

Prepositions in L2 Written English, or Why *on* Poses More Difficulties than *in*

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Abstract

The usage of English prepositions by non-native speakers is notoriously problematic. The debate about whether prepositions should be memorised as distinct cases or introduced in the teaching process by demonstrating their multiple meanings as a network of related senses is more likely to be resolved by adhering to the latter, sometimes referred to as the motivated polysemy approach. We claim that semantic (non-)congruence between prepositional senses in L2 and in L1 is no less important. The present paper focuses on two English prepositions, *in* and *on*, as they are used by Lithuanian learners of English representing different language proficiency levels ranging from B1 to C2 (Council of Europe 2001). Adhering to the approach of motivated polysemy and, more importantly, to the principle of semantic congruence between the senses of the above English prepositions and their prototypical Lithuanian equivalents, we have established that *in*, which demonstrates a high degree of semantic congruence with its prototypical equivalent in Lithuanian, the locative case, seems to be less problematic to Lithuanian learners of English than *on*, which lacks semantic congruence with Lithuanian. The results of the study suggest that the teaching of prepositions should take into account (non-)congruence of prepositional meanings between the learners' mother tongue and their L2.

Keywords: L2 learner English; prepositions *in* and *on*; Lithuanian learners of English; motivated polysemy approach; semantic (non-)congruence

1. Introduction

1.1. The Complexity of Prepositional Semantics

Prepositions are notoriously problematic not only to learners and teachers but also to linguists. While teachers struggle with how to best teach their students English prepositions so that they remember that we say *on TV* and *in a car* but not vice versa, students have numerous problems when using them, irrespective of their L1. Previous research demonstrates that problems persist for students whose L1 is German (Rankin and Schiffner 2011), French (Boers and Demecheleer 1998), Spanish (Navarro Ferrando 2006), Thai (Ruangjaroon 2014), Norwegian (Nacey and Graedler 2015), Chinese (Yuan 2014). Lithuanian seems to be no exception. Our previous investigation has demonstrated that

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Lithuanian learners of English as a foreign language tend to underuse prepositions in L2 written English in comparison to Dutch, Finnish and French learners (Juknevičienė and Šeškauskienė 2014).

Many researchers admit that prepositional meaning is rather difficult to define, much more difficult than the meaning of lexical words. One of the reasons is the abstract relational nature of prepositions. As claimed by Talmy (2000: 179), their meaning represents a skeletal conceptual microcosm, 'a framework that the further material is shaped around or draped over' (Talmy 2000: 179). Therefore, it is not surprising that abstract prepositional meaning has been debated for several decades; over the years, multiple models of prepositional semantics have been proposed (e.g. Evans 2010; Langacker 2010; Lakoff 1987; Navarro Ferrando 2006; Svorou 2008; Tabakowska 2010; Taylor 1993; Tyler and Evans 2003; Vandeloise 1991; Zlatev 2007). Lexicographers have also been struggling with definitions of prepositional meanings. Some evidence may be seen in the cross-referential treatment of prepositions in learners' dictionaries when preposition A is defined through a synonymous preposition B and preposition B is defined through preposition A (see OALD; CALD; DCL; DLL; MacMillan; Stasiūnaitė 2016). For example, in MacMillan *over* is defined with reference to the preposition *above*: *over* 'above someone/something'; the same dictionary defines *above* as 'at a higher level than something or directly over it'. Such treatment is indicative of the complexity of prepositional meaning.

Another problem of prepositional semantics is concerned with its extremely rich polysemy. As claimed by Talmy (2000: 237), prepositions 'provide hundreds of particular, sometimes idiosyncratic, characterisations of space' (Talmy 2000: 237). More traditional researchers focus on arbitrary senses whereas cognitive linguists adhere to the view of motivated polysemy (see Regier 1996; Tabakowska 2010; Talmy 2000; Turewicz, 2005; Tyler and Evans 2003, etc.). Motivation of meaning is mainly understood as explainability (see Matlock 2004). When describing multiple senses of prepositions, the senses are understood as derived from one another, producing different sub-networks joined in a single network, which is arranged around the central sense (see, for example, Lakoff's account of Brugman's analysis in Lakoff 1987: 416–461). In most cases, the central sense is more concrete and gives rise to more abstract meaning(s) (Evans 2010; Feist 2010; Jamrozik and Gentner 2011; Lakoff 1987; Tyler 2012). The motivational

link between senses in each case may be based on a different mechanism which explains how the central sense has been extended to abstract ones (Lakoff 1987; Tyler 2012).

One of the models based on the motivated polysemy approach was developed by Tyler and Evans (2003); it is referred to as the Principled Polysemy Model (PPM). According to the PPM, the senses are derived from the primary, or central, sense in a principled, systematic way (Tyler and Evans 2003: 45; Tyler 2012: 133). All senses are defined with reference to spatial scenes designating a relationship between Figure (more foregrounded object of the scene) and Ground (reference object of the scene). The central sense is defined with reference to the proto, or central, spatial scene (Tyler and Evans 2003: 52; Tyler 2012: 133). To illustrate it, let us consider the following example: *Sugar is on the table* (BNC, H85) (*sugar* as Figure and *table* as Ground) exemplifies a spatial relationship between the two objects. In *Every statement is based on observation* (BNC, A0K), however, the spatial relationship has moved away from the prototypical spatiality and denotes a more abstract relation between Figure (*statement*) and Ground (*observation*). This gradually increasing distance from the prototypical spatial sense gives rise to many other relational senses which are explainable by general cognitive principles such as embodiment, real-world force dynamics, metaphorical thinking and different construal operations (Coventry and Garrod 2005; Johnson 2007; Tyler 2012: 134; also see Šeškauskienė and Žilinskaitė-Šinkūnienė 2015; Shakhova and Tyler 2010).

