RULE-BASED VERSUS PROBABILISTIC LEARNING
AND THE TEACHING OF ENGLISH PREPOSITIONS:
A COGNITIVE CORPUS-BASED APPROACH

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1. Introductory remarks

Over the past decades prepositions have been the subject of extensive research for a number of linguists, and more importantly for the following discussion, the source of bafflement and vexation for teachers as well as frustration and errors for learners of English. One possible reason for this state may reside in the fact that the explanations of the meaning and usage of English prepositions in most reference materials available on the Polish market follow a *rule-governed* (i.e. top-down) approach to language description. The approach consists in listing a small number of (the most typical) contexts in which a preposition occurs with several examples presented to illustrate them, i.e. in presenting rules at the expense of their instantiations. The contention underlying this approach assumes that the most parsimonious grammar, i.e. one which '[does] the job with the fewest symbols' (Langacker 2000: 91) is the most effective one. Further to that, the descriptions of contexts presented in the vast majority of grammar books are recursive, thus well known to learners of English. In consequence, despite the knowledge of most typical contexts in which a preposition occurs, learners of English cannot achieve high standards of performance when it comes to using prepositions in speech or writing. What we may learn about prepositions presented in a vast majority of grammar books is, therefore, far from exhaustive, often inconclusive and confusing for learners of English.

For the sake of illustrating the above claim, let us analyse two reference materials. The description of the preposition *at* provided by Swan (1997: 80), although shedding some light on the problem, does not offer a completely satisfactory explanation. According to Swan, *at* is used in the following contexts (examples from Swan):

1. Indicating position as a point (e.g. *Turn right at the next corner*).
2. Referring to the name of a building when thinking of the activity that happens there (e.g. *I was at the theatre*).
3. Referring to proper names used for buildings or organizations (e.g. *I first met your father in/at Harrods*).
4. alking about the place of study (*He's at the London School of Economics*).
5. Talking about the name of a city to refer to that city's university (*He is a student at Oxford but He lives in Cambridge*).
6. Referring to group activities (e.g. *at a party*).

In a handbook of prepositions by a Polish author (Kosonocka-Taber 1997:10), we read that the preposition *at* is used in the following contexts:

1. to express place of location, e.g. *at the top of the hill, at school, at John's*
2. to express vicinity, e.g. *at the table, at the window*
3. referring to events, e.g. *at the party*
4. o express specific time, e.g. *at six o'clock*
5. o express age, e.g. *at the age of nine*
6. o express targets, e.g. *aim at*

Comparing this with Swan's list, we have to notice that, although the contexts present more details, their number is still far from comprehensive.

Without underestimating the obvious merits of the books, we have to admit that the information we learn from them leaves a learner with more than a shadow of doubt as to the semantic difference between, say, *at the beach* and *on the beach*, or *in the office* and *at the office* – usages occurring in popular English course-books at intermediate levels. The following sentences illustrate the case:

(1)   Someone stole their car while they were **at the beach**. (*First Certificate Gold,* page 155).

(2)   I've left my case at the office. (*Headway Intermediate,* Workbook, page 35).

On the basis of the aforementioned uses of *at*, the reading of sentence (1) might be interpreted as an example of use 1 proposed by Swan, i.e. indicating position as a point. However, the *point* illustrated by the sentence quoted in Swan:
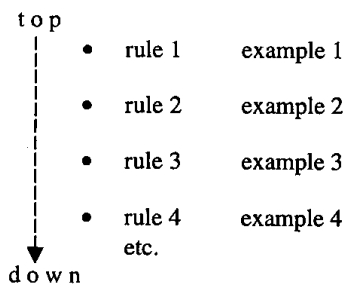
(3)   Turn right at the next corner

and sentence (1), impose conceptualizations characterized by different parameters typical of the objects observed. Namely, in (3) the *corner* is suggestive of representing a crucial point, behind which the space of other qualities emerges (indicated strongly by the verb *take*, i.e. by a short and abrupt movement). In other words the space which occupies the conceptualizer's locus of attention is divided by the landmark into two competing parts: the space contemporary with the time when the conceptualizer describes it (before taking the critical corner), and the space which is currently inaccessible to the observer (but will be when we *turn* the corner). In sentence (1), on the other hand, the space accessible to the conceptualizer occupies a unified belt of space (i.e. *the beach*) on or near which the tr (i.e. *we*) is located, in which case *the beach* is not minimized to a point but remains accessible to a conceptualizer in its full size. Moreover, the lm to which we refer does not code the concept of a critical point. Thus, the explication of the use of *at* presented above does not seem to satisfy the requirements imputed by context in (1). Despite the discrepancy, however, using *at* in (1) is perfectly correct. The explanation of the use of *at* in Swan is thus insufficient for a language learner to understand why *at*, rather than *on* (which is the more common preposition collocating with *beach*) is used in example (1).

