A Lexical-Semantic Analysis of the English Prepositions *At, On* and *In* and their Conceptual Mapping onto Arabic: A Comparative Investigation

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Declaration for SOAS PhD thesis

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Abstract

This study examines the semantic factors that determine the choice of the English spatial prepositions *at*, *on* and *in* within a cognitive semantic framework and accounts, as proposed by Herskovits (1986), Lindstromberg (1998, 2010), Talmy (2000), Tyler and Evans (2003), and Coventry and Garrod (2004). A semantic multiple-choice test was conducted to examine the performance of 54 ESL learners (32 Arabs, 11 Spanish, 11 Japanese). This test consisted of 59 items, in which central and peripheral prepositional meanings were included and were presented, with or without images. A repeated measure ANOVA test was used to analyse the findings for the semantic test. The semantic test findings revealed that: (1) The deviation of the performance of Arab ESL learners when using these prepositions could not only be explained by L1 interference patterns (Arabic) into L2 language (English), but (2) mastering them requires those ESL learners to have a high level of proficiency. (3) The peripheral meaning of prepositions posed a significant challenge to the participants in the test, especially during the trials for '*at'*. (4) The polysemous nature of English prepositions significantly impedes the progress of Arab ESL learners in acquiring native-like intuition. The outcomes of this comparative investigation offer a number of potential pedagogical benefits. The study highlights the non-equivalence between the prepositional systems in English and other languages, such as Arabic, which is defined by semantic considerations. It is possible for ESL learners to map the spatial relations expressed by these English prepositions (coincidence, support and containment) onto other conceptual relations. The identification of a one to one equivalent would not be considered the cause of the learning difficulty but rather, the manner through which the speakers of these

languages conceptualise and categorise spatial relations.

Dedication

To my parents,

Who taught me the first lessons in life,

And to my beloved husband,

Thank you for being there for me at all times.

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List of Abbreviations

ANOVA	Analysis of Variance
ACC	Accusative case
ACL	Applied Cognitive Linguistics
BNC	British National Corpus
CAH	Contrastive Analysis Hypothesis
CL	Cognitive Linguistics
CS	Cognitive Semantics
DDM	Different domain mapping
EA	Error Analysis
EFL	English as a foreign language
ESL	English as a second language
F	Figure
FL	Foreign Language
G	Ground
GEN	Genitive case
ICLE	International Corpus of Learner English
IL	Interlanguage
L1	First language
L2	Second language
LCCM	Lexical Concepts and Cognitive Models

LM	Landmark
L-space	Linguistic-space
LOC	Locative Marker
NOM	Nominative case
NSs	Native speakers
Post P	Postposition
P-space	Perceptual-space
RM	Repeated Measures
SDM	Same domain mapping
SL	Second Language
SLA	Second Language Acquisition
SUBJ	Subject
Top N	Top noun
TR	Trajector
UG	Universal Grammar
ZDM	Zero domain mapping
1DIM	One-dimensional
2DIM	Two-dimensional
3DIM	Three-dimensional

Arabic Gloss Abbreviation Symbols

(Adapted from Saeed, 2014)

ACC = accusative case

DEF = definite article

F = feminine

GEN = genitive case

IMP = imperative

M = masculine

NOM = nominative case

PST = past

PL = plural

POSS = possessive

PRS = present

1 = first person

2 = second person

3 = third person

I = singular

Ø = No corresponding element

D =Dual

Transcription

A description of place and manner of articulation of Arabic phonemes and their transcriptions (Adapted from Esseesy, 2010).

1) Consonants

Consonants	Transcription symbol	Arabic
Glottal Stop	ʔ	ء
Glottal fricative	h	هـ
Voiceless pharyngeal fricative	ḥ	ح
Voiced pharyngeal fricative	ʕ	ع
Voiceless uvular stop	q	ق
Voiceless velar stop	k	ك
Voiceless velar fricative	x	خ
Voiced velar fricative	ɣ	غ
Palatal glide	y	ي
Voiceless alveolar fricative	š	ش
Voiced alveolar affricate	j	ج
Voiced alveolar liquid	r	ر
Voiced alveolar nasal	n	ن
Voiced velarized interdental fricative	ẓ	ظ

Consonants	**Transcription symbol**	**Arabic**
Voiced interdental fricative	ḏ	ذ
Voiceless velarized dental stop	ṭ	ط
Voiced velarized dental stop	ḍ	ض
Voiceless velarized dental fricative	ṣ	ص
Voiceless dental stop	t	ت
Voiced dental stop	d	د
Voiceless dental fricative	s	س
Voiced dental fricative	z	ز
Voiced dental liquid	l	ل
Voiceless labiodental fricative	f	ف
Voiced bilabial stop	b	ب
Labial glide	w	و
Voiced bi-labial nasal	m	م

2) Vowels

Vowels	Transcription symbol	Arabic
Low open long vowel	ā	ا
Low open short vowel	a	ـَ
High front long vowel	ī	ي
High front short vowel	ɪ	ـِ
High back long vowel	ū	و
High back short vowel	u	ـُ

Chapter 1 Introduction

1.1 Preliminaries

Adpositions[1], also known as postpositional and prepositional particles, are an important lexical category in many languages, including English, Arabic, Spanish and Japanese. Prepositions, in grammar books, are defined as relational words that express a relation between two entities (Quirk et al, 1985, p.673). In cognitive semantics (CS) the different meanings of a preposition are originated by our daily spatio-physical interaction with objects in the world, therefore, "investigating the meanings associated with spatial particles will offer fundamental insights into the relation between language, mental representation and human experience"(Tyler and Evans, 2003, p.2) .The aim of my study is twofold: to increase our understanding of the semantic properties of the English prepositions *at*, *on* and *in,* and to investigate the semantic aspects that influence the choice of these prepositions. In this way, it is hoped that the study provides an insight into the difficulties and challenges encountered by English second language (ESL) learners, mainly Arab, Japanese and Spanish, during their acquisition of these lexical terms. Previous comparative research into English and the languages of the current study, particularly those conducted in Arabic (Habash, 1982; Kharma and Hajjaj, 1989; Ho-Abdulla and Hasan, 2009; Tahaineh, 2010), Japanese (Sinha et al., 1999; Katsuki-Pestemer, 2003; Musadu, 2007; Kodachi, 2005; Kita, 2006; Cho, 2010) and Spanish (Coventry and Guijarro-Fuentes, 2008; Huerta, 2009), indicate that there is a great difference between English and these languages in the semantics of the prepositions. In this

[1]This study focuses on the English prepositions *at*, *on* and *in*. The term 'adpositions' will be used in reference to both postpositional and prepositional particles. For more information on this, see (4.4.3).

study, I will focus on the polysemy, idiomaticity and diversity that exist in the usages of prepositions through the adoption of a contrastive method of analysis to collect, analyse and interpret the relevant data from English and the chosen languages. The comparison will concentrate on an examination of the relationship between English and Arabic, my native language, within a cognitive semantic framework as proposed by Herskovits (1986), Talmy (2000), Tyler and Evans (2003,) and Coventry and Garrod (2004). In order to explain their semantic diversity and polysemy, I will focus on both the core meaning of these English prepositions, namely the spatial meaning, and the peripheral meaning, that is the metaphoric extended non-spatial meaning. For the most part, the metaphorical extension is grounded in literature dealing with English (Johnson and Lakoff, 1980) and image schema (Johnson, 1987; Lakoff, 1987). This study aims to not only yield new insights into the semantics of English prepositions, but also to provide functional data regarding the performance of English second language learners, specifically those from Arabic, Spanish or Japanese backgrounds. From the Arabic perspective, for example, there are often no significant semantic differences between the three English prepositions *at, on,* and *in* when they are used in their spatial meaning. In some cases, the spatial relationships or the concepts conveyed by these prepositions, which are coincidence, support and containment respectively, can be expressed by using a single Arabic preposition, *fi,* such as in the examples of *in* the club, *on* the farm and *at* school. Therefore, preposition choice is not a matter of finding a word-to-word equivalent, but rather of finding the correct dimensional semantic counterpart (the preposition) to express the relationship between two entities. Spanish and Japanese ESL learners also face similar problems. The spatial relations expressed by *at, on* and *in* can be mapped onto the Spanish preposition *en,* and onto

the postpositions *ni* and *de* in Japanese. As a result, ESL learners, whether Arabic, Spanish or Japanese, cannot develop clear-cut borders between the core and the peripheral senses of these prepositions. A brief cross-linguistic comparison between the semantics of the English prepositions *at*, *on* and *in,* as well of the aforementioned languages (Arabic, Spanish and Japanese) is provided in (4.4). Consequently, the study posits that these differences will have an impact on the conceptual mapping of these prepositions by such ESL learners as Arabic, Spanish and Japanese students, leading to their experiencing difficulties in differentiating between the multiple meanings, whether core or peripheral, and the usages of the English prepositions *at*, *on* and *in*.

1.2 Statement of the Problem and the Purpose of the Research

In this study, I explore the semantics of the English prepositions *at, on,* and *in,* each of which seems to entail certain spatial features that, while probably universal, appear to be conveyed in different ways across languages. To a certain extent, these prepositions are semantically similar from an Arab viewpoint, making the correct choice in a certain context challenging to Arabic learners of English. As a teacher of EFL at governmental schools in Kuwait, I already had a suspicion that the English prepositions *at*, *on* and *in* might have other meanings than I have previously explained to my students. Throughout my ten years of teaching experience, I have experienced difficulties in explaining the usages of English prepositions *at*, *on* and *in* to my students, and even in responding effectively to their enquiries. It is especially challenging to clearly differentiate between the different senses of the

prepositions, e.g. *in* the library[2], *at* school, *on* the farm, or the issues of why in English it is more correct to say 'she is good *at* reading' rather than 'she is good *in* reading'. This may be because I have engaged myself in the functional and syntactic use of these prepositions and how they occur in sentences. Previously, I have typically explained the syntactic features of these words, rather than looking at the semantic factors that determine their correct usage. This has led me to recommend that my students memorise the different senses of these prepositions, especially the most prominent and frequent examples. However, this did not help many of my students to acquire native-like intuition or to use the prepositions *at*, *on* or *in* appropriately. This is likely attributable to the fact that the aforementioned English prepositions are polysemous in nature and their meanings vary in different contexts because of their semantic diversity. This can make it difficult for second language learners, such as Arabs, to intuitively understand the ways in which these seemingly chaotic senses are semantically related and to establish what is called a 'meaning network', which means the relations between the varying senses or meanings of prepositions.

Although this study is developed around the core and peripheral senses of the English prepositions *at*, *on* and *in*, as well as their mapping onto Arabic, I assume and am hopeful that it will also have significant cross-linguistic implications. The observations and the suggestions are built on a 'universal basis' through comparison of the performance of Arab second language learners of English to Japanese and Spanish ESL learners. This assessment will enable a judgement to be made about

[2] The use of '*at the library'* is also correct but with a different meaning from *' in the library'*. This is because each preposition conveys a different concept. More explanations of these concepts are provided throughout the thesis.

some of the language problems typically encountered by English second language learners, particularly concerning whether the problem is '*inter-lingual*' or '*intra-lingual*' in character. The data analysis will be based upon the use of a repeated measures ANOVA test, which will enable analysis of the results of the semantic test of the Arab ESL learners. I will compare their performance in this semantic test with the performance of the Spanish and Japanese ESL learners. Particular focus will be given to the type of error produced by the participants in each language group by looking at questions such as: whether the core meaning or the peripheral meaning is more difficult; which preposition is the most challenging one for the test participants; and how images might assist test participants in choosing the correct preposition. Therefore, I will semantically explain the deviation of the ESL learners' performance (Arabs, Spanish and Japanese) when using these prepositions (see Chapter 5 below).

1.3 The Scope of the Research

The focus of my study will be on the semantic properties and features of the meanings of the prepositions *at*, *on* and *in* in English and Arabic, as well as their similarities, differences. Particular attention will be given to the manifestations of their effects in terms of the performance of Arab learners of English. In this respect, I will outline an account that brings together ideas from contemporary semantic approaches to prepositions, mainly the cognitive semantic approach. This will be supplemented by reference to recent work in the field of spatial semantics and in the field of lexical semantics in English, Arabic and in other languages, as illustrated by Second Language Acquisition (SLA), applied linguistics, and contrastive studies.

1.4 The Chapters' Outline

This study is divided into seven chapters. Following this introductory chapter, a literature review is provided in Chapter 2. This chapter is divided into two main parts, the first of which provides a brief summary of the main contemporary semantic approaches to prepositions. I will investigate the way that linguists describe the relations that occur among the different prepositional meanings: (2.2.1) the core sense approach, (2.2.2) the prototype theory, and (2.2.3) the cognitive semantic approach. An attempt will be made to explain why the image schema approach to spatial prepositions is considered central to the operation of metaphorical thinking (Lakoff, 1993) and ways in which this approach is used by cognitive linguists (Jackendoff, 1983; Herskovits, 1986; Langacker, 1986; Taylor, 1988; Goddard, 1998; Lindstromberg, 1998, 2010; Brala, 2002; Tyler and Evans, 2003; Coventry and Garrod, 2004) (see Sections 2.2.3.1-2.2.3.2). The second part of the chapter seeks to explain the relationship between cognitive linguistics and second language learning and teaching (2.3.1). I will illustrate the merit of applying prepositions, which have long been assumed to be one of the most difficult areas of acquisition for foreign and second language learners. A number of studies on teaching prepositions (e.g. Leung, 1991; Lindstromberg, 1996; Boers and Demecheleer, 1998) revolve around the ways in which the actual educational practices can utilise semantic explanations and analysis in the teaching of prepositions. I will display the effect of L1 transfer (Ellis, 1994- 2008) in (2.3.2) and (EA) error analysis (Corder, 1967; George, 1972; Richards, 1973; James, 1998) in (2.3.3). In (2.3.4), I will present evidence from first language acquisition (Rice, 2003; Richards, 2004; Morgenstern and Sekali, 2009), while in section (2.3.5) the

evidence will be provided from typological cross-linguistic studies (Ferrando and Tricker, 2000-2001; Vandeloise, 2003; Tyler et al., 2010; Mahmoodzadeh, 2012).

The focus of Chapter 3 is on meaning, with a particular focus on prepositional meaning. In order to provide a coherent context for this discussion (3.2), I will display the ways in which the study of cognitive semantics defines the semantics of spatial expressions. In (3.3), I will illustrate the most prominent CL accounts and approaches to the lexical semantic analysis of prepositions, e.g. Herskovits (1986), Talmy (2000), Tyler and Evans (2003), and Coventry and Garrod (2004). In (3.3), I will explain the sources of meaning conventionality (3.3.1) and meaning flexibility (3.3.2). The CL position of the notion of linguistic universals will be shown in (3.4).

In Chapter 4, I will explain the concept of space and discuss its universal and unique features. This concept plays an important part of communication, however, each language expresses this concept differently (4.2). In (4.3), I will demonstrate a lexical semantic analysis of the English prepositions *at*, *on* and *in*. I will analyse the semantic properties of these prepositions, describing their geometric features and image schemas through the combination and application of multiple cognitive semantic approaches to prepositions, e.g. Herskovits (1986), Lindstromberg (1998, 2010), Tyler and Evans (2003), and Coventry and Garrod (2004). I will then discuss the differences between the English and Arabic prepositions, in terms of characteristics that include their number, usages, and syntactic and semantic properties (4.4.1-4.4.2). This analytical study aims to yield original data especially from Arabic. To the best of my knowledge, this would constitute the first attempt to investigate Arabic prepositions from either semantic or cognitive perspectives, as extant studies of Arabic prepositions typically approach the subject from the

syntactic point of view. In (4.4.3), I will briefly demonstrate the Spanish (Coventry and Guijarro-Fuentes, 2008; Huerta, 2009) and Japanese (Katsuki-Pestemer, 2003; Musadu, 2007; Kodachi, 2005; Kita, 2006; Cho, 2010) equivalents of the English prepositions *at*, *on* and *in,* supporting commentary with examples from studies conducted in this area. Finally, the summary will highlight the rationale for the inclusion of Japanese and Spanish ESL learners as participants in the semantic test.

In Chapter 5, I will present the methodology and potential outcomes for the current study. A semantic test is conducted to test the hypotheses inspired by the findings of the analytical stage of this research, as I attempt to answer the main research question: *'how do the different meanings and usages of prepositions in English significantly influence the L2 acquisition process and impede the progress of ESL learners in acquiring a native-like intuition?'* In order to comprehensively and critically engage with this question and fulfil the objective of this study, I have employed a useful experimental tool for analysing contrasts within the data and to identify differences between groups. A repeated measures (RM) ANOVA test is used as the main statistical technique in analysing the data, in order to examine the performance of the Arab participants and identify the possible sources of errors in using the core and peripheral senses of the chosen English prepositions (*at*, *on* and *in*). (RM) ANOVA test is used to determine whether statistically significant differences exist in the proportion of the test items answered correctly across certain independent categorical variables. For clarity, these are: a) between-groups variable (English proficiency level) and b) within-groups variables (prepositions, meaning, and images).

In Chapter 6, I will provide a general discussion of how the outcomes of the experimental stage may hopefully form the basis for improved understanding of the conceptual mapping of the English prepositions *at*, *on* and *in* by Arab learners of English. A full interpretation of the semantic test results will be given, in light of the cognitive semantics (CS) approaches to preposition meaning (Herskovits, 1986; Talmy, 2000; Tyler and Evans, 2003; Coventry and Garrod, 2004).

Finally, Chapter 7 presents the conclusion of my study. A summary of the thesis is included, illustrating the key factors involved in the acquisition of the semantics of prepositions by ESL learners (Arabs, Spanish and Japanese), ideally through the development of a native-like intuition. The study concludes by providing recommendations for future research, with the notion of 'space' being considered a particularly exciting avenue for future studies. It is hoped that these outcomes may inform and even direct future research in the fields of cognitive linguistics, cognitive semantics, second language acquisition research, applied linguistics, language pedagogy, typology, and lexicography; future research that incorporates a wide variety of languages and a larger sample of ESL learners would add to the power of empirical data and also develop our understanding of this language problem.

Chapter 2 Literature Review: Review of the Related Theories in the Contemporary Semantic Approaches to Prepositions and the Cognitive Semantics and Second Language Learning and Teaching

2.1 Introduction

This literature review chapter is divided into two main sections. In the first of these, I will review the related theories that underpin the contemporary semantic approaches to prepositions, focusing on the cognitive semantic (CS) approach. In the second section, I will attempt to illustrate the merit of applying insights from cognitive linguistics to second language acquisition (SLA). This will be accomplished through a comprehensive examination of English prepositions, which have long been held to be one of the most difficult areas of acquisition for foreign and second language learners. I will also present evidence from first language acquisition studies concerning the way in which spatial prepositions are learned and acquired by children whose mother tongue is English. These findings will be compared to the outcomes from typological cross-linguistic studies of English prepositions conducted with ESL learners, in an attempt to provide answers for the following questions.[3] Which cues do ESL learners use when expressing spatial relations in English? Do the geometric and the extra-geometric factors affect the process of preposition acquisition for those learners? And do these two different factors equally impact second language learning or does one surpass the other? Does L1 negative transfer occur in the process of acquiring spatial language for second

[3] These questions stem from earlier studies of spatial prepositions in the field.

language learners? And if yes, does it occur at all times? Previous researchers in spatial prepositions studies presented in this chapter raised these questions.

2.2 Contemporary Semantic Approaches to Prepositions

2.2.1 The Core Sense Approach

As with other lexical items, prepositions are generally considered to have a core or primary meaning, in addition to other extended meanings:

> The core meaning of a preposition is systematically extended in various contexts and the extended meanings are represented and comprehended based on a set of special or physical experiences, assumptions and inferences, and background knowledge. Knowing the core meaning of a preposition and then extending the use in different sentences on the basis of understanding the context and logical relations between the preposition and the part of speech it modifies, we can avoid prepositional misuses (Shuying, 2008, p.5).

This can be seen through examination of the following examples:

1) He sings *with* me. (I sing and he sings together.)
2) He sings *to* me. (I am the person his voice reaches to)
3) He sings *for* me. (He sings upon my request or he dedicates this song to me)

(Cited in Shuying, 2008, p.5)

In these examples, Shuying (2008, p.6) demonstrates the varied ways in which English prepositions can be used to express a range of different and subtle meanings. Therefore, in order to understand the usage of each preposition, one should return to the basic meaning: *with* means "in the company or presence of somebody" when actions take place; *to* serves to "show the person or thing that is affected by an action or receives the action"; and *for* is used to show "who is intended to have or receive the action" (Shuying, 2008, p.6).

Therefore, the Core Sense[4] approach begins by searching for the core sense of a word, which is then entered into the "theoretical lexicon, culminating with the statement of context-sensitive rules for deriving divergent surface senses from the core sense" (Hawkins, 1984, Cited in Leung, 1991, p.89). Here, Hawkins argues that the explanation of meaning variations requires contextual cues that screen the core sense from the surface 'new' sense. However, emphasising concentration on the core sense can sometimes be misleading, in that learners of a language may believe that understanding the core sense is enough, leading them to develop a misplaced confidence in their knowledge of the senses of a lexical item. Thus, Leung (1991) identifies three difficulties with this approach: most importantly, it may not be possible to clearly establish this primary meaning; even when established it may be "so general and abstract that it does not have any explanatory value" (p.89-90); and the context-derivational rules devised to understand the rule can increase the need for rote learning (Leung, 1991).

2.2.2 The Prototype Theory

Research in prototype theory (Rosch, 1988; Geeraerts, 1989) offers an alternative perspective for the explanation and description of polysemous words like prepositions. This theory attempts to identify a prototypical sense, which can then use a meaning chain analysis to capture the relationships between the different senses of a given word.

In relation to his study of English and Italian prepositions, Taylor (1988) explains the operation of the meaning chain analysis, initially developed by

[4] The core sense has the same meaning as 'core meaning', which is used above by Shuying (2008).

Brugman (1983). He argues that a prototype sense is central but not as general as the core meaning. This prototype sense 'profiles' very specific meaning features. Therefore, in this definition, polysemy as a meaning is closely related to the prototypical meaning, although it is distinct in some aspects:

> For example: a condition which is essential might not be met; a feature which is optional to the prototype now assumes central importance, or vice versa; or some additional feature might be required. By the same process, this derived meaning may in turn give rise to a further extension, and soon the various senses of the word thus radiate out from the central prototype, like the spokes of a wheel. Senses at the periphery might well have little in common, either with each other, or with the central senses; they are merely related by virtue of the intervening members of the meaning chain (Taylor, 1988, p.301).

2.2.3 The Cognitive Semantic Approach

According to the cognitive linguistic approach, linguistic knowledge is an important part of cognition or general thinking. Cognitive linguistics (CL) is defined as "a linguistic theory which analyses language in its relation to other cognitive domains and faculties such as bodily and mental experiences, image-schemas, perception, attention, memory, viewing frames, categorization, abstract thought, emotion, reasoning, inferencing, etc." (Driven, 2005, p.17). There is a mutual relationship between different sources of cognition and linguistic knowledge. Accordingly, knowledge of linguistic structures, such as phonology, syntax or semantics, is dependent on mental processes that include attention, memory and reasoning. According to CL,

> [the] principles of language use embody more general cognitive principles; and internally, that explanation must cross boundaries between levels of analysis. […] Thus it makes sense to look for principles shared across a range of cognitive domains. Similarly, it is argued that no adequate account of grammatical rules is possible without taking the meaning of elements into account (Saeed, 2009, p.356).

In this sense, cognitive semantics (CS) does not distinguish between linguistic knowledge and encyclopaedic knowledge and, hence, between literal meaning and figurative language. In the literature of cognitive semantics, meaning is dependent on conventionalized conceptual structures: these structures are "mental categories which people have formed from their experience of growing up and acting in the world" (Saeed, 2009, p.357). A good example of these conceptual structures is 'metaphor'.

2.2.3.1 Conceptual Metaphor

The concept of metaphor is one that is important but challenging for ESL learners to acquire, and is therefore relevant to the current study. This concept can be defined as:

> a cognitive faculty by which linguistic meaning is created from basic, 'pre-conceptual' bodily experiences. [...] Their key concept is that of the CONCEPTUAL METAPHOR, an underlying identification of an abstract concept with a more basic or concrete concept (Johnson and Lakoff, 1980, Cited in Goddard, 1998, p.77).

This assumption about conceptual metaphors seems to be founded upon Reddy's (1979) notion of 'conduit metaphor', which explained the construction of our daily language as follows:

> IDEAS ARE OBJECTS.
> LINGUISTIC EXPRESSIONS ARE CONTAINERS.
> COMMUNICATION IS SENDING.
> (Quoted by Garrod, 1998, p.77)

As an instance of this kind of metaphor, Reddy listed the following examples:

> 4) It's hard to get that idea across to him.
> 5) I gave you that idea.
> 6) His words carry meaning.
> 7) It's difficult to put my thoughts into words.
> (Quoted by Goddard, 1998, p.78)

Lakoff (1980, 1987, 1993) considers metaphors to be an important 'component' of human cognition. He argues that metaphors should not be perceived as merely 'linguistic', instead arguing that they are 'conceptual' in nature. Cruse (2004) adds that they offer a way to conceptualise "abstract and intangible areas of experience…in terms of the familiar and concrete" (Cruse, 2004, p.201). Cruse (2004) summarised Lakoff's approach to metaphor by displaying the three domains involved in metaphor construction which are "(i) the source domain, usually concrete and familiar, (ii) a target domain, usually abstract or at least less well-structured, and (iii) a set of mapping relations, or correspondences" (p.201). Consider the following example:

8) Love is a journey.
(Quoted by Cruse, 2004, p.203)

In (8), the concrete meaning of 'journey', the source domain, is used to express the abstract meaning of 'love', the target domain. Cruse (2004) explains that there are two types of relations between the source and the target domain: ontological, which refers to two different domain entities, such as 'journey' and 'love'; and epistemic, which describes the relations between the information and knowledge regarding these two entities. This means that proper understanding of the metaphor, such as the example 'love is a journey', requires an understanding that the language (words or expression in metaphors) is of secondary importance. The consideration of primary importance is the ontological mapping across conceptual domains. This process of mapping is *conventional*, which is considered a fixed part of the conceptual system, and *systematic* (Lakoff, 1993). The extended metaphor is logical because it results from the convergence between the features of the source and target domains. Cruse (2004, p.203) argues that the application of Lakoff's (1993) approach to metaphor

demonstrates how many linguistic expressions, such as prepositions, can be used metaphorically in a very flexible and productive manner.[5]

2.2.3.2 Image Schema Theory

The notion of image schemas attracted the attention of cognitive linguists (Hampe[6], 2005; Johnson, 2005; Correa-Beningfield et al, 2005; Dodge and Lakoff, 2005; Mandler, 2005; Oakley, 2007), who conducted studies to address essential questions like: What are image schemas? Where do image schemas come from? What is the relation between image schemas and cognition, perception, embodiment and language? How does the theory of image schemas contribute to the notion of cross-linguistic diversity and universality? The answers to these questions and the results of these investigations formulated the framework and the structure of image schema theory.

In their respective influential works, Johnson (1987) and Lakoff (1987) both attempted to explain the meaning of image schemas. Johnson (1987), in his work *The Body in .the Mind: The Bodily Basis of Meaning, Imagination, and Reason,* described image schema as follows:

> An image schema is a recurring dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience. … 'Experience' … is to be understood in a very rich, broad sense as including basic perceptual, motor-program, emotional, historical, social and linguistic dimensions (Cited in Hampe, 2005, p.1).

Lakoff (1987) and Johnson (1987) both introduced the notion of image schemas as being meaningful, experiential, embodied, pre-conceptual structures that

[5] The metaphoric meaning of prepositions will be tackled below, in section 3.3.2.2.
[6] Hampe (2005) collected a number of cognitive linguistic researches that are interested in examining the relationship between perception and meaning by investigating the notion of image schemas.

arise from our "recurrent bodily movement through space, perceptual interactions and ways of manipulating objects"(Hampe, 2005, p.1). Image schemas are a recurring structure within cognition processes that establish patterns of understanding and reasoning. They are formed from our bodily interactions, from linguistic experience, and from the historical context. Importantly, these image schemas are independent and exist prior to concepts (Hampe, 2005, p.1). Expressed differently, image schemas represent clear semantic concepts, which enable us to recreate our personal physical experiences with space in the form of distinct mental images or concepts. In this way, an "image schema contains our fundamental bodily experience with physical objects in space, and it is like a mental picture, worth infinite words" (Ching-Yi, 2002, p.14). Contemporary cognitive linguistics considers image schemas to be dynamic, embodied, pre-linguistic patterns or structure of experience that motivate conceptual metaphor mappings and polysemy. Studies on spatial semantics have explained a range of language aspects, such as the semantics of prepositions, through the use of image schema concepts to characterize mental representations or images for words. These image schema concepts include Trajector (TR), which denotes someone or something that moves from some domain to another, and Landmark (LM), which describes the domain from which someone or something moves.[7]

Johnson (2005, p.18) explains the notion of 'embodiment'. He argues that image schemas are used to obtain and understand 'inferences' about the domains of thought and that "image schemas are the recurring patterns of our sensory-motor

[7] More examples on why the image schema approach to spatial prepositions is considered central to the operation of metaphorical thinking will be provided in Chapter 3 and 4 below. A description of the English preposition *at*, *on* and *in* geometric features and their image schemas will be provided by combining a number of cognitive semantic approaches to prepositions: e.g. Herskovits (1986), Lindstromberg (1998, 2010), Tyler and Evans (2003) and Coventry and Garrod (2004).

experience by means of which we can make sense of that experience and reason about it". Johnson also clarified the relationship between image schemas and embodied meaning, arguing that image schemas facilitate our understanding of abstract meaning, such as conceptual metaphor. In this way, they enable abstract concepts to be understood, and for inferences about them to be made, through the use of "the structure of sensory and motor operations[,] […] image schemas […] have their own logic, which can be applied to abstract conceptual domains" (Johnson, 2005, p. 24).

