Integrating cognitive linguistics insights into data-driven learning: teaching vertical prepositions

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Abstract

The present study investigates the impact of the integration of the Cognitive Linguistics (CL) pedagogy into Data-driven learning (DDL) on the learners' acquisition of two sets of English spatial prepositions of verticality, *over*/*under* and *above*/*below*. The study followed a quasi-experimental design with a control and an experimental group including a pre-test, two instructional treatments, and a post and a delayed post-test for each group. A total of 52 students participated in a two-week instruction on the vertical prepositions. The treatment group (N=26) received a DDL-based CL-inspired instruction, which employed cognitive explanations based on the Principled Polysemy model and concordance activities. The control group (N=26), on the other hand, received traditional instruction (i.e. dictionaries, either electronic or print, as being the only resource). The groups were later compared with respect to their performance on pre-test, post-test and delayed post-test. The statistical analyses revealed that the two teaching methods, the traditional and the DDL-based CL-inspired instruction, helped the students significantly improve their knowledge of the vertical prepositions, yet the latter led to greater learning gains and better retention of knowledge. The findings suggest that the combination of the two instructional pedagogies with the meaningful presentation of the senses of prepositions and the rich context provided for their uses can be quite effective to teach spatial prepositions.

Keywords: data-driven learning; cognitive linguistics; principled polysemy model; vertical prepositions; concordance

1. Introduction

Prepositions constitute the most frequently used linguistic category in English because they serve as links between two linguistic units, most typically forming prepositional phrases and assuming a broad range of semantic functions (Quirk,1985; Kennedy, 2003; Biber et al, 2012). Similarly, Kennedy (2003) notes that about 100 prepositions in the English language make up about 8 percent of all the words used in spoken English, and about 12 percent of the words in written genres. Another significant aspect of prepositions is considered to be "their status as identity markers of languages" (Sovran, 2008, p. 259) as they are "used in their own special and different way in each language"

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(Gethin and Gunnemark, 1996, p. 18). Similarly, Altenberg and Granger (2002) state that the functional importance of prepositions shows variation between languages due to their tendency to assume various uses specific to a language, which renders them interesting to study in a contrastive manner.

English prepositions have received considerable attention from a number of disciplines over the years. Particularly, since the early 1980's the semantics of prepositions has been a major area of interest and been systematically studied by such scholars as Brugman (1981), Brugman and Lakoff (1988), Taylor (1988), Dirven (1993), Tyler and Evans (2003) contributing to the rapidly growing area of research, cognitive semantics, within Cognitive Linguistics (CL). These cognitive semantic studies focused on the Trajectory/Landmark (Langacker 2008, p. 58) principle and the notion of prototype (Rosch, 1975) in order to explicate how a spatial preposition conceptualizes relations between entities in space and how its non-spatial (figurative) uses derive from its spatial domain through conceptual metaphors as radial categories clustering around a central or a prototypical member. For instance, extending Brugman's (1981) study on the polysemy of *over*, Lakoff's (1987) cognitive semantic analysis of *over* in terms of radial categories, shows that prepositions are, in fact, polysemous items the various senses of which extend from a central or prototypical sense, constituting polysemy networks in a related and motivated manner as against the traditional view on "the semantics of English prepositions as arbitrary" (Tyler, 2011). In this respect, Lakoff (1987) notes that the arrival of prototype theory brought "order into an area where before there was only chaos" (p. 387) and made it possible to understand the semantics of prepositions in English and in other languages which were once difficult to describe mainly due to their multiple senses. However, Lakoff's approach referred to as the full-specification approach has been criticized as it lacks a principle and provides a highly detailed account of the semantics of prepositions, leading to a redundant number of senses (Tyler & Evans, 2003). As opposed to the full specification approach, Tyler and Evans (2003, p. 59) proposed another approach termed the Principled Polysemy model (PP), which is grounded on principles such as (1) avoidance of polysemy fallacy when distinguishing between the separate senses of the proto-scene and those derived from context, (2) avoidance of intuition when determining the proto-scene and (3) the explicit articulation of the cognitive processes involved in the emergence of distinct senses.

The PP model has been applied to English prepositions and been found to be successful in laying out the semantic network of the prepositions investigated. The model demonstrated that various senses of a preposition are, in fact, systematically related rather than arbitrary (Tyler & Evans, 2003). Several studies (Mahpeykar, & Tyler, 2011; Balkan, 2016) also explored the model's potential in developing a semantic network of spatial particles and delineating the cross-linguistic variations and similarities regarding the conceptualization of spatial relations in languages other than English. Mahpeykar and Tyler's analysis revealed that the model could successfully be applied to the semantic description of the Farsi preposition *be*. Similarly, Balkan (2016), applying the PP model to the Turkish spatial noun *üst* in dative case marker, found that the polysemy networks of *üst* + dative and English *over* overlap in several ways as regards the primary and extended senses although both languages are typologically distinct and use different linguistic means to express spatial relations.

The implications from such studies have led to the exploration of pedagogical possibilities of the CL approach to word meaning. A number of studies (Tyler & Evans, 2004; Evans & Tyler, 2005; Tyler, 2010; Tyler, Mueller & Ho, 2011) investigated the possible advantage of CL-informed instruction over traditional approaches. The CL view that different senses of a preposition are systematically related and linked to a prototypical sense could help L2 learners acquire the different senses of the preposition. Also, learners could establish conceptual links between different uses of a given preposition rather than resort to rote learning.

However, recently, it has been suggested that the combining the techniques of Corpus Linguistics (CrL) with CL-methodology could prove a powerful pedagogical tool to teach learners the figurative senses of a polysemous word as well as the phraseological patterns associated with these senses (Boers &Lindstromberg, 2008). This, in fact, is the repetition of the previous call by Lindstromberg (1996) for the application of the prototype approach to the semantics of prepositions as a balance between the lexical phrase approach. The lexical phrase approach claims that many words including even the highly frequent prepositions are delexicalized and their meanings are context dependent. In contrast, the prototype approach maintains that many words including the commonly used prepositions tend to have at least a few related senses that combine with the meanings of other words, contributing to an overall meaning. This argument clearly points to the use of corpora in the form of data-driven learning (DDL) (Johns, 1991, 1994). And DDL, focusing on collocations of the words by means of concordance learning activities, has already been successfully applied to the teaching and learning of grammar and vocabulary.

Yet, as regards the teaching of prepositions, the sole use of the collocationist approach is criticized by (Lindstromberg, 1996) as it lacks "any unifying insight about relations among different uses of a particular word" and, therefore, "lead[s] to uneconomical use of learners' time both in and out of the classroom" (p. 235). Hence, it seems reasonable to assume that a cognitively-based DDL, applying the insights from both DDL and CL as two complementary approaches, would allow for a more effective and motivated teaching and learning of spatial prepositions. It could also be reasonable to assume that such an approach would provide a longer and lasting retention for the meanings of spatial prepositions than would the traditional approaches.

In this respect, the purpose of the present paper is to present the findings of an experimental study, which was specifically inspired by the possible pedagogical implications of the Principled Polysemy (PP) model proposed in Tyler and Evans (2003) and Evans and Tyler (2004), and the suggestion that the integration of corpora in CL-inspired teaching in the form of DDL would provide a more contextualized learning. In particular, the study aimed to combine the DDL and the CL approach and investigate the effect of this approach (henceforth the DDL-based CL-inspired instruction) on the learning of the two sets of English spatial prepositions of verticality, *over/above* and *under/below,* employing a pre-, post- and delayed post-test design with a control group, who received a traditional instruction. Although these pairs of prepositions make up contrasts sets as *over/under* and *above/below* and each pair is traditionally referred to as opposites or antonyms (Tyler & Evans, 2003), this study will adopt the aforementioned pairs for the ease of cross-linguistic comparisons.

1.1. Literature Review

1.1.1. Prepositions from learners' perspective

Critically important though, prepositions are recognized as one of the major problems that second language (L2) learners of various first language (L1) backgrounds face by common consent. Celce-Murcia and Larsen-Freeman (1999) point out that teachers consider prepositions the second most difficult aspect of the English language. In the same vein, Lindstromberg (2001, p. 80) note that "less than 10% of upper-level EFL students can use and understand prepositions correctly", which is also agreed on by researchers who compare them to nightmares (Littlemore, 2006) or bête noire (Gilquin & Granger, 2011, p. 60) often met but hated by both teachers and learners, manifest as either errors such as the wrong use, the omission, overuse of prepositions (Kennedy, 2003, p. 257) or avoidance of periphery category, but overuse of core meanings, i.e. prototypical senses (Littlemore, 2006).

Yet, what is it, then, that makes prepositions so challenging for L2 learners although they appear highly frequently in both written and spoken English language? The problem is multi-faceted and

naturally, the answer may be sought in not only the linguistic nature of these items and the cross-linguistic variability but also the pedagogical approaches adopted in EFL/ESL classes or texts/grammar books. For instance, from the linguistic perspective, several reasons are cited why almost all learners experience difficulties in learning prepositions.

Morphologically, English prepositions are mostly either of one syllable or a few syllables, which renders them difficult to recognize in rapid, continuous speech (Lam, 2009). Syntactically, they are viewed to display idiosyncratic behavior as they do not "follow any predictable pattern even across nearly identical contexts" (Felice & Pulman, 2008, p. 169). Therefore, it is often hard for learners of English to know which preposition to use with particular nouns or verbs. And sometimes different word classes of the same root word require different prepositions (Kennedy, 2003, p. 257). Finally, being characteristically multifunctional, prepositions function as a preposition, a noun, an adverb, an adjective or a particle (Leung, 1991).

Semantically, prepositions are polysemous, and thus used in diverse senses either literally or figuratively in different contexts. Kennedy, (2003, p. 246) notes that the most frequent prepositions, *of* and *in*, have over 40 senses each in comprehensive dictionaries. For instance, Tobin (2008) demonstrate this polysemous and multi-functional nature of English prepositions by exemplifying the uses of *in*:

> Small words" (such as the "preposition" in) may often begin as "locatives" (in the room), are extended metaphorically from concrete spatial messages to the more abstract realm of "temporal messages" (in the morning), to the even more abstract realm of "existential" messages (in trouble), (in pieces), to the point at which they may even be "nominalized" (to be 'in') or made into adjectives (the 'ingroup'). (p. 276)

Another semantic difficulty that prepositions pose is that the same meaning may be expressed through the use of two or more prepositions such as a *love of books* vs. *a love for books* and *rush for the exits* vs. *rush to the exits* (Liu, 2013), or more than one preposition can be possible in certain contexts, for instance, depending on the spatial proximity intended such as *a house (by/near) the lake* (Celce-Murcia & Larsen-Freeman, 1999, p. 414), which can cause lexical confusion within L2 (Hermet & Désilets, 2009).

Cross-linguistically, many English prepositions lack one-to-one word order correspondence in languages or are expressed via either case inflections on nouns or articles or postpositions. Hence, learners' use of prepositions are likely to be influenced by cross-linguistic variation, often leading to negative syntactic transfer and wrong assumptions as to the semantic one-to-one mapping between the first and the second language (Celce-Murcia, 1998; Littlemore, 2009; Hermet & Désilets, 2009; Lam, 2009; Liu, 2013). The following section briefly discusses cross-linguistic differences concerning spatial relations of verticality by comparing the spatial particles used in English and Turkish

1.1.2. Spatial relations of verticality in English and Turkish

Languages vary considerably in the way they encode spatial relations, using such different linguistic means as "prepositions, postpositions, verbs, cases, body-part metaphors, or morphemes" (Dodge & Lakoff, 2005, p. 61). In English, spatial relations are primarily expressed with prepositions, which typically describe "a conceptualized spatial relationship between a focus element (F) and a locating or ground element (G)" (Tyler et al, 2011, p. 184). This relation, also called the trajectory (TR) and the landmark (LM) relationship by Langacker (2008), constitutes abstract spatial scenes which "presuppose 'the normal horizontal/vertical dimensional grid …calculated in relation to the surface of the earth" (Tyler & Evans, 2003, p. 109). In this respect, spatial prepositions express our 'vertical and lateral movement in space' or borrow this imagery to structure abstract relations. (Holme,

2009, p. 179). Tyler and Evans (2003) note that the vertical axis crucially involves the most highly developed subsets of spatial prepositions in English, which comprise *over*, *under*, *above* and *below* (p. 109).