Similarly, the explanation of the use of *at* in sentence (2) causes problems. In line with Swan, we use *at* to refer to activities occurring in a building. However, as we shall see in the remainder of this paper, when highlighting activities which take place in a building *in* is equally appropriate; in some cases it is even the recommended preposition (cf. section 3.2.1. point 1.). Here, again, the rules which explain the use of *at* in popular reference materials prove incomplete. Of course, one might assume that it is possible to account for the use of *at* in this phrase by conceptualizing *the office* as a point, which is minimalised by the conceptualiser (Swan, explanation 1). Such an explanation cannot be excluded; however, we should be prepared to deal with arguments which question this line of reasoning: if the *office* is minimized to a point how can we visualize another object which occupies its interior? or if *the office* is juxtaposed with another potential place (say a point of the journey home), what is it juxtaposed with? As in this short sentence there is no indication of an alternative space to which *office* is compared, it is difficult to prove that *at* is a better alternative than *in*. The fact that *the office* is always located in some building speaks for the use *in*, which is the preposition typically used when referring to some interior. Given so many alternative and self-excluding explications which one may follow, it seems that the above-mentioned enumeration of possible senses conveyed by *at* most probably will not satisfy pedagogical needs of teachers/learners.
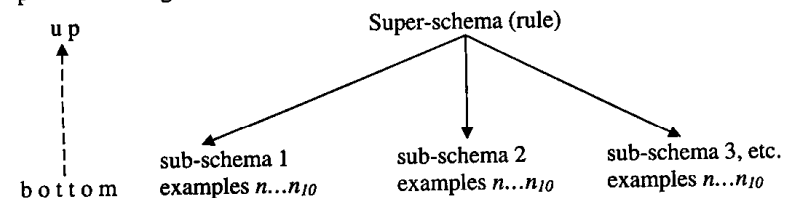
To conclude the above discussion, let us note that although both sentence (1) and (2) illustrate the context of *at* used of a point, a vast majority of students would opt for the preposition *on* in (1) and *in* in (2), as the phrases *on the beach* and *in the office* are intuitively judged to be more frequent in everyday language. Moreover, the explication of the use of *at* in sentence (2) is not possible referring solely to rules provided by popular reference materials. Therefore, it is of vital importance for teachers not only to openly admit that both *on/at the beach* as well as *in/at the office* are correct but also to be able to justify their usage and explain the difference in meaning between these phrases while confronted with questions posed by inquisitive students.

Unfortunately, my observations of in-service instructors confirm a rather unfavourable suspicion that there is a generally adopted defective teaching policy (often stemming from an ill-founded contention) of ascribing an arbitrary status to prepositions in prepositional phrases. In other words, most language teachers are inclined to admit that prepositions occur in *fixed* phrases, for example that *the beach* always collocates with *on*, and *office* with *in*. In line with Cognitive Grammar (CG), however, the choice of a particular preposition depends on the intentions a speaker wishes to express.

At this juncture we shall discuss another common problem connected with teaching prepositions, namely, the contexts in which *at* occurs seem to bear no relation to each other or to its canonical meaning of 'proximity'. How to explain to a learner of English that, for example 'expressing specific time' (Kosanocka-Taber, meaning 3) or 'expressing age' (Kosanocka-Taber, meaning 4) is an elaboration of its super-ordinate meaning (superschema) of 'proximity'? The word 'specific' seems to conflict with the rule, and 'age' does not seem to have any connotations with 'proximity'. The contexts thus appear to be autonomous, self-contained categories, i.e. a list of illogical rules, which do not influence positively their learning and retention. The top-down approach discussed above may be illustrated as follows:

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t o p
  |
  |    •  rule 1       example 1
  |
  |    •  rule 2       example 2
  |
  |    •  rule 3       example 3
  |
  |    •  rule 4       example 4
  ↓       etc.
d o w n
```

If we wish to facilitate the learning of prepositions we have to show how the canonical meaning (super-schema) may be realized in particular contexts (in sub-schemas), as by highlighting semantic properties sustained in a number of usages we reduce the number of its uses to be learned. For example, remembering that *at* applies to contexts implying reference to a 'point' should suffice if we are able to explain how the concept of a 'point' is embodied in the phrase 'at the age'.

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 u p                          Super-schema (rule)
  ↑                              ╱    |    ╲
  |                            ╱      |      ╲
  |                          ╱        |        ╲
  |                        ╱          |          ╲
  |                      ↙            ↓            ↘
  |              sub-schema 1    sub-schema 2    sub-schema 3, etc.
b o t t o m    examples $n...n_{10}$   examples $n...n_{10}$   examples $n...n_{10}$
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To recapitulate, two possible sources of problems with prepositions have been identified: 1. the top-down approach common for descriptions of prepositions in most grammar books which favours the description of the 'rule' over its instantiations and focuses on the semantic properties characteristic of individual meaning presented without highlighting the properties shared by all 'nodes' in 'network of meanings', 2. the widely adopted (by language teachers) assumption that prepositions are ascribed to nominals (in prepositional phrases) arbitrarily and without any options of variation.

In response to the needs of Polish learners of English, the intention of this paper is to canvass how selected aspects of the preposition may be elucidated through an innovative approach. The approach, grounded – in its theoretical part – in the theory offered by Cognitive Linguistics supported by connectionism, and – in its practical applications – in language corpora, follows a bottom-up direction of learning, which aims at explaining macro-level facts in terms of micro-level phenomena.

In a bottom-up approach to learning, a language learner analyses the conceptual meaning of the preposition under scrutiny as well as the meaning of the prepositional phrase in which it occurs as, in accordance with cognitive grammar, the preposition is believed to encapsulate meaning as an autosemantic unit as well as participate in meaning emerging when inserted in a phrase, i.e. higher order structures. As a result, the meaning of the whole phrase depends both on the nominal (or the verb preceding the prepositional phrase) and on the preposition itself. It is worth mentioning at this point that, contrary to a common belief, a preposition *per se* does not convey a myriad of meanings exemplified by particular contexts (as believed by a number of cognitive linguists, cf.

Brugman 1980). The preposition is ascribed solely one general (canonical) meaning, while the meaning of a phrase in which a preposition occurs is in fact the meaning of the particular context rather than the preposition *per se* (Aleksander Szwedek, personal communication, 7/11/2003). To give an example, the preposition *at* can be used in the following contexts:

- to express imprecision (*Let's meet at a later date, Mary is at the window*);

- to express partial involvement in the action described (Mary is pecking at the food as she is on a diet).

In line with the above claim, however, we cannot speak of two meanings of *at*, but of two *contexts* in which *at* occurs (cf. Ruhl for details on monosemy). The canonical meaning of *at*, i.e. 'proximity', remains (implicitly) the same in each sentence: 'proximity' is a category super-ordinate to 'imprecision' and 'partial involvement', and to some extent semantic properties of 'proximity' are accessible in each of its contexts. In order to allow a learner to notice the common denominator typical of a number of cases (i.e. to propose a rule), it is necessary that a learner be exposed to a rich inventory of contexts in which it occurs. A wide array of contexts in which learners could identify common properties of the words analysed may be found in language corpora. We shall return to the role of corpora in language teaching issue in 2.2.

The second advantage of the bottom-up approach is that a learner, being exposed to a number of examples of usage of the preposition analysed and, next, encouraged to eventually extract one rule which governs its use (i.e. its canonical meaning), is more likely to use the preposition correctly in novel contexts than in the case when the procedure follows a reverse order (first rules, then examples). The reason for expecting a higher effectiveness of bottom-up learning resides in a generally agreed contention that a learner's greater intellectual involvement in rule extraction (than it is in the case of inductive learning) ensures longer retention of the item learned (as the item analysed lingers in the working memory longer when a learner performs the analysis him/herself). Of course, the more contexts a learner is presented with at input stage, the higher the probability of their error-free usage by learners. Corpora, with their technical possibilities of retrieving a great number of concordances, seem to be exceptionally efficient in creating such a learning environment.

2. Inductive model of language processing

Traditionally, in language acquisition theory and psycholinguistic research two competing viewpoints in regard to language processing are juxtaposed: deductive and inductive. The former is strictly connected with a symbolic and the latter –

with subsymbolic paradigm ascribed to cognitive models of language acquisition (Broeder and Murre 2000: 1). The symbolic paradigm is typically associated with the modularity of the mind (expounded by Fodor 1983) and it assumes that the human mind (to be more specific one module of the mind, which is called Language Acquisition Device) has the capacity to manipulate information definable as clearly demarcated discrete items, i.e. symbols. These fixed symbols (often associated with single words) are manipulable and are governed by pre-established rules and principles (i.e. grammar). A child learning a language is exposed to impoverished and degenerated input which, owing to the existence of LAD, allows one to infer a finite number of rules applicable to all symbols and, as a result, create an infinite number of original outputs. Framed in this way, the approach assumes that a child's task is grammar identification. According to a competitive approach (connectionism), a child's task is to develop the skill of how to use language on the basis of recurrent patterns available in input data (Seidenberg 1997: 1603).