In order to understand how human beings perceive space, Correa-Beningfield et al. (2005, p.353) explain Clark's (1973) correlation hypothesis, which proposed four parameters for conveying perceptual space (P-space):

a) A three dimensional physical space (length, height, width).
b) Geological space (gravity and ground levels)
c) Biological space (human body parts)
d) Social space (how people interact with each other)

To this list, Correa-Beningfield et al. (2005) added a linguistic space (L-space). They explain that the P-space is considered the semantic form that every language uses to 'conceptualise'. Examples of these semantic forms are lines, planes of reference, the ground level with positive and negative poles, up-down, right-left, or front-back directions (Correa-Beningfield et al., 2005, p. 354). Correa-Beningfield et al. clarified that Clark noted a correlation between the P-space and the L-space, stating that "the structure of P-space will be preserved in L-space" (Cited in Correa-Beningfield et al., 2005, p.354).

However, Correa-Beningfield et al. pointed out that "[t]he universality of perceptual principles […] does not imply that L-space should have the same form and structure for all languages" (Correa-Beningfield et al., 2005, p.354). Johnson (2005, p.19) claims that image schemas do not exist in the brain separate from perceptions, feelings and actions.

> For example, humans will share certain general understanding of what it means for something to be located within a container, and will understand at least part of this without having to reflect upon it or think about it. Seeing a container, or hearing or reading the word *in* will activate a CONTAINER image schema as crucial to our understanding of a particular scene. Certain types and sizes of containers will offer different specific affordances for a being with our type of body, brain, and environments (Johnson, 2005, p.22).

Meanwhile, Dodge and Lakoff (2005) argue that while image schemas are expressed linguistically in the form of prepositions, postpositions, verbs, cases, body-part metaphors, or morphemes, they are still independent. They also exist prior to language in the sense that the experience that child will have of CONTAINMENT and the corresponding perception of things as containers, such as boxes-cups-rooms, exists prior to verbal utterances or the emergence of language. In effect, they state that children undergo an exploratory stage during which they interact with many objects, and "repeatedly put things in and take them out of many different kinds of objects, thus treating these objects as containers" (Dodge and Lakoff, 2005, p.60). Oakley (2007) explains the cognitive linguistic position of image schemas formulated by Lakoff (1987) and Langacker (1987). Lakoff (1987) argues that both "the lexical and grammatical items reside on a continuum of meaning from specific to schematic, and that all linguistic structures are instantiated as parts of Idealized Cognitive Models (Lakoff 1987, p.113-14)" (Oakley, 2007, p. 218). This view of all

grammatical structures being meaningful is supported by Langacker (1987, 1991), who claims that for a grammatical item to be meaningful it should meet a certain 'content requirement'. This requirement includes: "phonological and semantic components (or 'poles'), specific categorising relationships for integrating these components with other structures, and schemas for organizing and extending these structures into different […] domains" (Oakley, 2007, p.218-219). For example, the image-schematic of the English preposition *in,* containment, is extended across different conceptual domains, e.g. *in* the kitchen, where the kitchen acts as a reference point that is enclosed by walls and interior and exterior boundaries. In contrast, the image schematic of the English preposition *on* is contact, e.g. *on* the table. Here, 'the table' is a point of a mass in contact with a surface.

Mandler (2005) describes how image schema conceptualisations 'underlie' grammatical learning by presenting an investigation of Korean and American children (9-, 11- and 14-month-old infants) conducted by McDonough et al. (2003). Both groups were found to have the same preverbal concepts or spatial relations such as support and containment. However, as they begin to know their first language, differences began to occur in their conceptualisations and interpretations of spatial scenes and relations in accordance with the language that these were mapped onto. Mandler (2005) proposes that image schemas represent perceptual meaning and he has also indicated that image schemas are not accessible by themselves. However, they construct the concepts, e.g. containment, contact etc., which could be represented by either an image or a linguistic form. Mandler explains the process of 'perceptual meaning analysis' (2005), with the claim that,

> infants not only see but also can analyse what they see. […] Infants don't come to the perceptual displays they analyse with preformed hypotheses; rather, they apply an analytic mechanism that extracts simple descriptions of what is being attended. These descriptions put spatial information into the representational forms we call image-schemas (Mandler, 2005, p.140).

Other studies have found significant evidence for the cross-linguistic variation and diversity in the ways spatial relations are expressed. Talmy (2000, 2005) investigated the grammatical forms of the linguistic description of space cross-linguistically and came to the conclusion that languages contain a 'limited' number of primitive image schemas of basic spatial distinctions. Talmy proposes that this inventory of primitive image schemas, e.g. CONTAINMENT, SOURCE-PATH-GOAL, CONTACT, ENCIRCLEMENT, are universal. Dodge and Lakoff list Talmy's inventory of these primitive schemas as follows:

- Focal distinctions within a scene – figure (focal object) and ground (secondary focus, serves as a reference object to locate a figure)
- Figure and ground geometries, relative orientations
- Presence/absence of contact of the figure with the ground
- Force-dynamics – reflects non-visual modalities, and is largely independent of other spatial distinctions

(Cited in Dodge and Lakoff, 2005, p.65)

Dodge and Lakoff (2005) explain that Talmy proposed that the complexity of the spatial relation terms used in languages, e.g. the English preposition *into,* encodes a complex schema that combines both a CONTAINER and a SOURCE-PATH-GOAL schemas. Moreover, they add that despite the use of primitive image schemas there is no evidence of "a one-to-one correspondence between the spatial-relations terms of a given language and the primitives in this presumably universally-available inventory" (Dodge and Lakoff. 2005, p.66). For example, McDonough et al. (2003) found that both Korean and English infants were able to

differentiate between the two categories tight-fitting and loose-fitting containment, which are considered preverbal concepts that precede the conceptualisation of spatial language, e.g. the concept of containment, whereas the same investigation on Korean and English adults produced contradictory results. Korean speakers utilise the tight-loose distinction for the expression of containment relations, while English speakers do not. Mandler (2005) explains that this is because "daily use of a language that makes this distinction affects the interpretation of senses that involve containment. […] [English speakers] have a concept of tightness but it appears not to be closely related to containment as it is for Korean speakers"(Mandler, 2005, p.156).

Dodge and Lakoff (2005) concluded their investigation and speculation of the image schema theory by listing some significant facts and assumptions of cognitive grammar:

- Linguistic structure reflects brain structure.
- Linguistic structure is schematic (image schemas, force-dynamic schemas, aspectual schemas, and so on) because the corresponding brain regions each perform limited, small-scale computations.
- Linguistic schemas can form complex superpositions because the corresponding brain structures can be active simultaneously.
- Complex linguistic structures that vary widely are each made up of the same ultimate universal primitives because we all have the same brain structures that perform the same computations.
- Linguistic structure is below the level of consciousness because the brain structures that compute them are unconscious.
- Abstract schematic structures are not learned by a process of abstraction over many instances, but are rather imposed by brain structure.
- Image schemas are created by our brain structures; they have been discovered, not just imposed on language by analysts.
- Cognitive linguistics is not cognitive linguistics if it ignores relevant knowledge about the brain.

(Cited in Dodge and Lakoff, 2005, p.86)

2.3 Cognitive Linguistics and Second Language Learning

2.3.1 Second Language Learning Theory

In order to provide a coherent context for the current study, this section will present a brief introduction to Second Language Acquisition theory (SLA). In so doing, I will examine questions such as what is meant by SLA; how SLA is approached and explained; what the relation is between SLA and cognitive linguistics; and how SLA theory builds on cognitive accounts.

SLA theory is an interdisciplinary field of research that draws from, and affects, a wide range of fields, including "linguistics, psychology, psycholinguistics, sociology, [and] sociolinguistics" (Gass and Selinker, 2008, p.2). In simple terms, SLA refers to the process of learning a second language that is different from the first language that an individual acquired, or which they mastered from childhood as a mother tongue. This process requires exposure to the new language to be acquired in its social contexts and linguistic environments. Gass and Selinker (2008, p.7) define SLA as the acquisition of a new language, either by formal classroom situations or through the exposure to natural situations. This language is different from the native language that has been acquired in childhood. They also defined the scopes of SLA, as follows:

> It is the study of the acquisition of a non-primary languages; that is, the acquisition of a language beyond the native language. It is the study of how learners create a new language system with only limited exposure to a second language. It is the study of what is learned of a second language and what is not learned; it is the study of why most second language learners do not achieve the same degree of knowledge and proficiency in a second language as they do in their native language (Gass and Selinker, 2008, p.1).

According to this perspective, the stages and the processes of acquiring a second language are inherently different from those involved in learning a first language. Therefore, the characteristics of a first language learner and the conditions of learning will also be different from those of the second language learner. Slobin (1993, p. 242) argues that the construction of pragmatic concepts and grammar occur simultaneously among children, however, for adults "construction of the grammar often requires a revision of semantic/pragmatic concepts, along with what may well be a more difficult task of perceptual identification of the relevant morphological elements" (Cited in Ellis and Robinson, 2008, p.8). Lightbown and Spada (2006) recorded some of the characteristics of second language learners. They found that while infants and children learn their first language without any 'metalinguistic' knowledge and awareness, second language learners are cognitively mature, meaning that they have already acquired a level of linguistic knowledge that gives them an understanding of the formation and structure of language.[8] While adult second language learners are more capable than children of using mental abilities, such as inferences and problem solving, children are often more willing to use the language in 'speaking' than many adult second language learners, despite not yet being acquainted with its rules. This has been primarily attributed to the anxiety experienced by second language learners and their feeling of discomfort about making errors or about not sounding sufficiently proficient in the use of the target language (Lightbown and Spada, 2006). However, second language learners can be forced to speak and to practise the language in formal settings, like schools and language classes, which can have numerous different effects on the process of

[8] Although this prior linguistic knowledge is important for learning in general, it may also lead some second language learners to make false generalizations about the second language transfer effect. A number of SLA researchers consider this to be the main source and cause of learners' errors.

language learning and acquisition. “Classroom learners not only spend less time in contact with the language, they also tend to be exposed to a far smaller range of discourse types. For example, […] teachers switch to their students’ first language for discipline or classroom management, thus depriving learners of opportunities to experience uses of the language in real communication” (Lightbown and Spada, 2006, p. 32).

Selinker (1972), the founder of Interlanguage (IL) theory,[9] also differentiated between the characteristics of children’s first language acquisition and the development of SLA. Saville-Troike (2012) listed these characteristics:[10]

- Language transfer from L1 to L2
- Transfer of training, or how the L2 is taught
- Strategies of second language learning, or how learners approach the L2 materials and the task of L2 learning.
- Strategies of second language communication, or ways that learners try to communicate with others in the L2
- Overgeneralization of the target language linguistic material, in which L2 rules that are learned are applied too broadly.
  (Cited in Saville-Troike, 2012, p. 44)

SLA theory has been approached from a number of significant perspectives. The most important of these, as will be discussed below, are: the behaviourist approach; the nativist approach; functional theory; and the cognitivist approach.

The behaviourist theory was founded in the US in the 1940s-1970s. This conceptual framework explains the learning process through the use of ‘imitation’, ‘practice’, ‘reinforcement’ and ‘habit formation’. This theory had a great impact on language teaching in the 70s, such as the ‘audiolingual teaching’ method, which focuses on memorization and mimicry. Behaviourism has always been linked to the

[9] IL theory will be explained in (2.3.4) below.
[10] Saville-Troike referenced these the (IL) characteristics from McLaughlin (1987, p.61).

notion of contrastive analysis hypothesis (CAH), because both are based on a belief in the main cause of learners' errors and mistakes in learning a second language is the influence that their first language exerts over the language acquisition process.

However, with the growth and progress in research in the field of SLA, the hypothesis that the habits of a first language would interfere with the process of learning a second language was rejected by many studies, especially those of the nativist approach (Lightbown and Spada, 2006, p.34). The nativist approach to language learning was triggered by the Chomskyan notion of Universal Grammar (UG).[11] Chomsky claims that the UG principles of innate knowledge and the existence of the innate language acquisition device (LAD) are responsible for the language acquisition process. This position is that UG enables "all children to acquire the language of their environment during a critical period of their development" (Lightbown and Spada, 2006, p. 35). Therefore, SLA researchers who adopted this approach engaged themselves with the ways in which the language competence and grammatical knowledge of learners, influence and 'underly' their performance. Another leading academic influenced by the nativist approach to SLA was Krashen (1982), who formulated the hypotheses of the 'monitor model' of language acquisition in terms of UG theory.[12]

While the nativists focus on underlying linguistic knowledge, or competence, the model of functional theory approaches language learning and acquisition processes by emphasizing the role of language as a 'function'. Language has both

[11] A full explanation of the question of how language is acquired and the different views that have been given on this issue is beyond the scope of my research.
[12] For more information on Krashen's monitor model, see Krashen 1982 *Principles and Practice in Second Language Acquisition*.

structural function and pragmatic function. The functional approaches to SLA, such as "Systematic Linguistics, Functional Typology, function-to-form mapping and information organization" (Saville-Troike, 2012, p.56), share general principles that oppose Chomsky's UG. For the functionalists, both performance and competence are equally important to the process of language acquisition and learning. They therefore pay more attention to discourse structure, in order to study aspects of interaction 'beyond' language, resulting in the adoption of a communicative approach to language acquisition and use (Saville-Troike, 2012, p.56).

Although their view of language appears similar to that of the functionalists, the cognitivists argue that "humans have a language specific module in the brain or that 'acquisition' and 'learning' are distinct mental processes" (Lightbown and Spada, 2006, p.38). Cognitive psychological theories and developmental perspectives: information processing (Segalowitz, 2003), connectionism (Ellis, 2002), and the competition model (Bates and MacWhinney, 1981) inspired a number of SLA theories. These theories include a) the interaction hypothesis (Long, 1993), which emphasises the relationship between conversational interaction and language; b) the noticing hypothesis (Schmidt, 1990-2000; Gass, 1988), which describes SL learning in terms of 'noticing' (hearing and seeing) something in the 'input' (the second language) that is different from their first language or other languages they have learned, leading them to 'fill the gaps' in their knowledge of the input; c) input processing (VanPatten, 2004), which focuses on the input, the language itself, and the interpretation of meaning; and d) processability theory (Pienemann, 1999-2003), which argues that SL learners develop a certain 'level' of processing capacity,

different from their first language, by which they are able to acquire the second language (Lightbown and Spada, 2006, Chapter 2).[13]

In relation to the interest and aim of the current study, that is understanding the semantics of the English spatial prepositions *at*, *on* and *in* and their acquisition by ESL learners, I will attempt to investigate how these English prepositions are learned. This will involve investigating which aspects of meaning are familiar (core meaning) to SL learners and which are not familiar (peripheral meaning), as well as how this would affect their proficiency and command of language, or even prevent them from building a native-like intuition.

Studies on language acquisition have demonstrated that the acquisition and the understanding of prepositions in language is an extremely difficult task for many native speakers and even more so for second language learners (Romaine, 1995; Celce-Murcia and Larsen-Freeman, 1999). In fact, studies have shown that prepositions represent the primary source of grammatical errors for learners of English as a foreign language (Gocsik, 2004). In the following sections, I will attempt to show how second language teaching and learning can be facilitated by the use of cognitive linguistic tools, such as conceptual metaphor, category formation (prototype) and image-schema. The potential value that cognitive semantic analysis of prepositions offers in pedagogical contexts will be illustrated by reference to a number of studies on teaching prepositions (2.3.2). In (2.3.3), studies on the effect of L1 transfer (interference) on SLA will be reviewed, while I will discuss in (2.3.4) how L1 transfer (interference) could shape the error analysis (EA) approach and the

[13] In (2.3.4) below, I will also show how these approaches to SLA explain the deviation in the performance of second language learners, their linguistic errors, and their position vis-à-vis CAH, EA and interlanguage.

contrastive analysis hypothesis (CAH).[14] Departing from a cognitive linguistic account, I will also collate and present evidence from first language acquisition (2.3.5), children's acquisition of English spatial prepositions, and evidence from cross-linguistic typological research (2.3.6) in an attempt to determine whether there are any common findings or conclusions shared by these different areas of research.

2.3.2 Studies on Teaching Prepositions to Second Language Learners

A number of studies on the teaching of prepositions (Leung, 1991; Lindstromberg, 1996; Boers and Demecheleer, 1998) focus on the ways in which the actual teaching and learning practices could make use of semantic explanations and the analysis of prepositions. Informed by the insights of Brugman (1983) and Lakoff (1987), Leung (1991) studied the preposition *over*. Leung (1991) concluded his study on the relationship between the prototype theory and the teaching practice of English with an important discussion on the implications of his findings for ESL pedagogy:

a- "In the classroom, the discussion can focus on the different senses of prepositions, as well as the links between the various senses. [Therefore,] [i]t is natural to present the uses of spatial prepositions using line figures or three-dimensional objects" (Leung, 1991, p.95).

b- We should not ignore the role of metaphors in the extension of meanings of spatial prepositions. Low (1988) argues that as metaphor is integral to language use it should part and parcel of second language teaching,

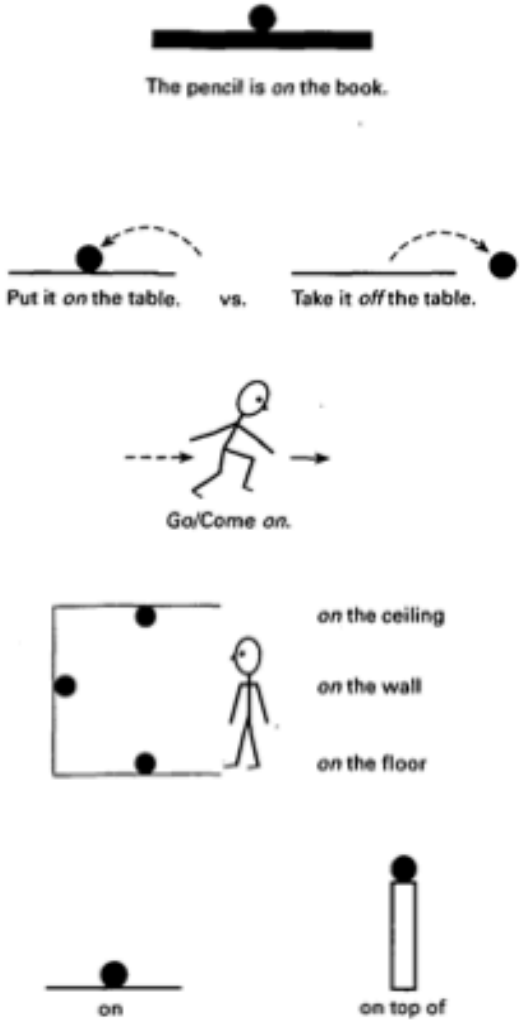
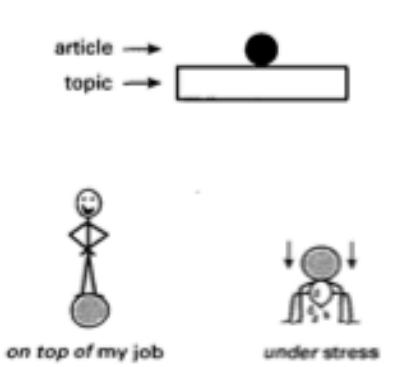
[14] Ellis (2008) argues that the CAH and EA approaches should be used 'hand in hand' in order to identify, predict and explain SL learners' errors and performance deviations. More explanations will be provided below (see Section 2.3.3).

noting that “from a structural point of view it pervades large parts of the language system” (Quoted in Leung, 1991, p.96).

c- Analysing prepositional usages in the semantic field will be an effective way of increasing cross-linguistic knowledge of two different languages. This means that translation as a method in teaching a language would be misleading and so learners should be aware that not every single preposition in a language has a definite equivalent in another language. “[O]ne important caveat in this: for second language learners, the metaphors that are present in the conceptual system of their native languages may differ from those present in English” (Leung, 1991, p.96).

Similarly, Lindstromberg (1996) outlines a new approach to teaching prepositions and directional adverbs that was informed by the earlier works of Brugman (1983) and Lakoff (1987). He emphasises the importance of ‘prototype semantics’ to the study of prepositions, suggesting pedagogical applications and benefits such as helping students to understand “unfamiliar uses of a preposition if we help them to see these as expressions of meanings already learned” (Lindstromberg, 1996, p.235). In reference to the preposition *on*, Lindstromberg suggests a lexical analysis approach that can improve teaching materials and guide both teachers and learners to the different meanings, uses, and functions of prepositions (see Table 2-1).

Table 2-1 Examples of the learning points suggested by Lindstromberg (1996, p.229-234).

Learning Points	Examples	Suggestions for Classroom Demonstration Methods
1. The prototypical meaning 'contact of an object with line or a surface'. 2. The other basic literal meaning: - A variation of *on1*: *on* vs *off* - *On* vs back - *Rotation of the prototype surface* - *On top of*		-Demonstration with objects, draw a figure on the board, use the icon as classroom shorthand for meaning.
3. Metaphorical meaning: - *On* = about or concerning an article on holidays in France. - *On* top of		- Introduce *on* as a synonym for *about* when the Landmark noun stands for a topic -Under stress

According to Boers and Demecheleer (1998), prepositions are polysemous in nature, as characterized by a multiple set of distinct, but systematically related meanings. Through the adoption of a cognitive semantic analysis of prepositions (Langacker, 1991; Lakoff, 1987; Johnson, 1987), Boers and Demecheleer (1998) attempted to better understand the comprehension problems facing French learners of English when learning prepositions. They attribute these problems to the presence of L1 interference in the interpretation of the different senses and usages of prepositions, as well as the various ways that facilitate the comprehension of unfamiliar figurative senses (Boers and Demecheleer, 1998). In addition, they suggest two ways in which the cognitive semantic analysis of prepositions may be helpful in pedagogical contexts. They assumed that the figurative senses of a preposition are extended from its spatial senses through conceptual metaphors. Therefore, when teaching prepositions, teachers should draw the learners' attention to certain aspects of a preposition's spatial sense that are relevant for its metaphorization processes. Consider the following examples of the prepositions *behind* and *beyond*:

9) a- The man behind the wheelbarrow.
b- The people behind the strike.
c- We cannot recover our ball; it's beyond the neighbour's hedge.
d- We cannot buy this house; it's beyond our means
(Cited in Boers and Demecheleer, 1998, p. 200, 203)

Boers and Demecheleer (1998) stated that the "learners' awareness of the conceptual metaphor that is at play (e.g. ABSTRACT INACCESSIBILITY IS DISTANCE) could be enhanced by eliciting other expressions that reflect it (e.g. 'they've taken me off the case', 'the decision is out of my hands', etc.)" (p. 203). In this, they demonstrate an assumption that the understanding of metaphorical extensions plays

a crucial role in facilitating the comprehension of polysemous items, such as prepositions.

2.3.3 The Effect of L1 Transfer

L1 transfer[15], otherwise known as interference, has been tackled from a range of different perspectives, including the behaviourist and mentalist theories, and the cognitive linguistic approach. After SLA emerged as an independent field in linguistics, some researchers adopted the cognitive linguistics assumptions in an attempt to study the relationship between the influence of the learner's first language (his/her existing linguistic knowledge, patterns and structures) and their second language acquisition, development, and mastery. From the cognitive linguistic point of view, L1 transfer does not only exist because one has already acquired a first language. Instead, it is a complete mental process in which both interaction and linguistic knowledge, known as 'input' in cognitive linguistics, occur during L2 acquisition and development. Ellis (2008) argues that "there is a need to consider not just what a learner knows of the L2 but also to what extent this knowledge is usable under different conditions of language use" (p.346). This is an important factor and should be considered in the measurement of L2 fluency and mastery (Ellis, 2008). Bearing in mind the similarities and differences between L1 and L2 patterns, L1 transfer can be seen as 'positive transfer' when L2 and L1 patterns are similar or identical, or as 'negative transfer' when the structures of the two languages are different.

[15] L1 transfer is divided into a) negative transfer, which describes SL learners using their L1 patterns and leads to errors in L2; and b) positive transfer, when the SLA process is smooth and easy because both L1 and L2 share the same linguistic pattern.

Although the influence of the learner's existing linguistic knowledge is an important factor that may explain the deviations and errors that occur when learning a second language, other factors that could also hinder L2 acquisition. Ellis highlights a number of constraints that may 'promote' or 'inhibit' transfer:

> (1) language level (phonology, lexis, grammar and discourse), (2) social factors (the effect of the addressee and of different learning contexts on transfer), (3) markedness (the extent to which specific linguistic features are 'special' in some way), (4) prototypicality (the extent to which a specific meaning of a word is considered 'core' or 'basic' in relation to other meanings of the same word), (5) language distance and psychology (the perceptions that speakers have regarding the similarity and difference between languages), (6) developmental factors (constraints relating to the natural processes of interlanguage development). Non-structural factors such as individual learner differences (such as personality and age), and the nature of the tasks a learner is performing (1994, p.315).

2.3.4 SL Learners' Error Theories, Analysis and Sources

The SLA literature has long assumed that L1 negative transfer is a major source of the problems experienced by EFL/ESL learners. Studies on SLA have realised the negative interference of the L1 systems on the acquisition and mastery of the second language: "the learner of a foreign language does not start learning this new language from zero or a neutral point. Instead, he interprets the new phonological, morphological, syntactic and semantic patterns through those of his native language" (Habash, 1989, p.20). As a consequence of this, SLA researchers focused on the errors produced by learners as a result of the negative transfer of L1 patterns onto their L2. In effect, they propose that the greater the difficulty encountered by the L2 learners, the more frequent the errors (Ellis, 1994).

SLA researchers have also been engaged with finding a 'principled' means for the analysis of the errors of second language learners, establishing an account

that defines the 'sources' and 'causes' of these errors, and effectively interpreting the significance of these errors to the theory of language learning in a systematic meaningful framework. In the SLA literature, a number of different perspectives have attempted to explain language learner errors. The most important of these within the context of this study are: the Contrastive Analysis Hypothesis (CAH); the Error Analysis approach (EA); and Interlanguage (IL) theory. These will be discussed individually below.

Established in the 1960s, the contrastive analysis hypothesis is a systematic approach that introduced a crucial hypothesis to SLA research. CAH focuses on the influence of the learners' L1 on learning and acquiring a second language. CAH has been influenced by both structuralism and behaviourism. It studies these influences by contrasting the two language systems and attempting to deduce the similarities and differences between them. "Following notions in structuralist linguistics, the focus of CAH is on the surface forms of both L1 and L2 systems, and on describing and comparing the languages one level at a time" (Saville-Troike, 2012, p.36). As a result of adopting behaviourist notions, CAH has also implemented the Stimulus-Response-Reinforcement (S-R-R) process and the notion of "practice makes perfect" in order to interpret the learners' responses. The theory of CAH has also introduced an important assumption about SLA with regard to the effect of 'transfer' in SL learning. Transfer describes the movement of elements from one's first language to the second language. When facilitating the process of learning this transfer is classified as 'positive', and it is deemed to be 'negative' when the first language structures are generalized and applied inappropriately to the second language. However, CAH has also been criticised by academics, such as Saville-Troike

(2012), who indicates that there are a number of limitations and problems with CAH. These include its failure to account for the logical problem of language learning; it is not always supported by evidence from 'actual learner error'; and it does not provide a useful approach for teaching languages in general (Saville-Troike, 2012, p.39). However, it should be noted that these limitations do not eliminate the role played by CAH in linguistic studies.

Error Analysis (EA) has been developed as a reaction to the shifts and changes in linguistic theory which occurred as a result of the findings of the nativists' approach and Chomsky's theory (UG) with its assumption of the innate capacity of the language learner. EA "is based on the description and analysis of actual learner errors in L2, rather than on idealized linguistic structures attributed to native speakers of L1 and L2 (as in CA)" (Saville-Troike, 2012, p.40). Corder (1974) considers EA as a useful tool for the detection of how learners acquire a second language and established the principles of error analysis investigations as follows:

1) Collection of a sample of learner language.
2) Identification of errors.
3) Description of errors.
4) Explanation of errors.
5) Evaluation of errors.
(Cited in Ellis, 2008, p.46).

Ellis (1997, Chapter 2) provides a detailed explanation of the steps involved in analysing learners' errors: identification, description, explanation and evaluation. When identifying a second language learner error, the first step is to compare the learner's performance with the correct target language counterparts. However, a researcher should differentiate between errors and mistakes (Ellis, 1997). Errors

usually occur because of a lack in the learner's linguistic knowledge of the target language, whereas mistakes can happen because of certain circumstances that hinder learners from communicating what they know in the target language. Ellis (1997) stresses that an ultimate clear distinction between errors and mistakes may not be possible, which creates a challenge to researchers in the field. The second step is error description, which involves the researcher sorting and classifying the learners' errors according to types (e.g. grammatical categories). Once the mistakes have been categorised, they should figure out the constructions of the target language and the particular operations that the learners are employing when their utterance violates the structures. Such operations are omission, misinformation and misordering. After identifying and describing the learners' errors, the researcher should try to find a justification for, and an explanation of, these kinds of errors. Ellis (1997) states that the errors that learners make tend to be systematic and predictable, with some even being universal, such as omission and overgeneralization. Learners' errors can also occur due to L1 negative transfer. In this situation, error evaluation is an essential step, helping second language learners to master the target language. In this way, the purpose of SLA research is attained. Ellis (1997, p.20) argues that teachers should therefore differentiate between global errors, which violate the overall structure of a sentence, and local errors, which only affect a single constituent in a sentence.

The theory of Interlanguage (IL) was developed by Selinker (1972). This approach focuses on how the learner's performance is taken as a means to interpret the underlying processes and strategies of SL learning. Therefore, in IL theory, SL learners can be seen to move on a 'continuum' from knowing only their first language towards acquiring more 'skills' of the second language. IL is widely

perceived as being an extension of EA theory and transfer (Byram and Hu, 2013, p.356). In IL theory, learners are assumed to 'build up' a language system that is halfway between L1 and L2 (See Figure: 2-1). The learner's L1 defines the beginning of the IL's construction, while L2 defines its end, meaning that IL seems to be influenced by both L1 and L2. It is sometimes also seen as a third systematic language that is different from L1 and L2 (Selinker, 1972). "[T]he IL is governed by rules which constitute the learner's internal grammar. These rules are discovered by analysing the language that is used by the learner at that time- what he or she can produce and interpret correctly as well as errors that are made" (Saville-Troike, 2012, p.43).