The expression of relational meanings in languages with complex case systems is very different from English. In inflecting languages such as Romance, Baltic, Slavic and some Germanic languages, cases also express relational meaning, in English usually expressed through prepositions. For example, the Lithuanian locative case is roughly equivalent to the English *in*: LT *stiklin-ėje* glass-LOC.SG – EN *in the glass*. This fact, however, does not mean that cases replace prepositions in all situations. In many inflecting languages prepositions coexist with cases as well as such elements as prefixes, suffixes or infixes which semantically correspond to prepositions (for a more exhaustive overview, see Haspelmath 1997). Therefore, the English prepositions are likely to cause problems for learners of English as a foreign language (EFL) who are inevitably influenced by their L1 (Lindstromberg 2010: 5–6). Cross-linguistic influence has been extensively discussed by Odlin (2005), who

places it in the context of linguistic relativity. His review shows that the impact of L1 on L2 is rather varied and requires more research. Research into L1 acquisition demonstrates that typologically different languages are acquired differently and learners ‘package’ spatial information in language-specific ways (Hickmann and Hendriks 2010). In other words, each L1 influences an L2 differently. Another study on language acquisition (Johannes, Wilson, and Landau 2016) is devoted to the study of two English prepositions, *in* and *on*, prototypically expressing containment and support relations, respectively, as in the following examples: *in a box*; *on the table*. Children’s mature use of these relationships very much depends on the verbs used together with a selected preposition. The study demonstrates a marked increase in the number of lexical verbs used with *in* whereas with *on* the number of such verbs is much lower.

1.2. Scope of Study

With all the above considerations in mind, this study was set up to investigate *in* and *on*, two much debated English prepositions, as they are used by Lithuanian EFL learners. The prepositions are among the top ten most frequent English prepositions (Nacey and Jensen, 2017; Turewicz 2005) and they are among the five most frequent prepositions in our corpus (the other three being *of*, *for* and *with*), which were the major reasons for choosing them for this study. We assume that prototypically they express the relationship of containment and support, respectively. In more abstract meanings, they often retain elements of their spatial meanings. In our investigation of prepositional senses we partially relied on the study carried out by Tyler and Evans (2003; see also Evans 2010) and on the principle of semantic congruence between L1 and L2, or semantic equivalence between the senses of *in* in English and the senses of the Lithuanian locative case and between the English *on* and the Lithuanian *ant*. Evans’ model (2010) and the principle of semantic congruence will be explained further (see sections 2.3 and 4).

The aim of the study is to investigate the use of *in* and *on* in written English produced by Lithuanian EFL learners at three levels of proficiency, loosely described as intermediate, upper-intermediate and advanced. As argued above, due to the cross-linguistic (non-)congruence of prepositional semantics, *in* and *on* pose a number of difficulties to

Lithuanian EFL learners. By comparing data extracted from L2 English produced by learners of varying proficiency levels, we expect to demonstrate that the usage of *in* and *on* as evidenced by learner corpus data is influenced by L1. More specifically, we hypothesize that *in*, which has many more congruent senses with Lithuanian than *on*, is easier to acquire and that this might be demonstrated by evidence from learner corpora. In contrast, the senses of *on* manifest less congruence with Lithuanian and, as a consequence, the distribution of *on* may not necessarily change alongside learners' proficiency.

To verify these hypotheses, the following research questions were raised:

1. Are the distributions of *in* and *on* across three different levels (dis)similar?
2. Is there a relationship between the distribution of prepositional meanings and the level of proficiency of L2 English learners?
3. Can a motivated approach to polysemy and cross-linguistic (non-)congruence help account for divergent uses of the two prepositions in the learners' L2?

As shortly to be described, we used a corpus-based approach, which involves quantitative and qualitative analysis of linguistic data (Tognini-Bonelli 2001) extracted from learner corpora. We tested the PPM and proposed our own structuring of senses of the two prepositions.

In the following sections, we describe our study in quantitative terms, including the composition of the corpus and methodological principles. Then we move on to describe the main tendencies of usage of the two prepositions and discuss possible causes of such trends. We finish the paper by drawing conclusions and outlining possible implications of the study.

2. A Quantitative Study

2.1. Corpora and Learners

The data for the study was collected from three corpora representing L2 written English produced by L1 Lithuanian learners at different levels of proficiency ranging from B1 to C2 (Council of Europe 2001). All corpora consist of examination essays produced without access to

reference tools. Corpus 1 contains essays by secondary school pupils (18-19 years old) written at the end of their studies at school. Corpus 2 represents written English produced by first-year university students at Vilnius University. Lastly, Corpus 3 consists of essays taken from the LICLE corpus, compiled as the Lithuanian component of the current version of the ICLE project (Granger et al. 2009; Grigaliūnienė and Juknevičienė 2012), which represents the most advanced learners, i.e. senior undergraduates. It is expected that such a combination of learner corpora provides a quasi-longitudinal perspective of the productive competence of Lithuanian EFL learners: Corpus 1 contains written English of learners whose level varies between B1-B2 (lower) according to the Common European Framework of Reference (Council of Europe 2001) and illustrates the level of mastery of written English at the end of the secondary school. Corpus 2 contains essays written by first-year university students after two academic semesters on a study programme where the majority of courses are taught in English, while language enhancement classes are strongly biased towards academic English. Lastly, Corpus 3 essays were written by third- and fourth-year students who had had a number of literary and linguistic courses, all of which contributed to the development of their proficiency in written English. Therefore, we assume that the three corpora represent a cline of language proficiency ranging from intermediate (Corpus 1) to upper-intermediate (Corpus 2) and advanced (Corpus 3) levels.

The total number of essays randomly chosen for this study is 600, namely, 200 essays from each level of proficiency. The essays are argumentative texts on a variety of topics, which deal with social issues, studies and education, media, etc. Since prepositions are functional words, for the purposes of this study the topics of the essays were considered to be irrelevant (see more comments on the topic factor in section 4). The size of each corpus and the average length of essays are given in Table 1 below.