2.1. Inductive learning: the connectionist approach

An alternative to this atomistic perspective is offered by a non-modular approach to language processing promoted by connectionism. In line with this view, the human mind (i.e. the whole cognitive system, not just one of its modules) stores fragments of items, i.e. constitutive elements, known as sub-symbols, which have only potential meaning. Each 'piece of information' may participate in computing a greater portion of information and thus contribute to the overall meaning construed on-line according to a given transfer pattern. Depending on the meaning of the final item determined by the pattern of its retrieval, the meaning of each subsymbol may be adjusted to 'fit' in the target item. Thus, a subsymbol does not encode meaning itself but, instead, by transmitting information to higher-order processing system which pools all subsymbols together, encodes information indirectly. Information is transmitted by means of a complex network of interconnections. The more often a connection is activated, the easier it is to activate it (i.e. the higher its weight). The information, being encoded by a number of participating primitive elements ('neurons') triggered off by means of impulses transmitted by interconnections ('axons'), is thus distributed over the whole network (i.e. the mind/brain). Moreover, while computing the final output information each component is fired at the same time, and the target item is a result of a joint activity of all its constituents. In other words mental representations are distributed in nature, and the activation of each element occurs in parallel. The process of retrieval of mental representations thus follows a bottom-up paradigm, i.e. from particular to

general, or from the smallest fraction of information to its higher-order realization. The claim that a neural network manipulates non-symbolic input data and is still capable of abstracting rules supports the claim that rules do not need explicit teaching (since the system can formulate them as a result of on-line analysis). In fact, it has been experimentally proved that not only artificial neural networks but also the human beings – even a five-month-old infant[1] – are capable of rule abstraction. Rule abstraction as a result of probabilistic analysis is only possible in the presence of a handful of instances which exemplify the rule, and only in contexts where similarities between these instances are readily discernable. In other words, it is possible to extract rules only from instances which share a number of similarities: novel words are evaluated against the already known ones and/or against other novel instances. Therefore, it seems that a natural teaching procedure should emphasise similarities between phrases, for example by presenting simplified input data.

The suggested applicability of neural networks to neuroscience has serious constraints[2], yet there are many similarities between them, such as: "the emphasis on numerous units (analogous to synaptic efficiency); adaptive plasticity; graded responsivity; and tolerance to damage and noise" (Bechtel and Abrahamsen, 2002: 342). Even backpropagation, which has long been considered a procedure typical of artificial neural networks which has no equivalent in humans, is now claimed to be realized by means of a neurobiological mechanism known as retrosynaptic information transfer (Gardner, 1989: 58). Connectionism is thus consonant with what we know at least about rule abstraction from neuroscience, and thus it provides a supportive argument which speaks for inductive learning as the natural and predominating activity of the brain. In other words, it may be argued that the inductive paradigm in language learning (and hence language teaching) has strong biological grounds. This brings us closer to the claim of introducing the inductive paradigm in language *teaching* as the predominant teaching procedure.

The claim that language is processed and acquired in a bottom-up fashion is typical of inductive learning, and it is often supported by inductive teaching. A necessary requirement for a bottom-up teaching is the provision of an inventory of

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1   Cf. Marcus, 2001: 38-9.
2   The most oft-cited differences between artificial neural networks and neurobiology are the following: "Units are assigned activation values, while neurons emit a spike train. Connectionist networks use the single device of summing weighted activations to obtain net input, whereas connectivity in real brains is implemented chemically via various neuro-transmitters with different properties. In connectionist networks the inputs to a unit (...) are simply summed to obtain a net input, whereas neurons seem to use a more intricate mechanism which relies in part on the specific location at which an axon synapses with a dendrite or cell body"(Bechtel and Abrahamsen 2002: 342).

language data (which are to be stored as intake in the mental lexicon of learners) from which to abstract rules. As already mentioned, a rich source of natural language worth recommendation to a language teacher is a language corpus.

2.2. Inductive teaching: a corpus-based approach

The main advantage of using language corpora in language teaching is that they provide a language teacher with an overwhelming number of examples, and that these examples are generated within seconds. Of course, citations prepared as a classroom activity, as compared to ones displayed by a concordancer, are acutely limited, yet even a small collection of carefully selected exemplifications of a problem to be tackled by learners in class presented in the format of concordances allows learners to draw conclusions as to the usage of the preposition analysed. In other words, concordances promote autonomous, i.e. inductive learning – the fundamental assumption of the approach we shall present in the remainder of this paper.