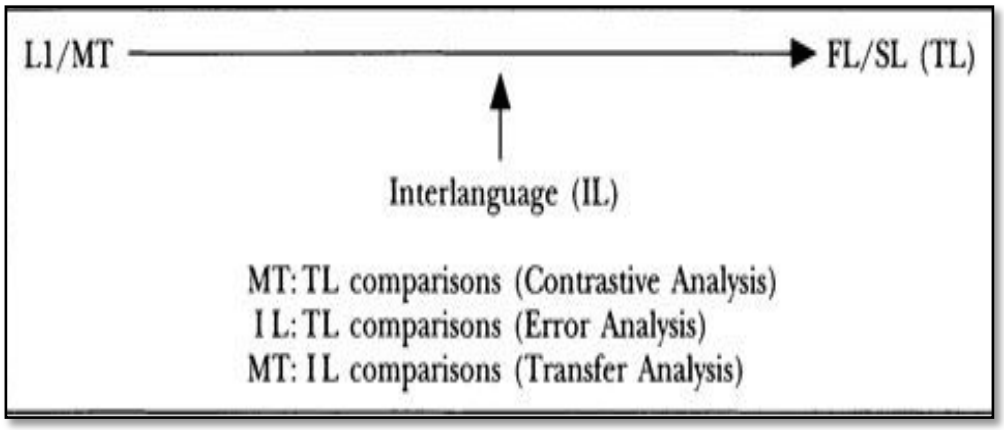


Figure 2-1: Inter-language continuum (James 1998, p.3)[16].

Despite the potential limitations of the aforementioned theories of learners' error analysis (CAH, EA, and IL), each has played an important role in the interpretation of these errors, thereby guiding SLA and applied linguistic research. In the following Table (2-2), I have summarised these approaches and listed their critical views (Khansir, 2012; Saville-Troike, 2012).

[16] The abbreviations in figure (2-1) represent the following: L1= first language, MT= mother-tongue, FL= foreign language, SL= second language, TL= target language.

Table 2-2: A summary of the approaches of learners' error analysis: CA, EA, and IL

Analyses of Errors Approaches	Contrastive Analysis (Fries, 1945; Lado, 1957)	Error Analysis (Corder, 1960)	Interlanguage (Selinker, 1972)
Source	Beginning with comparing L1 and L2 systems in order to predict learners' errors.	Detecting learners' errors and classifying them: 1.Inter-lingual errors/transfer 2.Intra-lingual errors/transfer	-Learners' 'interim grammars' or L2 knowledge. -Faulty or partial learning of L2.
Cause	L1 Interference	1. Learners are internalizing the system of L2: in phonological, morphological, grammatical, lexical-semantic levels 2. Learners try to make hypotheses about L2 from their partial learning and limited experience with L2.	-Language transfer/ Transfer of learning/ Strategies of second language learning/ Strategies of second language communication/ Overgeneralization of the L1 systems.
Significance	Differences between the two language systems predict learners' errors and formulate teaching techniques.	Provide evidence for linguists and applied linguistic researchers to understand SLA and design pedagogical strategies.	Productive theory in the SLA studies
Criticism	Not all learners' errors are the result of L1. Other factors influencing learners' performance are ignored.	Because the focus is on the learner, it does not provide adequate interpretations for 'avoidance phenomena'.	Progress of SL Learners should be measured against native-like production (TL competence).

In summary, observing and assessing ESL learners' performance is very important. This is accomplished by analysing their errors. Regardless of which error analysis approach is adopted, the most important consideration is the significance of the approach or integrated approaches in supporting linguists, SLA and applied linguistic researchers in understanding how SL learners acquire language. Knowing these factors could facilitate or hinder the acquisition process, and inform how to best make use of these inferences and analyses, especially cross-linguistic information, in shaping language applications and teaching instructions. In the current study, I will use these strategies and principles of EA to inform: 1) collection of a sample of learner language, 2) identification of errors, 3) description of errors, 4) explanation of errors and 5) evaluation of errors, through analysis of the results of the semantic test completed by ESL learners (Arab, Japanese and Spanish) (see Section 5.7). I will use these strategies to describe and explain the participants' choice and usage of English prepositions. From a cognitive semantic perspective, this analysis could lead to a viable interpretation of the problem in question, that is, the deviation in performance of the ESL learners (Arab, Spanish and Japanese) when using the English prepositions *at, on and in*. As will be seen from the results of the semantic test, the sample of ESL learners, in the current study, find the English prepositions *at*, *on* and *in* extremely difficult to use appropriately, in terms of both their core meaning and the peripheral meaning. I assume that this type of analysis can open the doors for more empirical evidences and investigations that can help in understanding the complexity of the SLA process and for the improvement of pedagogical implications, teaching methodologies, techniques and instructions.

2.3.5 Evidence from First Language Acquisition for Preposition Acquisition

The difficulties faced by English second language learners, in learning and using the correct spatial prepositions in the appropriate situations, are also faced by young children. Children who have English as their mother tongue often find it difficult to produce the right preposition in specific contexts. This view is supported by evidence from developmental data in first language acquisition and is determined by several factors and constraints. In this section, I will review a selection of important studies and conclusions of first language acquisition research into the acquisition of English preposition among children (e.g. Rice, 2003; Richards, 2004; Morgenstern and Sekali, 2009). The findings of these studies are very significant for my current research. They define this SLA problem encountered by Arab, Japanese and Spanish ESL learners as being either an '*inter-lingual*' or *'intra-lingual'* problems. *'Inter-lingual'* refers to those obstacles that can be attributed to the native language (L1 transfer), where the L1 patterns, systems or rules of learners interfere or prevent them from acquiring the patterns and rules of the second language. However, if this SLA problem is '*intra-lingual*', it would arise from the characteristics of the target language being learned: in this case, the complex semantic patterns of the English prepositions *at, on* and *in*. Therefore, when I come to the data analysis (in Chapter 5), I will apply a quantitative analysis to analyse the findings of a semantic test performed by a group of ESL learners (Arab, Spanish and Japanese) focusing on the type of error the participants in each group produce rather than the number of the occurring errors.

There are several factors that constrain children's acquisition of spatial prepositions that we need to pay attention to. To develop a lexical semantic network

that consists of the multiple senses for a preposition, children must overcome constraints including the frequency of preposition production by adults and also include factors that illustrate the semantic extension of prepositions such as "semantic contrast, pragmatic utility, ease of articulation, lexical preference, conventionalization" (Rice, 2003, p.276). Carpenter (1992, 146) argues that,

> [l]earning a language is not simply a process of mapping linguistic forms onto salient cognitive categories. Thus, many conceptually salient categories are not grammaticalized in all languages, or even in all systems of a single language, and the child must learn which ones are linguistically significant and which ones are not (Quoted in Rice, 2003, p.275).

Researchers in the field of first language acquisition and cognitive development have been influenced by the work of Piaget (1954), who states that children often develop a fundamental 'repertoire of concepts' for language acquisition, e.g. objects, actions, space. When infants are able to utter words, they usually map these words onto these pre-existing concepts. It has been argued that spatial concepts, e.g. containment and support, can be "developed prelinguistically as distinct abstract categories, and when children learn words like *in* or *on* in English, they map those words directly onto the concepts" (Choi, 2006, p.208).

Therefore, scholars interested in children's acquisition of English prepositions have attempted to investigate how youngsters develop their spatial lexicon and find answers to the following significant questions: When is a child able to use a preposition in interaction? Which prepositions does a child utter first? Which sense of spatial preposition is used first by a child? Do the geometric and the extra-geometric factors influence the children's production of prepositions? The last two questions are crucial to my study. It is absolutely essential to understand how children can differentiate between the various usages of prepositional meanings,

either in terms of the core meaning (spatial meaning) or the peripheral meaning (the non-spatial metaphoric meaning), and whether recognising the geometric and the extra-geometric factors of the spatial scene influences the mastery of the correct usage of prepositions in both their core meaning and peripheral meaning.

In order to determine the function of prepositions initially uttered by children, Morgenstern and Sekali (2009) analysed the emergence of prepositions in verbal communication between children aged 1;08 to 2;04 and their parents. They found that children use prepositions from the point where they are able to formulate a sentence of only two words. Their observation coincides with the conclusions of the literature in this field: "[prepositions] are part of the first twenty items learnt by English speaking children according to Brown (1973), and are primarily spatial localizers" (Morgenstern and Sekali, 2009, p.2).

Children typically begin to use the prepositions *in* and *on* at the end of year two, as they start the process of establishing various relations of containment and support between two words (objects) in the world around them. Richards (2001) argues that "it is only by interacting and experiencing interaction with containers and surfaces that one might fully understand those concepts" (p.83). In his study on children's production of locative expressions in English, Richards (2001) found that some theorists in first language acquisition, such as Vandeloise (1987), believe that the children's concepts about space are formed by the function of the objects in the world around them. Other theorists, such as Landau (1994), argue that the geometry of the spatial scene is what makes children map concepts onto their linguistic forms (Richards, 2001, p.85). Richards investigated the role of the geometric and the extra-geometric factors in children's production of the prepositions *in, on, over, above,*

under and below and found that both the geometric and the extra-geometric factors influenced how children produce spatial expressions in their early age (1:6 years old). This finding was consistent with similar studies that examined the comprehension and production of prepositions among adults. The extra-geometric factors, namely those factors unrelated to the scene of utterance, have been found to influence adults' comprehension and production of prepositions. These factors include 'locational control', the 'noun' used to describe the objects, the 'context of the utterance' and the specific properties of the Trajector (TR), the located object and a Landmark (LM), the ground where this object is located (the geometry factors of prepositions are explained in details in Chapter 4). In free response tasks, an adult asked each child about the location of an object with respect to another object. During this test, children of all ages were able to produce the prepositions *in* and *on*. However, older children did better in *above* and *over* trials than younger ones. This finding accords with the fact that there is "a consistent order of acquisition of spatial prepositions, with *in* [...] and *on* typically emerging as the first prepositions comprehend/produced by pre-school children (e.g. Clark, 1973; Johnston and Slobin, 1979)" (Richards et al., 2004, p.154).

Rice (2003) studied the acquisition of the nine English prepositions *in, on, at, to, for, from, with, by*, and *of* by English children. She found that these monosyllabic prepositions appear during the first two and a half years of an English child's life. The emergence of these prepositions differed in terms of the interaction of children and which sense was used first, the basic spatial meaning or the abstract sense (Rice, 2003). Rice (2003) explains that the type of meaning that is utilised first by children depends on a set of factors, e.g. the "frequency of exposure, favourite expressions,

or semantic factors" (p, 274) and the social interaction and routines. A significant conclusion drawn was that "semantic extension within a lexical category by a young child proceeds outwardly only partially (if at all) from some basic, concrete sense by the application of a series of metaphorical image-schematic transformations or other construal processes (Rice, 2003, p.272)". She also found that "SPATIAL usages emerge before NON-SPATIAL ones" [and] "PREPOSITIONAL usages emerge before PARTICLES" (Rice, 2003, p.273).

As we have seen, these studies show that the correct mapping of the spatial scene onto linguistic form is dependent on two main factors: geometric factors and extra-geometric factors. This raises the crucial question of whether this finding is also applicable to English second language learners. In order to find answers to this question, I will review the results of some cross-linguistic and typological studies below, in (2.3.6).

2.3.6 Evidence from Typological Studies

"One may have acquired a particular language that carves up the world in a particular way, what are the consequences, if any, for the acquisition of a second language?" (Coventry and Guijarro-Fuentes, 2008, p.128). It is generally assumed that spatial language is expressed differently in different languages, however, it is widely agreed that the process of learning spatial prepositions in English is challenging for most second language learners. In this section, I will display the results and findings of some SLA studies that are interested in studying the ways in which English second language learners acquire, learn and master English prepositions. What cues do ESL learners use when expressing spatial relations in

English? Do the geometric and the extra-geometric factors affect the process of acquisition? And do these two different factors affect second language learning equally or does one surpass the other? Does L1 negative transfer occur in the process of acquiring spatial language for second language learners? And if yes, does it occur at all times?

A number of SLA studies (Ferrando and Tricker, 2000-2001; Vandeloise, 2003; Tyler et al., 2010; Mahmoodzadeh, 2012; Tyler, 2012b) have attempted to identify the differences between the prepositional system of English and a number of languages, including Arabic, Spanish, German, Dutch, Italian, Japanese, Korean, Chinese, Persian and Russian. These studies attempt to explain the difficulty of mastering spatial prepositions by SL learners.

Ferrando and Tricker (2000-2001) conducted a comparison between the use of the English prepositions *at*, *in* and *on* among English native speakers and Spanish students of English at university level (at intermediate and advanced English proficiency levels). The outcome of the two experiments indicated that the second language learners learn the different senses of prepositions progressively and in parallel; the topological senses, which depend on geometry, and the other senses, which depend on force dynamic and functional configuration, such as the control relationship between the (TR) Trajectory and (LM) Landmark (in other word, the extra-geometric features of prepositional meaning). The study found that Spanish students of English cannot use the different senses of the prepositions *at*, *in* and *on* 'fluently'. Ferrando and Tricker (2000-2001) ascribe their finding to the fact that the 'concepts' (the relations expressed by these prepositions) were not fully mastered by the Spanish students, irrespective of their level of proficiency. Their study also

found that the geometric senses of these prepositions (the basic core senses) are not primary in the acquisition process. This seems to be attributed to the type of approach used in the teaching of English spatial prepositions to those students, as this approach is not usually built on a cognitive semantic basis.

Vandeloise (2003) adopted a cognitive linguistic account in the analysis of the Spanish preposition *en*. He notes that the basic meaning of this spatial preposition is abstract. Therefore, in order to distinguish between the containment and the support relations that are expressed by this single preposition, *en*, it is necessary to understand the specific features of the Landmark (LM) that controls the location of the Trajector (TR), which means the object located. He found that it is very difficult for Spanish second language learners of English to sort the two relations (containment and support) into the two categories *in* and *on,* taking into account the polysemous nature of the spatial prepositions.

Tyler et al. (2010) applied a cognitive linguistic account to teaching and learning the semantic features of the English prepositions *to*, *for* and *at* to 14 advanced Italian English learners. They found that mastery of the semantics of English prepositions is often challenging, even for professional translators. Their results revealed weaknesses in the use of the correct extended meanings of the three prepositions studied, particularly in terms of the extended meanings of the English preposition *at,* in which the participants scored an average of 17.9% correct attempts.

In studying the influence of transfer on the acquisition of English prepositions among Persian EFL learners, Mahmoodzadeh (2012) conducted a contrastive study

to detect and analyse the type of errors made and to investigate the cross-linguistic influence. In this experiment, 53 adult EFL learners at an intermediate level of English fluency attempted a translation task from Persian to English. The redundancy in preposition usage and the errors (omission 9.2%, wrong use 52% or redundancy 46.4%) made by participants in this task were attributed to the negative transfer and the influence of L1 on L2: "Iranian EFL learners tend to carry over their L1 collocational prepositions to their L2 production" (Mahmoodzadeh, 2012, p.737).

Tyler (2012b) argued that applying the CL account to SL learning can provide teachers and learners with an effective tool to better understand the complexity and the cross-linguistic variation of prepositions. She provided a comparison between the semantic networks of the Russian preposition *za* and the English prepositions *over* and *at*. Tyler (2012b) found that there are particular cross-linguistic semantic mismatches between these prepositions. "[A]lthough the central figure-ground configurations of za versus over and at are quite different, za has developed key extended meanings which overlap those of over and at"(Tyler, 2012b, p.305). Tyler (2012b) conducted a short translation task on eight English speakers who were learning Russian. As a result of the semantic mismatch with English *over* and *at*, Tyler (2012b) found that the tasks including the extended meanings of the Russian preposition *za* were more difficult for the learners than the tasks including its central meaning.

2.4 Conclusion

Recent studies in first language acquisition, second language acquisition and error analysis (EA) recommend the adoption of a cognitive semantic approach to the learning and teaching of English prepositions, with particular reference to prepositions. This may offer a significant and effective way to reduce the difficulties that ESL learners encounter when acquiring and mastering the use of English prepositions. It may also help to decrease the effect of L1 transfer in the acquisition of prepositions and to help ESL learners more effectively establish systematic links between the various senses of English prepositions.

Chapter 3 The Meaning of Spatial Expressions

3.1 Introduction

For cognitive semantics, meaning is taken to reside in 'conceptualisation' and the function of a language is understood to map between domains. In this chapter, I will focus on meaning, with particular reference to the meaning of prepositions, from a cognitive semantic perspective. This will be achieved by tackling essential issues about meaning, such as meaning conventionality and meaning flexibility as context-dependent. In other words, this chapter will compare semantics and pragmatics against the approach of meaning, taking into consideration other sources of prepositional meaning, including metaphoric meaning, polysemy and idiomaticity. In addition, I will review the most prominent semantic approaches to prepositional meaning proposed by Herskovits (1986), Talmy (2000), Tyler and Evans (2003), and Coventry and Garrod (2004). In addition, I will highlight the cognitive linguistic and cognitive semantic position with respect to linguistic universals in reference to the SPACE domain.

3.2 Preposition Meaning in Cognitive Semantics

Cognitive semantics (CS) is a division of cognitive linguistics that was founded in the 1980s in opposition to the formal semantic approach and truth conditional semantics. This area is concerned with the conceptual structure of linguistic meaning, taking the stance that meaning is dependent on the different aspects of mental representations (Evans and Green, 2006, p.157). It can be useful to understand the characteristics and the key concepts of CS, as these are excellent ways for prepositional meanings to be explained and understood.[17]

First of all, CL researchers such as Jackendoff and Landau (1992) explored the notion of spatial representation. This is a fundamental issue of spatial language, which describes the way that humans express their spatial experiences; in other words, spatial language means the manner in which individuals express what things are and where they are located. In Figure (3-1), Jackendoff and Landau (1992) illustrate the levels of representation in which spatial language is encoded or expressed linguistically. There is a level of underlying non-linguistic representation or configurations, which includes visionary, auditory, and haptic factors. In order to understand the spatial representation, these configurations should be converted into a form of representation that is specific to the motor system that both initiates and guides human behaviour. This means that "in order to account for the language of space, there must be a translation between the spatial format and the representations proprietary to language" (Jackendoff and Landau, 1992, p.100). Some significant constraints exist with regards to the spatial relations expressed by a language, although these are not attributed to limits on the spatial representation itself

[17] This subject will be revisited in Chapters 4 and 5 below.

(Jackendoff and Landau, 1992). Instead, the constraints exist partially as a result of linguistic information, such as asymmetry between figure (TR) and reference object (LM). Jackendoff and Landau (1992) explained these as restrictions on the geometry of the reference object (LM), certain specification of the geometry of the figure (TR), constraints on the spatial relations that describe regions and other factors that contribute to the complexity of English prepositions. These factors involve:

> (1) how spatial configurations that are nonstereotypical or ambiguous are forced into the expressions available in the language, (2) how particular prepositions are extended from core place meanings to different sorts of related paths and places […], (3) how preposition meanings are extended to nonspatial domains such as time and possession, and (4) how prepositions are used as purely grammatical markers (Jackendoff and Landau, 1992, p.118).

Jackendoff and Landau identified a correlation between the linguistic aspect of language knowledge and the non-linguistic one, e.g. cognition subcategories (see Figure 3-1). These kinds of studies lead scholars to ask crucial questions, such as whether language constrains 'space' or whether 'space' constrains the linguistic representations of spatial relations, or to investigate the relationship between cognition with its subsystems, such as perception and vision, or the language of space.

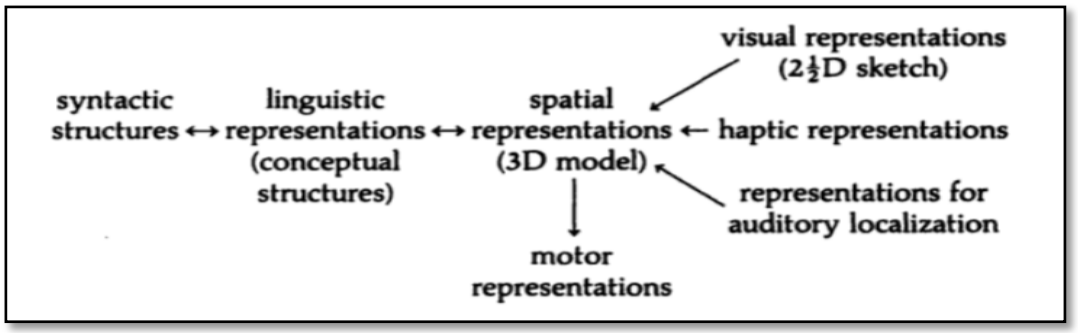


Figure 3-1: The relationship among the levels of representations devoted to the spatial representations proposed by Jackendoff and Landau (1992, p.100). The arrows indicate translations from one level to another.

Evans and Green (2006, p.157) identified four principles of cognitive semantics (CS). They argue that (1) the conceptual structure of meaning is 'embodied' in our daily 'experience', 'interaction' and 'awareness' of the physical world and that (2) linguistic concepts, by which they refer to the meaning associated with lexical items whether open-class or closed-class, are a subset of conceptual structure. (3) The representation of meaning is encyclopaedic: "words do not represent neatly packaged bundles of meaning (the dictionary view), but serve as 'points of access' to vast repositories of knowledge relating to a particular concept or conceptual domain"(p.157). (4) The meaning of words is conceptualised. Accordingly, word meaning is constructed at the 'conceptual level', as "[L]inguistic units serve as prompts for an array of conceptual operations and the recruitment of background knowledge" (Evans and Green, 2006, p.162). The following examples explain the concept of 'containment':

1) A: Where is Mary? B: She is in the kitchen.

2) They are in love.

In example (1), when B replies to A's question about Mary's location, what A understands is that Mary is in a 'bounded' room, which has both interior enclosed sides and an exterior boundary, namely the kitchen. Accordingly, this Landmark (LM), the 'kitchen', has containment as one of its functional properties because of its physical interaction with the Trajector (TR), 'Mary'. This example clearly illustrates the cognitive linguistic concept of an image schema.

In cognitive linguistics, the image schema concept is seen as "one of the ways in which bodily experience gives rise to meaningful concepts" (Evans and Green, 2006, p.185). These schematic conceptual structures of linguistic meaning express physical meaning and the direct embodied interaction with 'bounded landmarks', as in example (1). They can also express abstract meaning, as occurs in example (2). In (2), the abstract conceptual domain of STATES, such as LOVE, is expressed by the 'container' image schema. This is what Lakoff (1987) and Johnson (1987) describe as 'metaphoric projection' (see 2.2.3). Therefore, in CS the conventional meaning of lexical items is 'schematic', which describes a situation in which "concepts relate to lived experience" (Evans and Green, 2006, p.160), 'dynamic', and 'encyclopaedic'. Furthermore, this conventional meaning serves as "a 'prompt' for the process of meaning construction: the 'selection' of an appropriate interpretation against the context of the utterance" (Evans and Green, 2006, p.161). These 'schematic concepts' can be used to express more abstract concepts in the process of conceptual metaphor (Lakoff, 1987; Johnson, 1987), which is a form of what they call 'conceptual projection', such as 'in love' projecting the STATE in (2). Therefore, Evans and Green (2006) argue that English prepositions are polysemous in nature and that they can be used to express different abstract meanings that are not spatial in nature. It is not unreasonable to expect that this could be considered a major source of difficulty for English second language learners, as will be discussed in Chapters 5 and 6. Consider the following examples:

3) John is on the farm.

4) John is at school.

5) John is in the club.

In these examples, John's location is specified through the use of one of the spatial prepositions *on*, *at* or *in*. In order to understand the meaning of the utterance, it is necessary for one to go through a process of 'meaning selection'. This is done by relating our encyclopaedic knowledge about the words *farm*, *school,* and *club* to the meaning of the spatial prepositions *on, at* and *in*. In this way, it can be seen that the appropriate paraphrases for the meanings of these sentences are: 3) John is working on the farm, 4) John is a teacher at the school, 5) John is a member of the club. "These image-schematic concepts are not disembodied abstractions, but derive their substance, in large measure, from the sensory-perceptual experiences that give rise to them in the first place" (Evans and Green, 2006, p.46). An 'embodied cognition' thesis of cognitive linguistics is therefore essential in examining the relation between language, mind and experience (Evans and Green, 2006). This led to the definition of cognitive semantics as "the study of the relationship between experience, embodied cognition and language" (Evans and Green, 2006, p.50) and "the spatial meanings associated with prepositions present a clear case of the way in which image schemas underpin language" (Evans and Green, 2006, p.52). In this way, the different image schemas that are expressed by the English spatial prepositions *at*, *on* and *in* are COINCIDENCE, CONTACT and CONTAINMENT, respectively. Therefore, Coventry and Guijarro-Fuentes (2008) argue that:

> [T]he meaning of a spatial expression does not simply derive from the addition of the fixed meanings of the preposition together with the meanings of other elements in the sentence (e.g., nouns and verb). Rather meaning is constructed on-line as a function of how these multiple constraints come together (p.124).

3.2.1 Cognitive Semantic Approaches to Preposition Meaning

Spatial meaning has been a topic of great interest in recent linguistic literature, particularly as regards the area of cognitive semantics. In this section, I will display and discuss the most prominent semantic approaches to the meaning of prepositions, as proposed by leading academics like Herskovits (1986), Talmy (2000), Tyler and Evans (2003), and Coventry and Garrod (2004). In so doing, it should be noted that each semantic analysis is likely to have an inherent degree of limitation, although each is also considered to be an important framework in the field of CS. I therefore propose to illustrate the overlap between these accounts, given that they stem from a cognitive base. The most prominent and relevant components of their semantic analysis will then be applied to this study and the investigation of the English spatial prepositions *at*, *on* and *in* (Chapter 4). They will also be utilised in interpreting the deviation in the performance of the ESL learners, who are Arab, Spanish and Japanese in the current study (Chapter 5).

3.2.1.1 Herskovits' Approach

Herskovits (1986) describes English spatial expressions and introduces three important notions to cognitive semantics: the 'ideal meaning' of a lexical item; the role of conventions in conveying meaning; and the influence of pragmatics on the 'ideal meaning'. Herskovits argues that lexical meanings can be explained in an 'ideal world' and in spatial domains according to points, surfaces and lines, as well as through different spatial relations, such as inclusion, contact, or intersection (1986, p.3). In order to describe the world around us, speakers utilise 'ideal world' concepts and the deviations from the ideal that are created by 'bending' and 'stretching' these concepts. This facilitates the mapping of lexical meaning to

language usage, and in so doing, explains the polysemy of prepositions. "Her goal is to position the study of linguistic expressions (in particular, spatial expressions) within a broader context of language usage and the conventions associated with communicating goals, beliefs, etc." (Pustejovsky, 1989, p.187).[18]

Herskovits' lexical analysis of spatial expressions begins with the proposition of an 'ideal meaning' and a description of two types of deviation from this meaning. In so doing, she indicates that what is meant by the meaning of a given preposition is an ideal one, although this can be "conventionally exploited in various ways, which must be recorded with the preposition in the lexicon" (Herskovits, 1986, p.3). This 'ideal meaning' goes through a process of conceptualisation. Herskovits (1986) claims that there is "an intermediate level of geometric conceptualisation, where geometric description functions map locative description onto objects. […] [They] determine what preposition contributes to the meaning of a particular situation" (Pustejovsky, 1989, p.189). The meanings of the two reference objects in the following examples are compared by contrasting the 'space' in (6), describing the table which is 'bounded' and 'definite', with the water in (7), which is 'unbounded' and 'indefinite':

6) the lamp on the table
7) the child in the water
(Cited in Pustejovsky, 1989, p.189).

Herskovits (1986) lists six geometric descriptive functions that differentiate between different kinds of objects, including solids, liquids, geometrics and holes. In broad terms, these functions map:

[18] Pustejovsky (1989) wrote a review discussing Herskovits' (1986) descriptive framework of English spatial expressions.

a. a region of space onto a part of it, e.g. *the child must sit at the back of the chair*.
b. a region onto some idealization, e.g. *the city on the road to London*.
c. a region onto some associated 'good form', e.g. *the bird is in the bush*.
d. a region onto an adjacent volume, e.g. *the milk in the bowl*.
e. a region onto axes, e.g. *she rewound the vine along an horizontal lath*.
f. a region onto a projection, e.g. *the painting is to the right of the chair*.
(Cited in Herskovits, 1986, p.65, 67-71)

Herskovits emphasises the contextual factors that facilitate pragmatic inferences of a certain expression, arguing that the intentions of speakers can play an important part in understanding and inferring the spatial meaning. Therefore, she differentiates between two aspects of meaning that are associated with words: the 'interpretation', which depends on the conventional meaning of the expression on its own; and the 'situation type', which is motivated by particular contextual factors. In this classification of lexical meaning, Herskovits touches a very controversial issue in linguistics, meaning the interface and distinction between semantics and pragmatics in regard to meaning. Pustejovsky (1989, p.188) places Herskovits' representational view, which is influenced by pragmatic factors, in a close position to Lakoff (1987) and Jackendoff (1983).

The 'ideal meaning' of prepositions that is proposed by Herskovits stems from 'geometric' relations. Geometric descriptions are mental constructions of the related spatial objects. Herskovits argued that these "geometric images are neither contained in, nor directly inferable from, the canonical (basic) description" (1986, p.5). Herskovits assumed that there is an agreed-upon common-sense knowledge of the world on which speakers and hearers build their understanding of utterances (1986, p.11). She argues that due to "the common structure of human organisms, one may assume the common-sense knowledge that relates to spatial properties is well defined" (p.11). Herskovits (1986) also relates prepositions to a situation type,

which is delineated into a list of factors: relevant purposes, concerns, and beliefs of the speaker or hearer. In this way, 'situation' can be used broadly to include the perceptual representations of the spatial scene (Herskovits, 1986).

Certain situational constraints exist on geometric meaning, although Herskovits (1986) has suggested solutions for these limitations. These solutions are predicated upon the idea that one should not depend on a simple geometric relation model, instead supplementing it with contextual conditions. She argues that,

> part of the meaning associated with the use of a given locative expression is a proposition asserting that a transformed ideal is true of the geometric descriptions; this proportion is the geometric meaning of the expression […]. It is only part of the meaning of the expression, because other elements of meaning, preconditions and contextual conditions, come into play (p.18).