Table 1. Corpora

	Corpus 1	Corpus 2	Corpus 3
Number of words	38,703	81,209	116,082
Average essay length in words	194	406	580

The analysis of the data was carried out using #LancsBox (Brezina, McEnergy, and Wattam 2015). The software was used to obtain frequencies of the two prepositions in each essay of the corpora (the Whelk function), while the KWIC tool was used to generate concordances of *in* and *on* which were later transferred to MS Excel for coding of prepositional meanings. All statistical tests and charts were computed with software R (R Core Team 2015).

2.2. Targeted Prepositional Expressions

In order to quantify the distribution of prepositional meanings in our samples, all instances of prepositions were extracted from the corpora and analysed for their senses¹. Automatically generated concordances, however, were first manually revised in order to eliminate from the sample those cases which were considered to be irrelevant for this study; the reasons will be explained in the next paragraph.

When analysing prepositional expressions, it is important to take into account the fact that a large part of vocabulary is acquired by L2 learners in chunks. In this respect, prepositions are no exception. A number of studies demonstrate that certain idiomatic multi-word expressions with prepositions, e.g. *in addition to*, *on the other hand*, *in spite of*, are acquired as memorized chunks and not subjected to processing at the time of production (Boers and Lindstromberg 2012; Nattinger and DeCarrico 1992; Wray 2002, Wray 2008). They are usually introduced in EFL textbooks as distinct lexical units to be learned as ready-made

¹ The terms *sense*, *meaning* and *usage type* in this paper are used interchangeably.

phrases (e.g. Evans and Dooley 2008; Wildman and Hudson 2015). A similar degree of fixedness is characteristic of phrasal verbs, described as '[h]ighly idiomatic' in Quirk et al. (1985: 1163) and 'fully idiomatic' in Downing and Locke (2006: 342). Since the primary focus of this study is the learners' ability to process prepositional meanings rather than reproduce them in fixed chunks, a decision was taken to eliminate from the study sample such highly idiomatic expressions. A similar strategy was also employed in other studies of prepositions in L2 English (see Nacey and Graedler 2015; Nacey and Jensen 2017). Therefore, the following highly idiomatic expressions were excluded from the analysis: phrasal verbs (e.g. *give in*), fixed discourse markers (e.g. *on the other hand*, *in conclusion*, *in general*), complex words (prepositions, e.g. *in front of*, adverbials, e.g. *so on*). The remaining instances of *in* and *on* irrespective of their correctness were taken for further analysis and, as shown below, coded for the senses they express.

2.3. *Coding of Prepositional Meanings*

The analysis of prepositional meanings partly draws on Tyler and Evans (2003) and Evans (2010). The model suggested for *in* and *on* by Evans (2010) was tested on our data. Adhering to the principles of motivated polysemy and using a corpus-based approach to data analysis, we identified different senses of the two prepositions. As it turned out from the early stages of analysis, the model of prepositional meanings proposed by Evans (2010) could not be used for L2 English as many senses identified by Evans were not represented in our sample. Moreover, our corpora contained such uses which are not covered by Evans' model but are numerous in learner English. Therefore, for the purposes of this study, a decision was taken to classify prepositional senses into such semantic categories which are present in our material and to modify the model proposed by Evans (2010), which turned out to be rather limited presumably because it has not been applied in the analysis of learner language. We explain our procedure in the following paragraphs.

The senses of *in* and *on* were categorized on a scale from the most concrete, as in *keep one's hands in the pockets* or *jump on the roof of a car*, to the most abstract, as in *contribute in many ways* or *disagree on certain aspects*. Also this categorization takes into account the semantics

of Figure and Ground as well as the lexical word which specifies the relation between the two elements and governs the prepositions. Examples (1)-(2) taken from Corpus 3 illustrate why the lexical words are relevant:

- (1) (...) *the scientific linguistic discourse **has its roots in the circle of scientists** of the British Academy of Science of Newton's day*².
- (2) *In the postmodern times the science lost its primary motivation, **running in a circle**, to give enough justification for itself (...).*

Both examples contain *in* used in combination with the noun *circle* but these are two different uses. The lexical word (*has its roots*) in (1) implies an abstract location, i.e. scientific community, whereas *in a circle* in example (2) is an expression of manner which is evident from the lexical verb *running* and which means 'moving in a circular trajectory'. As pointed out by Quirk et al. (1985: 1159), the lexical word in a multi-word expression governs the preposition 'in the sense that the preposition is selected by reason of the verb, rather than by independent semantic choice'. The same principle can be observed not only in the case of lexical verbs, but also in multi-word nouns and adjectives. The other reason for taking into account the lexical word is the special character of L2 English. Our data includes a number of diverging or non-standard uses that are often impossible to map onto categories derived from native speaker language. As shown in the discussion, it is often the lexical word that makes the use of the prepositional expression unacceptable in English. Therefore, to be able to obtain a more fine-grained picture of prepositional meanings in the language of non-native speakers, we decided to take into account not only the type of Figure and Ground and the relationship between them as they are understood by Tyler (2012), but also the lexical word (verb, noun or adjective) which predetermines the choice of the preposition.

The two authors of the paper first coded together 10% of the concordance lines of both prepositions in order to agree upon coding

² Examples from the learner corpora are given in their original form.

criteria and interpretation of prepositional meanings. During the next stage we coded the samples individually after which the codes were compared and dubious cases discussed in order to reach a consensus. The resulting classification of prepositional meanings was revisited again after several months to run a second round of coding. The inter-coder reliability between the two rounds of coding was considered sufficient as only less than 5% of instances of prepositional meanings were coded differently and required additional discussion.