3. Cognitive linguistics (CL) and language teaching

3.1. Introduction

The fundamental claim voiced by CL about the structure of language is that it reflects the way the human being perceives and conceives of objective reality (cf. Langacker 1987, Langacker 1990, Lakoff and Johnson 1980, Johnson 1987, Lakoff and Núñez 2000, Krzeszowski 1997, Talmy 2000, Zelinsky-Wibbelt 1993, Herskovits 1986, Rauh 1991). To put it differently, apparently arbitrary structures and meanings depend on and may be accounted for by our cognitive abilities, such as perception and conception, i.e. the way we see and conceptualise objects. Selected here for illustration are two possible prepositions which may precede the category of 'city' in English:

(4)   Step Into Britain's Secret History At The New Empire Museum **In Bristol**. (*Independent*, 11/12/2002)

(5)   But although the Stockholm summit in March this year emphasised the strategy agreed **at Lisbon**, progress has been minimal. (*Economist*, 17/12/2001).

The preposition *in*, although most often used in the above presented contexts, may be, in some cases, replaced by *at*. The choice of the right preposition depends on how the conceptualiser (typically the speaker) portrays the scene he or she is currently observing (here – the city). There are two possibilities

permitted by cognitive linguistics (cognitive grammar in particular): the city perceived as a point on a map and as a three-dimensional, cubic-like interior.

The perception of a city as a point is only accessible if one takes a step back (mentally) from the observed object to allow seeing both the target object (the city) as well as its broad context. In the sentence above (2), *Lisbon* is the place of an important summit organised in the past. It is juxtaposed with the summit which takes place in Stockholm in the year contemporary to the time when the comment is being made. The two cities create the starting and the end point on an imagery line (i.e. imputed by a conceptualiser) which indicates progress, or lack of it (as 'progress has been minimal'). Both cities are thus reduced to (reference) points. Further to that, the city of Lisbon has not been of prior importance in the portrayed scene, as it is the summit that is highlighted (i.e. profiled) in the sentence. The most important information is thus the event of organising a summit, its location being pushed to the background. Contrary to *Lisbon*, the city of *Bristol* is preceded by the preposition *in*. *Bristol*, however, is not allocated in a broad context of other objects. Rather, it is conceptualised as an object itself, which occupies the whole scope of the conceptualiser's locus of attention. This entails being (mentally) close to the object observed, and seeing it in its full size. In this particular context, *Bristol* is, therefore, an object much bigger in size than *Lisbon*. It is sufficiently big to allow the conceptualiser to enter its (three-dimensional, cubic-like) interior (the city is also bigger than the conceptualiser), to be more specific – an object (*museum*) located inside it. To recapitulate, the difference between the two sentences resides in the geometrical parameters ascribed to the concept of each city: the city visualised as a point (*Lisbon*) and as a three-dimensional area (*Bristol*).
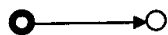
a. *at Lisbon*   b. *in Bristol*

The heavy line elements in each picture, which symbolise the summit and the city of Lisbon in picture a. and the museum in picture b., indicate the entities which are in focus in the construed scene. In cognitive grammar terminology they stand for the trajector (tr), while *Stockholm summit* and *Bristol* are the landmarks, i.e. the background elements in the scene.

By way of summary, let us enumerate the 'tools' used in analysis grounded in cognitive grammar involved in the preceding description: 1. mental transformation of objects (such as rotation, mini- and maximization); 2. setting a spatial configuration between the conceptualizer and the object described – this involves

the distance between them and actions performed by the conceptualizer with the object (entering its interior); 3. profiling selected parts of the object observed.

In the remainder of this section we shall present further examples of practical applications of cognitive linguistics to language teaching. To demonstrate inductive teaching, a number of examples will be displayed in the form of concordances prepared by the present author. These activities are tailored to three levels. Level one shows key words in context appropriate for pre-intermediate learners of English, by level two we mean upper-intermediate learners and for advanced and proficient learners concordances labelled 'level three' are adequate.

3.2. Cognitive analysis of selected prepositions

This section presents contexts in which three prepositions may occur: *at*, *on*, and *in*. Before analyzing particular phrases, let me note that in line with the analysis performed by the author, the three prepositions are believed to encode the following senses:

at: **proximity**, i.e. expressing the idea of: 1. being in the vicinity of another object in physical space (*at the bus stop*); 2. indefiniteness (*at a later date*); 3. imprecision (*at random*); 4. limited involvement in activities (*peck at food*); 5. imposing a distal perspective on the object observed and thus minimizing it to a one-dimensional point (of reference)[3] (*at the beach*);

on: **support**, which may express the idea of: 1. placing one object onto another one (*a book on the table*); 2. placing one object onto another elevated object in order to expose it (*actor on stage, woman on the pedestal*); 3. placing one object onto another one which is visualized as a platform (*on the bus*).

in: **enclosure**, which may be realized in the following contexts: 1. expressing inclusion (*in a box*); 2. expressing full involvement (*involved in doing something*).

The above list is not intended to be exhaustive yet it manifests how the canonical meaning encoded by the preposition (super-schema) may be reconstructed in a particular phrase (sub-schema).

3.2.1. [AT] + [OFFICE] vs [IN] + [OFFICE] – LEVEL 1

Let us start with a very general observation that the phrase *at an office* is very unlikely to occur, whereas *in an office* is perfectly correct. When comparing *at*

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3   This meaning is encompassed by 'indefiniteness' and 'imprecision'.