Therefore, prediction means mapping of the geometric descriptive functions onto different regions, as explained earlier. It also includes information about the objects themselves: for example, in the case of *the toy is in the box*, it is assumed that the toy is smaller than the box.

Herskovits (1986) argues that simple geometric relations do not apply to 'complex' meaning and that there are two kinds of 'shifts' from the ideal meaning. These deviations are convention-based shifting, which explains the polysemy of prepositions, and pragmatic tolerance shifting, which makes the meaning of expressions acceptable and true. Herskovits suggested that each preposition has two different levels of abstraction, namely an ideal meaning and a use type, which is explained in the following:

> The ideal meaning abstraction is not sufficient to build truth-conditions, but is a necessary anchor that organizes the overall set of uses of the preposition. The use type abstraction, with several use types derived from the same ideal meaning, is much richer and provides material that brings us much closer to a definition of truth-conditions; however, it is possible, in out-of-the-ordinary circumstances, to break even use type (1986, p.18).

Let us compare the ideal meaning of the preposition *on* in the following examples:

8) the label on the box
9) the wrinkles on his face
(Cited in Herskovits, 1986, p.141, p.143)

Example (8) represents the ideal meaning of the preposition *on,* namely 'support'; example (9) represents a shift of meaning from the ideal meaning of *on* because there is "no support is involved" ((Pustejovsky, 1989, p.188).

Herskovits' (1986) analysis of the semantics of spatial relations revolves around the questions of encoding and decoding. Encoding is the process of looking for the appropriate 'locative expression' to employ for the description of a spatial relation between two objects. Decoding is the meaning of a locative expression and how it is interpreted by communicators. Herskovits assumes that in order to 'predict' a correct encoding and decoding of a locative expression (e.g. a preposition), and to thereby generate and motivate appropriate preposition meaning, the speaker and the hearer should be able to correctly 'pair' the expressions, the contexts and situational constraints (see Table 3-2).

Table 3-1: Herkovitsian ideal meanings and use types for *at*, *on* and *in*. (Cited in Coventry and Garrod, 2004, p.25)

Ideal meaning: *At:* for a point to coincidence with another **Use Type:** *At:* Spatial entity at location Spatial entity "at sea" Spatial entity at generic place Person at institution Person using artefact Spatial entity at landmark in highlighted medium Physical object on line and indexically defined crosspath Physical object at a distance from point, line, or place
Ideal meaning: *On:* for a geometrical construct X to be contiguous with a line or surface Y: if Y is the surface of an object Oγ, an X is the space occupied by another object Oχ, for Oγ to support Oχ **Use types:** *On:* Spatial entity supported by physical object Accident/object as part of physical object Physical object attached to another Physical object transported by a large vehicle Physical object contiguous with another Physical object contiguous with a wall Physical object on part of itself Physical object over another Spatial entity located on geographical location Physical or geometrical object contiguous with a line Physical object contiguous with edge of geographical area
Ideal meaning: *In:* Inclusion of a geometric construct in a one-, two-, or three-dimensional geometric construct **Use types:** *In:* Spatial entity in container Gap/object "embedded" in physical object Physical object "in the air" Physical object in outline of another or a group of objects Spatial entity in part of space or environment Accident/object part of physical or geometric object Person in clothing Spatial entity in area Physical object in a roadway Person in institution Participant in institution

3.2.1.2 Talmy's Approach

Talmy (2006) is a cognitive linguistics pioneer who investigated the semantics of grammar and has distinguished between two subsystems of 'cognitive representation'. These are the lexical subsystems (the open-class elements) and the grammatical subsystems (the closed-class forms).[19] The closed-class forms represent certain conceptual domains, such as SPACE (location and motion). He argues that each system will have a different semantic function and that the grammatical forms provide a framework or a structure for the conceptual material, whereas the lexical items provide the content. He argues that knowing a language requires an understanding of how to combine and integrate these two subsystems in order to create unlimited cognitive representations or sentences (Talmy, 2006).

Talmy (2000) defines schematization as "a process that involves the systematic selection of certain aspects of a referent scene to represent the whole, while disregarding the remaining aspects" (2000, p.177). He also explored the cognitive processes that are present in the process of schematization during the communication between the speaker and the listener. In addition to this, he investigated the relationship between meaning in general and how space is presented in a language and how a particular spatial expression is chosen.

Talmy (2000) classifies the conceptualisation of spatial structure into two main subsystems. The first of these is concerned with the conceptualisation of any 'volume of space'. It contains static concepts that include region and location and dynamic concepts, which include path and placement. The second subsystem is concerned with materials or entities that form the content of the space such as the

[19] Talmy groups prepositions under closed-class items.

spatial properties of these entities themselves, or with respect to another object; this includes geometric relations exemplified in *X is near/in/on Y* (2000, p.181). Since I am concerned with the English spatial prepositions *at*, *on* and *in*, this example by Talmy (2000, p.182) seems relevant:

10) The bike stood in the house.

Here, the preposition *in* characterizes the site or the location of the bike (the Figure) in relation to the house (the Ground). These terms illustrate the way in which Talmy classifies the two objects in a spatial scene: the primary object (Figure) and the secondary object (Ground). Each of these objects has two different functions that are dependent on their different semantic properties (see Table 3-3).

Table 3-2: Talmy's classification of the functions of the objects in the spatial scene. (2000, p.183)

Primary object	Secondary object
• Has unknown spatial (or temporal) properties to be determined • More movable • Smaller • Geometrically simpler (often pointlike) in its treatment • More recently on the scene/in awareness • Of greater concern/ relevance • Less immediately perceivable • More salient, once perceived • More dependent	• Acts as a reference entity, having known properties that can characterize the primary object's unknowns • More permanently located • Larger • Geometrically more complex in its treatment • Earlier in the scene/in memory • Of lesser concern/relevance • More immediately perceivable • More backgrounded, once primary object is perceived • More independent

According to his classification of the objects in the spatial scene, Talmy also suggests that an asymmetry exists in spatial description (see Table 3-3). He explains that in order for an object to be a reference point (the secondary object), it should meet functional semantic differences from the located object (the primary object). To describe this asymmetry, consider these examples:

11) a) The bike is near the house.
b) The house is near the bike.
(Cited in Talmy, 2000, p. 183)

The preposition *near* relates the two objects (the bike and the house). The fact that houses are larger and have a more permanent location than bikes, example (11a) is therefore more semantically acceptable than (11b).

Talmy (2005) argues that each spatial schema in a language has 'pre-packaged schemas' that arrange 'objects' in a particular arrangement (cognitive representation). As a consequence of this, speakers of a language must select the appropriate schema required to express the spatial scene. In English, the prepositions *in* and *on* are utilised to refer to the location of objects that are wholly or mostly 'enclosed'. However, these prepositions nevertheless distinguish between *in* a car/*on* a bus, *in* a helicopter/*on* a plane, *in* a rowboat/*on* a ship.[20]

The basic assumption underlying this view about cognitive semantics is that Talmy regards,

> language as a major cognitive system in its own right, distinct from the other major ones: perception, reasoning, affect, attention, memory, cultural structure, and motor control. […] [However], the means and procedures language uses to shape and structure conceptual content, and the patterns in which it structures conceptual content, are to a considerable extent drawn upon, and common to, the ones of other cognitive systems (visual perception […]) (Marchetti, 2006, p.2).

[20] I shall refer to this kind of distinction in English in section 4.3.4 of Chapter 4.

Talmy (2014), in his recent article *Relating Language to Other Cognitive Systems—An Abridged Account,* explains that prepositions can represent particular spatial schemas. He highlights the idea that there is a sort of 'overlap' of the structural properties between language and visual perception. Consider the following examples for the spatial preposition *in*:

12) The radio is in the dumpster.

13) The water is in the vase.

Talmy (2000) explains this as the following. The dumpster/vase (Ground[21]) can be defined as a volume space, while radio/water (Figure) only occupies a portion of this space. In addition, the visual schematic representation of the spatial scene in these examples, in other words, the geometric relations between the Figure and Ground, may be similar to the linguistic representations (Talmy, 2000).

3.2.1.3 Tyler and Evans' Approach

Evans and Tyler (2001, 2003, 2004a, 2004b) distinguish between lexical representation and meaning. The lexical representation is the mental abstraction unit that is encoded by the concept level. In contrast, meaning is considered to be a property of the 'utterance'. These conceptions are a function of language usage, thus, the knowledge of a language is 'usage-based'. Evans (2010) assumes that "the organization of our language system is intimately related to, and derives directly from, how language is actually used (Tomasello 2003; Langacker 2000; Croft 2003)" (2010, p.225). This CL assumption about language is the cornerstone for the CS approach to preposition meaning that is proposed by Evans and Tyler.

[21] In my study, I have chosen to refer to Ground as Landmark (LM) and to Figure as Trajector (TR).

Evans and Tyler (2001, 2003, 2004a, 2004b) were concerned with modelling the lexical representation of spatial relations encoded by English prepositions and so examined the polysemic nature of these prepositions. They considered questions such as what constitutes the primary sense of a preposition, how the distinct senses of prepositions are related and form a semantic network, and how they are used for expressing non-spatial meaning. In so doing, they argue that polysemy is motivated by three important factors: situational language use; the nature of human socio-physical experience; and certain cognitive mechanisms and processes (Tyler and Evans 2003, 2004a, 2004b).

In an attempt at refining Tyler and Evans' proposed framework of Principled Polysemy to account for English prepositions, Evans (2010) suggested a theory of lexical representations named Lexical Concepts and Cognitive Models (LCCM). This theory holds that the meaning of prepositions can encode two different kinds of knowledge structure: lexical concepts and cognitive models (see Figure 3-4). In these terms, Evans defines lexical concepts as a "relatively complex sense-unit which is conventionally associated with a specific form" and a lexical concept can give rise to certain cognitive models "which constitute relatively stable, non-linguistic knowledge structures, which are subject to ongoing modification as we continue to interact in the world and in communicative settings" (2010, p.215).

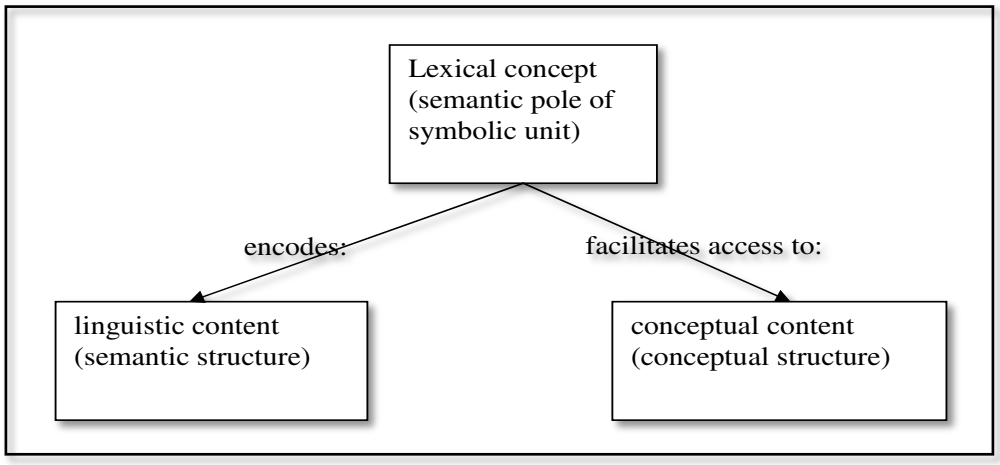


Figure 3-2: The structure of the lexical concept as displayed by Evans (2010, p.7).

The approach to the semantics of English prepositions proposed by Evans and Tyler (2005, p.12) suggests that the concepts encoded by prepositions are embodied. In other words, they are the result of our interaction with the physical-spatial world, meaning that they are schematic in nature or idealized image schema. Evans and Tyler argue that "generalizations across spatial scenes give rise to highly abstract, schematic generalizations established in memory in response to observing or experiencing physical entities in a number of similar spatial relationships" (2005, p.13). These abstractions are considered to be the primary spatial meaning of spatial expressions and because of this they have been named 'proto-scenes', which is "an abstract representation of recurring real-world spatio-physical configuration mediated by human conceptual processing" (Tyler and Evans, 2003, p.50). These proto-scenes consist of both configurational and functional elements. The configurational elements are the TR and the LM, which are defined by a conceptual spatial relation. The TR is the located element that is usually smaller and movable whereas the LM is the locator which is usually larger and immovable. The functional elements are influenced by the relationship between the TR and the LM,

e.g. containment for the preposition *in*. A preposition stimulates this "idealized mental representation" (Tyler and Evans, 2003, p.52) that encodes a spatial relation between these two objects, TR and LM, which create the spatial scene. Although the proto-scene 'mediates' the TR and the LM, it is still 'idealized', as it does not "contain detailed information about the nature of either the TR or the LM" (Evans and Tyler, 2005, p.18).

Evans and Tyler (2005) argue that prepositions are considered to have a 'functional element' as a result of their 'mediation' between the TR and the LM. These spatial relations have 'meaningful consequences'. For example, Evans and Tyler (2005) explained that the 'proto-scene' of the English preposition *in* involves a relationship in which the (TR) is bounded or surrounded by the (LM) as in *the cat is in the box*. Thus, the function element of the preposition *in* is containment. This proto-scene seems to 'motivate' the other different meanings that are associated with the preposition and, in so doing, 'formulates' the starting point for the 'sematic network' in which the different meanings of a preposition are systematically organised around the primary spatial meaning. Evans and Tyler (2005, p.20) explain preposition polysemy, or the semantic network, as follows:

> Each proto-scene is understood to constitute the primary meaning representation associated with a particular preposition, from which additional meanings have been systematically derived. Thus, each preposition and the multiple uses associated with it are represented as an organised, connected network of related meanings, rather than arbitrary lists of distinct meanings that happen to share the same phonological form.

Consequently, Evans and Tyler (2005) attempted to model preposition polysemy in a lexical semantic network. This semantic network consists of a primary sense and several distinct senses extend from it. They began by defining a

primary sense and a distinct sense. Evans and Tyler (2005) agree with many of the general assumptions underlying the semantic polysemy network. Therefore, in order to best model a semantic sense, they have refined the semantic polysemy network in terms of what counts as a primary sense, and what are the characteristics of a distinct sense. They explain that,

> within a semantic polysemy network, a lexical item has been treated as a conceptual category, which subsumes a variety of distinct but related (i.e. polysemous) meanings or senses. Each sense is treated within the network as a node. Such networks are typically diagrammed with one sense being central from which other senses are derived in radial fashion (Tyler and Evans, 2003, p.31).

Their criteria for determining the primary sense of a preposition is as follows:

> "[B]ecause of the particular nature of spatial particles- that they code for spatial relations which may not have changed over the last many thousand years (i.e., the way humans perceive space may not have changed), and that they are a closed class- the nature of the primary senses associated with lexical forms is likely to be at least somewhat distinct from the primary senses associated with other word classes, such as nouns, adjectives and verbs (Tyler and Evans, 2003, p.47).

In addition, they propose two types of evidence, linguistic and empirical, which characterize the primary sense selection. When these types of evidence are merged, they will form a 'convergence evidence' that is able to identify the sense that has served as the originating point of other senses (Tyler and Evans, 2003, p.47). Tyler and Evans (2003) explained the linguistic evidence criteria that determine the selection of the primary sense include:

> 1) the earliest attested meaning [that involves the original TR-LM configuration], 2) predominance in the semantic network [which has a unique spatial configuration that is involved in the majority of the distinct senses found in the network], 3) use in composite form [such as compound forms], 4) relations to other spatial particles [e.g. clusters of particle sets] and 5) grammatical predictions (Langacker, 1987, Cited in Tyler and Evans 2003, p.47).

Furthermore, Tyler and Evans (2003) characterized the criteria of the distinct sense of a preposition as including additional meaning; involving 'non-spatial meaning'; entailing different configurations between TR and LM than found in the primary proto-scene; and context independence, in some instances of the distinct meaning. An example of a semantic network for the preposition *in* is shown below (see Figure 3-5).

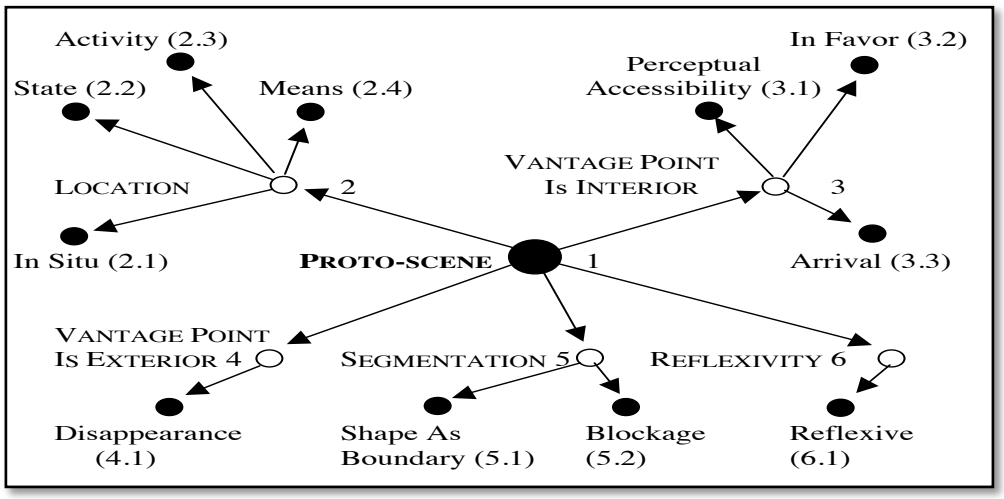


Figure 3-3: An example of a semantic network for the English spatial preposition *in* proposed by Evans and Tyler (2004b, p.173).

Evans and Tyler (2005) claim that the extended meanings of prepositions are constrained by a set of cognitive principles and the proto-scene is constrained by two fundamental principles of spatial meaning extension (polysemy). The first of these principles is that spatial scenes are constructed in different ways. "Each shift in vantage point coincides with a shift in interpretation of the scene (LANGACKER, 1987)" (2005, p.21). As a consequence, languages are said to curve or conventionalize spatial relations differently. Evans and Tyler (2005) assert that the importance of this characteristic explains the 'mismatch' problem, or one-to-one preposition cross-linguistic equivalence. The second fundamental principle is that

the proto-scene or the meaning of a preposition, which encodes a spatial-functional relation between a TR and a LM, can be extended to encode non-spatial meaning. This is a result of our recurring experience with the spatio-physical world. Evans and Tyler (2005) explain this feature of preposition meaning in terms of 'experimental correlation' (O'Grady, 1997). This concept describes when a particular event becomes distinct as a result of repeated co-occurrences and correlations, and is then stored at the conceptual level. This allows the speakers of a language to conceive, interpret and motivate this distinct meaning in relation to another events. In addition, "once a distinct meaning […] has become part of the semantic network for a preposition […], the preposition can be used to code for extended, non-spatial meaning" (Evans and Tyler, 2005, p.22).[22]

Before I conclude this overview and revise the approach to the semantics of the English preposition proposed by Evans and Tyler, it is important to first clarify their position regarding the meaning-construction process and conceptualisation. Evans and Tyler (2004b) highlight some linguistic facts about lexical structure. Lexical items can be used with different meanings in different contexts and, for this reason, they are generally taken to be polysemous. In addition, this lexical structure is not arbitrary, instead being organised in a very systematic way to count for the different senses of lexical items. Accordingly, meaning extension undergoes a very highly motivated cognitive process in the lexicon.[23] This process is grounded in our

[22] This is what Evans and Tyler (2005) called 'Polysemy Commitment', that is, when the distinct senses associated with a preposition are related to one another in a principled way through the semantic network.

[23] With regard to the lexicon, Evans and Tyler disagree with the traditional view (Bloomfield, 1933; Chomsky, 1995), which considers the lexicon as a 'repository of the arbitrary and idiosyncratic': "a static set of words and word senses, tagged with features for syntactic, morphological and semantic information, ready to be inserted into syntactic frames with appropriately matching features" (Tyler and Evans, 2001, p.725)" (Cited in Evans and Tyler, 2004b, p.158).

embodied experience of the world and is the result of our 'interaction' with this spatio-physical experience and language use (Evans and Tyler, 2004b, p.158). This motivated account of word meaning and word meaning extension also underpins the principled polysemy model and semantic network, mentioned earlier (Evans and Tyler, 2004b). In addition, an on-line meaning construction process could be added to the preposition proto-scene or any of its distinct senses because "the phenomenon of polysemy, is highly motivated in nature" (Evans and Tyler, 2004b, p.167). This on-line meaning could be interpreted in accordance with certain contextual factors.

Tyler and Evans (2003) assume that "it is important to note that not all usages [of prepositions] are contained within the semantic network […][and that] some uses are created on-line in the course of regular interpretation of utterances" (p.7). In the meaning-construction process, the distinct senses of a preposition are taken to have abstract representations since they become conventionalized and stored in the lexicon. Therefore, when they are combined at the conceptual level with contextual cues, different online interpretations can be originated and motivated, with the resultant interpretations providing the "relevant details of the scene being specified" (Tyler and Evans, 2003, p.55). Consider the following example adapted from Tyler and Evan (2003, p.7):

14) The cat jumped over the wall.

In (14), the meaning of "moving from one side of an obstacle to the other" (Tyler and Evans, 2003, p.7) is an on-line meaning that is formulated for the purpose of situational and contextual clues. In understanding and interpreting a given expression, individuals can therefore create a particular mental depiction of a scene

or action (2003, p.57) that can involve a spatial scene with 'dynamic' motion, such as in example (14).

It is crucial to understand the construction of this on-line meaning. Tyler and Evans (2003) describe a number of 'inferencing strategies' that are employed by communicators as a means to derive interpretations of on-line meaning: The first of these is best fit. Speakers typically use this strategy to select the preposition that is most appropriate for the conceptual spatial relation encoded by this preposition and the 'communicative needs', as well as to complete the relevant information in a particular spatial scene. The second strategy involves recognising knowledge of real world force dynamics, e.g. gravity, and knowledge about entities. The final strategy is called topological extension:

> conceptualized space and spatial relations are topological in nature, that is, they 'involve realistic relationships rather than absolutely fixed quantities' (Talmy, 2000, p.170). Thus, the TR-LM configurations can be distorted conceptually, as long as the relation denoted by the proto-scene remains constant" (Tyler and Evans, 2003, p.58).

In summary, Evans and Tyler (2008) provided a new approach to lexical meaning and to spatial meaning. This approach distinguishes between two forms of meanings: constructed meanings and senses (both the primary sense and the distinct senses); and meaning constructed on-line. They argue that the senses of a preposition "are instantiated in memory, and can be recruited for the process of conceptual integration", where on-line meanings "are constructed on-line in the course of constructing a conceptualisation of a specific scene prompted by a particular utterance" (Evans and Tyler, 2008, p.145). In addition to the aforementioned approach, Evans and Tyler designed a theoretically rigid cognitive semantic framework and methodology for the analysis of preposition meanings: the proto-scene, primary sense, distinct sense, online-meaning construction, principled polysemy model and LCCM theory. The result of this is that they provided a way to make the findings of other studies in spatial meaning more applicable. The

applications of this theoretical account to SLA research will be discussed further in Chapter 6 below.

3.2.1.4 Coventry and Garrod's Approach

Coventry and Garrod (2004) adopted the lexical semantic approach in order to study the ways in which language and the perceptual system map onto one another. Their approach for capturing the meaning of spatial expressions is dependent on how the perceptual representation adds to the meaning of prepositions in specific situations. As well as describing the positions of objects in terms of another object in space, their account also describes how these objects 'interact' with each other. This interaction is essential to understand and appropriately use spatial expressions. In addition, Coventry and Garrod (2004) explored whether the conceptual relations between these objects are driven by language or have any perceptual representation. I will also review their position on the prepositions' geometric features and their non-spatial use, such as metaphor, and the cross-linguistic implications of their account.

Building on Talmy (1988), Vandeloise (1994), and Garrod and Sanford (1989), Coventry and Garrod (2004) designed a 'functional geometric framework' that accounts for the comprehension and the production of spatial expressions. This framework consists of three key elements: geometric routines, extra-geometric routines (dynamic-kinematic); and object knowledge that controls these routines. It should be noted, however, that Coventry and Garrod (2004) assume that even though spatial prepositions can be linked to the place of an object, this does not necessarily mean that the meanings of prepositions are confined to those relationships. In addition, they add that "the language of space is inextricably bound

up with the process of seeing our world and acting on it" (2004, p.13). Coventry and Garrod (2004) supported the three key elements of their framework with analysis of numerous topological prepositions, including *in* and *on*; projective prepositions, such as *above*/*below*, *under*/*over*, *in front of*/*behind*; and proximity terms, like *at, near/far, between*. They show that the meanings of prepositions are influenced by a) extra-geometric factors, such as 'location control', b) the knowledge about the objects that these prepositions relate, and c) how often these objects occur together (Coventry and Garrod, 2004).

Coventry and Garrod (2004) assume that spatial prepositions convey the geometric relations of objects in space. However, they have disproved the minimal core sense definition of prepositions (cf. Cooper, 1968; Leech, 1969), arguing that the simple spatial relation approach to prepositions and one-to-one mapping between language and the spatial world fail to account for the diverse range of preposition usages. They took into consideration the role of 'seeing', perception, and 'acting', objects interaction, when determining the preposition meaning. They strongly argued that "spatial language must be grounded in perception" (2004, p.12).

Coventry and Garrod (2004) claim that spatial prepositions are considered very 'productive metaphorical' lexical items.

15) Harry was in a bad mood.
16) Joan had been on social security for years.
17) Mary felt under the weather.
(Cited in Coventry and Garrod, 2004, p.172)

In these examples, the prepositions *in, on* and *under* are used in a non-spatial context. The perspective of Coventry and Garrod (2004) regarding the metaphorical

nature of the preposition differs from Lakoff and Johnson (1980), who claim that spatial metaphors result from prepositions being basic representations. In other words, they come from the geometry of the underlying spatial relations. However, Coventry and Garrod (2004) state that the extended uses of prepositions can be assumed to be an extension of the extra-geometric components of the prepositions' meaning. In explaining the examples (15-17) they argue that "it is not clear what *being in a bad mood* has to do with the geometry of enclosure or what *being on social security* has to do with the geometry of contact" (2004, p.174). In order to comprehend and understand the preposition usages in these examples, we should take extra-geometric aspects of meaning into account (Coventry and Garrod, 2004). In example (15), one should relate the 'mood exerting control' and one's 'behaviour'; in example (16), one should take 'social security' as being as 'financial' support. They explain that support and location control "are particularly useful for making predictions about how objects will behave with respect to each other in the real world. It is just such inference potential that should make the prepositions productive as metaphorical vehicles" (Coventry and Garrod, 2004, p174).

Coventry and Garrod (2004) classify the prepositions *in* and *on* as being topological prepositions, while stating that the preposition *at* is a proximity preposition. They explain that "[f]or a located object *x* to be *at* a reference object *y* requires that the located object *x* is included in a region of the reference object *y*" (Coventry and Garrod, 2004, p.118). This reference object can "interact with *y* socially, physically or in whatever way *x*'s normally interact with *y*'s" (Miller and Johnson-Laird, 1976, p. 388)" (Coventry and Garrod, 2004, p.118).

Coventry and Garrod (2004) argue that despite the fact that many languages pack the geometric and the extra-geometric factors related to the spatial scenes in a different way, there are "fundamental constraints like gravity and the geometric and dynamic-kinematic routines associated with concepts like support and containment are in evidence across all languages" (p.164). Evidence of developmental data from researches in first language acquisition (Tomasello, 1987; Mandler, 1988, 1992, 1996; Richards, 2001; Richards and Coventry, 2003) supports the assumption that children are influenced by the geometric and the extra-geometric constraints that underlie spatial relations during their acquisition of how to express spatial relations in their first language (Coventry and Garrod, 2004).[24] In addition, the diverse results from studies comparing English spatial relations to other languages (Levinson, 1996; Munnich et al., 2001; Bowerman, 1996; Choi and Bowerman, 1991; Coventry et al., 2001; Coventry and Guijarro-Fuentes, 2008) suggest that different languages place different weights on geometric and the extra-geometric factors (Coventry and Garrod, 2004, p.161). In addition, "there are also differences within languages in terms of how geometric and extra-geometric routines are weighted for specific spatial terms" (Coventry and Garrod, 2004, p.161).[25]

To conclude, section (3.2) presented the most prominent semantic approaches to preposition meaning proposed in several of the most important frameworks in cognitive semantics (CS) (Herskovits, 1986; Talmy, 2000; Evans and Tyler, 2003; Coventry and Garrod, 2004). In conducting this overview, I have recognised an overlap among these accounts in terms of the way that they define the spatial meanings of prepositions. This may simply be due to the fact that they are founded

[24] This issue was addressed in Chapter 2 (Section 2.3.4).
[25] A comprehensive review of this issue lies beyond the scope of the current study.

on a cognitive basis. In chapter 4, I will summarise this semantic overlap and consider these semantic features in analysing the semantics of the English prepositions *at*, *on* and *in*. These factors will also be utilised during interpretation of the deviations observed in the performance of the ESL learners (Arab, Spanish and Japanese) (See Chapter 5). Overall, these CS approaches to preposition meaning agree upon a number of semantic factors that determine preposition choice:

1) The primary meaning of prepositions is the spatial meaning. This consists of the conventional abstract representation that is determined and constrained by geometric factors.

2) Contextual factors are important to the spatial scene, because they facilitate the pragmatic inferences (i.e. the intention of speakers). These contextual factors are an aspect of meaning interpretation and constrain the primary sense of preposition, meaning the 'situation type' (Herskovits, 1986). Tyler and Evans (2003) assume that these contextual cues and pragmatic strengthening strategies may enable the construction of an on-line meaning.

3) Talmy (2000) suggests that an asymmetrical relationship exists between the TR (the primary object) and the LM (the secondary object) in the spatial scene, as each has different geometrical configurations (see Table 3-3). These properties of the elements of the spatial scene, which are similar to what Coventry and Garrod (2004) named 'object knowledge', also constrain the encoded spatial relation and therefore the choice of preposition.