In contrast, Turkish has no prepositions, but a variety of postpositions, which can be categorized into two main groups as true/genuine postpositions and fake postpositions (Kornfilt, 1997), also called bare postpositions, and possessive-marked postpositions, (Göksel & Kerslake, 2005). While the former of each pair occurs in their bare form, the latter are derived from nouns marked by a possessive suffix and a case marker (dative, locative or ablative), the latter of which is assigned by the verb. Of these two types of postpositions, the fake postpositions derived from certain nouns express spatial relations similar to those of the English vertical prepositions *over*, *under*, *above* and *below*.

For example, the prepositions *over* and *above* correspond to locative postpositions derived from nouns *üzer-* or *üst-* in the sense of *top* or *top surface* in Turkish. Although Kornfilt (1997, p. 247) draws a semantic distinction between *üzer-* and *üst-* as superior (above) and superior-contact (top, top surface) respectively, she notes that these items can be used interchangeably. Below is the morphological process of adding a possessive suffix and a case marker to *üzer-* and *üst-* along with their semantic functions.

Superior

At rest	Motion to	Motion from	Motion past
Üzer –in -de	Üzer -in -e	Üzer -in -den	Üzer -in -den
Above-3.sg. -Loc.	Above-3.sg. -Dat.	Above-3.sg. -Abl.	Above-3.sg. -Abl.
'above/over'	'above'	'from above	'from above

Superior contact

At rest	Motion to	Motion from	Motion past
Üst -ün -de	üst -ün -e	üst -tün -den	üst-ün -den
top-3.sg. -Loc	top-3.sg. -Dat.	above -3.sg. -Abl.	above -3.sg. -Abl.
'on'	'on(to)'	'off'	'over'

By way of illustration, the following are the uses of the postpositions in context.

Superior

(1) Lamba   masa -nın   üzer -in -de

lamp   table -Gen.   above -3.sg. -Loc.

"The lamp is above the table"

(2) Uçak   ada –nın   üzer -in –den   geç –erek   yol -un –a   devam et -ti

plane   island -Gen. above -3.sg. -Abl. pass -MAdv.   way -3.sg. -Dat. continue -Past

"The plane continued on its way, passing above the island"

Superior contact

(3)   Sürahi   masa -nın   üst-ün -de

       pitcher   table -Gen.   top -3.sg.-Loc

       "The pitcher is on the table"

(4)   Sürahi   masa -nın   üst -ün -den   yer -e   düş -tü

       pitcher   table -Gen.   top -3.sg. -Abl.   floor -Dat.   fall -Past

       "The pitcher fell from the top of the table onto the floor"

<div align="right">(Kornfilt, 1997, pp. 246-247)</div>

On the other hand, *under* and *below* are expressed with only one postposition derived from the noun, *alt-* in the sense of *underside*, while *over* and *above* are expressed with two interchangeable postpositions derived from the nouns *üst-* and *üzer-*. Similar to the morphological process that *üst-* and *üzer-* undergo, *alt-* also attaches a possessive suffix and a case marker depending on the context it is used in. The following are the morphological derivations of *alt-* with their semantic functions.

Inferior

At rest	Motion to	Motion from	Motion past
alt-ın-da	alt -ın -a	alt-ın -dan	alt-ın –dan (geç -rek)
under-3.sg. -Loc.	under-3.sg. -Dat.	under-3.sg. -Abl.	under-3.sg. -Abl.
			(pass-MAdv.)
'below / under'	'below / under'	'from under'	under'

(5)   halı   masa -nın   alt -ın -da

       carpet   table -Gen.   under -3.sg. -Loc.

       "The carpet is under the table"

(6)   halı -yı   masa -nın   alt -ın-a   koy -du -um

       carpet -Acc.   table -Gen.   underside -3.sg. -Dat.   put -Past -l.sg.

       "I put the carpet under the table"

<div align="right">(Kornfilt, 1997, pp. 246-247)</div>

Kornfilt (1997, p. 248) notes that the above constructions can also be used to express inferior contact with verbs like değ- 'touch' as there is no expression specifically denoting inferior contact. One example illustrating this use is given below:

(7)   gemi köprü -nün   alt -ın -a   değ -di

       ship bridge -Gen.   under -3.sg. -Dat.   touch -Past

       "The ship touched the underside of the bridge"

As seen from the examples, the Turkish postpositions *üzer-/üst-* and *-alt* coding for spatial relations do not exhibit one-to-one correspondence with their English counterparts *over/above* and *under/below*. The postpositions based on *üst-/üzer-*, which variously translate into English as *over*, *above*, *on*, *off*, *from the top*, referring to both horizontal and vertical axis do not seem to distinguish between *over* and

above. In the same manner, the postposition with *alt-* maps onto the meanings of both *under* and *below*. Jarvis and Pavlenko (2008) point out that such differences may lead to both semantic and conceptual transfer which manifests itself as either L2 learners' reliance on linguistic categories in their own language to conceptualize in the target language or their "failure to pay attention to spatial distinctions obligatorily marked in the recipient language, prompted by the lack of such distinctions in the source language" (p. 145).

1.1.3. Approaches to the teaching of prepositions

1.1.3.1. The traditional approach

Traditional approaches, Kennedy (2003) notes, generally lay emphasis upon the core meanings of prepositions to the exclusion of their abstract and figurative meanings. This lack of descriptive adequacy (Tyler & Evans, 2003) of the traditional teaching methods or materials renders the prepositions one of the most difficult aspects of English language for EFL/ESL teachers to teach and L2 learners to master. For example, Tyler and Evans (2003) point out that one such method employs the partial homonymy modal, which mainly lists various meanings of a preposition by providing a sketchy relationship between the spatial meaning and the non-spatial extensions. Another similar approach is what Lam (2009) calls the non-explanatory method, which treats the multiple uses of prepositions as unrelated items and thus requires students to learn a list of uses for each preposition. Another common traditional approach is called rule-plus-exceptions, which requires students to learn rules along with the exceptions as there does not exist a simple one-to-one mapping between the prepositions in L1 and L2 (Song et al, 2015, p.115). Thus, a common learning strategy resorted to becomes rote memorization as L2 learners not only fail to derive generalization (Leung, 1991) and to establish conceptual links between different uses but also have to learn both exceptions and rules (Lam, 2009; Song, 2015).

1.1.3.2. The cognitive linguistic approach

The Cognitive Linguistics (CL), which advocates the central role of meaning and function in the description of language, has provided pedagogical insights to foreign language teaching (FLT). The CL-inspired studies were particularly driven by three related motives. One is the testing of the pedagogical applicability of the view that the senses of polysemous words form interrelated family resemblance categories clustering around a prototype and therefore can be studied through "general cognitive principles, rather than purely formal linguistic principles". (Cuyckens & Zawada, 2001, p. x). According to this view, L2 learners could be helped to "find that there is still order in the things of the world, be they only the polysemous English prepositions" by exposing them to how motivation determines the semantic relations of a word (Leung, 1991, p. 96) and by developing their "sensitivity to the fact that L2 words and morphemes operate within flexible and radial categories" (Littlemore, 2009, p. 50). Another is the research findings that non-native speakers prefer to use more literal meanings rather than the metaphorical senses of words, which, Danesi (1993) argues, leads to the lack of conceptual fluency in their discourse. According to Danesi advanced language proficiency is the level where "the learner's verbal fluency coincides with the conceptual fluency demonstrated by a native speaker of the language" (p. 419). In line with this argument, metaphor is considered significant to understand the world as it broadens one's perspective leading to "the use of interpretative processes that belong to the greater domain of human cognition which is cross-disciplinary and more general" (Leung, 1991, p. 96). And the other is that the application of CL insights to the teaching of prepositions may help learners to appreciate the cross-linguistic varieties that might be susceptible to

L1 interference, providing meaningful teaching and learning situations that traditional approaches fail to (Boers & Demecheleer, 1998: Lam, 2009; Tyler & Evans, 2011; Song, 2015).

1.1.3.3. The corpus linguistic approach

The use of corpora in the form of data-driven learning (DDL) (Johns, 1991, 1994) through concordance learning activities focusing on collocations of the words has already been applied to the teaching and learning of grammar and vocabulary as it is thought that "corpora nicely complement existing reference works and ... may provide information that a dictionary or grammar book may not provide" (Römer, 2011, p. 214). And numerous studies attest to the benefit and the effectiveness of DDL in teaching L2 learners the lexico-grammatical patterns. For instance, a study conducted by Huang (2014) found that concordance activities fostered usage-based learning, helping students in the experimental group to notice the lexical collocations and prepositional colligations of the target words, which rendered their productive language more accurate and complex.

However, as regards the teaching of prepositions, the sole use of the collocationist approach is criticized as it lacks "any unifying insight about relations among different uses of a particular word" and, therefore, "lead[s] to uneconomical use of learners' time both in and out of the classroom" (Lindstromberg 1996, p. 235). Hence, a cognitively-based DDL, applying the insights from both DDL and CL as two complementary approaches to the teaching of spatial prepositions, would allow for a more effective and motivating teaching and learning and, accordingly, a longer and lasting retention of the meanings of these linguistic items than would the traditional approach.

In this respect, the merits of the corpus-based approach if combined with CL-inspired instruction have recently been discussed. For instance, Geeraerts (2006) stresses the essential nature of CL as "a usage-based linguistics", which emphasizes the study of "actual usage – as it appears in corpora in the form of spontaneous, non-elicited language data" (p. 29). Similarly, MacArthur and Littlemore (2008) advocate the view that the use of corpus within CL-inspired instruction can be a powerful pedagogical tool to provide "learners with the kind of information gained by native speakers over a long period of time in their daily contact with the language" (p. 160), by which they can understand how figurative meanings extend from the core sense of a polysemous word and learn the phraseological patterns associated with these senses. In line with this argumentation, Divjak and Th. Gries (2009, pp. 274–276) see cognitive semantics as "a suitable domain" for Corpus Linguistic (CrL) studies in contrast to many researchers, in a way agreeing with Leech (1992, p. 105), who notes "corpus linguistics combines easily with other branches of linguistics".

Thus, it seems reasonable to argue that it is "gross injustice … to language as a living, [and] functioning entity" (House, 2008, p. 145) to focus the CL-inspired instruction on only a list of decontextualized, artificially created sentences to support the cognitive semantic definitions and the schematic diagrams. In this regard, it can be argued that using corpora and concordancing "to get students to explore regularities of patterning in the target language" defined by Johns and King as Data-Driven Learning (DDL) (as cited in Mukherjee, 2006, p. 11) and "setting up situations in which students can answer questions about language themselves by studying corpus data in the form of concordance lines or sentences" (Hunston, 2002, p. 170) has far greater potential for contextualized instruction and enhanced learning experience as it is difficult to define the meanings of prepositions without considering the context in which they occur (Altenberg & Granger, 2002). Stressing the significance of context, Mueller (2011) notes that collocational knowledge plays a significant role in selecting appropriate prepositions for specific contexts in the cases where learners can't acquire the semantic motivations underlying various senses of prepositions. One such study that combined CL-inspired instruction with corpus-based approach was conducted by MacArthur and Littlemore (2008)

to investigate to what extent the use of corpus data would help learners to work out the meanings of the peripheral senses of denominal verbs in English and Spanish. The results indicated that students were able to work out not only the basic senses but also the different senses of these verbs from the corpus examples. However, MacArthur and Littlemore (2008) stress the need for follow-up studies as no firm conclusions could be drawn from the DDL approach described in their study.