an office with *at the office*, the latter is of much higher frequency of occurrence in everyday language. In other words, the noun *office*, typically, collocates with the definite article in English, although phrases with the indefinite article are also attested in corpus data (it is perhaps worth mentioning at this point that the phrase without the article but preceded by *in* is also possible, yet the meaning of *in office* is different than *in the office⁴*).

Admittedly, the difference between *at the office* and *in the office* is rather fluid and thus cannot be always analysed in a yes-no fashion. In many cases the prepositions in question are substitutable and they entail only minute shifts in meaning yet if they exists this fact cannot be left unnoticed. The explanations offered in the remainder of this section do not claim the right to elucidate the subtle differences between the two phrases completely; instead it is hoped that they will cater for the needs of all those non-native users of English who wish to become conscious users of English.

In an/the office is used in the following contexts:

1.   When we are talking about the building in which an office is located.

The salient feature in the portrayed scenes is the line (to be more specific – the walls) which divides perceptible space into what is occupied by the building and what is outside the building.

(6)   Please contact with Mr Smith at 4 o'clock when he is normally in the office.

(7)   Please don't smoke in the office.

(8)   The heating was off in the office.

(9)   You can find the porter on the ground floor in the office.

2.   To emphasise the concept of a bounded and/or closed space.

In the office, *by locating the tr in a cubic-like lm, portrays the* office *as a closed physical object (most often visualized as a single room) thus profiling the relation of inclusion held between the tr and the lm and emphasizing a clear-cut division between the situation in the closed interior of the lm and in the external space.*

(10)   I often work alone in the office.

(11)   I will be in the office till 10 p.m. tonight.

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4   To be *in office* means to be in power.

3.   To convey a negative sense of being locked in a closed space with no escape:

(12)   I would hate being stuck in a nine-to-five job, like in an office, doing nothing but shuffling papers and looking at four walls.

Verbs and phrases which precede *in* + *office* often emphasise the concept of 'imprisonment':

being stuck/be sat/work long hours/spend some days sitting ~;

4.   When referring to clerical work:

(13)   Another busy day in the office: John is talking to some client, Jane is typing, and Mark is up to his ears in paperwork.

(14)   It is hard to imagine work in the office without computers nowadays.

5.   When referring to office equipment or other permanently fixed objects:

(15)   There are twenty swivel chairs in the office, seven desks, and two coffee tables.

(16)   Each room in the office is carpeted, has at least two computers and has an alarm.

6.   Describing staff members working as a team, i.e. being involved in a common project:

(17)   Tim is the only professional graphic designer in the office.

Typically, at the office *is suggestive of a set of qualities* associated *with an office, rather than the building itself, which may be realized in a number of ways.*

1.   The people working for a company:

(18)   She used to wear black mini-skirts at the office.

2.   The atmosphere in an office:

(19)   She is not very popular at the office.

(20)   The hostile atmosphere at the office may impair our work.

3.   Actions/states which fall outside the scope of clerical work:

When *at* is used, the event described may fall outside the office walls, in which case the office functions only as a loose association of events and people that implicitly exist also in other spatio-temporal dimensions.

(21) Everybody knows that she has had an affair at the office.

4. Indefiniteness.

When the lm is conceptualised as a physical object, there is a tendency to associate the lm with a number of rooms which constitute the *office* or with the space in the vicinity of an 'office'. This effect may be ascribed to the prototypical property of the preposition *at*, which assumes construing a scene from a distance, and thus seeing more, as well as our cognitive ability to manipulate objects (e.g. rotate, close, or merge), i.e. to transform image-schemas. As a result, the tr is thus not explicitly visualised in a closed area, e.g. an office room, but located only with some approximation in a virtually open area which has blurred boundaries (e.g. the tr may be in any room which is within the boundary of the office). The relation profiled is not inclusion but proximity of the tr relative to the lm

(22) Reach me at the office tomorrow morning.

(23) See you at the office at five p.m.

5. Juxtaposing the tr with competing events.

The preposition *at* is often used when making implicit reference to an alternative place of location. For example, by saying

(24) I'll be back at the office in an hour

we suggest another place where *I* will be located before returning to his previous location. Thus, the construed scene allows one to conceive the current situation as a starting point of a trajectory and eventually as its terminus point. The preposition *in*, on the other hand, does not carry such implications. The difference between the two contexts signalled by *at* and *in* can be illustrated as follows:

in the office   *at the office*
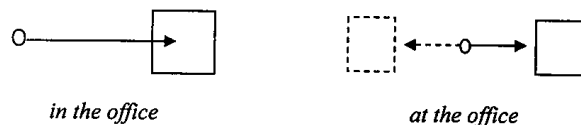
6. Proximity.

At is used when we refer to the building of an office itself, rather than its interior. In other words, it is its outer region that is salient.

(25) She parked her BMW at the office.

Level 1

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1 doesn't like. Jim often stays late in the office, till 10:00 p.m. or later. His
  wife
2 swivel chairs and one coffee maker in the office. There is also a yellow sofa
  and two
3 only professional graphic designer in the office, so whenever there are any
  problems
4 o have had an affair with somebody at the office but nobody wants to talk about
  it a
5 asked me: 'did you have a good day at the office, honey?'. I didn't know what
  to say
6 dn't worry about anything going on at the office. Just relax, take a week off,
  go awa
```

