shown by Figure 2, in the utterances above, F may be conceptualized as being positioned relative to G in Euclidean space along either horizontal or vertical axes, depending on a vantage point. This type of spatial flexibility contributes to the gradability of the sense under examination.

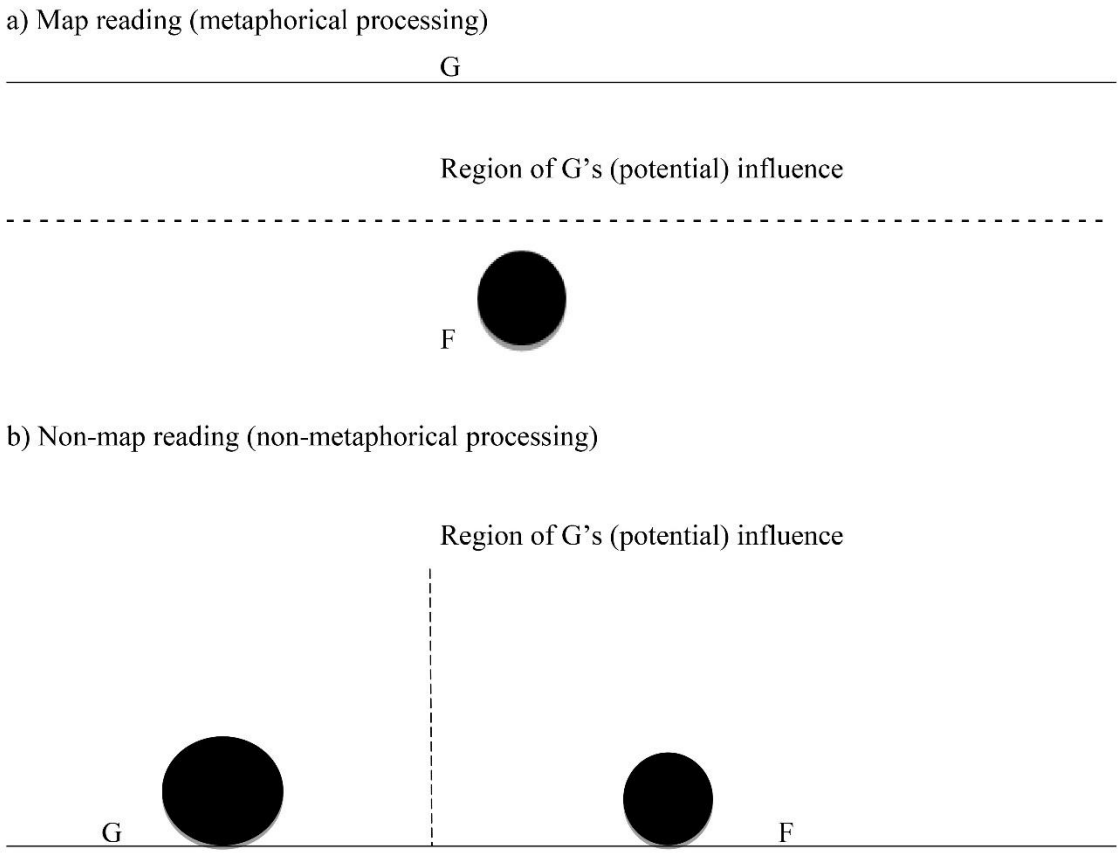


Figure 2. Spatial scene in the geography-related sense of *below* and *žemiau*

On the one hand, the schematic representation of such spatial scenes may involve a vertical axis if the arrangement of F and G is conceptualized analogously to the positioning of entities on a map (see map reading (a) in Figure 2). In such cases, the Thames and diversions are understood as lying south of Oxford and Chilete, respectively; hence the relevance of large-scale spatial reasoning, or what Talmy (1983: 244–245) refers to as "earth-based geometry" or "earth-associated space", incorporating four geographic cardinal directions in the semantic structure under study. A related observation is made by Lindstromberg (2010: 124) who notes that since people tend to conceptualize north as 'up' and south as 'down', as opposed to *across* which is more commonly used to describe east-west travel than north-south movement, such a map-based interpretation could be treated as a metaphor of an area (cf. the UP-DOWN axiology in Lakoff and Johnson 1980/2003). As Jacob (2006: 1 quoted in Edney and Pedley 2020: 942) aptly puts it, "Seeing the world from above is a timeless fantasy that geographical maps make actual by way of metaphor." Accordingly, the geography-related sense of *below*, like that of *žemiau*, may be regarded as a metaphorical extension of the primary sense.

On the other hand, the other way of spatially aligning entities in extra-linguistic reality, namely, non-map reading (b) in Figure 2, may also seem plausible. In this construal, the Thames and diversions, acting as F, are conceptualized as situated along the horizontal axis with reference to Oxford and Chilete in the position of G; hence large-scale space which can be mentally grasped without the aid of optical instruments. This type of reading does not stipulate that the river literally flows under Oxford or that roads are "buried" under Chilete. Rather, G may be conceived as an elevated entity relative to F which lies further within a horizontally construed frame and thus appears smaller. However, as in the case of *žemiau*, the non-map reading of spatial scenes involving topographical entities, though seemingly entrenched in the semantic structure of *below*, remains questionable. Firstly, the speakers often resort to other linguistic means to convey horizontal relationships, such as *in front of*, *behind*, *on the right*, or *on the left* (cf. *prieš*, *už*, *kairėje*, *dešinėje* in Lithuanian). Secondly, in geographic descriptions, the place of F is even more diffuse, with geometric parameters, such as shape and size, being largely irrelevant, which aligns with the primary sense of the prepositions, where localization along the vertical axis is already somewhat indeterminate.