Based on contextual indicators, mainly the semantics of the lexical word, the semantics of Figure and Ground and the nature of their relationship, the following senses of *in* have been identified (listed in the order of increasing abstraction and illustrated by examples from our data; the senses are based on the idea of containment):

1. Expressing relation of physical enclosure/ containment, e.g. *a baby playing with a toy in his hands, dangerous animals deep in the sea, gases which accumulate in the air.*
2. Expressing relation of geographical location whereby physical areas such as countries, other territories are conceptualized as enclosures, e.g. *in my city, in a foreign country, in different parts of the world.*
3. Expressing relation of communicative nature whereby texts and other abstractions are conceptualized as enclosures, e.g. *articles in tabloid newspapers, knowledge provided in books, an interesting record in your CV.*
4. Expressing relation of social inclusion and belonging whereby social groups of people and social institutions are conceptualized as enclosures, e.g. *in my family, insecurity in the society, in the army.*
5. Expressing relation of mental and emotional nature whereby human mental and emotional states, activities, mental constructs, other abstractions (including time) are conceptualized as enclosures, e.g. *the evil lies in a human soul, evolution in attitudes, have difficulties in making new friends, it helps you in the future, keep in mind.*

The rationale behind the proposed five senses of *in* is based on the degree of abstraction of the prepositional senses established in our data.

The first sense is the most concrete as it expresses a location within a physically delimited object, i.e. *hand* or *sea*. The second sense also involves the physical aspect but, in contrast to the first one, the enclosing container here is a geographical region, usually, a country or part of the world, which we consider to be a more abstract notion than a container of physical material relevant in the first sense. The third sense denotes a special type of enclosure which can refer both to concrete (*a book*) and abstract (*discourse, knowledge*) Grounds. In our data, the dominating Figures used in combination with Grounds expressing communicative textual notions were abstract, e.g. *ideas, information, knowledge, message, ideas*. Similarly, the fourth sense involves no less abstract Grounds, e.g. *army, family, society* or *university*. Lastly, the fifth sense comprises temporal and other highly abstract expressions (*in the future, in making new friends*) where enclosure is not necessarily evoked in the first place but is derivable through mental reasoning. The proposed list of senses should be viewed as a result of corpus-based analysis of authentic L2 learner English data.

The following senses of *on* have been identified (listed in the order of increasing abstraction; the senses are based to a large extent on the idea of support):

1. Expressing relation of physical support between objects and/or areas, e.g. *land on your feet, be on the top of their dream car, selling drugs on streets*.
2. Expressing relation of communicative nature whereby objects/entities of virtual reality and communication are conceptualized as providing support, e.g. *chat on a foreign forum, information on the internet, broadcast on TV*.
3. Expressing relation of social nature whereby people performing different social functions are conceptualized as providing support, e.g. *the essay will concentrate on students, to waste money on recruits*.
4. Expressing relation of mental and emotional nature whereby human activities, emotions, other abstractions (including time) are conceptualized as providing support, e.g. *based on love, life depends on parents' mood, emphasis is put on the fact, on holidays*.

Starting with the idea that the prototypical concrete sense of *on* denotes the relationship of physical support, we ascribed to the most concrete first sense such cases where physicality of Figure and Ground are most evident. Similarly to the description of *in*, a large group of instances occurring in our corpora involved nominal Grounds which refer to communicative notions which was the basis for the distinction of the second sense. A higher level of abstraction, in our opinion, characterizes such Figures and Grounds where the latter denote social roles in society which are included in the third sense. The fourth sense comprises the most abstract Figures and Grounds, mostly based on mental concepts. The four types of senses of *on* established by using the corpus-based approach, as argued above, reflect uses of *on* in our data and may not represent all possible senses of the preposition in natural English. Yet the approach used here provided comparable data which was necessary for this study.

The above models are the result of a consistent application of the principles mentioned in section 2.3 and partially overlap with the ones suggested by Tyler and Evans (2003; see also Evans 2010) mostly based on native speaker intuition. Both models—ours and the one proposed by Tyler and Evans—demonstrate the same tendency in terms of semantic (non-)congruence with the prototypical means of expression in Lithuanian (for a more detailed comparison of the models see section 4).

3. Results

Overall frequencies of the two prepositions (tokens) are given below in Table 2. The primary revision of concordance lines and elimination of highly idiomatic expressions resulted in 1,013 deletions (224 tokens from Corpus 1; 340 from Corpus 2; 449 from Corpus 3). The resulting data set consisted of 2,268 types (3,628 tokens) of *in* and 502 (635) tokens of *on*. We considered an instance of use to be a type if it had a unique combination of Figure, Ground and the lexical word through which the two elements are related. For example, *Quality of studies depends on the university* and *Your future depends on how much money you have* were treated as two distinct types because they have different realisations of Figure and Ground even though the lexical verb (*depend*) is the same.

Table 2. Absolute and normalised* frequencies of *in* and *on* in the corpora

	Corpus 1	Corpus 2	Corpus 3
IN tokens	706 (<i>norm. 18.24</i>)	1,222 (<i>15.04</i>)	1,711 (<i>14.74</i>)
ON tokens	36 (<i>0.93</i>)	271 (<i>3.34</i>)	330 (<i>2.84</i>)

*Normalised per 1,000 words

Measures of the central tendency and dispersion of the two prepositions (Table 3 and Figures 1.1 and 1.2) show that the distribution of both prepositions across the three corpora is different. It is obvious that *in* is more frequent than *on* across all corpora, which is evidenced by medians and means. While the average frequency of *in* steadily increases from Corpus 1 to Corpus 3, the tendency for the distribution of *on* shows a less prominent change in the average frequency.

To compare variability of preposition frequencies in each corpus, we used the interquartile range (IQR) as a measure of dispersion, because the data does not meet the assumption of normal distribution. The IQR statistics suggests that all three corpora are more heterogeneous in terms of frequencies of *in* and more homogeneous for the frequencies of *on*. In other words, the frequency of *in* in individual essays varies much more than the frequency of *on* does. Corpus 1, which represents the lowest proficiency level in this study, shows no variation in the frequencies of *on* at all whereas the other two corpora have minimal variability. In order to test whether the variation of frequencies among the three corpora for each of the prepositions is significantly different, we used the alternative one-way ANOVA test which confirmed that the corpora are significantly different for both prepositions (IN: $F=8.83$, $df=1$, $p < 0.001$; ON: $F=30.39$, $df=1$, $p < 0.0001$).