In conclusion, the key to understanding the difference between the two prepositions in question seems to reside in the temporal states they refer to: the preposition *in* expresses more permanent states as compared to those associated with *at* which emphasise short-lived and fleeting states. Evidence to support this observation may be found in the verbs and nouns that usually go with the two prepositions, as well as the particular aspects of *office*, which are chosen to be profiled:

in – verbs: to *be* always at a particular time *in the office*;
   – nouns: part of a *team* (working on one project), clerical work, permanently fixed objects;
   – aspects: *office* is a building; *office* 'imprisons' the people inside (implied immobility, which is suggestive of stability and permanence);

at – verbs: park (a car at (= near) the office), be available at a particular time, be back at five o'clock, have an affair, wear mini-skirts;
   – nouns: atmosphere.

3.2.3. in/at/on the bottom – LEVEL 2

The noun *bottom* may collocate with three prepositions, conveying a different meaning in the case of each prepositional phrase. Compare the following sentences:

(26) There are sediments that lie **on** the bottom of the ocean which are disastrous to the environment.

(27) Place the cod **in** the bottom of the baking dish.

(28) The beggar found a sandwich **at** the bottom of the bin.

Both *on the bottom* and *in the bottom* require contingence of the object described (tr) and the cubic-like container with a profiled bottom (lm). In the case of *on* a touching point between a tr and a surface-like lm (the canonical meaning of *on* is 'surface serving as a support') is sufficient to fulfill the requirement, whereas *in* is suggestive of a number of contingence points which either fully or partially cover the lm and, in addition, the tr extends vertically along the lateral walls of the lm. *In* may also imply the tr being inside the structure of the lm, as in *A box was buried in the bottom of the river*. It is also worth noticing that *in the bottom* often occurs in imperative sentences with verbs such as *place, put, locate*, etc.

The contexts in which *in* and *on* occur differ in the proportion of the tr relative to the lm (*on*: greater disproportion, *in*: smaller disproportion), and share similarity in terms of the relation of contingency held between the tr and the lm. Moreover, the use of *on* implies a long lasting state (e.g. *sediments that lie on the bottom of the ocean*), while *in* and *at* – shorter states (*a sandwich at the bottom of the bin*) or actions (*place the cod in the bottom of the baking dish*). The long lasting states are confirmed by the use of verbs preceding *on the bottom*:

accumulate/lying/lurking/mountain/ooze,

and nouns:

a carpet of algae/weed/slime.