4) Tyler and Evans (2003) suggest that the primary meaning of a preposition (the proto-scene) can differ from the extended non-spatial meanings (the distinct meanings) due to certain features. Although they are motivated by the primary sense, the extended meanings of a preposition entail different configurations between the TR and the LM. For this reason, they are considered additional meanings. Herskovits (1986) argues that the extended meaning of a preposition occurs as a result of the bending or stretching of the specific geometric factors that control the primary meaning. Tyler and Evans (2003) claim that the different preposition meanings are systematic and that they are motivated by a semantic network that links primary meaning and its extended distinct meanings.

I will be using four terms, namely TR, LM, core meaning, peripheral meaning,[26] when presenting the semantic analysis of the English prepositions *at, on* and *in* (in Chapter 4) and when analysing and interpreting the findings of the semantic test (in Chapter 5). I will explain the reference and meaning of these terms here: the term TR will be used to refer to the figure/object that is being located, while the term LM will denote the ground/reference object to which the TR has been located. The term 'core meaning' refers to the primary spatial meaning of prepositions, whereas the term 'peripheral meaning' refers to the non-spatial metaphoric meanings.[27]

[26] Linguists studying English prepositions have coined a number of terminologies to describe the semantics of these prepositions. This has resulted in a range of terminologies that can have extremely similar or even identical meanings or usages. For example, ideal meaning, prototypical meaning, primary meaning can all mean the core spatial meaning of a preposition. This therefore seems to be a matter of choice; one linguist prefers to use one terminology, rather than the other.

[27] Although researchers can use the terms figure/Trajectory and ground/Landmark interchangeably, these terms do not usually mean the same. Langacker (2008) differentiates between these explaining that the terms figure/ground are used for perception (p.58), whereas the terms Trajectory/Landmark describe the linguistic expressions that relate to the spatial relations (p.113).

3.3 Sources of Preposition Meaning

In this section, I will try to give a brief classification of the lexical semantic sources of preposition meaning, which are meaning conventionality and meaning flexibility. Polysemous meaning, idiomaticity and metaphoric meaning can be classified under meaning flexibility. It is essential that the definitions and characterizations of these sources be understood before this discussion proceeds to the lexical-semantic analysis of the meaning of the English spatial prepositions *at*, *on* and *in* (See Chapter 4).

3.3.1 Meaning Conventionality

The lexicon is the repository of word meaning. In the lexicon, an interface usually takes place between syntax (at the sentence level), semantics (lexical items) and pragmatics (contextual conditions). In the process of production and interpretation of words, there are two kinds of knowledge that a learner of a language should differentiate between: conventionalized linguistic knowledge and encyclopaedic knowledge. In linguistic terms, this distinction between the kinds of knowledge is assumed to be equivalent to the distinction between semantics and pragmatics. Accordingly, the meaning of a lexical item such as a preposition is 'conventional'. It is understood to exist in 'conceptualisation'. In describing word meaning as conventional, this means that it is relatively stable. This feature of meaning facilitates the process of language acquisition for both children during the acquisition of their first language and for adult FL/SL learners.

3.3.2 Meaning Flexibility

In cognitive linguistics, there are no clear boundaries between linguistic meaning and encyclopaedic meaning. Meaning flexibility (or meaning extension) is an essential feature of meaning, serving to explain how words can be utilised in unconventional ways in certain situations. It has been argued that meaning flexibility should reflect a "property of language user's processing system" (Frisson et al., 1998, p.192). In essence, meaning flexibility allows speakers to construct meaning on-line, depending on the context of utterance, thereby enabling its polysemous, idiomatic and metaphoric usages.

3.3.2.1 Polysemy and Idiomaticity

Herskovits (1986) defines an idiom as "any expression which conventionally conveys elements of meaning other than those obtained by straightforward application of the relevant rules of composition to the meanings of the component morphemes" (p.4). In discussing idiomaticity, she argues that one can argue that the meaning of many expressions is partly dependent on the particular combination of constituent lexical items, and "partly on conventions attached to phrase-type; those for which the latter predominates are perceived as more idiomatic" (p.5). This means that mastering the idiomatic usage of prepositions is a prodigious challenge for English second language learners. When using a preposition, learners need to know how to move from its central physical sense to the potential peripheral extensions of meaning.

Langacker (2009b) summarises how a lexical category is formulated in a given language. In cognitive grammar, a lexical category is seen as 'complex' and is most

accurately "characterized as a *network* of semantic, phonological, or symbolic structures, usually centred on a *prototype*, connected by relationships of elaboration and extension. Generally, for instance, the alternate senses of a lexical item form a complex category (*polysemy*)" (p.80). Polysemy occurs when a word is used to express different but related senses. Langacker (2009b) argues that a lexical item has more than one meaning and these meanings are related. In cognitive linguistics, however, meaning is not 'arbitrary' and the multiple meanings of a word are systematic and organised in a network. Therefore, polysemy can be seen as evidence for the flexibility of meaning.

3.3.2.2 Metaphoric Meaning

Where does 'metaphoric meaning' come from? This is question a worth considering. Brala (2002) proposes that "the categories of spatial relations are formed (and later organised into meaning clusters) on a combinatorial basis, out of universal, primitive, bodily-based semantic features" (p.9). From Brala's (2002) perspective, metaphoric meaning denotes a mapping of features between lexical patterns and referents. For example, a second language learner will need to know the topological features of prepositional meaning, in other words, the 'geometrical elements' of prepositional meaning. They will also need to know the functional control, which refers to the functional configurations or the features of the Landmark (LM) and how LM controls the location of the Trajector (TR). To clarify this point, Brala has compared the prepositional meanings in these sentences:

18) frog in the grass
19) frog on the grass
(Cited in Brala, 2002, p.41)

In order for the prepositions *in* and *on* in (18, 19) to be correctly chosen to express the intended meaning, the preposition *in* needs the (LM) to control the location of the (TR) in terms of 'voluminosity', whereas, the preposition *on* requires the (LM) or the location of the (TR) to be horizontal or vertical. Brala confirms that a 'specific conceptualisation' of the location (LM) in context is triggered by the use of a particular preposition (Brala, 2002, p.10). Brala showed that the static spatial meaning of *in* and *on* could be explained in terms of certain values or the features within three domains: dimensionality, orientation, and attachment. Dimensionality can be explained as:

> DIMENSIONALITY (a domain relative to the number of axes of G that are taken into consideration for the purposes of linguistic expression), yielding (for the purposes of explanatory needs of the range of prepositional usages under consideration) four features, i.e.: 1DIM (one-dimensional), 2DIM (two-dimensional), CIRCLE, and 3DIM (three dimensional or 'containment proper') (Brala, 2002, p.10).

The following Figure (3-6) explains what Brala described regarding the prepositions *on* and *in* gradient scheme, which she analysed in terms of dimensionality.

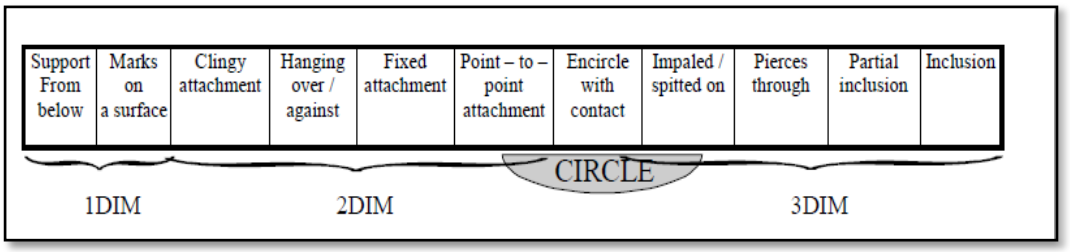


Figure 3-4: The ON-IN scale of spatial meaning categories (Bowerman and Pederson, 1992. Cf Bowerman and Choi, 2001) (Cited in Brala, 2002, p.8).

In Chapter 4 below (4.3.4), I will review the dimensional properties of the spatial preposition *in* as compared to *on* and *at,* and discuss the particular relations

of meaning that exist between these English spatial prepositions. In this sense, the dimension-type of a preposition denotes the dimensional property that is ascribed to the location (LM) as denoted by the prepositional complement, such as *the grass* in examples (18) and (19) above.

3.4 Linguistic Universals

Cognitive linguists do not see languages as being grammatically or semantically similar to one another, because "common cognitive principles do not give rise to uniform linguistic organisation and structure" (Evans and Green, 2006, p.54). However, while languages are different from each other, there are some particular patterns and structures that are common among many or all of them, which cognitive linguistics refers to as linguistic universals (Evans and Green, 2006).

Evans and Green (2006) argue that linguistic universals exist due to human general cognitive principles and embodiment. For CL, since language is often said to reflect conceptual structure, cross-linguistic differences among languages have to direct our attention to the underlying conceptual differences. Evans and Green (2006) propose that:

> Cognitive linguists therefore argue that evidence of variation across languages suggests that languages encode very different kinds of conceptual systems. However, these distinct conceptual systems are thought to emerge from a common **conceptualising capacity**, which derives from fundamental shared aspects of human cognition. Rather than positing universal linguistic principles, then, cognitive linguists posit a common set of cognitive abilities, which serve to both facilitate and constrain the development of our **conceptual systems** (our repository of concepts) (Evans and Green, 2006, p.56).

In support of the CL approach to linguistic universals, the functional typological approach is conducted through the role of a typologist, which can be described as follows: "[T]he typologist begins with cross-linguistic comparisons, and then compares typological classifications of different structural phenomena, searching for relationships" (Croft, 2003, Cited in Evans and Green, 2006, p.59). It can be argued that languages can maintain similarities with the cognitive linguistic assumption concerning language in the sense that linguistic phenomena are explained according to language use and function, and that the general cognitive abilities (e.g. perception) are responsible for some language features and characteristics.

Rather than perceiving language as being the product of "innate cognitive universals that are specialised for language, cognitive linguists see language as a reflection of embodied cognition, which serves to constrain what it is possible to experience, and thus what it is possible to express in language" (Evans and Green 2006, p.64). Evans and Green (2006, p. 64-65) explain the cognitive linguistic approach to universals as follows:

1) Humans share similar cognitive structures and abilities, e.g. brain and body.

2) The nature of human experience is constrained by these cognitive abilities.

3) As a result, the concepts formed according to this experience will also be constrained.

4) Human experience, which is constrained by human cognition abilities, can be divided into two inter-related categories: a) sensory experience that is derived from

our sensory perception and includes concepts such as the ones related to the SPACE domain, and b) introspective experience, which is internal and subjective, such as emotions.

5) The human conceptualising capacity tends to structure concepts that are related to introspective experiences (e.g. they are in love) by using concepts that are derived from sensory experience, such as SPACE (See the conceptual metaphor in 2.2.3.1).[28]

3.5 Conclusion

The notion of meaning and its constituents has been dealt with from a number of different perspectives in linguistics, and especially from a semantic and pragmatic point of view. Meaning has blurred distinctions and can fall within boundaries shared by the two, semantics and pragmatics. The recent interest in metaphoric meaning and polysemy in cognitive semantics and the number of studies that have been dependent on these notions can enable further productive research to be conducted in the field of first language acquisition to provide more developmental data. Investigations could also be conducted in the field of second language acquisition to highlight and explain the difficulties faced by SL learners during the acquisition of new languages. In Chapters 4 and 5 below, a cognitive semantic account to prepositions meaning is used to analyse the semantic features of the English prepositions *at*, *on* and *in* and to explain the findings of the present study regarding Arab, Spanish and Japanese ESL learners.

[28] For more details in the issue of universality, see Evans and Green (2006) Chapter 3.

In summary, prepositions are small, problematic words that have both a conventional meaning, otherwise known as a literal meaning, and non-literal meanings, which can be either metaphoric or idiomatic. The idiomatic meaning of a lexical item is the meaning of a frozen string of words that is connected with certain contexts. Although prepositions are considered closed-class lexical items, meaning that they are inherently limited in number and have structuring function, they provide and support the grammatical interpretation for a sentence. These prepositions also have 'schematic meaning', e.g. COINCIDENCE, CONTACT and CONTAINMENT, which could be related to and derived from certain conceptual domains, like SPACE. In this way, the spatial prepositions *at*, *on* and *in* can be seen to reflect the experiences and thoughts that native speakers of a certain language have about space.

Chapter 4 Semantic Analysis of the English Prepositions *At*, *On* and *In*

4.1 Introduction

This chapter outlines the semantic analysis of the English prepositions *at*, *on* and *in* from a cognitive semantic perspective. I will support this discussion with reference to a huge body of theoretical and empirical work on the semantics of spatial expressions. In (4.2), I will provide a brief explanation of why space is an important component of linguistic knowledge and how language users describe it differently. The larger part of this chapter is devoted to a lexical semantic analysis of the English prepositions *at*, *on* and *in*. In this, I will analyse the semantic properties of these prepositions, focusing on a description of their geometric features and image schemas (see Sections 4.3.1, 4.3.2, 4.3.3). This analysis will be conducted by combining a number of cognitive semantic approaches to prepositions, including those proposed by Herskovits (1986), Lindstromberg (1998, 2010), Tyler and Evans (2003), Evans (2010) and Tyler et al (2010). In (4.4), I will then conduct a linguistic comparison between the semantics of these English prepositions and those in Arabic. The main parts of this section (4.4.1, 4.4.2) are devoted to the discussion of the differences between the English and Arabic prepositions in terms of characteristics such as their number, usage, and syntactic and semantic properties. This analytical study aims to produce original data especially from Arabic. To the best of my knowledge, because most studies of Arabic prepositions approach the subject from a syntactic point of view, this would constitute the first attempt to investigate Arabic prepositions from both a semantic and a cognitive perspective. In

(4.4.3), I will briefly present the Spanish and Japanese equivalents to the English prepositions *at*, *on* and *in*. Examples from research in this area will be provided to support these presentations. Finally, I will provide a summary that highlights the rationale for the inclusion of Japanese and Spanish ESL learners as participants in the semantic test.

4.2 Space

> Speakers of all languages deal with the same physical space, and with roughly the same kinds of objects in it [...]. [They] differ cognitively both as to their division of space, and as to their spatial-structural analysis of given physical objects (Swan, 1991, p.158).

In cognitive linguistics, the concept of space is considered as a central cognitive domain for human thought. Many cognitive linguists therefore focus on studying the relationships between the conceptual systems that underlie language, examining the relations between linguistic concepts and non-linguistic spatial cognition. Spatial concepts expressed by the prepositions *at*, *on* and *in* are seen to be 'innate concepts' and are universal in languages. However, it is generally held that cross-linguistic research shows that "there is no such uniformity in either the semantics or the formal expression of spatial distinctions across languages" (Levinson, 2003, p.2). In the following discussion, I will try to demonstrate how the spatial descriptions expressed by the English prepositions *at*, *on* and *in* vary across the chosen languages (Arabic, Spanish and Japanese), with a particular focus on the interactions between English and Arabic.

4.3 The Semantic Properties of the English Spatial Prepositions *At*, *On* and *In*

This study aims to provide a lexical-semantic analysis of the spatial senses of the English prepositions *at*, *on* and *in.* This analysis is developed within a cognitive linguistic framework (cf. Herskovits, 1986; Lindstromberg, 1998, 2010; Tyler and Evans, 2003; Evans, 2010, Tyler et al, 2010). As mentioned earlier, prepositions often express a relation between two entities: a Trajector (TR) and a Landmark (LM). Consider, for instance, the following examples:

1) There is a candle in the first drawer.
2) He collapsed in his study.

In (1), the 'candle' is the subject of the preposition (the TR), whereas the 'drawer' is the LM of the preposition; it is seen as a container, space or medium. The preposition *in* informs us the location of the TR in relation to the LM. In (2) the TR is the 'event of him collapsing' and the LM is 'his study'.

Spatial prepositions, such as *in,* are not only used to express concrete physical relationships. They can also be semantically extended to describe abstract 'non-spatial' meanings. However, appreciation of the role of metaphor effectively diminishes the degree of arbitrariness. Prepositions are extended semantically by virtue of unusual combinations with other linguistic items, particularly with regards to the types of objects that follow them. The emergence of new, related usage types of English spatial prepositions occurs due to the fact that they demonstrate a *'degree of flexibility'*. This flexibility can be seen through various systematic ways that apply to different prepositional meanings. Let us consider the following, for example:

3) You're in trouble.

In (3) the LM refers to an abstract concept rather than to objects or places. Here, it is evident that the preposition *in* is utilised metaphorically. In such a case, the preposition *in* has a meaning similar or identical to the meaning when the LM refers to a physical place, as seen in (1) above; "the use of *IN* goes hand in hand with our tendency to speak of any abstract circumstances, such as trouble, as if they were an actual physical surrounding like a room or a cloud of fog" (Lindstromberg, 2010, p.10).

Tyler and Evans (2003) illustrated that each English preposition has a central meaning in which the TR and LM are interpreted according to particular configurations. Accordingly, the preposition functional element is conceptualized. "[I]mportant advance in our understanding of spatial language is the recognition of a functional element, i.e., the humanly salient consequences of F-G being in a particular spatial configuration, as a fundamental part of F-G configurations" (Tyler, 2012b, p.309)[29]. Tyler (2012b) explained that these functional elements, which are related to prepositions, include contact, support, containment and proximity.

The extended meanings of a preposition are established according to certain situational and contextual factors, e.g. inferences arising from the context. Due to the repetition of the uses of the preposition extended meanings, they become a part of the sematic network and these distinct senses are no longer connected to "the original spatial, F-G configuration" (Tyler, 2012b, p.312). Therefore, according to Tyler and Evans (2003), the interpretations of extended meanings and the distinct

[29] Some researchers such as Evans and Tyler name the TR a figure (F) and the LM a ground (G).

senses of a preposition "are analysable through the application of the systematic cognitive principles that guide contextualized inferencing" (Tyler, 2012b, p.312).

In the following sections (4.3.1, 4.3.2, 4.3.3), I will offer a separate analysis for each of the individual prepositions studied in the current research (*at*, *on* and *in*) according to the CS accounts of Herskovits (1986), Lindstromberg (1998, 2010), Tyler and Evans (2003), Evans (2010) and Tyler et al (2010). They analysed the semantics of the English prepositions *at*, *on* and *in*, defined the spatial relationship encoded by them and described the different properties and configurations of the TR and the LM that occur in the spatial scene with these prepositions. Furthermore, I will provide a number of examples that classify the types of meanings, either spatial meanings or the non-spatial meanings, expressed by *at*, *on* and *in*. After the semantic analysis, I will present the dimensional properties of these English prepositions comparing *in* to *on* and *at* (see Section 4.3.4).

4.3.1 A lexical-semantic analysis of the English preposition *at*

Herskovits (1986) explained that the ideal meaning for the preposition *at* is motivated when a point coincides with another point (see Table 4-1). The special relationship expressed by *at* emphasises that "those two points, each specified by a different description, overlap in space, and the various use types[30] […] can be seen as variations on this theme" (Herskovits, 1986, p.128). Consider the following examples:

3) Julie is ***at*** the post-office.
4) The Titanic will never be ***at*** sea again.
5) She owns a cabin ***at*** the mountains.
6) My son is ***at*** the University.
7) There is nobody ***at*** the counter.

[30] See Table 3-1 for the different 'use types' senses of the preposition *at*.

8) The camp is ***at*** the bend in the river.
9) The gas station is ***at*** the freeway.
10) The airplane is ***at*** 10,000 feet.
(Cited in Herskovits, 1986, p.128, p.133-139)

In these examples, the two objects in the spatial scene, the TR, e.g. Julie, the Titanic, the camp, the gas station, and the LM, e.g. the post office, sea, the bend in the river, the freeway, are "conceptualized as coincident points"(Herskovits, 1986, p.128). This ideal meaning can be differently mapped according to the configurations of the reference object (LMs) formulating the various 'use types' senses or other deviations of meanings, e.g. the metaphorical extended meanings, expressed by *at* (see Section 3.2.1.1). "[T]hese deviations interact with context very freely and it is difficult to uncover systematicities" (Herskovits, 1986, p.193).

According to Lindstromberg (1998), the preposition *at* differs from the prepositions *in* and *on* as being 'neutral' about the relative sizes of both the TR and the LM. "Owing to the subtlety of its meaning, *at* is perhaps the most troublesome preposition for foreign learners" (Lindstromberg, 1998, p.165). Lindstromberg (2010) listed six spatial meanings related to preposition *at*:

11) *AT* for zooming out; *AT* for intersections & junctions
(e.g., *Some one **at** a crossroads/junction*)
12) *AT* for points on a route – way stations, ports of call, pause points, end points
(e.g., *I stopped **at** page 7*)
13) *AT* for points on a scale
(e.g., ***At** sea-level water boils **at** about 100°C.*)
14) *AT* for contact with (or extreme nearness to) edges, ends & extremities in general
(e.g., *A box **at** the edge of a roof*)
15) *AT* for location in broad scope views
(e.g., *The temperature **at** Chicago was 55°F.)*
16) *AT* with hotels, restaurants, etc.
(e.g., ***at** the Ritz, **at** the Odeon)*
(Cited in Lindstromberg, 2010, p. 173-176)

The LM in (11) is understood to be an intersection of roads, e.g. a crossroads or a junction (see Figure 4-1). In (12), Lindstromberg (2010) describes the usage of preposition *at* as vague; the relation between the TR and the LM is not clear: it "could mean that the writer stopped immediately before the *first* word of page 7, just after the *last* word, or somewhere in between" (p.175). In the case of (13), the LM, which is the temperature that the boiling water reaches, is considered a point in a metaphorical route or a scale. "*AT* is routine in expressions which refer to a scale […] having to do with […] angle, speed, acceleration, pressure, temperature, and so on" (Lindstromberg, 2010, p.175). In (14), the LM seems to be the boundary of the roof (i.e. very close to the roof). To understand the LM in (15), one should zoom out the geographical area to cover the broad scope of Chicago (Lindstromberg, 2010, p176). In (16), the LMs refer to business constructions such as a hotel or a cinema. "*AT* is more common before proper names like Ritz than before 'building' nouns like *restaurant*" (Lindstromberg, 2010, p.177). Lindstromberg (2010) pointed out that being *at* the Ritz "can mean not only 'in' but 'near' (e.g. right in front of the Ritz)" (p.177).

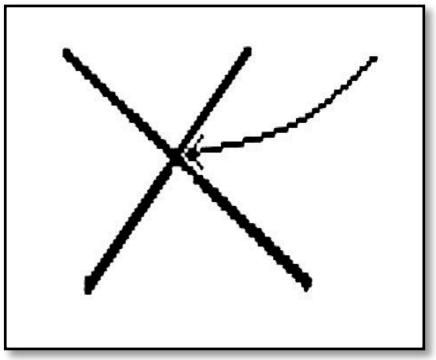


Figure 4-1: The spatial scene for 'someone *at* a street corner /crossroad'. The arrow indicates the location of the TR of this image schema. (Cited in Lindstromberg, 2010, p.174).

Besides these spatial senses, Lindstromberg (2010) explains that the preposition *at* can indicate three functional meanings:

17) *AT* as an expression of 'typical activity-related connection'
(e.g., *There's someone **at** the door*.)
18) *AT* as an indicator of 'focal point'
(e.g., *Look **at** that!*)
19) *AT* for indicating that the Landmark is a target vs. for indicating it is a recipient
(e.g., *laugh **at**, be mad **at** sb.*)

(Cited in Lindstromberg, 2010, p. 177-179)

In example (17), with someone 'at the door' what is primary is not the location of this person, what is more important is this person wants to be known and recognised. In other words, they are at the door and we should open the door. The same interpretation is applicable to example (18) because using the preposition *at* "indicates sharp focus on the Landmark"(Lindstromberg, 2010,p.178). In the case of (19), the meaning of the preposition *at* is extended to express emotions in which the LM (you) is a target. Example (19) can also express the metaphoric extension of the meaning expressed by *at*.

Tyler and Evans (2003) also defined the central meaning of the English preposition *at* "as a spatial scene in which two objects are either very close or in the same location"(Tyler et al, 2010, p. 194). In Figure (4-2), Tyler et al (2010) explain the relationship of co-location (coincidence) between the TR, the small sphere, and the LM, the large sphere. Evans (2010) has similar position to Lindstromberg (1998), regarding the learning difficulty of preposition *at*. He argues that *at* "is one of the most polysemous of all English prepositions"(Evans, 2010, p.243). Evans (2010) explains that the lexical concept encoded by *at*, which he names 'co-

location'[31], constitutes what he refers to 'Practical Association'. "That is, a functional consequence of being co-located with a particular LM is that the TR has some practical association with the reference object" (Evans, 2010, p.243). Evans (2010) clarifies that an example, such as *the man at the desk*, indicates that *the man*, the TR, is not only "in close proximity to his desk, but he is also working at his desk"(p.220). Therefore, the kind of activities related with being in the same location of one's desk is the most important or salient, e.g. typing, writing, reading etc. "Thus, in many contexts, *at* does not prompt for a neutral conceptualization of simple co-location, but a conceptualization of an interactive, functional relationship between the F and G" (Tyler et al, 2010, p.195).

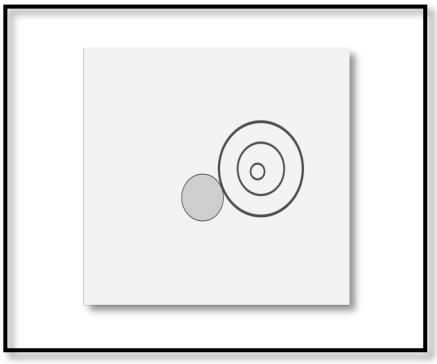


Figure 4-2: The figure represents the central meaning of preposition *at*. (Cited in Tyler et al, 2010, p.194).

One type of the non-spatial meanings of preposition *at* is the 'state'[32] senses (Evans, 2010, p.244). These state senses can represent the extended metaphoric meaning of the preposition *at*; "an extended sense of functional interaction" (Tyler

[31] Throughout my research, I refer to the spatial relation encoded by the English preposition *at* as coincidence.

[32] Evans (2010) explains that the 'state' senses associated with the English prepositions *at*, *on* and *in* can be explained through the concept of conceptual metaphor, STATES ARE LOCATIONS, proposed by (Lakoff and Johnson, 1999). "On the metaphor account, the existence of an independently motivated conceptual metaphor licenses the development of new polysemous senses associated with *in*, *at* and *on*" (Evans, 2010, p.216).

et al, 2010, p.195). Evans (2010) provided a classification of these state senses as follows:

20) State (or condition) of existence
at rest/peace/ease/liberty
(e.g., *He stood at ease, or He is at peace* [=dead])
21) States relating to mutual relations
at war/variance/strife/one/dagger's down/loggerheads
(e.g., *The EU is at war with the US over the imposition of steel tariffs*)
22) States relating to external circumstances
at peril/hazard/expense/an advantage/a disadvantage
(e.g., *The company is at risk of going under*)
(Cited in Evans, 2010, p.244)

Evans (2010) explains that these state senses for *at* are also motivated by the 'Practical Association' parameter (see Figure 4-3), meaning that, there should be "a practical association […] [holding] between a given entity and its state of existence, […] resulting from co-location of two entities involving mutual relations and […] [relating] to evaluations concerning circumstances associated with mutual relations" (p.244). In (21), for example, the EU countries and the USA are not engaged in a real official war, however, due to the practical association which results from a co-location between the two, preposition *at* expresses a state relating to mutual relations rather than merely close-proximity between two points (Evans, 2010, p.244).

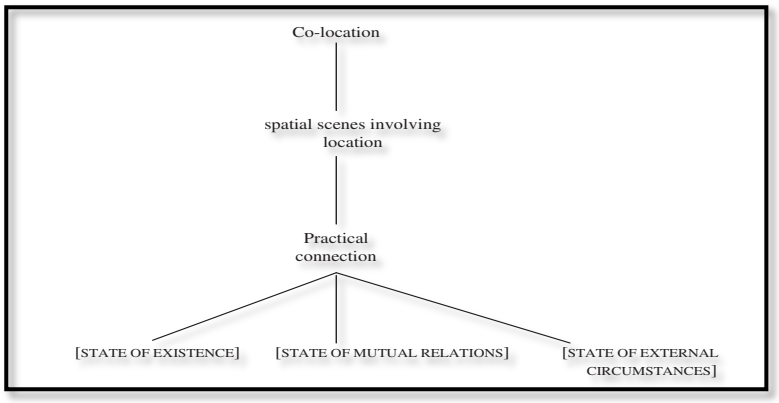


Figure 4-3: The relationship between the parameters of Practical Association and the 'state' lexical concepts for *at* suggested by Evans (2010, p. 245).

4.3.2 A lexical-semantic analysis of the English preposition *on*

The English preposition *on* expresses a relation of contact between a TR and a LM, in which the LM is understood to be a supporting 'surface' (Lindstromberg, 2010, p.51) (see Figure 4-4). According to simple geometric relations, the ideal meaning of the English preposition *on* can express support plus contact or can only describe contact relation depending on the different dimensional properties of the LMs (Herskovits, 1986, p.48). Consider the following examples:

23) The book is on the desk.
24) The town is on the border.
(Cited in Herskovits, 1986, p.12)

In (23), the LM, *the desk*, is interpreted as a three dimensional object or a surface which entirely supports and is in contact with the TR, *the book*. However, in (24) the LM, the border, is a line. In this scene, the preposition *on* does not express support but implies a contact relationship between the TR and the LM. The TR, the town, is touching the LM, the border. "The idea most consistently associated with *on* is contiguity – with a surface or with a line" (Herskovits, 1986, p.48). Contiguity refers to the contact relation which should be always present when using the preposition *on* (see Table 4-1). Therefore, the prototypical meaning of the English preposition *on* can imply supportive contact and the non-supportive contact relations (Lindstromberg, 2010, p.52). Let us examine the following examples:

25) The cat's sitting on the car.
26) A house on the park.
27) City Hall is on Main Street.
(Cited in Lindstromberg, 1998, p. 52-53)

In example (25), preposition *on* describes a supportive contact relation where the TR, the cat, is in contact with the upper surface of the LM, the car, which also supports the cat. In examples (26-27), the prototypical meaning of *on* differs in

certain specific details of the spatio-scene; *on* describes a non-supportive contact relation.