Table 3. Distribution of *in* and *on*: measures of central tendency and dispersion

	Median	Mean	IQR
IN			
Corpus 1	3.00	3.59	3
Corpus 2	6.00	6.16	5
Corpus 3	8.00	9.00	6
ON			
Corpus 1	0.00	0.21	0
Corpus 2	1.00	1.4	2
Corpus 3	1.00	1.73	3

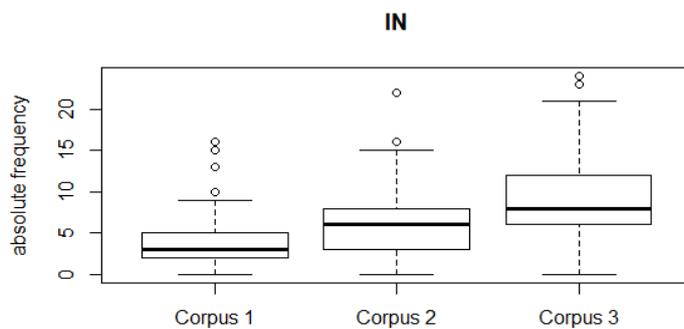


Figure 1.1: Frequencies of *in* per corpus

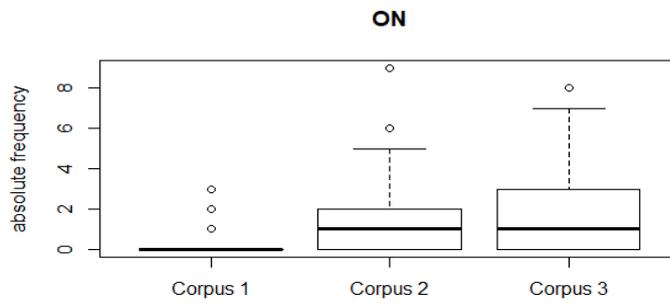


Figure 1.2: Frequencies of *on* per corpus

The next step of the quantitative analysis was establishing whether the distributions of prepositional meanings depend on the proficiency level of learners. Figures 2.1 and 2.2 below show the relative frequencies of different senses of *in* and *on* in our data.

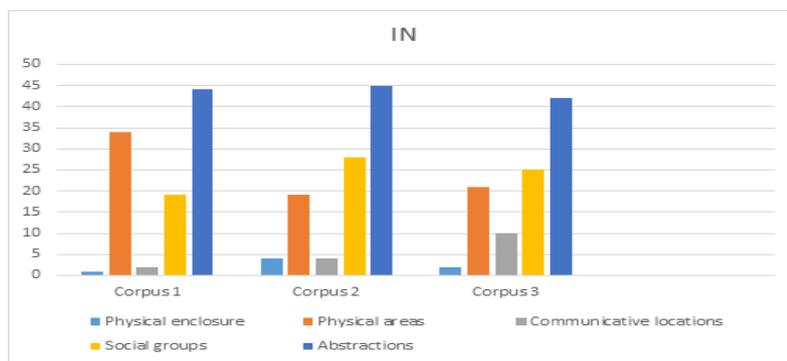


Figure 2.1: Distribution of the prepositional meanings of *in* across the corpora (in percentages)

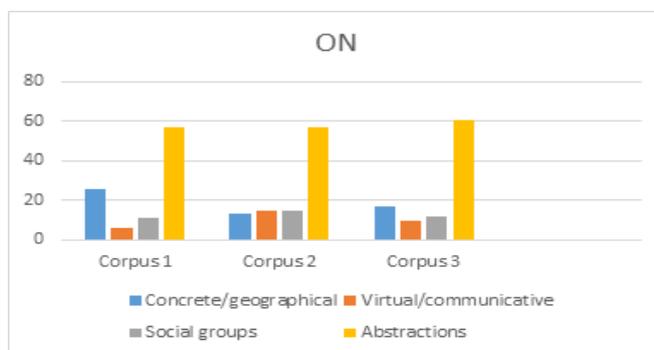


Figure 2.2: Distribution of the prepositional meanings of *on* across the corpora (in percentages)

To check the (in)dependence of prepositional senses and the level of learners' proficiency, χ^2 test was run. It showed that the distribution of senses of *in* in the three corpora differs significantly (x-squared = 77.211, df = 8, p-value = 1.778e-13), yet the effect size is small (Cramér's V = 0.13). In contrast, the result for the distribution of *on* senses in the three corpora does not reach statistical significance (x-squared = 9.0543, df = 6, p-value = 0.1705; the effect size is small: Cramér's V = 0.123). Therefore, as the learners' proficiency develops, we observe a significant change in the distribution of *in* senses whereas the patterning of *on* senses does not vary to the same extent. In other words, the statistical tests suggest that the distribution of senses of *in* in learner corpora correlates with the proficiency level but no such dependence has been established in the case of *on*. Yet the small effect sizes do not allow us to generalize that these differences would be applicable to a different data sample. Insights from the qualitative analysis presented in the Discussion section provide a more detailed picture of how prepositional meanings manifest cross-linguistic challenges to EFL learners.

4. Discussion

The quantitative analysis showed that our corpora are more heterogeneous in terms of frequencies of *in* and more homogeneous for the frequencies of *on*. In other words, the number of instances of *in* per essay varies more than it does for the preposition *on*. The data shows that the learners make use of a wider range of expressions with *in*. While in

some essays of our sample *in* occurs more than 20 times, the frequencies of *on* in the data vary between 0-2 occurrences per essay. We argue that this could be explained by the fact that senses of *in* have more regular correspondences with the learners' L1 than *on*. In our analysis we relied on a revised model of polysemy based on the PPM suggested by Tyler and Evans (2003) and Evans (2010).

In his analysis of *in*, Evans (2010: 232–240) posits enclosure as a central concept characterized by the spatio-geometric components of interior, boundary and exterior. *In* is associated with three other functional categories: Location with Surety, Occlusion and Affecting conditions, which could be regarded as senses of *in* (see Table 4 below). The first sense is central and the others are treated as derived from it.