The phrase *at the bottom*, on the other hand, signals that the tr is either contiguous to the bottom part of the tr or is located above it, i.e. at some point on a (virtual) scale on which the bottom constitutes one of the extreme points. The relation between the tr and the lm is analysed on a vertical plain in the case of *at*, and on a horizontal plain in the case of *on* and *in*.

on the bottom   in the bottom   at the bottom
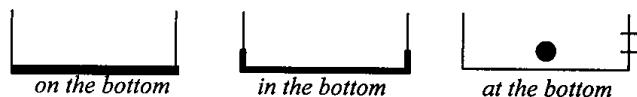
Finally, both *on* and *in* typically impose the concept of an interior wherein the tr is located, while *at* may be employed to express an internal as well as external perspective:

(29) The baby is standing at the bottom of the stairs. (external perspective)
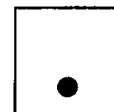
at the bottom (internal perspective)   *at the bottom* (external perspective)

Level 2

```
1 y and place a dollop of avocado mix on the bottom; top with the lobster flesh
2 g down with my scuba. I was sitting on the bottom of the ocean 20 minutes late
3 res graze on the sediments that lie on the bottom of the ocean, stripping out
4 e three couples, they were anchored at the bottom of the social ladder. Eliz h
5 asic letter tariff price. The UK is at the bottom end of the scale. The main p
6 side of the door and I was standing at the bottom of the stairs. I could see h
7 ime and a layer of grit accumulated in the bottom of the ditch. I didn't know
8 rom local people that he was buried in the bottom of the lake. The police star
9 ing tea when I noticed coffee dregs in the bottom of my cup. I called the wait
```

3.2.3. Round-off activity

Fill in the blanks with one of the following prepositions: *in, at*, or *on*.

```
1  y and place a dollop of avocado mix ... the bottom; top with the lobster
   flesh and se
2  g down with my scuba. I was sitting ... the bottom of the ocean 20
   minutes later I we
3  res graze on the sediments that lie ... the bottom of the ocean,
   stripping out whatev
4  e three couples, they were anchored ... the bottom of the social ladder.
   Eliz had to
5  asic letter tariff price. The UK is ... the bottom end of the scale. The
   main problem
6  side of the door and I was standing ... the bottom of the stairs. I
   could see her wal
7  ime and a layer of grit accumulated ... the bottom of the ditch. I
   didn't know how to
8  rom local people that he was buried ... the bottom of the lake. The
   police started to
9  ing tea when I noticed coffee dregs ... the bottom of my cup. I called
   the waiter imm
10 spacious and very clean. Each room ... the office is carpeted, has at
   least two new
11 hairs and a number of swivel chairs ... the office. There is also a new
   fax machine
12 heating was off one week in winter ... the office last year. There were
   many complai
13 o have had an affair with somebody ... the office but nobody wants to
   talk about it a
14 asked me: 'did you have a good day ... the office, honey?'. I didn't
   know what to say
15 dn't worry about anything going on ... the office. Just relax, take a
   week off, go aw
```

4. Conclusion

It has been the purpose of this paper to show that it is possible for a canonical sense of the preposition to emerge from examples that instantiate the most typical contexts in which it is likely to occur: the senses conveyed by particular examples do have a common denominator and thus may constitute the basis for higher abstractions, i.e. the canonical use. In other words, we claim that the senses coded by particular expressions containing the target preposition and the preposition itself form a network of interrelated meanings. This view is at odds with the traditional approach which assumes that senses exist in abstraction from each other and constitute lists of examples grouped arbitrarily. It has also been suggested that a language learner may be supported in the process of canonical sense extraction derivable from the whole network by exposure to an inventory of phrases, preferably those occurring in authentic materials, such as language corpora. The direction of learning proposed in this article is thus from particular to general, known in EFL methodology as 'bottom-up' procedure or inductive teaching. All these observations have serious pedagogical consequences. If learners are equipped with the knowledge of how to identify the canonical meaning as a constitutive element in a lower order structure (which is the teacher's task), when learning English prepositions, identifying solely the canonical meaning should suffice. This obviously saves time devoted to storing a number of phrases in which a given preposition occurs: by remembering the canonical meaning and knowing how this meaning manifests itself in lower order structures a learner may rely on his own knowledge and intellectual capabilities rather than external sources, such as reference materials or the teacher. The didactic process which consists in the provision of a list of rules is thus bound to be replaced by the provision (and the practice) of a list of skills.

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