The data also shows other elements of the geography-related sense of *below* and *žemiau*. As in the primary sense, the second component pertains to graded distance, which is due to the apparent absence of contact, or contiguity, between F and G. This is clearly manifested by the frequency of usage of the adverbs *far*, *just*, *immediately* (cf. *šiek tiek/kiek* 'a bit/slightly' in the Lithuanian data) even though there is always some subjectivity or 'plasticity' in what counts as proximal or distal:

(29) *(…) the suburbs in the valley far below the ancient hill settlement (…)*

As in Lithuanian, various units of measurement denoting exact distance (e.g. feet, miles, etc.) are also encountered with the English preposition in the postulated sense, signalling the importance of segregating the two entities as boundaries of extended space:

(30) *Three miles below the village they came upon the first of the hallowed plantations (…)*

Consequently, the alignment of contactless F and G along the vertical axis entails the absence of any functional interaction between the entities; hence the broken line in Figure 2, separating G's region of potential influence from the location of F. In this sense, the prepositions merely divide the spatial scene into two discontinuous portions, where one of them is conceptualized as lower (or ahead) with respect to the other on the vertical (or horizontal) axis.

Thus, negative verticality, metaphorically inferred in map reading and overshadowing horizontality that may occur in non-map reading, together with the lack of functional interaction between contact-free F and G, forms the core of the geography-related sense of *below*, and makes it directly derived from the primary sense. This semantic tendency is also reflected in the Lithuanian *žemiau*, suggesting a cross-linguistic similarity in conceptualization.

3.3 Measurement Sense

In addition to the primary and the geography-related senses, both grounded in the physical domain of human experience, *below,* like *žemiau* in Lithuanian, is used to measure vertical distance from an arbitrary reference level within a more abstract domain. However, since there are 3.2% of such cases in the English corpus as compared to 14.2% for *žemiau* (see Chart 1), this extension seems to be more routinely employed in Lithuanian. By way of comparison, consider two utterances from the corpus:

(31) *It just sank slowly and steadily below the ocean's horizon (…)*

(32) *(…) temperatures below zero (…)*

In (31), the preposition appears in its primary sense as the lower location of an entity is determined with respect to a concrete reference object (the ocean). In contrast, in (32), although a thermometer is a material artefact, it is used metaphorically as both F (the temperature) and G (zero) represent abstractions. This shift away from the domain of physicality is motivated by the strong conceptual link between quantity and vertical elevation, captured by the metaphor LESS IS DOWN. Therefore, according to Tyler and Evans (2003: 128), the sense is likely to derive from examples directly related to our physical experience, in which the mentioned correlation is more apparent: *Ian's head was still below the mark made for his brother when he was twelve*. Moreover, it is directly related to the primary sense due to the same element of distance associated with scales of verticality. Consider *fifty per cent*, *thirty degrees* and other contextual evidence, e.g. the verbs *lower* and *fall*, which strengthen the interpretation assigned to the preposition (cf. *dvidešimt laipsnių* 'twenty degrees', *gerokai* 'rather/noticeably', *kristi* 'fall' in the Lithuanian data set):

(33) *(...) the immediate effect of lowering that day's efficiency to below fifty per cent.*
(34) *(...) a temperature which rarely fell below thirty degrees (...)*

In utterances of this type, G becomes a standard, norm or any other level, such as zero, a freezing point, degrees, or per cent, serving as a division between two subspaces on the vertical line; hence a linear type of conceptualization. In a number of cases, the position of F is taken by temperature, per cent, or degrees (cf. *temperatūra* 'temperature', *laipsniai* 'degrees', *šaltis* 'cold', *speigas* 'frost' and even such abstractions as sound, speed, weight in the CCLL). Other fairly productive usage patterns in the BNC pertain to limits, extents, thresholds, all of which illustrate a longitudital type of G (cf. *riba* 'limit', *linija* 'line', *lygis* 'level'*, slenkstis* 'threshold' in the Lithuanian data):

(35) *(...) a near-bankrupt Great Britain trimmed her commitment back below the survival level (...)*

Thus, like with *žemiau*, when *below* is used in the measurement sense, what is of utmost importance is the positioning of F with respect to G along the vertical axis and an element of distance between the two entities. However, verticality here seems to enter our experience in a different way, giving rise to the orientational LESS IS DOWN metaphor due to a decrease in quantity as a downward motion in the abstract domain (Lakoff and Johnson 1980/2003).

3.4 Value Sense

While Lithuanian relies on vertical metaphors to express status, emotion, or morality (cf. 11.9% for *žemiau*, see Chart 1), the corresponding sense of value in the English *below*, as evidenced by the BNC data, is comparatively rare. It is observed in as few as 3.9% of the data, illustrating the most peripheral usage type (cf. the inferior sense in Tyler and Evans 2003: 129):

(36) *The others have a rank which is below that of an officer but above that of an ordinary soldier.*
(37) *That was the only difference between him and the pilots and the mechanics below him.*

The interpretation of these utterances is not that F is located physically lower than G, but that it occupies an inferior position relative to it; hence the linguistic expression of the orientational metaphor LOW STATUS IS DOWN. Another orientational metaphor, LOW QUALITY IS DOWN, which likewise involves a downward orientation in the domain of value, accounts for the use of *below* as well:

(38) *(...) I live below the reach of the economy (...)*
(39) *'I'm sorry if I've been a bit below par this evening,' she apologised.*

Utterances of this type illustrate the relationship of this sense with that of measurement as both entail reference to some quality-related standard (G), but in the case of value, an emotional element is also present. The role of culturally based spatial orientations, including up and down, in forming emotional and other concepts is pointed out by Lakoff and Johnson (1980/2003) and Kövecses (2010). However, even in such metaphorical extensions, the amount of space between F and G can be emphasized by contextual clues, such as the adverbs *way*, *well*, *a bit* or units like *two gins*, *two fathoms* that mark gradable distance, reinforcing the view that the sense is directly related to the primary sense:

(40) *(...) Mr Shakespeare was sometimes way below his best when it came to the writing of comedy.*
(41) *Dr. Stevie's playing well below his handicap (...)*
(42) *(...) a temperament born two gins below par.*
(43) *(...) he was two fathoms below useless.*

Thus, orientational metaphors offer a subtle way of expressing evaluation: if upward orientation usually corresponds with positive assessment, downward orientation implies negative evaluation. Over time the figurative meaning of such expressions has become so established, i.e. conventionalized, in the speech community, that its metaphorical force is no longer obvious.