Table 4. The English *in* (based on Evans 2010) and its congruence with the Lithuanian locative case

	Sense and illustrative example in English	C*or N-C**	Lithuanian translation
1	Enclosure as containment: <i>kitten in the box.</i>	C	<i>kat-ė dėž-ėje</i> cat-NOM.SG box-LOC.SG
2	Location with surety: <i>umbrella in hand.</i>	C	<i>skėt-is rank-oje</i> umbrella-NOM.SG hand-LOC.SG
3	Occlusion: <i>in prison, in a safe.</i>	C	<i>kalėjim-e jail-LOC.SG</i> <i>seif-e safe-LOC.SG</i>
4a	Affecting condition: prevailing (natural) conditions: <i>in dust, in the dark.</i>	C	<i>dulkės-e dust-LOC.PL;</i> <i>tams-oje darkness-LOC.SG</i>
4b	Affecting condition: physiological state: <i>the cow is in milk; the woman is in labour.</i>	N-C	<i>karv-ė duod-a pien-q</i> cow-NOM.SG give-PRS.3 milk-ACC.SG <i>moter-is stangin-a-si</i> woman-NOM.SG strain-PRS.3-REFL

4c	Affecting condition: psychosomatic state, subjective/internal state: <i>in love, in shock, in pain</i> .	N-C	<i>j-si-myl-ėj-ęs</i> into-REFL-love- PTCP.ACT.PST-NOM.SG.M <i>sukrės-t-as</i> shock-PTCP.PASS.PST- NOM.SG.M <i>jauč-iant-is skausm-q</i> feel- PTCP.ACT.PRS- NOM.SG.M pain-ACC.SG
4d	Affecting condition: socio-interpersonal state, externally maintained state: <i>in debt</i> .	N-C	<i>tur-int-is skol-ų</i> have- PTCP.ACT.PRS- NOM.SG.M debt-GEN.PL
4e	Affecting condition: professional state: <i>he is in banking</i> .	N-C	<i>j-is dirb-a bankininkyst-ėje</i> he-NOM.SG work-PRS.3- banking-LOC.SG

* C—Congruent; ** N-C—non-congruent

Table 4 above also demonstrates the extent to which the senses of the English *in* can be treated as semantically congruent to the senses of the Lithuanian locative case. *In* is the most salient means of expressing containment, which, apparently, is also the central sense of the locative case in Lithuanian. The first three senses of *in* are congruent with the senses of the Lithuanian locative. The fourth sense, subsuming five types of affecting conditions in the model suggested by Evans, in Lithuanian is mostly rendered through other means, except for natural conditions (4a). The same tendency is preserved in our model: the first four senses are congruent with the Lithuanian locative and the fifth is non-congruent (see Table 5 below). We therefore, claim that the English *in* and the Lithuanian locative demonstrate a high degree of cross-linguistic congruence.

Table 5. Proposed model of congruence of the English *in* and the Lithuanian locative case

	Sense and illustrative example in English	C*or N-C**	Lithuanian translation
1	Enclosure as containment: <i>toy in his hands.</i>	C	<i>žaisl-as jo rank-ose</i> toy-NOM.SG he-GEN.SG hand-LOC.PL
2	Geographical location: <i>in my city.</i>	C	<i>savo miest-e</i> my/his/her city-LOC.SG
3	Enclosure of communicative nature: <i>articles in newspapers.</i>	C	<i>straipsn-iai laikrašć-iuose</i> article-NOM.PL newspaper- LOC.PL
4	Social inclusion or belonging: <i>in my family.</i>	C	<i>savo šeim-oje</i> my/his/her family-LOC.SG
5	Mental and emotional states conceptualized as enclosures: <i>evolution in attitudes, difficulties in making friends.</i>	N-C	<i>požiūr-ių evoliucij-a</i> attitude-GEN.PL evolution- NOM.SG <i>sunkum-ai su-si-rand-ant</i> <i>draug-ų</i> difficulty-NOM.PL PFV- REFL-find- PTCP.PRS friend- GEN.PL

* C—Congruent; ** N-C—non-congruent

The preposition *on*, as seen in the analysis below, is different in that it manifests much less congruence. According to Evans (2010: 240–243), it primarily posits the geometric parameter of contact and the functional parameter of support as the main elements constituting its central sense. Two more functional categories provide the basis for other senses: means of conveyance and supporting pivot. In addition, the preposition *on* expresses non-physical support of seven varieties: dependency, psychological support, rational/epistemic support and active state. All of them with their illustrative examples from Evans (2010) are given in

Table 6, with the first case referring to the central sense. As seen in the table, in Lithuanian, the preposition *on* in a physical sense of support is prototypically rendered as the preposition *ant* with the Genitive case. It is the only sense which has been identified as congruent. None of the other senses manifest congruence with the English *on*. Our model (Table 7) puts forward support as the main idea underlying the central sense of *on*. This is in line with experimental research carried out by Jamrozik and Gentner (2011). Further senses are based on the idea of support; however, the non-congruence between the English preposition *on* and the Lithuanian preposition *ant* is also obvious: of four senses of the English *on*, only the first, the physical sense of support, is congruent with the Lithuanian *ant*. Therefore, the degree of congruence between Lithuanian and English is considerably lower for *on* and its equivalents. The preposition *in* with many more congruent forms in Lithuanian is used by the learners more frequently than the one whose senses do not have regular correspondences in the learners' mother tongue.