However, except for various DDL classroom applications on the teaching of the lexical or lexico-grammatical collocations, the teaching of prepositions through DDL has not received much attention. The reason may be that corpus data does not lend itself well to the learning and teaching semantics of prepositions as "corpus linguistics provides descriptive adequacy, whilst cognitive linguistics allows for explanatory efficacy" (Gilquin, 2017, p. 67). This weakness of corpus analysis to explain adequately the senses of spatial prepositions in a systematic and motivated way is explicated by Tyler and Evans (2003) who argue that our mental representations of concepts are of a more schematic nature and do not contain rich details that can be found in the individual spatial scenes. On the contrary, the primary sense of spatial prepositions, termed as the proto-scene, represents idealized spatio-functional configuration through abstraction away from specific spatial scenes at the conceptual level. In this regard, rather than directly connected with prepositions, concepts are spatially configured according to the two related elements: schematic background element, a landmark (LM) and the schematic focal element, trajector (TR). Thus, pictures or bees or trees are mentally represented as a schematic trajector, allowing any entity construed as focal to occupy this position. On this line of reasoning, while DDL could be effectively employed to learn, say, which preposition (in or at) with what frequency, and in what contexts *arrive* is followed by, it would be quite difficult to acquire various senses of a spatial preposition focusing solely on the collocates.

What follows from this argument is that DDL by itself may not be sufficient as a pedagogical approach to effectively teach the senses of spatial prepositions despite the rich context in which learners are exposed to various uses and can thus learn through discovery. However, even if whether or not corpus analysis allows for the explanatory adequacy remains arguable, as Meyer (2002) notes, corpora can still serve as indispensable "resources for testing out linguistic hypotheses based on more functionally based theories of grammar, i.e. theories of language more interested in exploring language as a tool of communication" (p. 2). Emphasizing the possible role of corpus data to make cognitive grammar more refined and more usage-based, Mukherjee (2004) states that "the 'schematic networks', 'low-level schemas' and 'linguistic conventions' correspond largely to the lexico-grammatical patterns and routines that can be identified by drawing on corpus data" (p. 87). Thus, it would mean underestimating the potential of DDL if one denied the possible contribution that exposure to frequently recurring sequences in similar contexts could do to the acquisition of some preposition senses.

1.1.3.4. Pedagogical applications of the CL methodology

However, to date, only a few studies (Boers & Demecheleer, 1998; Tyler, 2011; Bratož, 2014) assessed the implications of the cognitive semantic approach within CL to "offer 'enriched' input to the language acquisition device" (Jonhnson, 1982, p. 12) for the teaching of English prepositions. One early study by Boers and Demecheleer (1998), the finding of which was later corroborated in a follow-up study reported in Boers and Lindstromberg (2008), investigated whether students would be better able to understand the metaphorical senses of *beyond* if they were presented with the cognitive semantic definition of the word's core spatial senses. They tested their hypothesis on seventy-three students of different proficiency levels using a reading comprehension task based on the translation and rephrase of sentences that contained figurative uses of *beyond* in a text. They found out that the experimental group who only received the cognitive semantic definition of the core spatial sense of the

word outperformed those in the control group who were given traditional definitions in interpreting the figurative uses of *beyond*. The test was repeated to compare the performance of the experimental group who were only provided with a cognitive semantic definition of the spatial sense with the control group who had an access to the complete list of senses of *beyond* from the Cobuild English Dictionary. And the experimental group was found to able to interpret the metaphorical senses of this preposition as efficiently as those in the control group.

In a related study, Tyler (2011) investigated the efficacy of CL-inspired instruction on the prepositions *to*, *for*, and *at* on 14 advanced Italian learners of English. Tyler reports that the CL-inspired approach proved useful in teaching the semantics of English prepositions as the participants made significant gains between the pre-test and the immediate post-test. In another study, Bratož (2014) investigated the response of the first-year university students to the CL-inspired instruction on the use of the locative prepositions *in*, *on* and *at* in English.   The small-scale study consisted of two groups (the first group consisted of 45 students, the second of 42), which received a CL-inspired instruction and a standard instruction, respectively. The group which was given the CL-inspired instruction was generally more successful in selecting the correct preposition compared to the group which received the standard instruction. A discussion conducted with a focus group of nine students after the treatment revealed that the majority of the students found the CL-inspired instruction more useful and interesting than the standard model although the latter was clearer and easier to understand.

The above studies attest that cognitive semantic approach offers insightful teaching and learning situations that traditional approaches fail to, helping learners to appreciate the cross-linguistic varieties that might be susceptible to L1 interference. However, although invaluable in providing useful insights regarding the application of the CL-inspired approach in teaching L2 learners the semantics of English prepositions meaningfully rather than leading them to rote-learning, these studies suffer from several limitations such as either small sample sizes, lack of rigorous research design and a paucity of statistically standardized measures, which makes it impossible to   generalize and replicate their findings in other learning and teaching contexts.

For instance, Boers (2013) in his review of Boers and Demecheleer (1998) points to the insufficient detail in relation to the quantitative data in the study. He notes that the study does not mention the type of statistical analysis employed despite the p-values given, which gives readers no choice but assume that the statistical procedure chosen for the study is appropriate. He also underlines the significance of providing the mean test scores of the groups compared as well as the standard deviations. Tyler's (2011) study also suffers from several limitations. The researcher notes that the findings could not be generalized without further research for some reasons. For instance, their sample size was not large enough to be definitive. Also, the study didn't include a control group and a delayed post-test to effectively assess the impact of the treatment because the participants who were also involved in similar tasks, but not based on a CL approach, might have made similar progress. Another issue is basing the instructional treatments on learners whose L1 is related to English. This, the researchers think, led to the participants' performing better on the preposition *for* since many of the meaning extensions of Italian cognate of the English preposition are the same. In this respect, Tyler calls for the necessity of a more robust experimental design and add that it is essential that more empirical studies be conducted to determine whether CL-inspired instruction proves effective for L2 learning. Similarly, since Bratož's study (2014) does not employ a pre-, post, and delayed-post-test design with an appropriate statistical procedure, it is not possible to know according to what criteria the performance of the experimental group who received the CL-inspired instruction was found to be better than that of those given the standard instruction.

In addition to the aforementioned limitations, another limitation that the present study is specifically designed to address is that the previous studies did not expose learners to a corpus of

authentic language, whereby they could discover the various uses of a given preposition in context and try to map them onto the prototypical and peripheral meanings. Thus, learners neither had the opportunity to work out and learn the prototypical and extended meanings through comparison of the examples in context, nor were they able to familiarize themselves with the recurrent usages and phraseological patterns of the prepositions under scrutiny. Accordingly, Mukherjee (2004) notes that the present cognitive grammar approaches are not based on actual frequencies of linguistic items and the procedures that learners can easily utilize to select a specific item in a certain context from among several choices. From the literature reviewed so far, it appears that the possible impact of the combination of CL-oriented pedagogy and the DDL approach on the learning of spatial prepositions has not yet been thoroughly examined although several studies demonstrated the effectiveness of CL-inspired instruction as compared to the traditional approaches. The existing evidence suggests that there is a need for empirical research on the role of DDL in CL-oriented instruction to the teaching of spatial prepositions.

2. Method

The study followed a quasi-experimental design with a control and an experimental group including a pre-test, two instructional treatments, and a post and a delayed post-test for each group. The study focused on the instruction of the two sets of English spatial prepositions of verticality, *over/above* and *under/below*, employing two different types of instructions. The control group received a traditional instruction (henceforth, TR), using dictionaries, either electronic or print. And the experimental group received a CL-oriented instruction of the related prepositions (henceforth CPDL), utilizing an online corpus and the Principle Polysemy (PP) model as learning resources. The rationale for the selection of the sets of vertical prepositions, *over/above* and *under/below* for the study was based on the following considerations:

- Experiments indicate that vertical prepositions are used more frequently than horizontal prepositions (Hayward & Tarr, 1995)
- CL-inspired studies have already shown that the multiple senses of these prepositions are non-arbitrary and systematically related in principled ways and thus well-suited to the application of CL to instructed L2 learning. And the vertical prepositions provide good evidence that prepositional meanings extend from the spatial to abstract domains in regular and constrained ways. (Evans & Tyler, 2005; Tyler, 2011).
- The third reason is related to the cross-linguistic variability. These spatial prepositions lack a one-to-one mapping to their Turkish counterparts. For instance, the *over* and *above* correspond to two interchangeable and synonymous postpositions, deriving from the nouns *üst-* and *üzer-* meaning *top* or *top surface*. As for the second set of prepositions *under* and *below*, the case is even worse, as both *under* and *below* are expressed with just one postposition deriving from the noun *alt-* in the sense of *underside*. (Kornfilt, 1997, p. 247) Therefore, due to these cross-linguistic differences in spatial language, Turkish L2 learners might experience problems with the appropriate use of these prepositions.

The rationale for the integration of the PP model into CL-inspired instruction is that the PP model:

- presents the various, extended senses related to the prepositions selected for instruction in a clear and motivated manner drawing on comparatively a few principles.
- reduces the idiosyncratic uses of these prepositions to the minimum.
- explains the meaning of English prepositions in a more systematic way than the traditional approaches.
- substantially reduces the amount of arbitrariness and therefore reduce L2 learners' need for

rote learning.

- shows that the extended senses of the prepositions, in fact, are experientially motivated and in harmony with the learners' own experiences, which may render the acquisition of these senses easier.
- represents the various senses of the prepositions as conceptualizations of situations or scenes which are arranged in a gestalt-like manner and systematically connected, rather than a list of unrelated definitions as in dictionaries.
- graphically presents the polysemy networks that can be used as visual rubrics by language teachers and L2 learners.
- forms a basis that can help L2 learners to infer from context the meanings of unfamiliar uses of prepositions.

<div align="center">(Tyler & Evans, 2004, p. 273; Evans & Tyler, 2005, p. 15)</div>

The study sought to find answers to the following research questions.

1. Will the learners in both groups have any difficulty with the use of the vertical prepositions *over*, *above*, *under* and *below*, based on their pre-test scores? If they do, which one (s) will pose difficulty for them?
2. Will the two instructional methods differentially affect learner achievement in learning the target prepositions?
3. Which of the two instructional methods will lead to better retention of the target prepositions?

2.1. Participants

The data collection took place at a vocabulary class at the ELT department of a faculty of education at a university in Turkey. The pre-existing classes were used for the study. The two groups were instructed by the researcher. A total of 52 students took part in the study, 26 participants (20 females and 6 males) for the control group and 26 participants (22 females and 4 males) for the experimental group. All the participants were second-year students majoring in English. Their age ranged from 20 to 22 years old, with a mean age of 21. Regarding the participants' knowledge of English, they all had studied English as a compulsory subject for about 7 years since the sixth-grade at secondary school. In addition, they had to pass the university entrance examination based on English grammar, reading, vocabulary, and translation to major in English at a university. Also, after they were admitted to university, they were required to take a proficiency exam based on four skills at the university's Foreign Languages Centre, according to the results of which they either pursued their studies at their department or had to study a year of freshman English and then had to take a proficiency test in order to continue their studies at the ELT department. Hence, the participants were assumed to possess a similar level of proficiency in English.