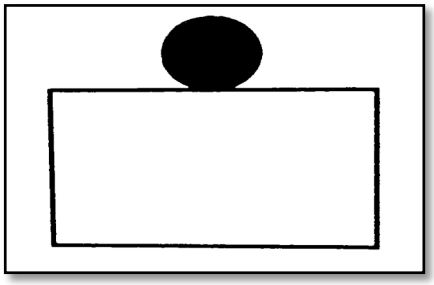


Figure 4-4: The prototypical meaning of the English preposition *on*. (Cited in Lindstromberg, 2010, p.72).

28) An article on holidays in France.
29) This round's on me.
30) On top of the world
(Cited in lindstromberg, 1998, p.57, p.60-61)

The central prototypical meaning of *on* is metaphorically extended in examples (28-30). Here, the LMs, e.g. the world, are broader than anything that might have a surface (see Figures 4-5 and 4-6). Example (30) represents a metaphorical contact for the English preposition *on*; a metaphorical idea of being "delighted, free of care" (Lindstromberg, 2010, p.57). A detailed illustration of the dimensional property ascribed to the location LM denoted by the prepositional *on* complement will be displayed in section (4.3.4).

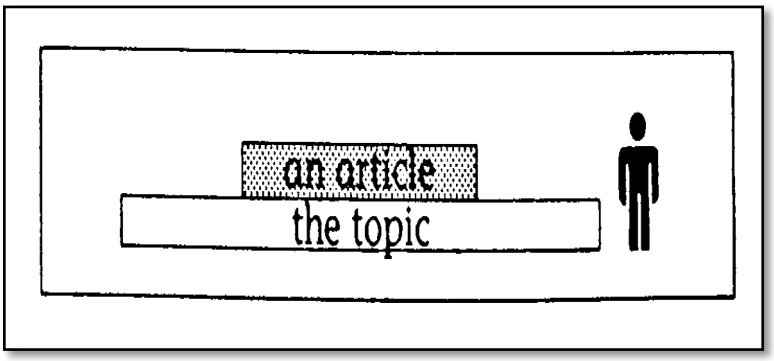


Figure 4-5: The spatial scene for example (28) *an article on holidays in France*. (Cited in Lindstromberg, 1998, p. 60)

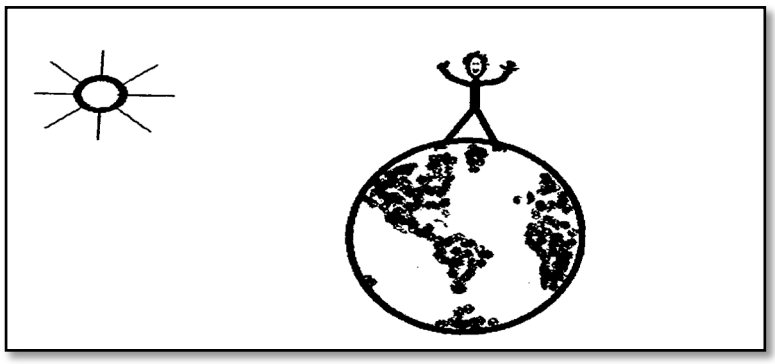


Figure 4-6: The spatial scene for example (30) *on top of the world*. (Cited in Lindstromberg, 1998, p. 60)

Evans (2010) explained that there is one 'state' lexical concept related to the English preposition *on* which he names [ACTIVE STATE]. This meaning is an extended metaphoric meaning which is different from the spatial meaning expressed by *on*. This lexical concept "relates to adjectives or nouns of action which involve a particular state which can be construed as 'active' or 'functional' " (Evans, 2010, p.242). Consider the following examples:

31) a. on live (i.e., a sport game)
b. on sleep (as in an alarm clock on a particular mode)
c. on pause (as in a DVD player)
32) switch on
(Cited in Evans, 2010,p. 242)

In (31), the [ACTIVE STATE] encoded by the preposition *on* designates "a Functional Actioning parameter as a part of its linguistic content" (Evans, 2010, p.242). Evans (2010) explains that this category of 'Functional Actioning' involved in a spatial scene is a result of a TR becomes functional when it happens to contact with a surface. "This lexical concept derives not from the functional category of Support" (Evans, 2010, p.242). In (32), an electrical appliance, e.g. a TV, is understood to be switched on as a result of a contact between this appliance and the electric source. Consequently, this appliance is interpreted functional (Evans, 2010, p.242) (See Figure 4-7).

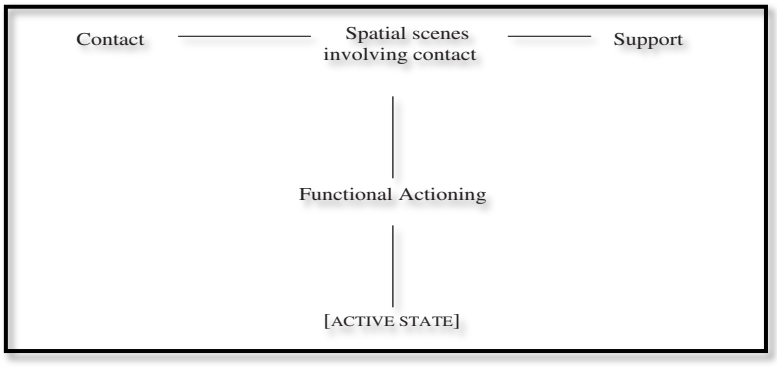


Figure 4-7: The relation ship between the functional parameters of the English preposition *on* and its 'state' lexical concept suggested by Evans (2010, p.243).

4.3.3 A lexical-semantic analysis of the English preposition *in*

Herskovits (1986) explained that the ideal meaning of the English preposition *in* requires an "inclusion of a geometric construct in one-, two-, or three-dimensional geometric construct" (p.149) (see Table 4-1). Preposition *in* is a highly polysemous lexical item that has a range of different, but often related meanings. This characteristics is illustrated in the following examples:

33) The cat is in the box.
34) The flowers are in the vase.
(Cited in Tyler and Evans, 2003, p.52, p.183)
35) The bird is in the tree.
36) The chair is in the corner.
(Cited in Herskovits, 1986, p.41)
37) They're standing in line/a queue for a movie.
38) Next in line for promotion is Dale Smith.
39) Candidates will speak in alphabetical order.
(Cited in Lindstromberg, 1998, p.71)

In (33), preposition *in* denotes a relation in which the TR is a physical object completely contained within a clearly bounded LM. This is said to be the 'conceptually prototypical' meaning of the preposition *in*, which describes the meaning that children first learn during the acquisition of their native language (Rice 2003; Richards et al. 2004). Figure (4-8) illustrates a spatial scene in which a mental

image (an abstract representation) consists of both the configurational elements (i.e. a TM 'the cat' and a LM 'the box') and the functional element (containment) that is described by the spatial preposition *in* (Herskovits 1986).

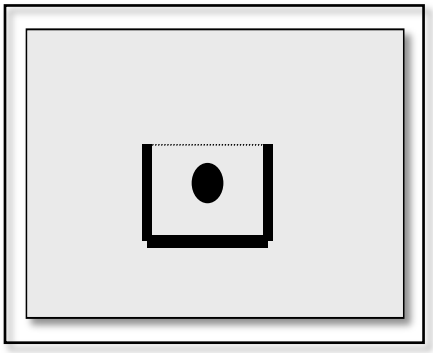


Figure 4-8: A Prototypical meaning image for the English preposition *in*. (Cited in Evans and Tyler, 2005, p.10)

In examples (34-39), the preposition *in* is most likely to have secondary literal meanings, where the notion of containment can be applied only loosely. In (34) only a part of the TR is contained within the confines of the LM (Figure 4-9). In (35) the boundaries of the LM do not manifest themselves in the kind of concrete physical form characteristic of a prototypical container, such as a building (Figure 4-10). In (36) the LM has relatively ill-defined boundaries (Figure 4-11). Thus, the TR 'the chair' is not totally enclosed by the LM 'the corner' but is contained in a vaguely delimited area of space that is nearer the corner than the middle of the room.

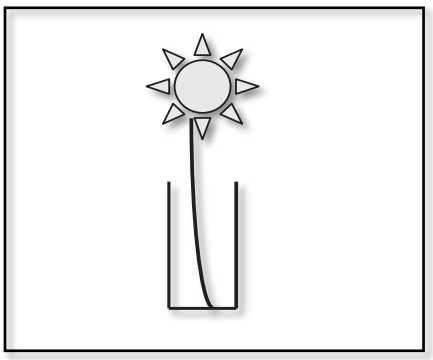


Figure 4-9: The image schemas for the English preposition *in*, the flowers are in the vase. (Cited in Evans, 2010, p.234)

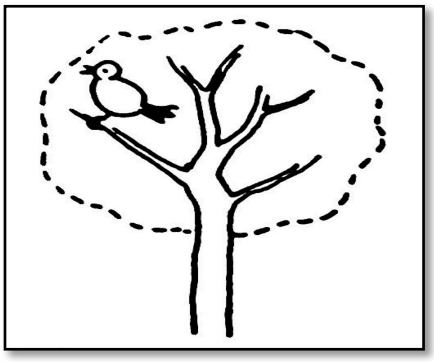


Figure 4-10: The image schemas for the English preposition *in*, the bird is in the tree. (Cited in Herskovits, 1986, p.43)

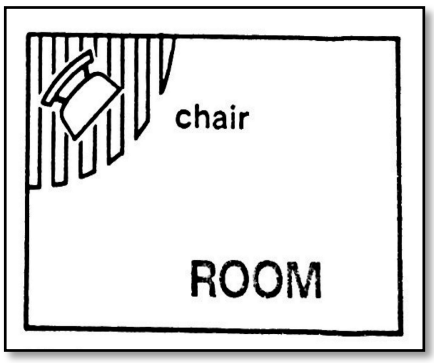


Figure 4-11: The image schemas for the English preposition *in*, the chair is in the corner. (Cited in Herskovits, 1986, p.43)

It should be noted that the metaphorically extended meanings are different from the secondary meanings. A comparison of Figure (4-8) and Figures (4-9, 4-10, 4-9) shows that the secondary meaning of a preposition is literal and differs from the prototypical meaning in some details of the spatio-scene. Hence, regardless of whether the literal meaning is prototypical or secondary, it can be metaphorically extended. In examples (37-38), the preposition *in* is used when the LM is a line (Figure 4-12). This is a non-central sense (secondary meaning) that can be applied to objects in 'rows', as seen in example (8), and metaphorically extended to series of anything, as in (37-39).

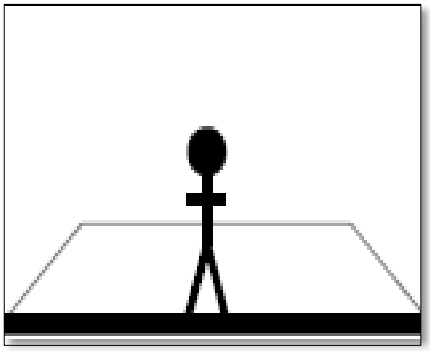


Figure 4-12: Metaphorically extended meaning of the English preposition *in*, They're standing in line/a queue for a movie. (Cited in Evans and Tyler, 2005, p.28)

Lindstromberg (1998) states that the preposition *in* appears highly in 'systematic conventional metaphors':

40) He's in trouble.
41) I live in hope of better fortune.
42) They're in love.
43) She is in a deep depression.
44) There's no sense in what you say.
45) In a summary/ In other words/ In my talk I'm going to cover.
(Cited in Lindsrtomberg, 1998, p.75)

Lindstromberg (1998) suggests that understanding these examples as metaphorical extensions is extremely important. In (40) circumstances are places, in (41-43) emotions are places, and in (44-45) " 'linguistic expressions are containers' and 'meaning is a tangible, containable substance' "(Lindstromberg, 1998, p.75). In this way, it becomes evident that "[a]s soon as one gets away from concrete physical experience and starts talking about abstractions or emotions, metaphorical understanding is the norm"(Lakoff, 1993, Cited in Ching-Yi, 2002, p.11).

Evans (2010) listed that there are five different 'state' lexical concepts related to the preposition *in*. He argued that these lexical concepts arise from the spatial senses encoded by *in* (see Figure 4-13). Evans (2010) assumed that these

'state' lexical concepts "emerge from the Affecting Conditions, which rises from spatial scenes involving enclosure" (p.236). Consider the following examples:

46) The cow is in milk. (resulting in a 'product')
47) John is in shock/ pain. (over the break-up of the relationship)
48) John is in debs. (to the tune of £1000/to the authorities)
49) He is in banking. (i.e. professional activity habitually engaged in)
50) The flag is in the storm. (i.e. a storm constitutes an environment which affects us)

(Cited in Evans, 2010, p. 236, p.238-239)

Evans (2010) argues that preposition *in*, when associated with a particular 'extra-linguistic' context, "collocates with semantic arguments"(p.237) (see Figure 4-13). For example, the lexical concept associated with preposition *in* is physiological state in (46), psycho-somatic state in (47), socio-interpersonal state in (48), professional state in (49) and prevailing conditions in (50).

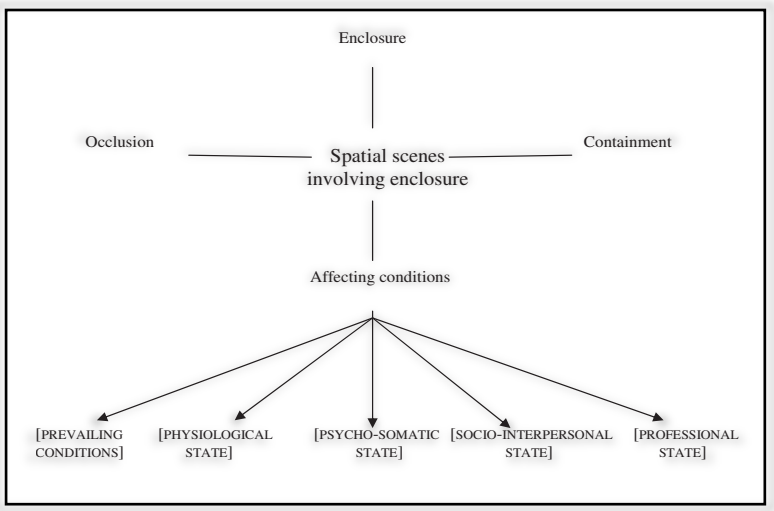


Figure 4-13: Parameters and their relationship with 'state' lexical concepts for preposition *in*. (Cited in Evans, 2010, p. 240)

Table 4-1: A Summary of the 'ideal meaning' of the English prepositions *at*, *on* and *in* proposed by (1986).

Prepositions	Simple Geometric Relations	Reference Object	Interpretation of Common-sense Knowledge
At	*At (X, Y)⇔Coincides(X, Y)* (with X and Y points) Mary is *at* the gate.	Point	Mary and the gate are not coincident. They are very close together.
On	*On*1 *(X, Y)⇔Support(Y,X) and Contiguous (Surface(X),Surface(Y))* The book is *on* the desk. *On*2 *(X, Y)⇔Contiguous (Boundary(X),Y)* The town is *on* the border.	Surface Line	The desk is a three dimensional object. The reference object (border) is a line.
In	*In (X, Y)⇔Located (X, Interior(Y))* The toy is *in* the box.	Regions of space of dimensionality greater than zero	The toy is smaller than the box.

4.3.4 Dimensional properties of the English spatial preposition *in* compared to *on* and *at*

Spatial prepositions are commonly divided into locative or relational prepositions and directional prepositions. Locative or relational prepositions, which include *at*, *on* and *in,* describe the location of one object in relation to another. As the name suggests, dimension-type prepositions are the dimensional property ascribed to the location LM, which is denoted by the prepositional complement. The following Table (4-2) demonstrates the dimensional properties of the spatial preposition *in* compared to *on* and *at*.

Table 4-2: The relations of meaning between the spatial English prepositions *at*, *on* and *in*. (Examples are adapted from Quirk et al. 1980, p.307)

Position	Dimension-type	Examples
At: at the door •X	**Dimension-type 0:** The door is seen as a dimensionless location, a vague 'point on the map', and no details concerning its shape or size come into focus.	at the shop at the bus-stop at the North Pole at the end of the road
On: on the door —•—	**Dimension-type 1/2:** *On* can indicate a location of either one or two dimensions (a line or a surface). The door is seen as a two-dimensional thing (a surface).	**Line**: (The city is situated) on the River Thames on the coast **Surface:** on the wall/ ceiling on my back
In: in the door ⊡	**Dimension-type 2/3:** *In* can also be applied to two-dimensional locations that are seen as 'areas' (enclosed or bordered) rather than 'surfaces'. The door is seen as a three-dimensional object, an object having volume.	**Area:** in the world in the village in the park **Volume:** in the bathroom in the cathedral

Therefore, an object, e.g. the [LM] ‘door’ in (51), can be viewed in terms of any of three dimension types:

(51) a- The manager stood at the door.

b- There was a new coat of paint on the door.

c- There was woodworm in the door.

Quirk et al. (1980) argue that various contextual assumptions must be taken into consideration when distinguishing between *on* meaning surface and *in* meaning area and between *at* (dimension-type 0) and *in* (dimension-type2/3), as illustrated by the examples below (52- 53) (Quirk et al., 1980, p. 309-310):

(52) a- on the window: The frost made patterns on the window

(window = glass surface)

in the window/mirror: A face appeared in the window/mirror

(window, mirror= framed area)

b- on the field: The players were practising on the field

(field= surface for sports)

in the field: Cows were grazing in the field.

(field= enclosed area of land)

c- on the island: He was marooned on a desert island

(viewed as a mere space)

in the island: He was born in Long Island

(viewed as an inhabited interior)

(53) a- *In* is used for continents, countries, provinces, and sizable territories of any kind. However, for towns and villages either *at* or *in* is appropriate (at/in Stratford-upon-Avon).

b- Very large cities, like London, Tokyo, or New York, are generally treated as an area: He works *in* London, but lives *in* the country.

c- One can also treat a large city as a point on the map, when discussing global distances: Our plane refuelled *at* London on its way from New York to Moscow.

d- With buildings, the use of both *at* and *in* are acceptable. The difference is that the word *at* refers to a building in its institutional or functional aspect, whereas *in* refers to it as a three-dimensional structure: He's at/in school (he is attending school/ he is physically inside the building), at/ in Oxford, at home but in the house.

However, Quirk et al. (1980, p.310) also emphasise that the dimensional properties of the spatial prepositions can be misleading and confusing in some contexts, as in (54):

(54) a- *at* the seaside (*on* the coast); *in* the world (*on* earth). However, even here, the implications of *at, on*, and *in* are felt to be different. For example, '*At* the seaside' suggests a point of contact with the sea rather than a one-dimensional coastline. '*On* the earth' sees the world as a surface (e.g. as it might be perceived by a geologist), rather than as a place where people live.

b- Two additional meanings of *on* as a preposition of position are 'hanging from': The apples are still *on* the tree, and '*on* top of': Humpty Dumpty sat *on* the wall. It is

possible to perceive these as extending the basic meaning of *on* to include the most obvious static relationship of contiguity between a smaller object and a larger one.

According to Tyler and Evans (2003), the concept of containment described by the English preposition *in* moves on a 'continuum' from full containment to non-containment. This can be explained due to the nature of the objects (their geometrical features) that it links and other contextual assumptions.

4.4 Cross-linguistic Comparison (Arabic- Japanese- Spanish)

4.4.1 Prepositions in the Arabic Language

In this section, I will present and discuss the properties of the English and Arabic prepositional systems, looking at the differences and similarities between the two. A number of similarities and differences exist between English and Arabic prepositions with regards to characteristics that include number, usage, syntactic and semantic properties. The prepositions in both languages are considered to be a closed grammatical class that typically expresses spatial relations (i.e. they refer to a location or a direction), or marks certain syntactic functions and semantic roles (Huddleston and Pullum, 2002, p.603). In broad terms, as defined earlier, a preposition describes a relation between two entities in terms of their relationship in space or time. Prepositions in English and Arabic cannot stand by themselves in a construction, because they derive their meanings through the reference objects (LM) and contextual assumptions. Munnich and Landau (2010, p.38) argue that prepositions "require a language learner to master language-specific representations of reference objects" (p.38). A more important consideration is that prepositions are

typically highly polysemous words that, while limited in number, can be used to convey multiple meanings (physical or abstract) in a range of contexts. The most important syntactic properties of this word class are (a) the P heading the PP takes an NP complement, (b) it can occur in conjunction with verbs to convey a particular meaning and (c) it is considered a case assigner in Arabic or English. It is important to differentiate between the syntactic function of a preposition in a sentence and its central characteristic of being a case assigner

Quirk et al. (1980) have outlined the syntactic properties of English prepositions, explaining that an English PP (a) assigns an accusative case to its NP complement, (b) allows different complement types (either an NP, a clause in a nominal function or a constituent that is not an NP), and (c) may function as an adjunct, a post-modifier, a complementation of a verb, a complementation of an adjective, a disjunct or a conjunct. Although prepositions are regarded as a closed class in English, they are numerous compared to the number of prepositions in other languages, such as Arabic (see Tables 4-2 and 4-3). These lexical items are divided into two groups: simple prepositions, which consist of one word, such as *at, in, on, for,* and *to;* and complex prepositions, which can then be subdivided into two and three word sequences, such as *next to, in front of, by the side of,* and *in place of* (see Table 4-3)

Table 4-3: Types of English prepositions classified.

Spatial Prepositions	**Intransitive prepositions**
about, above, across, after, against, along, alongside, amid(st), around, at, atop, before, behind, below, beneath, beside, between, betwixt, beyond, by, down, from, in, inside, into, near, nearby, off, on, onto, opposite, out, outside, over, through, throughout, to, toward, under, underneath, up, upon, via, with, within, without.	afterward(s), apart, away, back, backward, downstairs, downward, east, forward, here, inward, left, north, outward, right, sideways, south, straight, there, together, upstairs, upward, west.
Non-spatial Prepositions	**Compounds**
ago, as, because, during, for, like, of, since, until.	in back of, in between, in front of, on top of, in the left/right of, in the side of.

Arabic grammarians classify Arabic prepositional expressions into two categories: *ḥurūf aljarr* (particles of obliqueness); and *ẓurūf* (space and time qualifiers) (see Table 4-4). The focus of my study is on the Arabic spatial prepositions, which are found in the *ḥurūf aljarr* category. In Arabic, *ḥurūf aljarr* category is a limited and invariable set of lexical items, with only ten being used in Modern Standard Arabic: *bɪ-, lɪ-, ka-, fi, mɪn, ʕan, ʔɪlā, ʕalā, ḥattā and munḏu*. These

prepositional expressions are also called 'true prepositions', in other words non-derived prepositions. Unlike English prepositions, which can be utilised idiomatically in pairs, e.g. 'I was *in on* all his plans', a true Arabic preposition cannot be preceded by another preposition (Ryding, 2005). They are of high frequency and they have a wide range of meanings and usages. True prepositions or *ḥurūf aljarr* can combine with verbs to create verb-preposition idioms (e.g. *baḥaṯa ʕan* 'search for') (see Table 4-5). This set of prepositions can be divided orthographically into one-letter, two-letter and three-letter word groups. For example, *bɪ-*, *lɪ-* and *ka-* consist of one consonant plus a short vowel and therefore do not exist as independent orthographical items, meaning that they need to be prefixed to the noun that follows, e.g. bɪ-l-madrasah 'at school' (Ryding, 2005). Morphologically speaking, true prepositions are divided into separable dependent and inseparable independent prepositions. In general, Arabic prepositions assign an oblique case[33] to the noun (the NP complement) that follows them, which is often called genitive in English. "Genitive as well as oblique cases are assigned in similar if not identical ways in both Arabic and English" (Homeidi, 2003, p.60).

[33] In the Arabic language, case is assigned to nouns as: marfūʕ, manṣūb or majrūr, which are termed as nominative, accusative and oblique, respectively, in English. The oblique case that is assigned by prepositions (whether by *ḥurūf aljarr* or *ẓurūf*) to the noun (the NP complement) that follows them is often called 'genitive' by Western grammarians. Being the complement of *ẓurūf*, a noun in this position is said to be in *'ɪḍāfah'* construction, which is referred to as the 'genitive construction' in English (For more information on case in Arabic, see Homeidi, 2003).

Table 4-4: A classification of Arabic prepositional expressions**.**

Sibawayhi (8th c.)	**Later Grammarians (10th c. onwards)**
a- hurūf aljarr: 1. bɪ- (by) 2. lɪ- (of) 3. ka- (like) 4. la- following the interjection ya 5. The oath particle wa- wallahɪ (By God) 6. The oath particle ta- tallahɪ (By God) 7. mɪn (from) 8. fɪ (in) 9. munḏu (since) 10. ʕan (from) 11. rubba (few or many) 12. ḥatta (until) 13. xala (except) 14. kay (in the interrogative particle kaymah (for what purpose?)) **b-ẓurūf:** 1. xalf(behind, after)2.ʔamām(in front of) 3. quddām (in front of 4. waraʔ (behind) 5. fawq (above) 6. taḥtta (under) 7. ʕɪnd (at, near, by) 8. qɪbāla (before, towards) 9. maʕa (beside) 10. ʕala (on, above) mɪn ʕalayka (from above you) 11. ʕan- mɪn ʕan yamɪnɪka (from your right side) 12. qubālata (in front of) 13. makānaka (in your place,instead of you) 14. dūna (what is beneath, under) 15. qablu (before) 16. baʕdu (after) 17. ʔɪzāʔa (opposite, face to face to) 18. ḥɪḏa (opposite to)	- Sibawayhi's classification of Arabic prepositional expressions is accepted by the later grammarians except for the classification of ʕala (on). While Sibawayhi holds that ʕala is always a **ẓarf**, the latter grammarians, held that ʕala is **harf jarr** when it is not preceded by mɪn (from), but a **ẓarf** when preceded by mɪn, as in the example mɪn ʕalayka (above you). - **ẓurūf** are nouns that can also function as adverbials such as ʔamām (in front of). **ẓurūf** assign oblique case to the noun following them. And they themselves are assigned an accusative case in the sentence they occur in. They are traditionally analysed as nouns and so the reason they assign oblique case to their complements is that they are in a genitive construction with them. e.g. waqaf ʔamām albayt stand-past in front of the house 'He stood in front of the house.' - **ẓurūf** merely denote the environment in which the act occur e.g. 'ʔamāman sɪr' forward march. They are called derived prepositions because they usually come from tri-literal lexical roots. They are called locative adverbs **ẓurūf** makaan (adverbs of place) or **ẓurūf** zamaan (adverbs of time). - **ẓurūf** also denote location in much the same way as prepositions.

Table 4-5: Preposition Division in Arabic (adapted from Saeed 2014).

Lexical Syntactic Basis	**True Prepositions**		**Semi-Prepositions Separable**
	Separable	**Inseparable**	
Orthographic Basis	fi ‘in’ ʕalā ‘on’ ʔıla ‘to’ mın ‘from/of’ ʕan ‘away from’ ḥattā ‘until/up to’ ʕınd ‘at/with’ maʕa ‘with’ munðu/mið ‘since/so far’ ħāšā ‘except’ ʕadā ‘except’ xalā ‘except’ ʔıllā ‘except’	bı- ‘at/in/by’ lı- ‘to/for’ ta- ‘by’ (for oath) wa- ‘by’ (for oath) ka- ‘like’	ʔamām ‘in front of’ xalf / warāʔ ‘behind’ fawq ‘above’ taḥt ‘below’ qabl ‘before’ baʕd ‘after’ bayn ‘between/among’ ḥawl ‘around/about’ ladā/ladun ‘with’ wasaṭ ‘middle’ dāxıl ‘inside’ xārıj ‘outside’ ʔaʕlā ‘up’ ʔasfal ‘down’ qurb ‘near/beside’ yamin ‘right’ yasār ‘left’ ʕabr ‘across’ xıłāl ‘through’ muqābıl ‘opposite’

In the two following sections, I will provide a comparison between the spatial English prepositions *at*, *on* and *in* and their Arabic equivalents (4.4.2). In addition, I

will offer a brief semantic analysis of these spatial English prepositions in both Spanish and Japanese (4.4.3).

4.4.2 Mapping the Spatial English Prepositions *at*, *on* and *in* onto Arabic

A number of ESL learners find it extremely difficult to use English prepositions appropriately, perhaps because many languages map this word class onto spatial relations differently. Landau and Jackendoff (1993) argue that the polysemous nature of prepositions results in languages containing a relatively limited number of prepositions that can express a set of spatial relations between objects and these relations. As a consequence of this, many prepositions need to account for the whole range of possibilities (contexts). For instance, in Arabic a single preposition like *fi* could be mapped onto the meanings of the English prepositions *at*, *on* and *in* for certain contexts e.g. *in* the school, *at* the hospital, *on* the farm.

In this section, I will try to map the English *in* onto Arabic through the adoption of Ho-Abdulla and Hasan's (2009) conceptual mapping framework. This clearly identifies the 'semantic mapping' or the transfer of the English preposition *in* and its correspondent Arabic prepositions. This framework is divided into three categories:

> a- SDM: In the same domain mapping, the (English) source preposition is mapped onto the same domain in the target language (Arabic).
> b- ZDM: In the zero domain mapping, the source preposition does not appear in the target language. Some examples will show that there is no usage of prepositions in the Arabic sentences.
> c- DDM: In different domain mapping, the source preposition is mapped onto a different domain in the target language.
> (Cited in Ho-Abdulla and Hasan's , 2009, p.406)

Thus, comparison of the prepositional uses and meanings of the English preposition *in* to Arabic shows that there are not one-to-one Arabic equivalents for all the semantic representations of the English preposition *in.* This is because this mapping involves different configurations of the TR and the LM.[34] Consider the following example:

55)	I walked	**in**	the rain.
	sırtu	**taḥta**	al-maṭar-i
	walk.PST.1S	below	DEF-rain-GEN

In this example, the English preposition *in* is mapped onto the preposition *taḥta* (under) in Arabic, in a different domain in Arabic (DDM) because *taḥta* is a space qualifier. An explanation for this mismatch can be found in Tyler and Evans (2005), who describe the occurrence of a similar phenomenon between English and French:

> the spatial scene involving rain comprises a number of aspects. Although there are no clearly defined boundaries, as we would expect to find in a prototypical case of containment, the functional element of containment involves determination of the environment that surrounds and hence constrains and influences the TR (Tyler and Evans, 2005, p.26).