Table 6. The English *on* (based on Evans 2010) and its congruence with the Lithuanian preposition *ant*

	Sense and illustrative example in English	C*or N-C**	Lithuanian translation
1	Contact and support: <i>apple on the table.</i>	C	<i>obuol-ys ant stal-o</i> apple-NOM.SG on table-GEN.SG
2	Means of conveyance: <i>on foot; on a bus.</i>	N-C	<i>pėsč-iomis</i> walking-ADV <i>autobus-u</i> bus-INS.SG
3	Supporting pivot: <i>earth on its axis.</i>	N-C	<i>žem-ė suk-a-si aplink savo aš-j</i> earth-NOM.SG turn-PRS.3-REFL around its axis-ACC.SG
4a	Non-physical support: dependency: <i>she is on the pill.</i>	N-C	<i>ji vartoj-a tablet-es</i> she-NOM.SG use-PRS.3 pill-ACC.PL

4b	Non-physical support: psychological support: <i>rely on somebody.</i>	N-C	<i>pa-si-kliau-ti k-uo nors</i> PFV-REFL-rely-INF somebody-INS.SG
4c	Non-physical support: rational/ epistemic support: <i>on purpose.</i>	N-C	<i>siek-iant tiksl-o</i> pursue-PTCP.PRS purpose-GEN.SG
4d	Non-physical support: active state: <i>on sale; on the move; on lookout.</i>	N-C	<i>parduo-dam-a</i> sell-PTCP.PASS.PRS <i>judė-ti</i> move-INF <i>ieško-ti</i> search-INF

* C—Congruent; ** N-C—Non-congruent

Table 7. Proposed model of congruence of the English *on* and the Lithuanian preposition *ant*

	Sense and illustrative example in English	C*or N-C**	Lithuanian translation
1	Support between objects: <i>apple on the table.</i>	C	<i>obuol-ys ant stal-o</i> apple-NOM.SG on table-GEN.SG
2	Relation of communicative nature: <i>information on the internet.</i>	N-C	<i>informacij-a internet-e</i> information-NOM.SG internet-LOC.SG
3	Relation of social nature: <i>waste money on recruits.</i>	N-C	<i>eikvo-ti pinig-us rekrūt-ams</i> waste-INF money-ACC.PL recruit-DAT.PL
4	Relation of mental and emotional nature: <i>based on love.</i>	N-C	<i>pa-grįs-t-as meil-e</i> PFV-base-PTCP.PASS.PST-NOM.SG.M love-INS.SG

* C—Congruent; ** N-C—Non-congruent

Our data contains a number of examples which illustrate how interference of L1 is reflected in the use of prepositions when EFL learners choose prototypical renderings of prepositional senses. A typical example is the use of *abroad* with the preposition *in*. The English adverb *abroad* in Lithuanian is usually expressed through a noun in the locative case, i.e. *užsien-yje* (abroad-LOC.SG.M) which, arguably, is transferred into L2 English:

- (3) *Nowadays studies **in abroad** are very popular among young people.* (Corpus 1)

A similar case is illustrated in example (4) where *moon* in the locative gets an erroneous rendering with *in* where the preposition *on* would be the correct choice. This, again, is a direct rendering from the Lithuanian locative *mėnul-yje* (moon-LOC.SG.M):

- (4) *The best place for them is somewhere **in the Moon**.* (Corpus 3)

Our data suggests that Lithuanian learners, even at more advanced levels, feel it safe to opt for what is a prototypical rendering from their L1 into L2 and fail to realise the specificity of the English prepositional semantics. The following example illustrates a typical problem case:

- (5) (...) *some rather choose to sit at home and play computer games or sit **in social pages** such as “facebook” or “Twitter”.* (Corpus 1)

Example (5) offers an obvious transfer from the learner's mother tongue where a corresponding locative case construction of the learners' L1 (Lith. *socialin-iuose puslap-iuose* social-LOC.PL.M page-LOC.PL.M) is reproduced in L2 English with a prepositional phrase. Interestingly, the lexical verb, *sit*, in both English and Lithuanian could imply a Figure positioned on the interior of a particular Ground. Social networks could be indeed conceptualised as virtual locations. Although the whole phrasing looks like a metonymic reference to the action of browsing of social media, the combination of the lexical verb, preposition and the

Ground in (5) in English sounds unidiomatic. Similar cases are exemplified in (6) and (7):

- (6) *In the Internet* people can find very much of useful information, which can be used in their daily life. (Corpus 2)
- (7) However, the violence **in television** is much broader and comes in all various forms. (Corpus 3)

The common phrases in English are *on the internet* and *on television*, but to Lithuanian learners the preposition *in* also appears a possible alternative as the Lithuanian equivalent of this phrase involves the locative case (Lith. *internet-e* internet-LOC.SG.M) which, as argued above, is often rendered by combinations with *in*.

Unlike *in*, the distribution of the preposition *on* across the three corpora is rather similar, and the statistical differences between the corpora are not significant ($p = 0.1705$). Overall, the frequencies of *on* are remarkably low in our corpora (see Table 3). Only 35 types of *on* were identified in Corpus 1, 193 in Corpus 2 and 274 in Corpus 3. As already mentioned, these counts exclude such formulaic uses as *on the other hand* or *on the contrary*. The fact that learners who represent three different proficiency levels use this preposition with similar frequencies could possibly be accounted for by the non-congruence of prepositional meanings. Let us discuss the following examples:

- (8) *Many such families are on a psychological crisis* (Corpus 2)
- (9) (...) *there are mainly three positive aspects on watching television.* (Corpus 3)
- (10) *The difference also lies on the thematic basis.* (Corpus 3)

All the above examples contain non-idiomatic usage of *on*. The main reason for the misuse of the preposition could be the non-congruence between *in* and its Lithuanian translational equivalent *ant*. Sentence (9) may have resulted from a well-established expression *on television*; sentence (10) may have been produced as a result of reasoning relying on the verb *lie* in concrete situations (e.g. *lie on the ground*).

Alongside a number of deviant cases, there are numerous utterances where *on* is entirely unproblematic. For example:

- (11) (...) *as the right to have a control **on** her body and the choice* (Corpus 2)
- (12) *Language skills have a huge effect **on** young people's personal development* (Corpus 2)
- (13) (...) *puts a psychological pressure **on** every woman.* (Corpus 3)

It would be difficult to link the above utterances to higher proficiency level as the quantitative analysis did not show any clearly identifiable tendency towards improvement. The sentences of the above type are probably the result of (over-)teaching in prefabricated chunks, when students are encouraged to learn strings of words without resorting to any analysis of how these strings were produced. The results therefore offer little evidence about the learners' ability to fully understand prepositional meaning and its motivation.