2.2. Instruments

To assess the effect of instruction, one fill-in-the-blank format with only one blank per item tests were designed to be used as a pre-, post- and delayed post-test (see Appendix A). The test items were based on the example sentences provided by Tyler and Evans (2003) to illustrate the distinct senses of the prepositions concerned in the polysemy networks. For each administration of the test, the test items were shuffled, slightly modified to minimize the practice effect (Richards and Schmidt, 2010), and randomly presented. Care was also taken to minimize the extraneous cognitive load by either excluding or simplifying some irrelevant features of the test items (Haladyna & Rogriguez, 2004). As

for the structure of the test, the test consisted of two sections, A and B. Section A included 15 questions on *over* and 5 on *above*, while section B, 5 for *under* and 5 for *below*, with a total of 30 questions. For the purpose of a pre- and post-test, the test was divided into two subtests. The first subtest served as a pre-test for the first week's instruction on *over* and *above*, comprising a total of 20 items, 15 items for *over* and 5 for *above*. And the second subset served as a pre-test for the second week's instruction on *under* and *below* with a total of 10 questions, 5 questions for *under* and 5 for *below*. When these tests were administered again as a post-test, the questions were slightly modified for the reasons explained above. However, after the two instructions had been completed, the two sub-tests for each group were combined as a pre-test and a post-test containing 30 questions for the purpose of the statistical analysis. As the purpose of the study was to measure the effect of instruction on the students' overall performance in the use of vertical prepositions rather than on their performance on the individual sections of the tests, the statistical analyses were run on the students' total score on the combined versions. Finally, the delayed post-test, which was again slightly modified, was administered as the delayed post-test two weeks after the completion of the instructions to measure to what extent the learning gains were maintained. For each correct answer, one point was awarded to add to a total score of 30 points for the pre-, post- and delayed post-test. Only the correct answers were counted when the total score was calculated for each student.

2.3. The corpus

BNCweb (CQP-Edition) was used for the CPDL instruction and the construction of related exercises. BNCweb is a web-based client program used for searching and retrieving lexical, grammatical and textual data from the British National Corpus (BNC), which contains a 100-million-word rich variety of annotated texts. The students used the web-based interface to query the BNC regarding the uses of the prepositions studied and its concordance to access to the query results in context. BNCweb can be accessed at http://bncweb.lancs.ac.uk/bncwebSignup/user/login.php.

2.4. Procedure

The instructional intervention was conducted in the English vocabulary class over a two-week period by the researcher as the classroom instructor. The CPDL instruction took place in a technology-enhanced seminar hall which was equipped with a projector, a projection screen, wireless connectivity and high-speed internet, while the TR instruction was carried out in the regular classroom setting. Each of the two classes met once a week for three-hour sessions dedicated to instruction on vertical prepositions over a two-week period. The control and the experimental group used the same teaching materials (i.e. fill-in-the-blank exercises) derived from the concordance outputs (see Appendix B). However, the tasks differed in that the control group was guided to learn the meanings and uses of the prepositions from the definitions and the contexts provided by example sentences in their dictionaries (either electronic or print), while the experimental group was guided by the CPDL instruction, provided the students with non-technical cognitive explanations using the PP semantic networks representing the distinct senses of each preposition as radiating from a central, proto-scene in a related manner. Also, unlike the control group, the experimental group utilized corpus-informed descriptions of vertical prepositions. The corpus consultation included both direct exposure to corpus in the form of hands-on activities and indirect exposure in the form of printed materials (Boulton, 2010). Prior to the instructional treatments, each group was delivered the pre-test. Immediately after the treatment, the groups completed the post-test. Two weeks after the instructional period ended, the groups were administered the delayed post-tests. The following section elaborates on the procedure of the CPDL intervention employed with the experimental group.

2.4.1. Training session on DDL

A week before the instruction started, a three-hour training on DDL was designed to familiarize the students in the experiment group with corpus query techniques. Therefore, they were told to come to class with their own laptops as they were going to be introduced to a new source of learning material to enhance their knowledge of vocabulary and grammar. They were not informed that they would specifically study vertical prepositions as this could lead to an intentional learning of the target prepositions (Sonbul & Schmitt 2010). During the training session, after the students were told what a corpus was and how it was related to learning language, they were asked to register and open an account at http://bncweb.lancs.ac.uk/bncwebSignup/user/login.php to be able to use BNCweb.

After the registration, the training session focused on how to use the BNCweb client, run a concordance-based query and analyze concordance data. During the training, the students were encouraged to do hands-on activities on the uses of some common English words such as *do* and *make* (due to the same reason stated above they didn't know that they were going to study the uses of vertical prepositions the following week). The objective was to guide them to ask appropriate questions and to read and interpret the concordance material correctly so that they could obtain meaningful answers for the linguistic item(s) that they investigated. Throughout the session, the instructor acted as a facilitator, accompanying the students with his own laptop connected to the projector. So, the students and the instructor followed the same steps in a synchronized way with the activity projected onto the projector screen to make sure they didn't lose the tread and knew how to proceed until they developed their DDL skills. After the training session ended, the students were told to bring their lap-tops for the following week' session as well because they were going to carry out tasks similar to those that they had done.

2.4.2. Experimental instruction

The following week, the two-week experimental instruction began. It was performed during regularly scheduled class hours. Each week's session consisted of a period of three-hour lessons. The first week was devoted to the instruction of the vertical prepositions *above/over* and the following week to *under/below*.

2.4.2.1. Pre-activity: cognitive linguistic/metalinguistic explanation

Before the first week's instruction started, the students were told that they were going to do activities related to the vertical prepositions *over* and *above*. They were given a brief explanation about the objectives of these activities. Then, they were asked how they learn the meanings of prepositions. Almost all of them, naturally, said that they looked up the meanings of prepositions in the dictionary and then checked the example sentences (some students said this) and if necessary they wrote the meaning and the use of the preposition concerned in their vocabulary notebooks. Later, they were told that they were going to learn a new method, a cognitive approach, and apply it to the learning of the meanings of *over* and *above*, two easily confused prepositions not only as they have many different senses, but also they don't correspond one-to-one with their Turkish equivalents which are two locative postpositions derived from two interchangeably used nouns *üst-* and *üzer-* meaning *top* or *top surface*.

It was explained that the approach to be used was more specifically the Principled Polysemy Modal (Evans and Tyler, 2003; 2004; 2005), which simply proposes that the senses regarding *over* and *above* are not unrelated, or arbitrary, but in fact motivated and extend from one prototypical sense (paraphrased as the *main* or *central sense* for students). On the other hand, it was added, the

traditional approach generally employed was to look up the meanings of the prepositions in the dictionary, write them down in a list, and learn them by rote.

Then, a starting activity was planned for the following reasons. First, the activity aimed to activate the students' pre-existing knowledge of *over/above*. This was going to prepare the students for what type of learning task they were going to be involved in through schema activation in accordance with the view that "all new knowledge gains its form and meaning through its connection with pre-existing knowledge" (Shulman as cited in Sale, 2015, p. 36). Second, it was intended to orient the students to the PP model and the DDL hands-on activities (in addition to the training that had been given a week before) by providing them with "linguistic and metalinguistic knowledge, which can enable [them] to categorize occurrences, identify regularities and generalize from them" (Gavioli, 2005, p. 84)

Therefore, the students were paired up and handed out the first activity sheet (see Appendix B). They were asked to write as many sentences as they could think of using *over* and *above* for two minutes. They were told to analyze the words/phrases to the left and right of *over* and *above* and find out how many different senses of *over* and *above* they used in their sentences. Then, they were told to compare their sentences with their peer's and ask him/her how many different meanings *over* and *above* he/she had in his/her sentences. After that, they were asked to discuss with their peers which words/phrases (collocates) on the left and right of *over* and *above* helped them determine the meanings of those prepositions. Then, they worked with their peer and wrote down those meanings of *over* and *above* with their collocates as instructed in the activity sheet. Finally, all the meanings of *over* and *above* along with their collocates were pooled and projected onto the projector screen for the students to compare those meanings with the ones in the polysemy networks for *over* and *above* in their handouts. This activity replicated the real concordance activity and gave the learners a chance to explore their own output in a fashion as they would when working with corpus.

2.4.2.2. The CPDL instruction on "over" and "above"

Sinclair (2003, pp. xvi–xvii) proposes a series of steps about how to interrogate corpus, retrieve evidence and interpret the results of the query and report the findings. Of the seven-step procedure, i.e., *initiate*, *interpret*, *consolidate*, *report*, *recycle*, *result*, and *repeat,* the present study employed only the four stages of the procedure - *initiate*, *interpret*, *consolidate* and *report* followed by a classroom discussion to help the learners to uncover the contexts for the different uses of the vertical prepositions as is exemplified by Tribble (2010). The following exemplifies how the four-step procedure was applied to teach the distinct senses of *over* utilizing the PP model.

Step 1 Initiate

In the first stage, the students were asked to generate a concordance and carry out a search on the use of *over* by using the BNCweb concordance tool. After they generated the first concordance on their computers, they examined the uses of over in context with their peers. The first concordance contained 50 lines with the search item *over* in the middle. Figure 1 displays an example of KWIC (key word in context) concordance of *over* generated by the students.

Step 2 Interpret

The second step in Sinclair's procedure is *interpretation*, where the students focused on the patterns of uses and tried to arrive at a decision as to the meanings of *over* depending on the context. After they analyzed the words or phrases that occurred to the right and the left of the word, they classified those with the similar meanings in order to be able to form a hypothesis as to which sense can be the prototypical sense. When they identified the uses, which could be classified as proto-scene, they discussed with their peers which words or phrases helped them to identify that meaning.

Figure 1. Concordance lines for over generated by the students

Having determined the prototypical meaning, they went on to identify other senses of *over* repeating the steps specified in the activity sheet. Finally, they decided how many of the contexts illustrated the different meanings of *over* other than the central meaning and wrote these senses of *over* with its collocates in the matrix given in order to have an overall idea as to how many senses the first concordance activity captured (by referring to the polysemy network for *over* given in Activity 1, if necessary).

Step 3 Consolidate

At this stage, the students worked with their friends and matched the senses of *over* with those in the polysemy network. They discussed which senses were missing in their list and how many senses they were able to find. Afterwards, the instructor delivered to the students a hand-out of concordances (Figure 2) which contained examples illustrating all the other senses of *over*. This pre-prepared concordance sheet was meant to help students find the other senses of *over* as it would, otherwise, take the students a considerable amount of time to produce many more concordance outputs in order to be able to find the senses missing in the first concordance output that they generated. After analyzing and discussing the senses of *over*, they completed the missing parts in the polysemy network. After the students completed this step, they all went through the same steps they did for *over* in order to work out the senses of *above*.

Step 4 Report

Having completed the concordance search on *above* and determined the senses of the preposition, the students worked in pairs and compared the meanings of *over* and *above* referring to both the polysemy networks and the example sentences in the concordance they generated and the teacher provided. First, they discussed with their peers which meanings of the related prepositions are distinct

and which ones nearly synonymous. Later, the instructor asked the students to direct their attention to the projection screen and told them they were going to discuss what they found with the whole class.