3.5 Semantic Network

Figure 3 shows the systematic relationships of all the senses of the English *below* and the Lithuanian *žemiau*, as attested by the corpora.

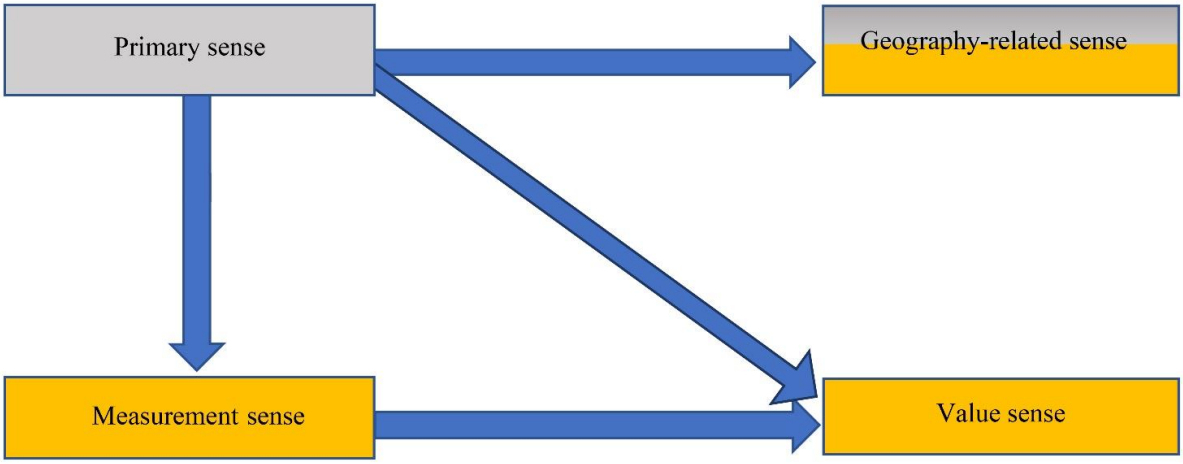


Figure 3. Semantic network of *below* and *žemiau*

The proto-scene characterized by vertical elevation in a physical, or concrete, domain refers to the primary sense of the prepositions (the grey rectangle) which acts as a derivational basis for geographic descriptions. The latter may require a change of domains, from concrete to more abstract, prompting map reading illustrative of metaphorical processing. As to a non-map type of spatial construal, it is not exluded, either, but remains more questionable. So, the rectangle in the figure is rendered half grey and half yellow to illustrate the gradability of the sense, which is neither fully concrete nor fully abstract, though it definitely leans toward the concrete end of the spectrum. G in the two senses refers to concrete objects, both animate and inanimate; however, abstractions may be denotata in the primary sense too. In geographical contexts, on the contrary, the focus is on various natural and artificial physical features of an area, i.e. inanimate rather than abstract entities.

Like with *žemiau*, the remaining extensions from the primary sense of *below* pertain to non-physical space. They seem to be determined by a shift of domains, from concrete to those of measurement and value, which can be explained by the Conceptual Metaphor Theory (Lakoff and Johnson 1980/2003) and the Theory of Mental Spaces (Fauconnier 1985, 2007). In both senses, F is abstract although concrete objects are not excluded, either. Moreover, the sense of value could also emerge from measurement since alongside gradable distance both involve comparison with a standard (G). However, in the case of value, the standard is one of quality; in other words, it is essentially the same kind of measurement, but with an added emotional component. The usage of *žemiau* with the Genitive is likewise motivated, because the case is considered to denote a reference point not only in concrete but also in abstract contexts (Berg-Olsen 2004).