This means that native English speakers perceive 'the rainy weather' as a container that includes the walker in it (Figure 4-15). In contrast, the same representation in the mind of a native speaker of Arabic has, the TR 'I' is viewed as walking *under,* not *in* the rain since it "originates from a location that is physically higher than the TR" (Evans and Tyler, 2005, p.26). This interpretation is illustrated in (Figure 4-5).

[34] See Talmy's classifications of the functions of objects in the spatial scene (Table 3-3).

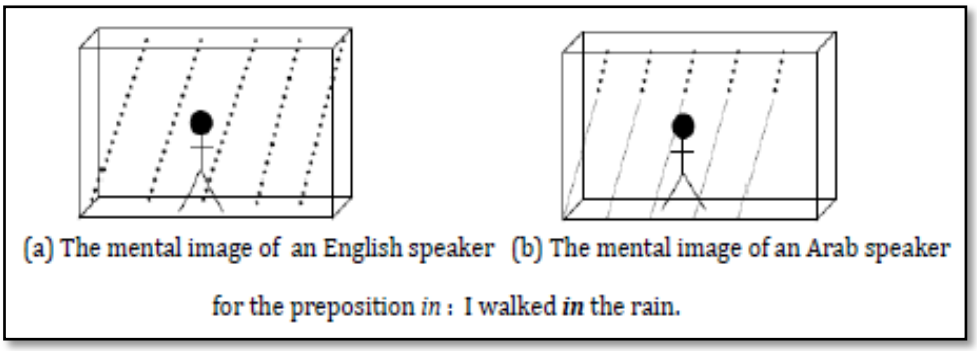


Figure 4-14: The image schema representation of the sentence: I walked in the rain (Cited in Evans and Tyler, 2005, p. 16-17).

Mapping English sentences that include the preposition *in* onto Arabic requires an awareness of Brala's assumption that "prepositional systems across languages vary to a considerable degree, and this cross-linguistic diversity increases as we move from core, physical senses of prepositions into the metaphoric extensions of prepositional meaning" (2002, p.2). In order to demonstrate this diversity in terms of the prepositional usages of both English and Arabic, as well as to illustrate how these senses are mapped within Ho-Abdulla and Hasan's (2009) conceptual semantic mapping framework, the following examples have been classified according to the multiple senses of the preposition *in*. These examples include the literal prototypical meaning in (56); the literal meaning extensions (secondary meaning) in (57), and the metaphorical meaning in (58).

56) a- The man is **in** the study.
ar-rajul ˆ **fi** lmaktab-i
DEF-man in DEF-office-GEN

b- No smoking **in** the library.
at-tadxīn-u mamnūʕ-un **fi** lmaktabat-i
DEF-smoking-NOM prohibited-NOM in DEF-library-GEN

c- She fell **in** the water.
waqaʕa-t **fi** al-māʔ-i
fell.PST-3SF in DEF-rain-GEN

In (56), the English preposition *in* is used in its core meaning where the TR is completely contained within a clearly bounded LM (the study, the library, water), a full containment schema (see figure 4-8). Therefore, the core meaning of English preposition *in* is mapped onto the same domain in Arabic (SDM). In this particular usage or context, the meaning of the Arabic preposition *fi* is identical to the meaning of the English preposition *in*.

(57) a- The flowers are **in** the vase.[35]
al-ward-u ˆ **fi** az-zuhrıyyat-i
DEF-flowers-NOM in DEF-vase-GEN

b- lying **in** the shade.
y.astalqi **fi** aẓ-ẓıll-i
3SM.ley.PRS in DEF-shade-GEN

c- The bird is **in** the tree.
aṭ-ṭāʔır-u ˆ **ʕalā** aš-šajarat-i
DEF-bird-NOM on DEF-tree-GEN

In (57a/b), the secondary meanings of the English preposition *in* are mapped onto the Arabic preposition *fi* (SDM) because the configurational elements in these instances (the landmarks 'vase' and 'shade') share the same geometric features in both languages (a container, a space). This means that they share the same functional element (partial containment), which is described by the prepositions *in* and *fi*. However, not all the secondary meanings of the English preposition *in* can be mapped onto the (SDM) in Arabic. In (57.c), the English preposition *in* is mapped onto a different domain in Arabic (*ʕal*ā '*on'*) because the LM 'tree' has different

[35] The Arabic sentence construction does not have a 'copula' verb as exists in English. The copula verb connects the subject to the complement, such as the verb 'to be' in the following example: *the teacher is in the library* (almuʕallım ˆ fı almaktabah).

geometric features in both languages. It is an enclosed space object in English (a container), whereas in Arabic it is a surface area.

(58)

a- Standing	**in**	silence.
y.aqıfu	**fi**	ṣamt-in
3SM.stand.PRS	in	silence-GEN
b- Engaged	**in**	reading.
munšaγıl-un	**fi**	al-qırāʔat-i
Engaged-NOM	in	DEF-reading-GEN
c- He's	**in**	trouble.
y.aqaʕu	**fi**	muṣībat-in
3SM.fall.PRS	in	trouble-GEN
d- They are	**in**	love.
waqaʕ-ā	**fi**	al-ḥubb-i
fall.PST-3DM	in	DEF-love-GEN

(59)

a- She's	**in**	a deep	depression.
ta.ʕīshu	**ḥālat-a**	ʔıktıʔāb-in	šadīd-in
3MS.live.PRS	state-ACC	depression-GEN	strong-GEN

'living a state of a deep depression'.

b- He is not **in**.

huwa	γayr-a	mawjūd-in
He	NEG	available-GEN

'he is not available'.

c- The train is **in**.

waṣal	al-qıṭār-u
arrive.PST.3SM	DEF-train-NOM

'the train arrived'.

d- **In** any case.

ʕalā ʔayyi	ḥāl-in
on any-GEN	State-GEN

e- **In** the place of.

ʕıwaḍ-un	**ʕan**
replacing-NOM	of

f- I live	**in**	hope of a better fortune.
ʔaʕīšu	**ʕalā**	ʔamal-i ʔl-ḥuṣūl-i ʕalā ḥaẓẓ-in afḍala
1S.live.PRS	on	hope-GEN DEF-getting-GEN of luck-GEN Better

In (58), these metaphorical meanings of the English preposition *in* are mapped onto the same domain in Arabic. However, in (59), the majority of the metaphorical extensions of the meaning of the English *in* are mapped differently in Arabic. These metaphoric meanings are considered to be part of the culture-specific representations of experiences in the mind of English native speaker and they therefore involve domain transfer. In (59.a/b/c), the metaphorical meaning of the English preposition *in* does not appear in Arabic, where there is no such usage of any preposition in such contexts (ZDM). In (59.d/e/f), the English preposition *in* is mapped onto a different domain in Arabic, which is described by ʕ*al*ā (on) and ʕ*an* (from) in Arabic (DDM).

To emphasise the assumption that a mismatch exists between English and Arabic spatial relations described by the English preposition *in*, we will explore the data gathered from the errors made by Arab second language learners when using prepositions in writing English compositions. According to Habash (1982) and Tahaineh (2010), these errors can be divided into three types: misuse/redundancy, which means adding a preposition where it is not needed; omission, which describes the deletion of a preposition where it is needed; or substitution, which refers to the use of the incorrect preposition for a given context. In both studies, 'substitution' errors were found to be the most frequent mistakes, perhaps because of the similarity in the use of prepositions in the two languages. Habash (1982) and Tahaineh (2010) claim that these errors are attributable to factors that include interference from Arabic, intra-English errors with no identifiable source, and other learning problems. In studying the case of Arabic students, Habbash (1982) emphasises that

interference of the mother tongue is a core reason for errors, because students very commonly resort to literal meaning equivalents before they form English patterns.

In (60), I have listed some examples of learners' errors in the usage of the English preposition *in*:

(60) a- *A ring **in** her finger. (on)
xatam-un **fi** ʔıṣbaʕı-ha
ring-NOM in finger-3SF

b- *I sleep **on** bed. (in)
ʔa.nāmu **ʕalā** as-sarīr-i
1S.sleep.PRS on DEF-bed-GEN

c- *I am **at** the third class. (in)
ʔana ˆ **fi** aṣ-ṣaff-i aṯ-ṯalıṯ-i
I in DEF-class-GEN DEF-third-GEN

d- *When I was ˆ first year, I was ˆ section 5. (in)
ʕındama kun.tu **fi** as-ṣaff-i al-ʔawwal-i
when be.PST.1S in DEF-grade-GEN DEF-one-GEN
kun.tu **fi** šuʔbat-i xamsah
be.PST.1S in class-GEN five

e- *We sat **under** the sunshine. (in)
na.jlısu **taḥta** aši ʕʕat-i aš-šams-i
1P.sit.PRS under rays-GEN DEF-sun-GEN

In these examples, many of the learners' errors seem to have occurred as a result of mother tongue interference, except for example (60.d). In (60. a), the Arabic learner has used the wrong English preposition (*in*). For an English speaker, the LM 'finger' is perceived as a two-dimensional surface, making it ungrammatical and semantically inappropriate to use *in* instead of *on*. In (60.b), the Arabic learner has substituted the preposition *in* with *on,* because in Arabic the LM 'bed' is viewed as a surface, whereas in English, 'bed' is seen as a container with covers that encloses the individual who is situated beneath the covers. Therefore, the use of the preposition *in* in this context is correct in English. This means that the incorrect

choice of the preposition *at* in (60.c) has probably occurred for two reasons: in Arabic, 'class' is regarded as an enclosed space object; and an Arabic speaker will be inclined to perceive *in* and *at* as equivalents of the preposition *fi*[36]. In (60.d), the learner has deleted the preposition *in* where it should be used. This is an atypical error because the version of this sentence mapped onto Arabic should include the preposition *fi,* which is an equivalent of the English preposition *in*, in order to be grammatically correct. This error may have occurred due to other learning problems, rather than interference from Arabic. In (60.e), the geometric features of the reference object (the sunshine) are perceived differently by English and Arabic native speakers. This may be because 'sunshine' is perceived by an Arab learner as something that comes from above (the sun), so the preposition *under* (a space quantifier) is used to express the relation between two objects in which one (the TR 'we') is beneath the other (the LM 'sunshine'). However, this is not the case in English, where 'sunshine' is perceived as an enclosed area in which it includes anyone inside its boundary.

In order to identify the needs of learners, Kharma and Hajjaj (1989) analysed the errors made by Arabic speakers when using English prepositions. They suggest two main reasons for the difficulty that Arab language learners experience when using English prepositions:

1) The nature of English prepositions; complexity and polysemy. A single preposition can encode different relations. Kharma and Hajjaj (1989) provide good examples that include the preposition *at*:

[36] Further explanation of this is given later in this section.

(61) a- He is at the office (place)
b- Shoot at (in the direction of)
c- Make a guess at something (an attempt to reach…)
d-at arm's length (distance)
e- at the age of (age)
f- at the second attempt (order)

2) Arab learners frequently make mistakes in using prepositions in non-spatial meaning. Kharma and Hajjaj (1989, p.77) listed some of these errors and I have chosen the relevant examples to my research: *aim at *aim on/to*, *arrive at *arrive to, dressed in*dressed with, good at *good in, write in ink *write with ink.*

Before concluding this section on mapping the English spatial prepositions *at*, *on* and *in* onto Arabic, I would like to recapitulate certain key features of Arabic prepositions. Jones (2005) studied Arabic through the Quran and summarises the most important characteristics of Arabic prepositions, as follows. All prepositions in Arabic take the genitive case. The majority of prepositions in Arabic are separable, written separately from the word that govern, except for *li-* as in *li-ahlin,* which means (*to*/*for* people), and *bi-* as in *bi-l-wādī,* which means (*in* the valley). A prepositional phrase in Arabic can act as the predicate of a non-verbal sentence, following a definite subject, such as the example in (62), or preceding an indefinite subject, such as in (63).

62) *Allāh-u* ***maʕa*** *al- ṣābir-īna*
Allah-NOM with DEF-patient-GEN.P
*'God is **with** the patient ones.'*

63) ***fi*** *l-arḍi* *fasād-un* *kabīr-un*
in DEF-earth corruption-NOM big-NOM
*'Great corruption **on** earth.'*

Morphologically, Arabic prepositions are divided into two classes: inseparable prepositions, e.g. *bi* (at, by, in, with), *li* (to), *ka* (as, like); or separable prepositions, such as *fi* (in, at), *ʕal*ā (on). Semantically speaking, depending on the context, the Arabic preposition *fi* can express the spatial relations described by the English spatial prepositions *at*, *on* and *in,* either to express the core spatial sense in (64) or the metaphoric extended senses in (65):

64) a- ***fi*** l-mustashfa
in DEF-hospital.GEN
'at the hospital'

b- ***fi*** l-nādi
in DEF-club.GEN
'in the club'

c- ***fi*** l-mazraʕat-i
in DEF-farm-GEN
'on the farm'

65) a- ***fi*** ziyārat-in li-faransā
in visit-GEN to-France
'on a visit to France'

b- ***fi*** hāḏihi az-ẓurūf-i
in this.3SF DEF-cases-GEN
'in these cases'

c- ***fi*** ʕumr-i al-xms.īn
in age-GEN DEF-fifty.GEN
'at the age of fifty'

However, *fi* is not the only Arabic preposition that encodes the spatial relations expressed by *at*, *on* and *in*. The meaning of a preposition requires the reference object (LM) to have certain geometric features that match the functional property of a preposition. For instance, the functional property of the preposition *in* is constraint of movement and requires a volume reference object, whereas the functional properties of *on* is support and requires a surface object. Therefore, second language

learners of English need to correctly match the functional property of a particular preposition and the features or configurations of the (LM), in order for them to be able to appropriately express the spatial relationship. From the perspective of Arabic prepositions, native Arabic speakers use the preposition *fi* for the expression of the spatial relation of containment, like the English preposition *in*. Meanwhile, they use the preposition *ʕalā* to express the relation of contact, as in the English preposition *on*. However, Arabic does not include a preposition that encodes the spatial relation encoded by the English preposition *at* to express coincidence. According to Lindstromberg (1998), the preposition *at* differs from the prepositions *in* and *on* as being 'neutral' regarding the relative sizes of both the (TR) Trajector and the (LM) Landmark. Therefore, in Arabic the preposition *at* is most commonly expressed using the preposition *fi*, meaning that it is conceptualised under CONTAINMENT. In Table (4-6), I have included some English prepositions that encode the relations of containment, support and coincidence.

Table 4-6: Some of the Arabic prepositions encoding the spatial relations expressed by the English spatial prepositions *at*, *on* and *in*.

Arabic equivalents to *at*	**Arabic equivalents to *on***	**Arabic equivalents to *in***
1) fi at home/at sea/ at your service/ at work/ at leisure/ at peace/ at rest/ at war/ at last/ at worst 2) *bi-* sell at loss/ at all 3) ʕalā at any rate/ at your request/ at best/ at least/ at different time/	1) fi on leave/ on strike/ on time/ on the way 2) *ʕalā* on account/on board/on the contrary/on foot 3) *ʕinda* on arrival	1) bi- engaged in reading 2) fi in itself 3) ʕalā in any case 4) *ʕinda* in the event of

In Table (4-6) each one of the English spatial prepositions is expressed in Arabic, using a set of different prepositions. In these examples, it is apparent that the Arabic spatial preposition *fi* is not the only Arabic preposition that is able to encode the spatial relations expressed by *at*, *on* and *in*. English prepositions are polysemous, but they are organised systematically around a primary meaning from which they are derived. Therefore, the English spatial prepositions *at*, *on* and *in* are expressed above in their extended metaphoric (non-spatial) meanings. I have noticed that both English and Arabic prepositions are polysemous, as the latter are similarly limited in number and are also used to convey different meanings in different contexts. The likely result of this is that, in the case of spatial meanings, Arabic ESL learners will not necessarily look for a word-to-word equivalent but rather look for the dimensional semantic counterpart that correctly describes the relationship between the TR and the LM. Meanwhile, in the case of the metaphoric extension or idiomatic meanings of prepositions, the task is even more difficult. ESL learners should look for the bodily experience that initially gave rise to the conceptual meaning. As I presented earlier in the cognitive semantic account to preposition meaning (See Chapter 3), prepositions have schematic conceptual structures (image schemas) that express spatial physical meaning. For example, the English preposition *in*, seen in the example of *in the kitchen*, expresses the direct embodied interaction with a bounded landmark. However, the preposition *in* can also be used to describe abstract meanings in which different conceptual domains are expressed by a container image schema e.g. *in trouble*, *in love*, *engaged in reading*, *works in banking*, *live in hope* and so on. This has been described as 'metaphoric projection' (Lakoff, 1987; Johnson, 1987). In cognitive semantics, the conventional meaning serves as a prompt or a trigger for another meaning construction process, in which the speakers

select the most appropriate meaning that is expressed in context. The challenge facing ESL learners is the need to understand the criteria for the distinct senses of a preposition. These include the consideration of: additional meaning; non-spatial meaning; the potential for different configurations between TR and LM than found in the primary meaning; and even 'context independent' distinct meaning, such as idiomatic uses (Tyler and Evans, 2003). These criteria of the distinct senses of a prepositions and the characteristic of a spatial scene can play a vital role in explaining the 'mismatch' problem (Evans and Tyler, 2005). This 'mismatch' occurs when no one-to-one preposition equivalent exists cross-linguistically. The SL learners therefore need to understand the semantic characteristics and properties of prepositions in which the different aspects of the spatial scene are involved. It is reasonable to expect that this could be considered as one of the main sources of difficulty for second language learners of English, if not the largest cause (See Chapter 3).

Tyler and Evans (2003) claim that the "analysis of 'equivalent' spatial particles […], for example the spatial particle *in*, in English […], will need to consider not only the spatio-configural properties associated with spatial particles, but also similarities and potential differences in functional elements" (2003, p.182). Taking these words into consideration, the inclusion of data from the error analysis task in my study can support and work as an input for my hypothesis, which involves recognising the underlining semantic aspects that influence the choice of the English spatial prepositions *at*, *on* and *in.* Understanding these semantic aspects is fundamental for mastering their polysemic nature. Therefore, this study seeks to investigate: what English spatial prepositions are acquired by ESL learners; which

aspects of meaning are familiar to and which are not familiar to ESL learners; and how this can influence and affect the learners' proficiency and command of English.

4.4.3 The English Spatial Prepositions *At*, *On* and *In* and their Equivalents in Japanese and Spanish

Arabic, Japanese and Spanish differ from English in the ways that they express spatial relations, as well as in the number of lexical items, the adpositions, which are used to express these relations. Tyler (2012a) explains that languages will often demonstrate key differences in terms of, "particular words which partially overlap in terms of their labelling of similar entities, experiences, events or spatial arrangements" (p.90). This process is a matter of a correct mapping operation rather than finding a word-to-word equivalent. A correct mapping operation means successively mapping the concepts, the relations and the lexical items that express a given subject. In this section, I will provide a concise comparison between the English spatial prepositions *at*, *on* and *in* and their equivalents in Spanish and Japanese. It should be noted, however, that a comprehensive and systematic exploration of cross-linguistic variation in the spatial semantics between English, Japanese and Spanish is beyond the scope of my thesis.

4.4.3.1 Japanese Postpositional Equivalents to the English Spatial Prepositions *At*, *On* and *In*

English prepositions are difficult to learn for ESL learners and especially for Japanese ESL learners. Cho (2010) illustrates this difficulty by drawing a semantic comparison between the two systems in English and Japanese:

1) The L1 interference: while a particular preposition in the L1 "may have an equivalent L2 counterpart as far as its prototypical, concrete spatial sense is concerned, its usage may differ markedly from that of the L2 counterpart when it comes to the less prototypical, more abstract senses" (Cho, 2010, p.260)
2) The fact that Japanese has a postposition system instead of a preposition system increases the challenge experienced by Japanese ESL learners.
3) Not only do Japanese postpositions encode spatial topological relations that usually exist between a TR and a LM, but they are also extended to encode various relations. For example, the Japanese preposition *ni* can be used to encode spatial relations expressed by the English spatial prepositions *to* and *from,* the temporal English preposition *at* and as an agentive role, which is equivalent to English *by*.
4) There are fewer Japanese postpositions than English prepositions (10 postpositions in Japanese e.g. *de, e, kara, nade, ni, no, to, yori*). Nevertheless, they encode multiple functions and usages.
5) However, in Japanese, particular set combinations of nouns and postpositions can encode spatial relations. This can be seen in the example of a noun like *naka* in example (66), which serves as a TR that expresses a topological relation similar to the image schema CONTAINER because it means inside of a two or three-dimensional bounded entity, *the cage*. Cho provides the following example:

(66) *Ori* *no* *naka* *ni* *raion* *ga* *iru*
Cage Post P Top N Post P lion SUBJ be
'There is a lion in the cage.'
(Cited in Cho, 2010, p. 261)

Japanese spatial expressions include postpositions and a topological nominal with a postposition. Consequently, Japanese students have to differentiate between two types of spatial relations: functional relations expressed by a postposition only and topological relations, encoded by a topological nominal combined with a postposition, e.g. cup on table, apple in bowl.

6) Japanese postpositional phrases also express temporal and metaphorical relations (see Figure 4-15).

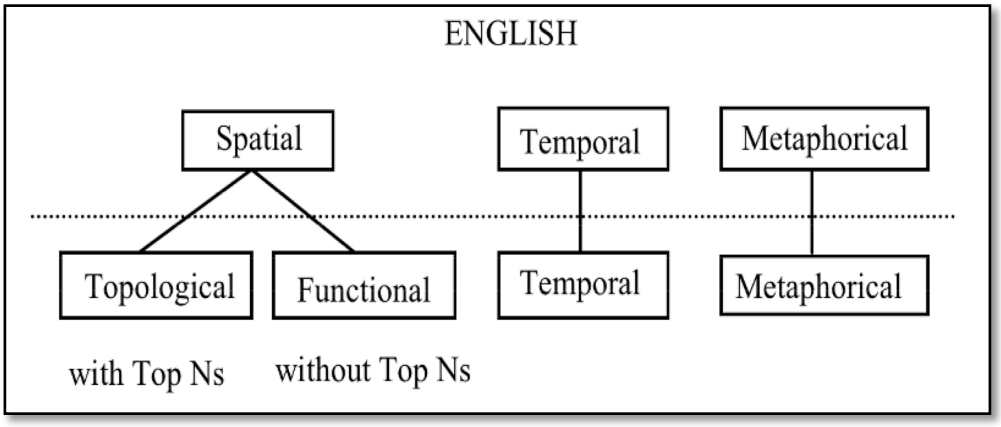


Figure 4-15: Showing the relationship of meaning types between English prepositions and Japanese postpositional phrases displayed in Cho (2010, p.263).

Generally speaking, the spatial relations encoded by the English prepositions *at*, *on* and *in* are expressed in Japanese through the use of the postpositions *ni* and *de*. An explanation of the semantic relations and usages of these particular postpositions provided by Katsuki-Pestemer (2003) is presented below (see Table 4-7).

Table 4-7: The semantic relations and usages of the Japanese postpositions *ni* and *de* based on Katsuki-Pestemer (2003).

Meaning	The Postposition '*ni*'	The Postposition '*de*'
1) Spatial Relation	▪ Encodes a place someone reaches or touches. ▪ Includes topological and abstract senses.	▪ Encodes a place of action or occurrence. ▪ Encodes a restriction of place.
2) Types of Topological relations	▪ A touching point We stick the calendar ***on*** the wall ▪ Getting into a place I get ***on*** the bus ▪ A place of existence There are students ***in*** this room There is a library ***at*** our university ▪ To mark a place of residence I stayed ***in*** Japan I stayed ***at*** this hotel tonight Many students live ***in*** the city My father works ***at*** an insurance company	▪ The site where the occurrence takes place Students study ***in*** this room I ate an apple ***on*** the hill There was a car accident ***at*** an intersection
3) Functional Senses	▪ A goal someone reaches. I concentrate ***on*** my studies ▪ Physical or emotional condition I got drunk ***on*** sake ▪ Manner: the way an action is carried out The man fell ***on*** his back	▪ Manner: how things happen I drove ***at*** full speed

There are thirteen postpositions in Japanese that encode a place of an action or an occurrence, a point of departure, a destination, or a locality through which someone passes (Katsuki-Pestemer, 2003). Most of these postposition phrases can be translated onto the English spatial preposition *in* (see Table 4-8). The meaning of these postpositions *de, e, kara, ni, no, o* and *yori* is dependent on the verbs used in the sentence: "the semantic meanings of verbs determine which case marking [locative case] PPS should be used" (Katsuki-Pestemer, 2003, p.31). For example, when the sentence includes a stative verb, e.g. to live, to place, the postposition *ni* is more appropriate to use.

Kita (2006) claims that the spatial nominals (topological nominals) play an important role in the spatial expressions in Japanese. She highlights that these lexical items are used for the expression of location, as well as to cover different domains of meaning, such as "topological relations, proximity, direction, deictic relations, relations based on the absolute, the relative, and the intrinsic frame of reference" (Kita, 2006, p.446).

Sinha et al (1999) argue that Japanese has a very restricted system of locative particles, as well as using some subclasses of verbs and nouns to encode spatial relations:

> Perhaps it would be more accurate to say that the meaning distinctions that the Japanese locative particle system conveys are orthogonal to those which are basic in English and Danish. This does not mean that Japanese does not express such distinctions as those expressed by IN and ON in English: it does so, however, by means of other form classes than locative particles, in particular subclasses of Nouns and Verbs. (Sinha et al, 1999, p.274)

Table 4-8: An Inventory of local cases in Japanese (Cited in Katsuki-Pestemer, 2003, p.31).

No.	Function	Postposition
1	Locative (a place of existence in the case of verbs of existence)	*ni*
2	Locative (a place of an action or an occurrence)	*de*
3	Locative (a place of an action in the case of static verbs)	*ni*
4	Locative (a place of an action in the case of verbs of motion)	*o*
5	Locative (a point of departure)	*o*
6	Local restrictive (a restriction of a place)	*de*
7	Local attributive (a specification of the location of nouns)	*no*
8	Local ablative (locality of a starting point)	*kara, yori*
9	Allative (a destination; a goal; a place one reaches)	*e, ni*
10	Allative (a place or object one touches)	*ni*
11	Illative (somewhere where someone gets into)	*ni*
12	Perlative (a place where someone or something passes though)+ Alblative (a starting place)	*kara*
13	Perlative (a place where someone passes through)+ Locative (a place of motion)	*o*

Masuda (2007) compared English and Japanese according to the definitions and classifications of figure and ground provided by Talmy (2000). Masuda (2007) found that the selection of the appropriate preposition in English is largely dependent on the way in which speakers interpret the ground in relation to the figure. In contrast, the correct selection of the Japanese locative postpositions *ni* and *de* is dependent on the way that a speaker interprets the figure in relation to the ground. To clarify this point, Masuda (2007) has provided the following examples:

(67) Heikindai (no ue) ni Mary ga ita
balance beam GEN on LOC Mary NOM was
'Mary was on the balance beam.'
(Cited in Masuda, 2007, p.15)

(68) Heikindai (no ue) de Mary ga taisoo o shita
balance beam GEN on LOC Mary NOM exercise ACC did
'Mary exercised on the balance beam.'
(Cited in Masuda, 2007, p.15)

In both examples (67-68), it is apparent that the English spatial preposition *on* indicates the place or the ground, *the balance beam*. However, Masuda (2007) explains that in the Japanese example in (67) the Japanese postposition *ni* is used to mark the place where *Mary* is situated. In this case, *Mary*, the TR, is understood as a stationary or moving object. However, in (68) the Japanese postposition *de* is used to mark the location of the action taken by *Mary*, the TR, in which the motion of this figure is defocussed. In this regard, Kodachi (2005) elaborated that "the Japanese particle *ni* itself does not have a function to express the spatial relations. It is not until *ni* has a spatial noun before it that it can express the spatial relation. For that reason, we cannot connect –*ni* to "at" as its only counterpart" (2005, p.110).

To conclude, important differences exist with respect to the semantics of prepositions in English and Japanese. Although there are postpositions in Japanese that express spatial relations, Japanese is still considered to be a language that distributes the spatial meaning between word classes, such as nouns and verbs.

4.4.3.2 Spanish Preposition Equivalents to the English Spatial prepositions *At*, *On* and *In*

In many ways, Spanish is similar to English in the way that it expresses spatial representation. Both languages use a limited number of prepositions that relate two entities (a TR and a LM) to encode or refer to spatial relations. Prepositions in Spanish are typically divided into simple prepositions, such as *a, con, contra, de, desde, dutante, en, entre, para, por sin, sobre,* and compound prepositions, which are an open-end class that is connected to an NP.

In Spanish, the preposition *en* can be mapped onto the meanings of the English spatial prepositions *at*, *on* and *in* (Coventry and Guijarro-Fuentes, 2008). Therefore, Spanish ESL learners need to distinguish between the three spatial relations, of coincidence, contact and containment, which are encoded by *at*, *on* and *in* respectively. Consider the following examples adapted from Huerta (2009):

(69) a- El plato está ***en*** la mesa.
The bowl is *on* the table.
b- La sopa estáen ***en*** el plato.
The soup is *in* the bowl.
c- Trabajo ***en*** la universidad.
I work *at* the university.
(Cited in Huerta, 2009, p.2)

In (69) the Spanish preposition *en* refers to the location of the TRs in relation to the LMs and can therefore convey contact, containment, or co-location. However,

"either relation is coded by the preposition *en* itself" (Huerta, 2009, p.70). Huerta argues that spatial relations, such as containment and contact, are conceptualised according to the background knowledge of the elements (TR and LM) that are in relation. Consequently, "the semantic boundaries and networks of prepositions in English do not identically match up to the senses and semantic networks of Spanish prepositions" (Huerta, 2009, p.2). Therefore, as a result of the differences that exist between the spatial concepts connected with prepositions in Spanish, the English spatial prepositions *at*, *on* and *in* can be expressed using other word classes or prepositions. For example, it is possible for the Spanish preposition '*a'* to refer to a spatial relation similar to *en,* but these are differentiated in terms of the element of the spatial scene (TR and LM). Consider examples (70), which have been adopted from Huerta (2009), where both *en* and *a* can refer to a relation encoded by the English spatial preposition *at*. The Spanish preposition *en* refers to the relation of co-location, while the preposition *a* refers to a point in a line where the TR is located.