No	Filename			
1	A03 365	done to those prisoners reaches a mass audience. Amnesty sections all	over	the world include the Prisoner Letter Writing Campaign cases in
2	A03 891	. We finished our coffee and watched the seagulls whirling and shrieking	over	the harbour in the spring sunshine. In some cases of '
3	A04 172	and Christianity. It is a memorable evocation, casting a spell	over	the reader: 'She is older than the rocks among which
4	A04 442	becomes evident. The presenter of a television series has some advantage	over	a writer, since filming is more flexible than book production.
5	A04 804	expressed; and were not the eye refreshed by the shade thrown	over	a great part of the foreground by some young trees, that
6	A04 1202	know what to say. I painted this bit here several times	over;	that hill too. But there's a lack of unity
7	A04 1390	Britain or France during the Second Empire the critic had some influence	over	taste. It is doubtful how much influence a critic has today
8	A05 365	far end of the corridor, but also from a deposit scattered	over	the floor. Despite the cold wet wind blowing in hard from
9	A05 381	her still, with no finality in her, turned her world over and	over	again in her mind's restless fingers. The child
10	A05 381	, with no finality in her, turned her world over and	over	again in her mind's restless fingers. The child, possessed
11	A05 1053	moving into, the far from populous row of flats, just	over	the river in South London, which is inhabited by Patrick and
12	A06 922	Fair, a tiddle dum ay. I had to carry her	over	the wall, can you imagine, to get her to my
13	A06 1154	England in the middle of July. My war seemed to be	over.	I couldn't understand why I'd not been killed when
14	A08 107	say, he wrote, that the present project has any value	over	and above the others, mine and those of everyone else,
15	A08 233	in the margin. Hurricane . The time for gentle breezes is	over,	wrote Harsnet (and Goldberg typed), the time for
16	A08 286	pristina mansit. And Goldberg, pushing back his chair, stepping	over	the piles of papers and magazines littering the floor of his study
17	A08 298	he wrote, and Goldberg, seizing his felt-tip pen, bent	over	the typewriter and wrote in the margin anxiety? serenity ? Anxiety
18	A08 377	metal frame. Calamity if glass breaks. And if it topples	over	it certainly will. Last ten days trying to devise way to
19	A08 715	the whole field is called back, the race could have been	over	but it has not yet started. Now I Joseph was walking
20	A08 782	. Fat already then, twenty-two, twenty-three, five eight but	over	fifteen stone. You didn't what? Face white, jaws
21	A08 982	half-tearing the page of his pad in his hurry to turn it	over	without breaking the flow of his thought, but where is his
22	A08 1217	on the glass. And those beautiful expressive hands of his flying	over	the keyboard of the little painted organ. Sense of excessive energy
23	A08 1610	, but other things, like earning enough to keep a roof	over	our heads and send the children to decent schools, always seemed
24	A0B 375	The Nag's Head still has its decorative painting on glass by Cosmo Clark	over	the fireplace in the public bar, and some original chairs.
25	A0D 239	Sven Hjerson clambered aboard and cautiously peered	over.	'Nothing,' he called at once to the others
26	A0D 383	broad flight of steps leading to the road outside, tripped clumsily	over	Jilly Jonathan's big crocodile-skin handbag, fell to her feet,
27	A0D 1017	which he now lies dead, in fact.' He glanced	over	at the mound of tablecloths hastily borrowed from the tables of the
28	A0E 864	straight off the set of his latest film for a retrospective look	over	his career and films with the Guardian's film critic Derek Malcolm
29	A62 105	Their degree of preference for one party	over	others had an important influence upon the usefulness-ratings they
30	A6D 366	adding: 'I distrust male homosexuals because they choose men	over	women just as do our social and political institutions, but they too
31	A6Y 686	term will be a switch to the American pattern, which stresses quality	over	quantity.
32	ALH 1705	I felt the tears welling up in my eyes and suddenly they spilled	over	the sides and dripped down my cheeks.
33	C8B 250	If you go	over	the limit you have to pay duty on the excess when you go through
34	C93 1599	The western half of the village	over	the river Derwent was the scene of the annual fair from about 1200
35	H07 1371	Drop a couple of marbles into the cup and watch the water spill	over	
36	HCR 148	Bothwell Castle, towering dramatically	over	the River Clyde, is arguably the most important medieval castle in
37	H7A 2178	She cried out, her tears brimming	over	again, red in the face.
38	B10 1418	One of the most frequent causes of fighting is the dispute	over	the possession of desired objects.
39	APC 547	And the fire has spread	over	our corn-fields.
40	ASJ 949	There has long been controversy	over	who invented the travellers cheque.
41	AK6 1634	We tried to explain the national concern	over	heart disease, and the medical advice to avoid excess salt.
42	A0R 1396	When the news finished they bent	over	the Guardian TV page, deciding what to see next.
43	ABH 1458	An Italian entrepreneur has taken	over	a whole department store to sell western goods in Romanian currency.
44	G01 376	The Governor of Whitely heard his secretary's voice	over	the intercom and glanced up at his wall clock.
45	AC4 2359	He rolled	over	, thinking resentfully that it was impossible to go to sleep.
46	AE8 270	A thin moon is already hanging	over	the river and the swallows are feeding very high, a sign of continuing fine weather.
47	G1D 1660	Hop	over	the fence and find your footwear.
48	G1E 1679	Sovereignty	over	continental Antarctica is less clear because ownership is in question.
49	G1D 2603	She and Guy lived	over	the road, next door but one to Barbs's house.
50	FSF 2687	At this rate, she thought desperately, the lunch hour will be	over	before I even get there.

Figure 2. Concordance lines prepared by the instructor.

The senses of *over* and *above* were projected onto the projection screen as in presented in the polysemy networks. A discussion was held regarding the prototypical senses of these prepositions and the metaphorical extension of the other senses with the participation of all the students. The students also provided example sentences for the clarification of the meanings of the prepositions drawing on the concordance example they found. Soon after the session ended, the students were given the post-test.

The following week's instruction on *under* and *below* followed the same procedure in the order presented above. Similarly, after the instruction ended, the students were given a post-test on *under* and *below*. Samples of activities for these prepositions are presented in Appendix B. Two weeks after the post-test, the students were given the delayed post-tests on *over/above* and *under/below*.

2.5. Data analysis

The analysis of the scores obtained from the pre-, post, and delayed post-test was carried out in two steps. The first step involved the descriptive analysis of both groups' performance scores on the use of *over*, *above*, *under* and *below* rather than inferential statistics on the data. The aim was to have a general view of learning gains from pre-test to post-test and to delayed post-test, and which prepositions were particularly difficult for the students. The second step involved analyses based on inferential statistics to determine whether or not there was a statistically significant difference a) in the

students' learning gains regarding the correct use of the vertical prepositions across the tests (within-group analysis) and b) between the two instructional methods applied

Initially, a two-way mixed ANOVA was intended to determine if there was an interaction between the between-subjects (the control and the experimental group) and within-subjects (the pre-, post-, and delayed post-test) factors. However, the result of the Shapiro-Wilk's test of normality indicated that the data violated the assumption of normality. Therefore, the Friedman test was run for each group to determine if there were differences between the pre-, post- and delayed post-test results. Also, Mann-Whitney U test was run on the data to compare the groups by pre-, post and delayed post-test results to measure the effect of the two different instructional methods. All the statistical analyses were operated by using the Statistical Package for Social Sciences (SPSS) version 24.0. The alpha level for statistical significance was set at $p < .05$ for all the analyses.

3. Results

3.1. Comparison of pre-, post- and delayed post-test scores by preposition categories

The bar chart in Figure 3 presents the students' average performance scores in each category of the vertical prepositions. The pre-test results revealed that both groups of students did quite well with the use of *over* and *under*. It seemed that the students were familiar with most senses of these prepositions. In regard to the first research question, it was found that *above* and *below* were most challenging for the learners. However, the post-test results showed that there was a considerable improvement in the use of the target prepositions, which suggested that both groups benefited from the instructional treatments, while the performance of the experimental group seemed to be better in all categories. Particularly, there was a considerable increase in the students' knowledge of the senses of *over* and *under*, indicating 93,6% and 99.2% improvement, respectively, for the experimental group and 86,9% and 98,5% improvement, respectively, for the control group.
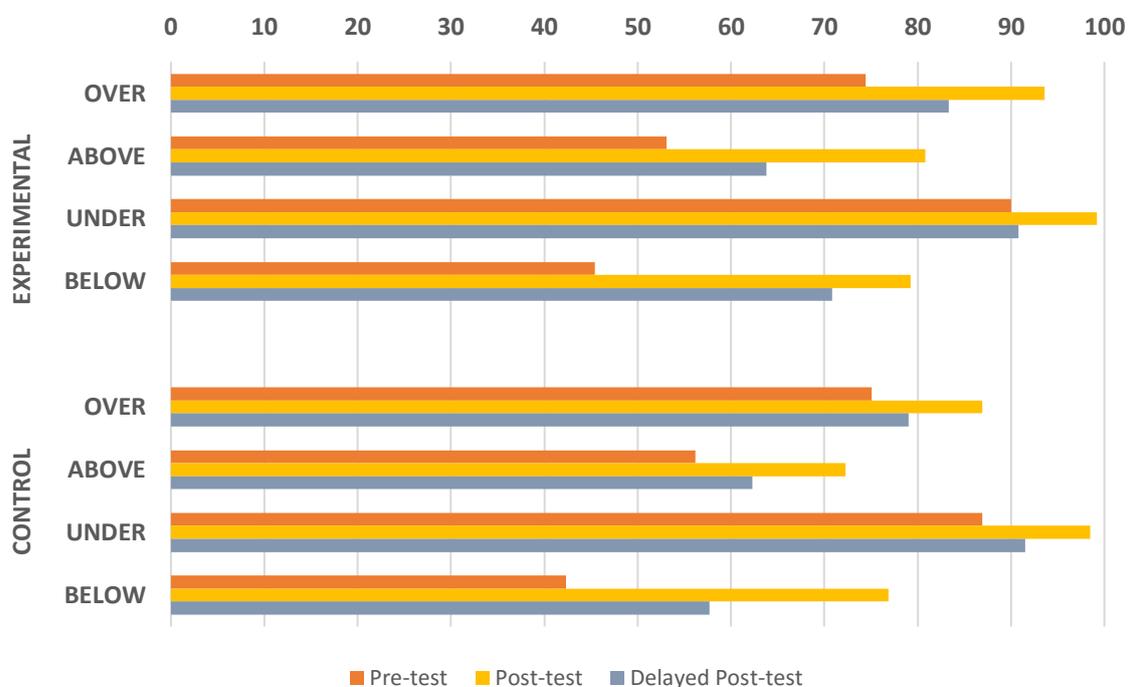
Figure 3. Distribution of pre-, post, and delayed post-test scores in percentages by preposition categories

Despite the considerable improvement across all categories, the uses of *above* and *below* still presented difficulty for the learners in both groups, suggesting that the students failed to learn all the senses of *above* and *below*. As far as the delayed post-test results are concerned, it was observed that the gain scores for the two groups decreased from the post- to delayed post-test. Although the students in both groups retained most of their knowledge regarding the senses of *over* and *under* from the post- to delayed post-test, the most remarkable decreases were observed in the scores with respect to the uses of *above* and *below* from 80.8% to 63,8% and 79,2% to 70,8%, respectively, for the experimental group and from 72,3% to 62,3% and from 76,9% to 57,7%, respectively, for the control group. To sum up, this overall analysis indicated that the students particularly had much more difficulty with the uses of *above* and *below* and that the CPDL instruction was much more effective than the TR instruction with respect to the learning gains and long-term knowledge retention.

3.2. Statistical analysis

3.2.1. Pre-test comparison

The Mann-Whitney U test conducted on the participants' pre-test scores indicated that there was no statistically significant difference between the control (mean rank = 27.73) and the experimental group (mean rank = 27.77), U = 319, z = -.355, p = .723. The descriptive statistics for this analysis is presented in Table 1. The results obtained from the test indicated that learners' initial knowledge of target prepositions was similar although *above* and *below* were particularly problematic for learners, based on the findings presented in the previous section.

Table 1. Control and Experimental Group Pre-test Results for the Mean and Median

	N	Control		Experimental	
		Mean	Median	Mean	Median
Pre-test	26	25.77	21.00	27.23	21.00

3.2.2. Within-group analysis

In order to determine the within-group differences regarding the effect of the instructional treatments on each groups' performance over two weeks, the Friedman test was run on the control and the experimental data. Table 2 summarizes the descriptive statistics for the two groups.

Table 2. Descriptive statistics for the control and experimental groups by test scores

	N	Control		Experimental	
		Mean	Median	Mean	Median
Pre	26	1.19	21.00	1.04	21.00
Post	26	2.88	25.00	2.92	27.00
Delayed Post-test	26	1.92	23.00	2.04	24.00

First, the Friedman test was run on the performance scores of the control group to determine if there was a statistically overall significant difference after a two-week TR (based on dictionary work) instruction of vertical prepositions. Pairwise comparisons performed (SPSS Statistics, v.24) with a Bonferroni correction for multiple comparisons revealed a statistically significant difference in student scores from pre-test to post-test and to delayed post-test, $\chi2(2) = 39.775$, $p < .0005$. Therefore, a further investigation was conducted with post hoc tests to determine where exactly the differences between groups were. Post hoc analysis with statistical significance accepted at the $p < .0167$ level revealed statistically significant differences in student scores between pre- (Mdn = 21.00) and post-test (Mdn = 25.00) ($p < .0005$), pre- and delayed post-test (Mdn = 23.00) ($p = .008$) and delayed post- to post-test ($p = .001$).