Thus, focusing on motivated polysemy of the two prepositions on the basis of corpora data, the paper has enabled a different insight into the senses listed in dictionary entries and traditional linguistic descriptions that include as few as one sense, showcasing exclusively spatial relations. These findings highlight the need for dictionaries, especially of Lithuanian, to be compiled using a corpus-based approach in order to obtain objective empirical data for investigating semantic peculiarities. The recommendation also applies to contemporary studies of prepositional meaning. When employed on a typologically different language, the Principled Polysemy Model by Tyler and Evans (2003) does not necessarily work as the semantic elements in the primary sense of *below* here differ from the ones established in their investigation. In particular, lack of emphasis on the diffuse place of F with reference to G in the work of the aforemantioned scholars changes the overall structure of the network for the English preposition. For instance, the authors distinguish five senses of *below*: (1) the primary sense based on the proto-spatial scene; (2) topographical distance, which corresponds to geographical descriptions in this study; (3) the less sense, referred to as measurement here; (4) the inferior sense, which corresponds to the sense of value in the present research; and (5) the next-one-down sense, as in the utterance *Not that one, the box below it!* (*ibid*. p. 129), which is subsumed here under the primary sense. Moreover, in their investigation, all the senses are directly derived from the primary sense, while in this paper, measurement and value are interrelated among themselves as well, which iliustrates not only direct but also indirect links with the primary sense of the preposition.

4. Conclusions

As a result of the investigation into the semantic micro-structure of the English *below* in comparison with the Lithuanian *žemiau* + GEN, which was based on the data from Internet corpora, there have been several tendencies identified.

The target prepositions manifest rather simple semantic structures in terms of the number of senses and their positioning in the established semantic network. First of all, both of them possess as few as four senses associated with physical and non-physical space, and demonstrate similarity in terms of their coincidence: (1) the primary sense, (2) geographic descriptions, (3) measurement, and (4) value.

In terms of the frequency of instantiation of concrete senses, *below* prefers physical space-related senses more than *žemiau*; however, the former is notably less represented in abstract uses than its Lithuanian counterpart. Such variation illustrates the importance of language-specific factors in conceptualizing concrete (spatial) versus abstract (no-spatial) relationships. Corpus composition and register-specific choices may constitute other contributing factors accounting for these differences.

The senses were distinguished according to various types of combinations of F and G, such as people, human body parts, inanimate concrete objects, abstractions, and processes, actions or states. For instance, the human body in the position of F may be used with G as a concrete entity, or F as an abstract object is employed with an abstract entity functioning as G, etc. Such combinations of F and G were especially useful while identifying the primary sense, which is expected to emphasize physical rather than non-physical properties of the entities involved — an approach in line with the experiential view of meaning and the principle of embodiment in cognitive accounts.

Geometric relationships characterized by topological properties and spatial alignment of F and G also play a major role in the description of the semantic structures under study. For instance, in the primary sense, *below* and *žemiau* do not encode the precise or concentrated location of F beneath G along the vertical axis. Instead, the spatial relation is rather indeterminate, a feature that becomes even more pronounced in geographical descriptions. In such contexts, G is typically conceptualized as a line or may even be reduced to a point. The same properties of G are retained in abstract contexts, i.e. in the senses of measurement and value.

Finally, the established four senses of *below* and *žemiau* form a semantic network which coincides across the languages. It is organized by direct and indirect relationships with the primary sense based on a proto-spatial scene of F beneath G. Metaphors offer an insightful model for extension during which some elements manifest an increase in the level of abstraction or become backgrounded due to other elements relevant for the scene. For instance, verticality underlies the orientational LESS IS DOWN metaphor, which is relevant to account for the measurement sense of the prepositions. The orientational LOW STATUS or QUALITY IS DOWN metaphors explain the value-related sense of the items under study.

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