The qualitative analysis of prepositional meanings revealed an interesting tendency. It turns out that prototypical physical senses are less frequent whereas derived secondary and more abstract senses are used more often. Moreover, their distribution across the three corpora representing three proficiency levels is quite similar for both prepositions. In all the corpora, the largest category represents *in* used in combination with words denoting abstract concepts and activities (e.g. *crisis in buying habits, help in personal development, increase in crimes*). This category also includes temporal expressions such as, for instance, *established in 1993, we are living in the 21st century*. The abstract uses of *in* account for 44% of all instances in Corpus 1, 45% in Corpus 2 and 42% in Corpus 3 and constitute the most frequent use of *in* across the three proficiency levels. The tendency can be partially explained by the abstract nature of the topics of the students' essays; a high frequency of temporal expressions (e.g. *in the morning, in winter, in 1989, etc.*) is quite natural, independent of the text type. The latter, mainly rendered though very stable expressions with the preposition *in*, are usually learned early and despite their cross-linguistic incongruence, pose hardly any difficulty to EFL learners. Interestingly, the temporal sense is not included in the matrix of senses suggested by Evans (2010: 232–240).

The dominance of abstract senses is also obvious in the case of *on*: they account for 57% of all uses in Corpus 1, 57% in Corpus 2 and 61%

in Corpus 3. The largest group of *on* uses represents expressions of relations to abstract concepts (including time), emotions, activities, e.g. *to concentrate on your studies, teenagers are keen on helping other people, put so much effort on everyday household tasks* (sense 4). In most cases these abstract uses of *on* lack regular equivalent expressions in Lithuanian, so their high frequency can hardly be explained by transfer from the learners' native language. A closer examination of concordances showed that almost half of all instances of *on* in the abstract sense (242 out of 502, or 48% of all types in the three corpora) are combinations with a limited set of lexical words. They are the following: *based, concentrate, depend* (incl. *depending, dependent*), *effect, focus, impact, influence, rely* and *spend* (usually *money* or *time*). Out of these nine, four (*based, focus, influence* and *rely*) do not occur with *on* in Corpus 1 which represents the lowest proficiency level in our study, yet the remaining five account for half of all abstract prepositional uses in the corpus. Apparently, these combinations with *on* are acquired in chunks. It is also possible to speculate that L2 learners do not fully understand prepositional semantics especially when the relationship of the abstract sense of the preposition with the primary, concrete, sense is rather distant. As the corpus data shows, such understanding may not even be required as these abstract uses do not cause many problems to the learners.

Lastly, it may be important to focus on the topic impact again a little more. The analysis of prepositional phrases suggests that the impact is not significant. The topics of the essays included in our samples are different in each corpus; however, several closely related topics, for instance, topics related to student life and part-time jobs, studies abroad vs studies in one's home country, reoccur in all three corpora. As functional words, prepositions can only be linked to specific essay topics in cases where they are used in topic-related prepositional expressions. For the purposes of this study, we could not isolate in our samples such topic-related prepositional expressions because it would be difficult to set the boundary between topic-related and general vocabulary. To give an example, let us consider the expression *to read a book in a foreign language*. It occurs in essays on the topics of *Gender differences in language, Writing is an adventure, Studying abroad* to mention a few, but it could also appear in any other argumentative or literary text dealing with any other topic on leisure time activities, learning foreign

languages, literary reviews of fiction, etc. Therefore, our decision was to disregard essay topics as a factor in this study.

5. Conclusion

The aim of the study was to test which of the two extremely frequent English prepositions are more problematic to Lithuanian learners and try to identify possible reasons. An approach of motivated polysemy, well-known in Cognitive Linguistics, seems to be a valid tool in rendering the multiple senses of the prepositions. However, an attempt to apply a Principled Polysemy Model, one of motivated polysemy products, suggested by Tyler and Evans (2003) and Evans (2010) was only partially successful. Based on our data collected from the essays of Lithuanian learners, we proposed a revised model. In the process of analysis it turned out that both models demonstrate the same trends in cross-linguistic (non-) congruence with prototypical equivalents of the above prepositions in Lithuanian. *In* is much more congruent with the Lithuanian locative case, a prototypical means of expressing enclosure, whereas *on* is much less congruent with the preposition *ant*, a prototypical Lithuanian equivalent to express support.

Our corpus-based study of the two prepositions as they are used by Lithuanian EFL learners representing three different proficiency levels has demonstrated that it is cross-linguistic (non-)congruence that plays a major role in the usage patterns observed in our data. There is a consistent increase in the use of the preposition *in* as the proficiency level increases whereas the preposition *on* does not demonstrate such a tendency. Bearing in mind the fact that *in* is more likely to be translated by the locative case in Lithuanian, we conclude that it is easier to acquire for our learners which is why its use increases in range and in frequency as the learners' proficiency develops. A very different picture was found for the patterning of *on* whose frequencies do not change to the same extent. Moreover, the distribution of senses of *on* does not differ significantly in corpora representing different levels of proficiency.

It is important to draw attention to an implication of employing the factor of semantic congruence. In our opinion, it is paramount that the teaching of prepositions should rely on the principle of semantic congruence between L1 and L2 and that each L1-L2 language pair should be studied separately. A study into another language pair could

bring completely different results. Generalisations across more than two languages, though not entirely excluded, could be very risky or, at least, not very effective in teaching. Moreover, it also suggests that different teaching approaches might be required in different contexts—what is easy and clear to EFL learners of one mother tongue background might be very challenging to a different group of students.

It should be noted that this study has some limitations, which could be viewed as prospective areas of further investigation. Firstly, our research only involved learners of one mother tongue background, so it remains to see to what extent cross-linguistic (non-)congruence would account for the use of prepositions in English produced by EFL learners with other native languages. It would also be interesting to see whether the same results could be obtained by investigating the use of other prepositions. Finally, the present investigation was based on three corpora of randomly selected learner essays. The corpora were rather limited in size and in the topics of student essays. In the future, it would be interesting to verify our hypotheses on larger corpora, including essays written on a different set of topics.

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