Similarly, the Friedman test was applied to the experimental group's performance scores on three tests to measure the effect of a two-week CPDL (the CL-inspired instruction based on the PP model and the DDL) instruction of vertical prepositions. Pairwise comparisons were performed with a Bonferroni correction for multiple comparisons to determine whether or not there were differences between three test scores. The pairwise comparisons revealed a statistically significant difference in student scores from pre-test to post-test and to delayed post-test, $\chi2(2) = 48.080$, $p < .0005$. In order to determine where exactly the differences between groups were, a further investigation was conducted with post hoc tests with statistical significance accepted at the $p < .0167$ level. The post hoc analysis revealed that there were statistically significant differences in student scores between pre- (Mdn = 21.00) and post-test (Mdn = 27.00) ($p < .0005$), pre- and delayed post-test (Mdn = 24.00) ($p < .0005$) and delayed post- to post-test ($p = .001$).

The results from the two different instructional interventions (TR versus CPDL) indicated that TR and CPDL instructions were both effective since the increase in students' scores over time was found statistically significant.

3.2.3. Between-group analysis

As for the between-group difference, the Mann-Whitney test was used for pre-, post- delayed post-test results in order to understand whether there was a difference between the groups in terms of the effect of instruction. The descriptive statistics for this analysis is presented in Table 3.

Table 3. Group means and median by pre-, post-, and delayed post-tests

	N	Control		Experimental	
		Mean	Median	Mean	Median
Pre-test	26	25.77	21.00	27.23	21.00
Post-test	26	20.12	25.00	32.88	27.00
Delayed Post-test	26	20.08	23.00	32.92	24.00

A Mann-Whitney U test was run to determine if there were differences in post-test score between the experimental and the control group. Distributions of the post-test scores for the experimental and the control group were similar, as assessed by visual inspection. Post-test score was found statistically significantly higher for the experimental group (mean rank = 32.88) than for the control group (mean rank = 20.12), U = 172, z = -3.075, p = .002.

As for the comparison of the delayed post-test scores, a Mann-Whitney U test was again run to determine whether or not there were differences in delayed post-test score between the experimental and the control group. Visual inspection revealed that the post-test scores for the experimental and the control group were similarly distributed. Independent samples Mann Whitney U test indicated a statistically significant difference in the delayed post-test scores between the experimental group (mean rank = 32.92) and the control group (mean rank = 20.08), U = 171, z = -3.109, p = .002.

Figure 4 illustrates the effect of the two different instructions of vertical prepositions on the control and the experimental groups. Although both groups benefited from the type of instruction they received, the participants exposed to the CPDL instruction achieved statistically significantly higher scores at post- and delayed post-tests than did the participants exposed to the TR instruction.
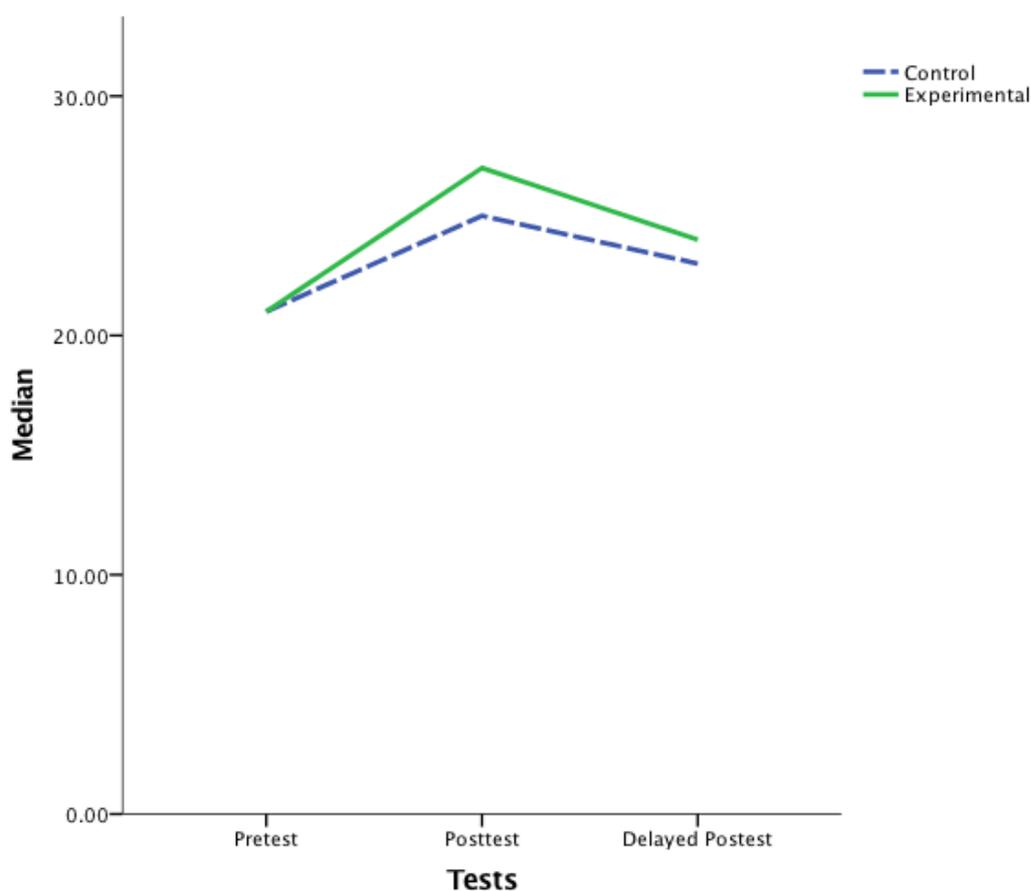
Figure 4. Comparison of group gains by pre-test, post-test and the delayed post-test.

4. Discussion

The results of the analysis indicated that both the experimental and the control group benefited from the instructional treatments they received. Although the two teaching methods, the traditional and the DDL-based CL-inspired instruction, helped the students significantly improve their knowledge of the vertical prepositions, the latter led to greater learning gains and better retention of knowledge.

In reference to the first research question concerning which prepositions pose difficulty for the learners, it was found that the students in the study particularly had difficulty with the senses of *above* and *below*. This might be attributed to two reasons. First, the students may have failed to map the

senses of these prepositions onto the L1 equivalents because, as was previously discussed, there is not a one-to-one correspondence in their L1 regarding the uses of *over/above* and *under/below*. While the meanings of the first set are expressed with two interchangeable postpositions derived from *üst-* and *üzer-* in the sense of *top* or *top surface* in Turkish, *under* and *below* are, worst of all, expressed with only one postposition derived from the noun, *alt-* in the sense of *underside*. And both expressions undergo various morphological processes depending on the context. The second reason might be that *over* is unmarked, while *above* is marked as the former expresses contact in contrast to the latter expressing distance (Rauh, 1993). Since Tyler and Evans (2003) note that the proto-scene designated by *over* and *under* is proximity and potential contact, while it is no possibility of contact for *above* and *below*, this dichotomy can also be logically extended to *under* and *below*, as *under* being unmarked and below *marked*, which is also supported by Herskovits' (1985) view that ""nextness" is the unmarked case, the default ..." (p. 368). Givon (1991, p. 337)) characterizes marked linguistic features as structurally and cognitively more complex, less frequent, and therefore cognitively more salient. Since learners are often exposed to unmarked linguistic feature and the marked ones require an extra cognitive effort, the students in the study may not be proficient enough in the use of the prepositions *above* and *below*. Yet, the CPDL instruction, with the meaningful presentation of the senses of prepositions and the rich context of uses it provided for the students, can be said to be quite effective to overcome these intra-linguistic and cross-linguistic issues.

As for the research questions regarding the effectiveness of the instructional methods in terms of the learners' achievement in learning target prepositions and better retention of the senses of these prepositions. Findings concerning the use of the CPDL instruction (DDL-based CL-oriented instruction) proved to be useful for the teaching of vertical prepositions *over/above* and *under/below*. Although both groups of students benefited from the two types of instruction given, the experimental group exposed to the CPDL instruction were able to achieve higher scores and retain more senses of the prepositions concerned as opposed to those instructed traditionally. This finding correlates with the view that "retention of the multiple senses and uses of a polyseme can be enhanced by employing insights from cognitive semantics" (Beréndi et al., 2008, p. 71). The integration of the Principled Polysemy model into DDL with accompanying cognitive explanations acted like a compass for the students to navigate across the sea of concordance lines in their search for the related senses of the target preposition, both helping them to find the related meanings and saving them a considerable amount of time. In this respect, the findings from the present study demonstrate that DDL may very well be integrated into the CL-inspired approach and be an alternative to the visuals such as pictures, diagrams, and cartoons successfully utilized by previous CL-inspired studies.

With respect to the difficulties encountered during the classroom application of the CPDL approach, it would be misleading to present too rosy a picture of the instructional procedure. The students, of course, encountered some difficulties, yet these were not so insurmountable. One of the difficulties was related to the operation of BNCweb. Just as Gavioli (2005) noted, the lack of knowledge about how to operate a concordance tool posed a problem rather than the lack of technical knowledge. The reason was that many of them had already forgotten how to use the BNCweb interface such as starting a query, toggling between the sentence view and the KWIC view and using the collocations feature although they had been given a three-hour training on the use of BNCweb a week before. Therefore, some students lagged behind, which somewhat prevented all the students from starting together. However, with the help of the instructor, and thanks to the previous week's training, the students were easily able to remember how to operate the functions of BNCweb, these difficulties were quickly handled and the students were able to adapt themselves to the task at hand and were soon involved in the activities. In this regard, the students acknowledged the usefulness of the DDL training.

The second difficulty was related to the search words. Queries for the given preposition returned a large number of concordance lines, yet most of them were only related to some of the senses of the prepositions investigated. However, since the instructor had prepared for the instruction in advance by going through the steps that the students would follow in class, he had already anticipated this problem and accordingly prepared concordance printouts (see Figure 2), which illustrated the senses of the related prepositions at least three times. Indeed, Boers and Lindstromberg (2008) point out that corpora may contain language that could be difficult for learners as they are essentially unedited. Therefore, they note that it could be more appropriate for teachers to reduce the amount of text by selecting the concordance lines beforehand. When the students generated two or three more hands-on concordances for the analysis of the uses of the preposition concerned and began to have difficulty finding contexts which would illustrate the specific senses of the prepositions under focus, the students smoothly moved on to the paper-based concordances to find out the remaining senses of that preposition. This fostered the students' motivation, kept them going with their tasks and saved them from a time-consuming task, which would have otherwise been tedious and laborious for them. Similarly, Boulton (2010) points out that much of the tedious labor that might result from hands-on practices can be eliminated with the use of carefully constructed materials. Despite these difficulties, the learners enjoyed their experience with the corpus and particularly appreciated the rich context that DDL exposed them to. They also found the PP model very useful for understanding and learning the senses of the prepositions concerned in a related and a meaningful way.

5. Limitations of the study and future research

The integration of the CL-inspired instruction into DDL proved to be more successful than the traditional approach and led to greater learning gains and better retention of the target prepositions. However, these findings should be interpreted with caution and might not be generalized to other student populations as the researcher could not select the students randomly from a large population due to resource constraints, and therefore had to use the two existing vocabulary classes. Also, due to the same reasons, the researcher assumed that the students in both groups were of the same proficiency level rather than administering a general proficiency test to the students and accordingly form the groups based on the proficiency test results. For this reason, future studies might replicate the study with a larger number of students using a more rigorous design. Another issue concerns the tests used to measure the students' performance, which only included fill-in-the blank type of questions, forcing the students to make a choice between two answers. This type of test might not have effectively assessed the learners' production skills as the students already knew that they were going to fill in the blanks with either of the choices. In this respect, a further study may utilize more effective assessment tools including visuals to elicit the uses of these prepositions by reducing the chance factor. Lastly, the training period on the use of corpus and the duration of the instructional treatment may be increased. First, it was observed that when the instructional treatment began, many students experienced difficulties with hands-on DDL work in the beginning due to their failure to remember what they had learned during the training session a week before. Second, it seems that a two-week instruction, one week for *over/above* and another week for *under/below* was not sufficient for the learners to learn all the meanings of the prepositions, particularly, the uses of *above* and *below*. Therefore, longer instructional treatment might produce different results.

6. Conclusion

This study addressed the need for empirical research on the role of DDL in CL-oriented instruction with the aim of helping learners overcome difficulties related to polysemy and cross-linguistic differences. In this respect, the study specifically focused on the teaching of highly polysemous prepositions of the vertical axis, *over/above* and *under/below*. The combination of the Principled Polysemy model and DDL with accompanying cognitive explanations was of great help to the learners to find the related senses of the target prepositions from the concordance outputs and saved them both a considerable amount of time and an exhaustive labor. The study also demonstrated that DDL with the PP model might be integrated into the CL-inspired approach and be an alternative to the visuals such as pictures, diagrams, and cartoons, which were often utilized by previous CL-inspired studies.

Acknowledgements

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Appendix A. Pre-, post-, and delayed post-test questions

The tests were constructed from the following sentences mostly taken from Tyler, A., & Evans, V. (2003) and were slightly modified to be used as fill-in-the blank pre-, post-, and delayed post-test. Each time the test was presented, the sentences were slightly modified, shuffled and randomly presented.

SECTION A SENSES OF OVER AND ABOVE

The tree branch extended over the wall
The old town lies over the bridge
Your article is over the page limit.
The play is over
Sally turned the keys to the office over to the janitor

The festival will take place over the weekend
The tablecloth is over the table
John looked over the book
The little boy cried over his broken toy
Jerome found over forty kinds of shells on the beach)
The heavy rains caused the river to flow over its banks
She has a strange power over me
I would prefer tea over coffee
The fence fell over.
He played the same piano piece over.
The birds are somewhere above us
It was ten degrees above zero.
Nancy's intellectual capacity is well above the others.
His office is on the floor above mine
The nearest bridge is about half a mile above the falls

SECTION B SENSES OF UNDER AND BELOW

The nurse put the pillow under the patient's head
It's impossible to run the marathon in under one hour
The boy had trapped the fly under his hand
My diary is somewhere under all this paperwork
The dead person was buried under six feet of dirt.
The valley is far below the tallest peak
The temperature dropped below freezing
Alan is below me in the law firm
His office is on the floor below mine
The hydroelectric station is five miles below the dam

Appendix B. CPDL activities and fill-in-the-blank exercises for *over* and *above*

ACTIVITIES ON *OVER* AND ABOVE

ACTIVITY 1 - Reflection

1. **Write** as many sentences as you can think of using *over* and *above***.**
2. **Analyze** the words/phrases to the left and right of *over* and *above* and **decide** how many different senses *over* and *above* have.

Compare your sentences with your friends' and ask him/her how many different meanings *over* and *above* have in his/her sentences.

Discuss with your friend which words/phrases (collocates) on the left and right of *over* and *above* have helped you determine the meanings of these words.

Work with your friend and **write** these meanings down with the collocates of *over* and *above* as shown below**.**

You can add more meanings if necessary**.**

Left		**Right**	**MEANING**
(1) ……………..		(1) ……………..	(1) ……………..
(2) ……………..	**OVER**	(2) ……………..	(2) ……………..
(3) ……………..		(3) ……………..	(3) ……………..

Left		**Right**	**MEANING**
(1) ……………..		(1) ……………..	(1) ……………..
(2) ……………..	**ABOVE**	(2) ……………..	(2) ……………..
(3) ……………..		(3) ……………..	(3) ……………..

3. Now **let's pool** the meanings of *over* and *above* each group has with their collocates on the board for a whole class discussion.

Compare these meanings with the ones in the network of meanings for *over* and *above* that I am going to hand out to you and project onto the screen as well.

Proto-scene is the *central meaning*. The central meaning of *over* is higher than (with potential contact). And the central meaning of *above* is higher than (but mostly with no potential contact). Other meanings are considered to be the *extensions* of the proto-scene of *over* and *above*.

How many of the uses of *over* and *above* in your sentences can be grouped under the proto-scene (central meaning) category.

Compare the networks of meanings for *over* and *above* and decide which meanings are distinct and which ones nearly synonymous.

Do your sentences contain these distinct and synonymous uses? Can you use *over* and *above* interchangeably in these sentences? Why? Why not?

How many of the senses in the network have your sentences captured for *over* and *above*?

HAND-OUT 1 – Polysemy network for *Over*

1. Semantic network for *over*

Above-and-
beyond
(excess I)   Completion   Focus-of-
2.B   2.C   Transfer   Covering   attention
                   2.D   3   4.A

2.A   2.E
On-the-other-   2   Temporal   4
side-of   ABC trajectory   Examining
        cluster   PROTO-SCENE
                            1

    Up cluster   Reflexive
                                  6
     5

5.A   5.B   5.C   6.A
More   Control   Preference   Repetition

5.A.1
Over-and-above (excess II)

2. Semantic network for *above*

2.A More   2.B Superior

        2. Up

1. Proto-scene

3. Next-one-up   4. Topographical-distance

ACTIVITY 2 - Hands-on

We are going to carry out a corpus search on *over* and *above* and generate concordances to learn the other uses that your sentences do not include.

SECTION A

Generate a concordance for *over*.
Look at the usages of *over* in context.
Analyze the words/phrases to the left and right of *over*.
Classify the similar meanings of *over* with its collocates.
Identify which of the uses of *over* can be classified as proto-scene (central meaning)

Remember!

The proto-scene is the *central meaning*. The central meaning of *over* is higher than (with potential contact). Other meanings are considered to be the *extensions* of the proto-scene of *over*.

Discuss with your friend which words/phrases on the left and right of *over* have helped you determine this meaning.
Apply the steps 1 to 3 and **identify** the other meanings (the extensions of the proto-scene) of *over*.
Decide with your friend how many of the contexts illustrate the different meanings of *over* other than the central meaning you have found.

Write down these senses of *over* with its collocates in the matrix below by referring to the polysemy network for *over* given in Activity 1.

Left		Right	MEANING
1 ………………..		1 …………..…..	1 …………..…..
2 …………..…..		2 ………….……..	2 …………..…..
3 ………………..		3 ………………..	3 ………….……..
4 …………..…..		4 ………………..	4 …………..…..
5 ………………..		5 ………….……..	5 …………..…..
6 …………..…..		6 ………………..	6 …………..…..
7 ………………..	**OVER**	7 ………….……..	7 …………..…..
8 …………..…..		8 ………………..	8 …………..…..
9 …………..…..		9 ………….……..	9 …………..…..
10 ……………...		10 ……………....	10 ……………....
11 ……………...		11 ……………..	11 ……………..
12 ……………..		12 ……………..	12 ……………..
13 ……………..		13 ……………..	13 ……………..
14 ……………....		14 ……………....	14 ……………....
15 ……………....		145……………....	15 ……………....

Work with your friend and **match** the meanings of *over* with those in the polysemy network schema for *over* in Activity 1

How many meanings have you found? Which meanings have you failed to find?

Now I am going to hand out a sheet of concordances for *over* so that you can complete the missing meanings of *over*.

Look at the usages of *over* in context.
Analyze and **discuss** with your friend the words/phrases on the left and right of *over* to determine its meanings**.**
Complete the missing meanings in the network of senses for *over*.

SECTION B

Generate a concordance for *above*.
Look at the usages of *above* in context.
Analyze the words/phrases to the left and right of *above*.
Classify the similar meanings of *above* with its collocates.
Identify which of the uses of *above* can be classified as proto-scene (central meaning)

Remember!

The proto-scene is the *central meaning*. The central meaning of *above* is higher than (mostly with no potential contact). Other meanings are considered to be the *extensions* of the proto-scene of *above*.

Discuss with your friend which words/phrases on the left and right of *above* have helped   you determine this meaning**.**

Apply the steps 1 to 3 and **identify** the other meanings (the extensions of the proto-scene) of *above*.

Decide with your friend how many of the contexts illustrate the different meanings of *above* other than the central meaning you have found.

Write down these senses of *above* with its collocates in the matrix below by referring to the polysemy network for *above* given in Activity 1**.**

Left		Right	MEANING
1 …………..…..		1 …………..…..	1 …………..…..
2 …………..…..		2 …………..…..	2 …………..…..
3 …………..…..	**ABOVE**	3 …………..…..	3 …………..…..
4 …………..…..		4 …………..…..	4 …………..…..
5 …………..…..		5 …………..…..	5 …………..…..
6 …………..…..		7 …………..…..	7 …………..…..

10. **Work** with your friend and **match** the meanings of *above* with those in the polysemy network for *above* in Activity 1

How many meanings have you found? Which meanings have you failed to find?

11. Now I am going to hand out a sheet of concordances for *above* so that you can complete the missing meanings of *above*.

 Look at the usages of *above* in context.
 Analyze and **discuss** with your friend the words/phrases on the left and right of *above* to determine its meanings.
 Complete the missing meanings in the network of senses for *above*.

ACTIVITY 3 – Comparison of the senses *over* and *above*

 Work with your friend and **compare** the meanings of *over* and *above* you have found with the ones in the polysemy networks given in Activity 1.
 Discuss with your friend which meanings of *over* and *above* are distinct and which ones nearly synonymous.

ACTIVITY 4 A sample fill-in the blank exercise for *over* and *above*

Complete the sentences below using *over* and *above*. In some sentences, *over* and *above* can be used interchangeably.

1. I replaced the blanket ...... his head and stood for a few moments looking at the bodies in their neat little rows.
2. .... their heads bats flickered almost invisibly between the treetops. proto
3. She'd never let go of him, either, even when their affair was ......, and he was tramping the globe looking for Nirvana.
4. I felt the tears welling up in my eyes and suddenly they spilled .... the sides and dripped down my cheeks.
5. With gliders which climbed .... 15,000 feet in cloud in the early 1960s, there was approximately one serious strike or electrical damage for every ten flights.
6. Oh, he slipped off the old bar stool occasionally and when going home tripped ...... the odd stone that he was sure wasn't there when he went out.
7. Read .... and check carefully for errors, either grammatical or type-wise.
8. There could be a city .... the hills!
9. Home news was preferred .... foreign, new a about things familiar to the reader over the unfamiliar.
10. He had one great advantage over all the others.
11. My only contribution to the debate is to affirm that the colony of twenty or more specimens growing along the lane .... my house breeds true.
12. As the ball flew .... the front edge, I was screaming inside, 'Come down, come down; oh, God!'. It went over the green and into the crowd.
13. As far as Henry could remember they gave advice .... the phone.
14. The Government faces controversy .... plans to sell off the spectrum of radio frequencies. Focus of attention
15. Do you always take the lift to the next floor or to the one ....?

16. Seven million are already HIV infected in sub-Saharan Africa, increasing by .... one million a year.

17. She crossed one knee .... the other.

18. I cast my eye .... the front page of the Telegraph while Anne poured the coffee.

19. The clergy are seen as .... criticism in their religious statements, and such criticism can cause considerable distress to many people.

20. Has the position of the director changed in theatre for you ....the years?

KEY to the exercises

No	Text ID	Example Sentence	Senses
1.	A61 478	I replaced the blanket over his head and stood for a few moments looking at the bodies in their neat little rows.	**Cover**
2.	A0N 1363	Above their heads bats flickered almost invisibly between the treetops.	**Proto Scene**
3.	A0L 392	She'd never let go of him, either, even when their affair was over, and he was tramping the globe looking for Nirvana.	**Completion**
4.	ALH 1705	I felt the tears welling up in my eyes and suddenly they spilled over the sides and dripped down my cheeks.	**Over and Above**
5.	A0H 1509	With gliders which climbed above 15,000 feet in cloud in the early 1960s, there was approximately one serious strike or electrical damage for every ten flights.	**More**
6.	CDG 582	Oh, he slipped off the old bar stool occasionally and when going home tripped over the odd stone that he was sure wasn't there when he went out.	**Reflexive**
7.	BN3 1331	Read over and check carefully for errors, either grammatical or type-wise.	**Repetition**
8.	FR0 1533	There could be a city over the hills!	**On the Other Side**
9.	CRY 2032	Home news was preferred over foreign, new a about things familiar to the reader over the unfamiliar.	**Preference**
10.	ARK 1201	He had one great advantage over all the others.	**Control**
11.	A0G 1034	My only contribution to the debate is to affirm that the colony of twenty or more specimens growing along the lane above my house breeds true.	**Topographical Distance**
12.	ASA 405	As the ball flew over the front edge, I was screaming inside, 'Come down, come down; oh, God!'. It went over the green and into the crowd.	**Above and Beyond**
13.	ASS 1673	As far as Henry could remember they gave advice over the phone.	**Transfer**
14.	A1S 8	THE GOVERNMENT faces controversy over plans to sell off the spectrum of radio frequencies.	**Focus of Attention**
15.	B26 773	Do you always take the lift to the next floor or to the one above?	**Next One Up**
16.	A02 191	Seven million are already HIV infected in sub-Saharan Africa, increasing by over one million a year.	**More**
17.	A0R 1049	She crossed one knee over the other.	**Proto Scene**
18.	A0R 598	I cast my eye over the front page of the Telegraph while Anne poured the coffee.	**Examine**
19.	A07 420	The clergy are seen as above criticism in their religious statements, and such criticism can cause considerable distress to many people.	**Superior**
20.	A06 2366	Has the position of the director changed in theatre for you over the years?	**Temporal**

ACTIVITIES ON *UNDER* AND *BELOW*

ACTIVITY 1 - Reflection

1. **Write** as many sentences as you can think of using *under* and *below*.

2. **Analyze** the words/phrases to the left and right of *under* and *below* and **decide** how many different meanings their uses have in your sentences.

Compare your sentences with your friends' and ask him/her how many different meanings *under* and *below* have in his/her sentences.

Discuss with your friend which words/phrases (collocates) on the left and right of *under* and *below* have helped you determine the meanings of these words?

Work with your friend and **write** these meanings down with the collocates of *under* and *below* as shown below. You can add more space if necessary.

Left		Right	MEANING
(1) ……………..		(1) ……………..	(1) ……………..
(2) ……………..	**UNDER**	(2) ……………..	(2) ……………..
(3) ……………..		(3) ……………..	(3) ……………..

Left		Right	MEANING
(1) ……………..		(1) ……………..	(1) ……………..
(2) ……………..	**BELOW**	(2) ……………..	(2) ……………..
(3) ……………..		(3) ……………..	(3) ……………..

3. Now **let's pool** the meanings of *under* and *below* each group has with their collocates on the board for a whole class discussion.

Compare these meanings with the ones in the network of meanings for *under* and *below* that I am going to hand out to you and project onto the screen as well.

The proto-scene is the *central meaning*. The central meaning of *under* is lower than (with potential contact). And the central meaning of *below* is lower than (but mostly with no potential contact). Other meanings are considered to be the *extensions* of the proto-scene of *under* and *below*.

How many of the uses of *under* and *below* in your sentences can be grouped under the proto-scene (central meaning) category.

How many of the meanings in the network have your sentences captured for *under* and *below*?

Compare the networks of meanings for *under* and *below* and decide which meanings are distinct and which ones nearly synonymous.

Do your sentences contain these distinct and synonymous uses? Can you use *under* and *below* interchangeably in these sentences? Why? Why not?
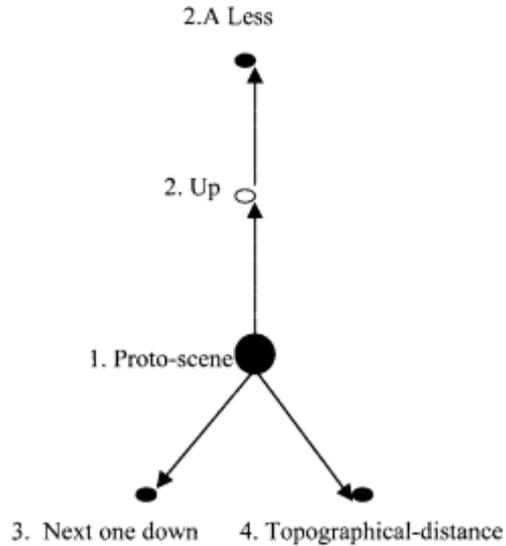
How many of the senses in the network have your sentences captured for *under* and *below*?

HAND-OUT 1 – Polysemy network for *under* and *below*

1. Semantic network for *under*
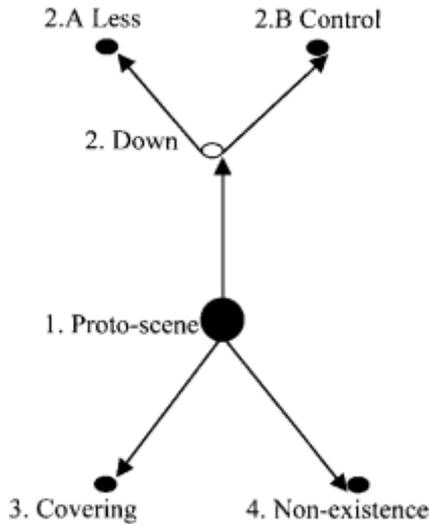
2. Semantic network for *below*

ACTIVITY 2 – Hands-on

We are going to carry out a corpus search on *under* and *below* and generate concordances to learn the other uses that your sentences do not include.

SECTION A

Generate a concordance for *under*.

Look at the usages of *under* in context.

Analyze the words/phrases to the left and right of *under*.

Classify the similar meanings of *under* with its collocates.

Identify which of the uses of *under* can be classified as proto-scene (central meaning)

Remember!

The proto-scene is the *central meaning*. The central meaning of *under* is <u>lower than (with potential contact)</u>. Other meanings are considered to be the *extensions* of the proto-scene of *under*.

Discuss with your friend which words/phrases on the left and right of *under* have helped you determine this meaning.

Apply the steps 1 to 3 and **identify** the other meanings (the extensions of the proto-scene) of *under*.

Decide with your friend how many of the contexts illustrate the different meanings of *under* other than the central meaning you have found.

Write down these senses of *under* with its collocates in the matrix below by referring to the polysemy network for *under* given in Activity 1.

Left	Right	MEANING
1 …………..…...	1 …………..…..	1 …………..…..
2 …………..…...	2 …………..…..	2 …………..…..

3 ……………..…..   **UNDER**   3 ……………..…..   3 ……………..…..
4 ……………..…..   4 ……………..…..   4 ……………..…..
5 ……………..…..   5 ……………..…..   5 ……………..…..

10**. Work** with your friend and **match** the meanings of *under* with those in the polysemy network schema for *under* in Activity 1

11. How many meanings have you found? Which meanings have you failed to find?

Now I am going to hand out a sheet of concordances for *under* so that you can complete the missing meanings of *under.*

   Look at the usages of *under* in context.
   Analyze and **discuss** with your friend the words/phrases on the left and right of *under* to determine its meanings**.**
   Complete the missing meanings in the network of senses for *under.*

SECTION B
   Generate a concordance for *below***.**
   Look at the usages of *below* in context.
   Analyze the words/phrases to the left and right of *below*.
   Classify the similar meanings of *below* with its collocates.
   Identify which of the uses of *below* can be classified as proto-scene (central meaning)

   Remember!

The proto-scene is the *central meaning*. The central meaning of *below* is lower than (but mostly with no potential contact). Other meanings are considered to be the *extensions* of the proto-scene of *below.*
   .
   Discuss with your friend which words/phrases on the left and right of *below* **have** helped you determine this meaning**.**
   Apply the steps 1 to 3 and **identify** the other meanings (the extensions of the proto-scene) of *below*.
   Decide with your friend how many of the contexts illustrate the different meanings of *below* other than the central meaning you have found.
   Write down these senses of *below* with its collocates in the matrix below by referring to the polysemy network for *below* given in Activity 1**.**

   Left   **Right**   **MEANING**
   1 ……………..…..   1 ……………..…..   1 ……………..…..
   2 ……………..…..   **BELOW**   2 ……………..…..   2 ……………..…..
   3 ……………..…..   3 ……………..…..   3 ……………..…..
   4 ……………..…..   4 ……………..…..   4 ……………..…..

10**. Work** with your friend and **match** the meanings of *below* with those in the polysemy network schema for *below* in Activity 1

11. How many meanings have you found? Which meanings have you failed to find?

12. Now I am going to hand out a sheet of concordances for *below* so that you can complete the missing meanings of *below***.**

Look at the usages of *below* in context.

Analyze and **discuss** with your friend the words/phrases on the left and right of *below* to determine its meanings**.**

Complete the missing meanings in the network of senses for *below*.

ACTIVITY 3 Comparison of the senses of *under* and *below*

Work with your friend and **compare** the meanings of *under* and *below* you have found with the ones in the networks given in Activity 1.

Discuss with your friend which meanings of *under* and *below* are distinct and which ones nearly synonymous.

Bilişsel dilbilim içgörülerinin veri-yönlendirmeli öğrenim ile birleştirilmesi: düşey edatların öğretimi

Öz

Çalışma, Bilişsel dilbilim ve veri-yönlendirmeli öğrenim tekniğinin bileşiminin, öğrencilerin İngilizce uzamsal edatlardan iki grup düşey edatın, *over/under* ve *above/below* edinimi üzerindeki etkisini araştırmaktadır. Çalışmada toplam 52 öğrenci ilgili edatların öğretimi için iki haftalık programa katılmıştır. 26 kişiden oluşan deney grubu ile veri-yönlendirmeli öğrenime dayalı bilişsel dilbilim içgörülerini içeren bir öğretim tekniği izlenmiştir. Bu program bilişsel açıklamalar, İlkeli Çokanlamlılık (Principled Polysemy) modeli ve tanıklı dizin etkinlikleri içermiştir. Kontrol grubu ise aynı şekilde 26 öğrenciden oluşmuş ve deney grubunun aksine elektronik ya da basılı sözlük çalışmaları üzerine kurulu geleneksel eğitim almıştır. Gruplar daha sonra öntest, sontest ve geciktirilmiş sontest edimleri açısından karşılaştırılmıştır. İstatiksel çözümlemeler her iki öğretim tekniğinin öğrencilerin düşey edat bilgilerini önemli ölçüde iyileştirdiğini, fakat veri-yönlendirmeli öğretime dayalı bilişsel dilbilim içgörülerini içeren öğretim tekniğinin daha çok öğrenim kazanımları sağlama ve bilgiyi daha iyi hatırlama yönünde geleneksel öğretim tekniğinden çok daha etkili olduğunu ortaya koymuştur. Bulgular, iki öğretim tekniğinin bileşiminin, edatların farklı anlamlarını anlaşılır bir şekilde öğrencilere sunma ve öğrencilere ilgili edatların kullanımı ile ilgili zengin bağlam sağlama açısından uzamsal edatların öğretiminde etkili bir yöntem olabileceğini göstermektedir.

Anahtar sözcükler: veri-yönlendirmeli öğretim; bilişsel dilbilim; ilkeli çok anlamlılık modeli; düşey edatlar; tanıklı dizin

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