(70) a- La cotorra está ***en*** la puerta de sujaula
The parrot is on/at the door.
b- La cotorra está ***a*** la puerta.
The parrot is at the door.
(Cited in Huerta, 2009, p.71)

There is much to say about Japanese and Spanish grammar with regard to adpositions (prepositions and postpositions). However, I am not in a position to give as detailed a description as I have provided for Arabic for many reasons. Firstly, this level of description is beyond the scope of my study, which seeks to primarily conduct a comparative study on a cognitive linguistic background between English and Arabic. Information on Japanese and Spanish learners has been included

because of the inclusion of Spanish and Japanese ESL learners as participants in the semantic test I have conducted on Arab ESL learners, aiming to reach an accurate and significant result. There are a number of reasons for the inclusion of speakers of other languages in the current study. After defining the language problem, I wanted to know whether the cause of acquisition difficulty is inter-lingual or intra-lingual. I hope that this research will pave the way to a larger cross-linguistic study. This could have different effects on the results, showing that L1 interference may or may not be significant. Secondly, the languages share similar patterns regarding the English preposition *at*. Therefore, speakers of these languages are not able to easily develop clear-cut borders between the three spatial relations encoded by the three English prepositions. Moreover, they share a common vagueness towards the spatial relation encoded by the English preposition *at*. Finally, these particular languages have been selected for the practical reason that there is a large number of Japanese ESL learners who study at SOAS and Spanish ESL learners who study at UCL in London, making both populations accessible for data collection.

Each of the languages chosen in my study (Arabic, Spanish and Japanese) has different spatial concepts that are expressed by different patterns and lexical items. They not only differ in terms of the number and classification of adpositions (prepositions and postpositions) but also in the way that the relations expressed by them are sorted, in other words prototypicality, and therefore in differentiating between the core meanings and the metaphoric extensions of these adpositions. Ellis (1994) explains that a good example for markedness, meaning "the extent to which specific linguistic features are 'special' in some way" (p.315), is the use of the preposition *at* in English for the expression of coincidence or co-location. Generally

speaking, the spatial relations expressed by the English spatial prepositions *at, on* and *in*, namely coincidence, support and containment, are mapped onto the Arabic preposition *fi* and *ʕalā*, the Spanish preposition *en,* and onto the postpositions *ni* and *de* in Japanese. Evans (2010) argued that

> language users typically employ proto-scenes in ways which draw upon the functional consequence of interacting with spatial scenes of certain kinds in humanly relevant ways. Thus, linguistic knowledge associated with proto-scenes appears to involve more than simply knowing the particular spatio-geometric properties encoded by a particular form (Evans, 2010, p. 223).

Therefore, when using prepositions in English, ESL learners should understand and consider both the primary meanings and the extended meanings of the English prepositions *at*, *on* and *in*, in other words, the semantic network associated with them. This is a crucial distinction that is expected to affect how the speakers of these languages conceptualise space and express spatial relations. This makes me hypothesise that this kind of categorisation can be the cause of this language difficulty encountered by ESL learners (Arab, Spanish and Japanese).

4.5 Conclusion

The complex preposition system and the polysemous nature of these prepositions are challenging for many ESL learners. In the next chapter, I will display the results of the semantic test of Arab, Spanish and Japanese second language learners of English. I have employed this experimental tool, together with the statistical technique of the Repeated Measures (ANOVA), in an attempt to examine the performance of Arabic SL learners of English. In this way, I seek to find the possible sources of errors that occur in the use of English spatial

prepositions *at*, *on* and *in,* as well as to provide cognitive semantic explanations for their performance. In addition, these data may demonstrate that the polysemous meanings and usage of prepositions are not chaotic, but rather are clustered around a set of 'primitive bodily based' features (Brala, 2002).

Chapter 5 Empirical Study / The Semantic Test

5.1 Introduction

This chapter seeks to examine how the cognitive linguistic account and approach explain the semantics of English prepositions and then to attempt to systematically link the different senses. In order to achieve these objectives, I will present the methodology and the potential outcomes of the semantic test that I conducted during the fieldwork stage of this research. This semantic test was conducted to test the hypotheses inspired by the findings of SLA studies on English prepositions, with the aim of answering the main question of this research: *'How do the different meanings and usages of prepositions in English significantly influence the L2 acquisition process and impede the progress of ESL learners in acquiring native-like intuition?'* Comprehensively addressing this question involves addressing three major issues: the main semantic factors determining the choice of *at*, *on* and *in* in English; how these factors differ from language to language; and the pedagogical implications that these findings could offer on the ways in which the cognitively based account of prepositional meaning could be useful for ESL teaching and learning. In order to fulfil this aim and the objective of my study, I will conduct a language experiment in which the participants all experience the same conditions and take the same semantic test. These measurements seek to examine the performance of Arabic ESL learners as a single group in the first analysis then to assess their performance when combined in a group with other ESL learners (Japanese and Spanish students in the second analysis). The two types of analysis are conducted using the same statistical tool, the Repeated Measures (RM) ANOVA.

The underlying purpose behind these two analyses of the language experiment is to identify possible sources for the difficulties that ESL learners encounter when using the English spatial prepositions *at*, *on* and *in.* In particular, I wish to ascertain whether the problem is inter-lingual, meaning that it arises because of L1 interference, or intra-lingual, due to the complex semantic nature of the L2 prepositions.

5.2 The Research Question

As stated above, the main question of this research is *'How do the different meanings and usages of prepositions in English significantly influence the L2 acquisition process and impede the progress of ESL learners in acquiring native-like intuition?'* In this study, I am therefore primarily interested in investigating: the main semantic factors that determine the choice of *at*, *on* and *in* in English; as well as how the effects and configurations of these factors differ from language to language, especially in terms of their influence on L2 acquisition.

5.3 The Semantic Test Experiment

In order to fulfil the aim of my study, I conducted one language experiment and applied a semantic test in which the participants of the test experience uniform conditions. Two types of analysis were then applied to this semantic test experiment, using (RM) ANOVA as a statistical tool. The first of these analyses sought to concentrate on an examination of the performance of Arabic ESL learners only; the second analysis combined the data collected from the Arabic participants with participants from two other language groups (the Japanese and the Spanish). I expected that the comparison of the results of the two analyses would yield

significant findings for the problem of the study: uncovering the source of the difficulties that Arabic ESL learners encounter during the acquisition and use of the English spatial prepositions *at*, *on* and *in*.

5.4 Hypotheses

The goal of my study is to test and examine a set of hypotheses. These hypotheses are consistent with the findings of the empirical investigations in the field, as presented earlier (see Section 2.3). Acquiring English prepositions is challenging for ESL learners and has even been described as "a traditional and recurring nightmare for all learners of English" (Littlemore and Low, 2006, p.284). This is due to the fact that while English prepositions are relatively limited in number, most of them are polysemous in nature. This diversity in terms of the meaning of prepositions is not mapped onto one-to-one correspondence in L1. Similarly, the prepositions in Arabic, Japanese and Spanish are also polysemous, being used in different contexts to convey different meanings. For example, the Spanish preposition *en* and the Arabic preposition *fi* can be used to encode the meanings of the English prepositions *at*, *on* and *in.* However, it seems unlikely that this L1 interference is the only source or cause of this difficulty. The nature of the semantic relations encoded by the English spatial prepositions *at*, *on* and *in* could be one of the sources of difficulty. These chosen English prepositions have similar topological uses, among others, because the control relation that they encode can be categorised in three spatial relations: coincidence, contact or containment, respectively. A good example of markedness, which refers to "the extent to which specific linguistic features are 'special' in some way" (Ellis, 1994, p.315), is the use of the preposition *at* in English as expressing coincidence. The three English spatial

prepositions *at*, *on* and *in* are mapped onto the Arabic, Spanish and Japanese languages, however, native speakers of these languages differ from English speakers in categorising the relations encoded by these prepositions, which makes it difficult for them to draw clear-cut borders between these prepositions.

As mentioned above, I have conducted two analyses for this language experiment, each of which has a set of similar hypotheses. These hypotheses are similar because they are the result of similar variables. These hypotheses will be discussed in this section, which is divided into two parts for clarity: (5.4.1) hypotheses for Arabic ESL learners' analysis; and (5.4.2) hypotheses for ESL learners' analysis.

5.4.1 Hypotheses for Arabic ESL learners' Analysis

The first analysis of the language experiment that I have conducted has the following hypotheses:

1) Arabic ESL learners will score lower on the (*at*) tasks than the (*in*) and (*on*) tasks.

2) Arabic ESL learners will score higher on the tasks that include the 'core meanings' of the prepositions *at*, *on* and *in*.

3) Arabic ESL learners will score higher on the tasks that include 'images'.

5.4.2 Hypotheses for the ESL learners' Analysis

The second phase of the language experiment has similar hypotheses to the first, since the participants experience the same conditions and complete the same semantic test. However, this test differs from the first analysis in terms of the L1 of

the participants. I combined the Arabic ESL learners into one group with Japanese and Spanish ESL learners. The hypotheses for the second analysis are:

1) Participants will score lower on the (*at*) tasks than the (*in*) and (*on*) tasks, regardless of the L1.

2) Participants will score higher on the tasks that include the 'core meanings' of the prepositions *at*, *on* and *in*, regardless of the L1.

3) Participant learners will score higher on the tasks that include 'images', regardless of the L1.

5.5 Research Method

5.5.1 Participants

In order to gain an insight into the performance of ESL learners in understanding and using the English spatial prepositions *at*, *on* and *in*, a total of fifty-four ESL learners (32 Arabs, 11 Spanish, and 11 Japanese) participated in the study. All of these ESL learners have studied English in their countries as a second language and have travelled to the UK to study at universities (UCL, SOAS, Surrey, Swansea, and Brighton). Each of the students has spent a period of one to three years in the UK. The process of sampling and selecting participants according to certain criteria, explained in the next paragraph, was extremely time consuming and required me to be careful and realistic about the size of the sample. Because I was governed by certain criteria and restricted by time, it was difficult to reach my target number of 30 participants for the Japanese and Spanish language groups.

Nevertheless, the current sample size has been determined as sufficient to continue to conduct the semantic test and to yield relatively realistic results.

Prior to the start of the semantic test, participants were asked to fill in a sheet to provide information about their education, proficiency level and the years spent in an English-speaking country such as the UK, USA and Australia[37]. As part of the experiment, the English proficiency of the participating students was tested and assessed by means of the Online Oxford Placement Test (OOPT). This was fundamentally important, as clear and reliable information was required concerning the relative language proficiency of different participants. When participants completed a sheet outlining their personal information, most of them provided details about their results in a number of proficiency tests, e.g. IELTS, TOFEL or TOEIC, which they had taken a year or two earlier. Because of this, I considered using a test, which is the OOPT, that they undertook in the same period of time and under the same test conditions[38]. Participants from the three language groups were categorised in two proficiency levels: 34 low proficiency level: A1 – A2 – B1 (25 Arabs, 8 Japanese, 1 Spanish) and 20 high proficiency level: B2 – C1 – C2 (7 Arabs, 3 Japanese, 10 Spanish).[39] The English proficiency levels vary among the three L1 speakers since the number of the participants is unequal.

[37] See Appendix A: Student Information Sheet.
[38] Information about the nature and the measures of the OOPT is available at www.oxfordenglisttesting.com.
[39] See Appendix B for a guide to the EFL tests.

5.5.2 Design

5.5.2.1 Materials: The Semantic Test

The items of the semantic test were collected from different sources, such as English dictionaries and grammar books[40], which list a number of sentences that include prepositions. In addition to being convenient, I felt that these types of sources would be accessible and clear for the participants, as they are often exposed to this format during their studies. There were three stages to the semantic test.

The first version of the test included 100 sentences containing the prepositions *at*, *on* and *in* and also the prepositions *through* and *about* as fillers (See Appendix D). In these sentences, both the central and the peripheral meanings of the English prepositions *in, on* and *at* were included. As a first step, 100 English native speakers (NS) from the University of York students completed the task[41]. The test was arranged in 5 pages, requiring approximately 10-15 minutes to complete, and requiring the NS participants to select the right preposition from a list of choices. At the end of each page, as an optional task, a space was provided in which each participant wrote their comments on the sentences and the responses. The test items were randomized in four different models.[42] I filtered the items and wrote a second

[40] *Advanced Grammar in Use* by Hewings (2005), *Cambridge Grammar of English, A Comprehensive guide, Spoken and Written English Grammar and Usa*ge by Carter and McCarthy (2006), *Real English Grammar* by Lott (2008), *Correct your English Errors* by Collins (2009), *Collins Cobuild Intermediate English Grammar & Practice* (2011), *English Grammar in Use Supplementary Exercises* by Hashemi and Murphy (2011), *Oxford English Grammar Course, Basic* by Swan and Walter (2011), *Oxford English Grammar Course, Intermediate* by Swan and Walter (2011), *Oxford English Grammar Course, Advanced* by Swan and Walter (2011), *English Grammar in Use* by Murphy (2012).

[41] I would like to express my sincere thanks to Prof. Peter Sells, the head of the Department of Linguistics at the University of York, who provided invaluable assistance in finding these NSs, all of whom study linguistics in the Department of Linguistics.

[42] Appendix C includes a sample of the semantic test conducted with native speakers.

version of the test with 59 items; including only the items that scored highly and which had been approved by the majority (90+) of the native speakers (see Table 5-1 for the items of the semantic test that include the prepositions *at*, *on* and *in* only).

At this stage, I will present some of the comments provided by the English NSs on the test items. The majority agreed that more than one grammatically correct answer could be given for many of the questions, especially when the preposition *at* was the most appropriate answer. However, they chose what they 'believed to be the most likely' in each case. Moreover, only 6 items (from 20 items) of the preposition *at* items scored 100%. Participating NSs recommended that selection of the appropriate preposition would require learners to consider the context and the contextual factors of the situation in each question. English NS participants noticed that most of the preposition usages in the test were idiomatic, which meant that it was often difficult for them (NSs) to decide on a single response. In fact, some noted that they had read some sentences twice in order to select an answer, and therefore expected that these items might also be difficult for non-native speakers of English.

Some of the most helpful comments concerning the preposition *at* are presented below:

1) *I'm still sitting ... my computer desk*.

   All the English NS participants chose to use the preposition '*at'*. Some of them added this comment. Sitting *at* the computer desk implies that the person is still at work and therefore would constitute the only commonly acceptable preposition in this case.

2) *John wrote a book when he was … prison*.

All of the English NS participants chose to use the preposition *'in'* for this item. One of the NS commented that 'in prison' as a set phrase could be derived from the verb 'imprison'. In contrast, using the expression 'at prison' would be understandable, but would be likely to have the connotation of 'at the prison', i.e. working there or visiting, rather than being imprisoned there.

3) See you … Fred's house.

All of the English NS participants chose to use the preposition *'at'* for this item. One of the comments on this item was that the use of *at* means *at the place,* and often means inside the building. However, *in* would not be correct in English.

4) *Sue wasn't … the meeting*.

66% of the English NS participants chose to use the preposition *at* for this item and 32% of them chose the preposition *in*. Most of the comments were that 'to be at a meeting' is more common in English and it means that someone is participating in this event. Nevertheless, there is the occasional use of 'to be in a meeting', which implies that someone is busy and participating in a meeting and so they cannot be somewhere else or do something else at that time.

5) *Have you ever worked … a farm?*

The preposition *on* was overwhelming more popular (92%) than the other option of *at* (8%) among the English NS participants. One commented that it could be correct to say *at* a farm in English and everybody would understand this, but it would be more common amongst native speakers to use *on* the farm to mean that you work or live there, or perhaps even implies ownership of the farm/farmhouse or as a regular paid staff working there.

6) *They used to live … 10 Downing Street*.

95% of the English NS participants chose to use the preposition *at* for this item, 4% of them chose *in,* and 1% of them chose the preposition *on*. Although to live *at* a house (with name and number) implies that one actually lives *in* (inside) this house, using the preposition *on* could be possible since this house is off the street or a road.

7) *We landed … a large airport.*

20% of the English NS participants chose to use the preposition *in* for this item and 79% of them chose the preposition *at*. Most of the NSs were hesitant about choosing the prepositions *in* or *at,* but the majority of them decided on *at*. They described this sentence as ambiguous and that having more than one possible correct answer depending on the context.

8) *Harry was sitting ... the table.*

A small proportion (10%) of the English NS participants chose to use the preposition *on* for this item, while the remainder (90%) of them chose the preposition *at*. One explained that the sentence is ambiguous and he was uncertain whether the speaker meant to literally say that Harry is not 'sitting on the table' or meant 'sitting at the table' to have a meal, for example.

The English NSs also recommended considering the context of the sentence when deciding to choose the appropriate preposition. Therefore, I decided to add images to my final test. By including photos to describe the situation in each item, I intended to help the participants of the semantic test to better imagine and visualize the situation. It can also be seen as an attempt to consider the geometric and the extra geometric factors of the context. I attempted to include images that could describe the spatial scene, thereby expressing both the core meaning and peripheral meaning of each preposition (see Tables 5-2, 5-3, 5-4). Nevertheless, I found it very difficult to include an image to clearly express certain of the peripheral meanings of these prepositions. As noted above, the reason for the inclusion of images was to clarify the ways in which the English NSs conceptualise the relation encoded by the prepositions *at, on* and *in*. Later, in the findings section, I will report whether or not ESL learners were able to make use of these images to select the correct answer.

The second stage in the preparation of the semantic test was 'piloting.' In order to check the test validity and in order to screen the test 59 items, 12 ESL learners did the test. These individuals were friends and relatives whose first

language is Arabic. I was concerned with the layout of the four versions of the semantic test, whether participants would make use of the images provided with certain of the examples, and if I was giving enough time to finish the test. Knowledge about time management was a particularly important consideration, because the final stage of the experiment in the current study involved the ESL learners doing two tests, one immediately after the other. Firstly they answered the semantic test and secondly they did the Online Oxford Placement Test (OOPT). I have done this because students have limited time to enable data collection to be completed more quickly.[43]

In the final stage, the semantic test (a multiple-choice task) came in four randomized forms[44]. Some of the items appeared with images, which were carefully chosen to describe each sentence, and some without images.

> [I]t is similarly essential that participants don't all experience our experimental conditions in the same order (something we achieve by presenting the conditions in either a random order or by counterbalancing order). [...]. [W]e want to isolate the effects of our manipulation of the independent variable. Recall that a score consists of a 'true score' (a measure of the thing we're really interested in) and 'error' (from the influence on our participants of all sorts of other, extraneous factors) (Field and Hole, 2003, p.71).

[43] More information about the reason why the participants answered the semantic test first is provided below in the procedure section (5.5.2.2).
[44] For samples of the semantic test, see Appendix D and Appendix E.

Table 5-1: The items of the final version of the semantic test that includes the English prepositions *at*, *on* and *in*.

Type of Meanings	Central Meaning	Metaphoric Extension
Preposition *at*	1. Can you pick me up .....the station? 2. There is a strike ..... the university. 3. Children, please stop throwing snowballs .....Mrs. Anderson. 4. A dog was standing .....the top of the stairs. 5. See you .....Fred's house. 6. A: Where is Mary? B: She should be ……home right now.	1. There's someone .....the door. 2. She waited ..... the back of the queue. 3. I'm still sitting …….my computer desk. 4. Harry I sitting .....the table. 5. Water boils ….. 100 degrees Celsius. 6. Aunt Tracy died ….. the age of 72. 7. Technology has developed …… great speed.
Preposition *on*	1. Who put the poster ..... the wall? 2. She had a diamond ring .....her finger. 3. Jenny went to school ..... the bus this morning. 4. You should find the key ..... the kitchen table. 5. She's been ….. the phone for hours and I need to call office. 6. There's a dirty mark ….. your shirt.	1. A: Where are your neighbours? B: They went ….. holiday. 2. A: Why aren't you eating any cake? B: I'm ……. a diet. 3. Wow! You're ……time. 4. Don't be so hard ….her. 5. How are you getting …. with your new job? 6. Look! That car is ….. fire. 7. All books are …….sale.
Preposition *in*	1. We spent two days .....Paris. 2. I left my jacket behind .....the classroom. 3. She got a job..... London. 4. John wrote a book when he was .....prison. 5. The children are all .....bed. 6. A: What would you like to do now? B: Let's sit ……the shade.	1. He is ……. trouble now. 2. They are …..love. 3. She is ….. a deep depression. 4. In exams, you're not allowed to write …….pencil. 5. James works..... banking. 6. The next ..... line for promotion is Miss Smith. 7. I live ..... hope of a better fortune.

Table 5-2: Some of the preposition *at* items and images included in the semantic test.

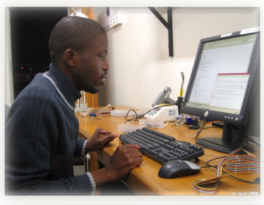
Preposition *at*	Items	Images
Core Meaning	1. There's someone ... the door.	
	2. I'm still sitting … my computer desk.	
	3. Harry is sitting ... the table.	
Peripheral meaning	1. Technology has developed … great speed.	
	2. Water boils … 100 degrees Celsius.	
	3. She waited ... the back of the queue.	

Table 5-3: A sample of the preposition *on* items and images included in the semantic test.

Preposition *on*	Items	Images
Core Meaning	1. Who put the poster ... the wall?	
	2. Jenny went to school ... bus this morning.	
	3. She had a diamond ring ... her finger.	
Peripheral meaning	1. Wow! You're … time.	
	2. All books are … sale.	
	3. Look! That car is … fire.	

Table 5-4: A selection of preposition *in* items and images included in the semantic test.

Preposition *in*	Items	Images
Core Meaning	1. The children are all ... bed.	
	2. John wrote a book when he was ... prison.	
	3. A: What would you like to do now? B: Let's sit … the shade.	
Peripheral meaning	1. He is … trouble now.	
	2. She is … a deep depression.	
	3. The next ... line for promotion is Miss Smith.	

5.5.2.2 Procedure

The semantic test was administered by the examiner (myself). I arranged to meet with each participant individually at the SOAS main library in order to do the test. We sat in a quiet room in which there was a computer and access to the internet. Participants were asked to first read and sign the consent form, and agree to the ethical standards of the School of Oriental and African Studies, University of London. They were then asked to carefully read the instructions for the semantic test and to begin when they felt comfortable. Upon completion of the semantic test, each participant was asked to log into the OOPT website to take the proficiency test.

There were a number of reasons for my decision to intentionally administer the semantic test first before asking participants to take the OOPT test. For example, if the participants took the OOPT first, I felt that it might have been possible to attribute an improvement in their performance in the semantic test to the OOPT, since the latter may include items similar to those being assessed by the semantic test. In addition, the semantic test procedure is considerably easier and less comprehensive than the OOPT, meaning that participants are less likely to lose interest or get tired early.

5.6 Analysis

The analysis of the semantic test experiment is divided into two parts. In the first analysis (5.6.1) a four-way (RM) ANOVA was used to analyse the test done by the Arabic ESL learners only. In the second analysis (5.6.2) a five-way (RM) ANOVA was used to compare the test results of the ESL learner's group (Arab,

Japanese and Spanish). I will report the findings for each analysis separately and then I will generally discuss the results of the semantic test experiment.

5.6.1 Analysis of the results of the Arabic ESL learners' group

5.6.1.1 Four-way (RM) ANOVA analysis test

In this analysis, a four-way repeated measures (RM) ANOVA (2X2X2X3) (meaning: core/peripheral, sentences: with-images/without-images, English proficiency level: low/high, prepositions: *at/on/ in*) is used. The variables of the test are: a 'dependent' continuous variable, which is the scores of the semantic test; and 'independent' categorical variables, which are subdivided into a between-group variable and within-group variables (see Table 5-5).

Table 5-5: The independent variables of the four-way (RM) ANOVA analysis test.

Between-group variable	Within- group variables
1) English Proficiency level (high/low)	1) Prepositions (at/on/in) 2) Meaning (core-peripheral) 3) Images (with/without)

Although this data could have been analysed using multiple regression, experimental convention calls for ANOVA when searching for differences between groups. In addition, the repeated-measures nature of the task makes repeated-measures ANOVA a useful tool for analysing the contrasts within the data. The ANOVAs were run using SPSS version 19.

There were no outliers. Kolmogorov-Smirnov tests indicated significant non-normality of 10 of the 12 results categories (ps < 0.01); 10 of 12 studentised residuals were also significantly non-normal (ps < 0.05), and the group of all studentised residuals was also non-normal (p < 0.01). This is likely due to a ceiling effect of the task (i.e., even for speakers with low proficiency, this was a relatively easy task, as can be seen by the overall mean of the proportion correct answers, 0.722; there were no result categories where participants scored less than 50% correct). Field (2009) states that the *F*-statistic could be robust to violations of normality if the group sizes are equal. For this reason, the test was run with un-transformed data. The assumption of sphericity was violated, as assessed by Mauchly's test, which was significant for the variable of preposition, $W(2) = .720$, $p < 0.05$, indicating a lack of sphericity, so the Greenhouse-Geisser adjusted F is reported in the following statistics.

5.6.1.2 Findings of the four-way (RM) ANOVA analysis test

In this section, I will present the main effects and interaction effects of the different independent variables of the four-way (RM) ANOVA test. This was the statistical tool utilised to conduct the analysis of the results of the semantic test completed by the Arabic ESL participants. I will report the effect of the prepositions (*at, on, in*), the effect of meaning (core meaning, peripheral meaning), the effect of the image (with image, without image) and the effect of proficiency (low proficiency level-high proficiency level).

The four-way (RM) ANOVA showed that there was a significant main effect of the preposition, $F(1.625, 48.760) = 7.806$, $p < 0.05$, $\eta_p^2 = .206$. Planned contrasts revealed that the Arabic ESL participants scored significantly higher in the tasks including the preposition *in* ($M = .808$, $SE = .049$) than preposition *at* tasks ($M = .665$, $SE = .040$), $F(1, 30) = 4.790$, $p < 0.05$, $\eta_p^2 = .138$. The Arabic ESL participants also scored more highly on the tasks for the preposition *on* ($M = .874$, $SE = .033$), than they did on the preposition *at* tasks, $F(1, 30) = 17.473$, $p < 0.01$, $\eta_p^2 = .368$. Overall, prepositions (*in, on and at*) were shown to influence how well the Arabic ESL participants scored; they scored better on both *in* and *on* tasks than on the preposition *at* tasks (see Figure 5-1).

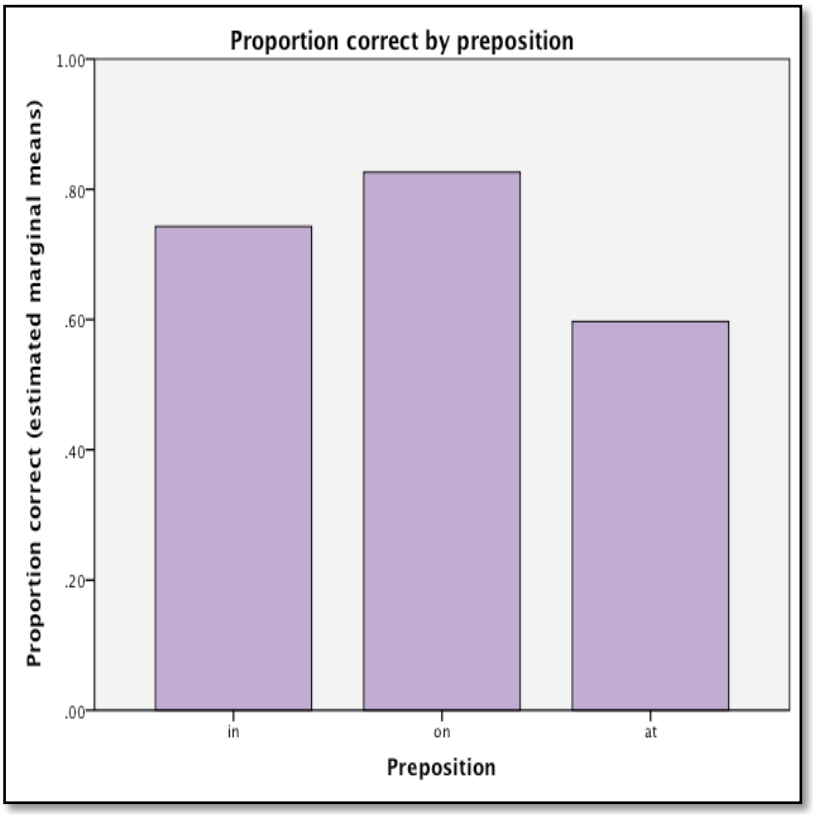


Figure 5-1: The significant effect of prepositions *at*, *on* and *in*.

There was also a significant main effect with regard to meaning, $F(1, 30) = 5.082$, $p < 0.05$, $\eta_p^2 = .145$, indicating that Arabic ESL participants scored higher on core meanings ($M = .814$, $SE = .028$) than the peripheral meanings ($M = .750$, $SE = .039$). However, there was no main effect found in terms of the image, $p > 0.05$, $\eta_p^2 = .038$. Tables (5-6) and (5-7) below present the estimated marginal means of meaning (core and peripheral) and images (present or not present).

Table 5-6: The estimated marginal means of meaning (core and peripheral).

	95% confidence interval			
Meaning	Lower bound	Mean	Upper bound	Std. error
Core	.757	.814	.872	.028
Peripheral	.670	.750	.731	.039

Table 5-7: The estimated marginal means of images (present or not present).

	95% confidence interval			
Image	Lower bound	Mean	Upper bound	Std. error
Present	.730	.805	.880	.037
Not present	.681	.760	.838	.038

In addition, the four-way (RM) ANOVA illustrated that proficiency had a significant effect on performance, $F(1, 30) = 6.650$, $p < 0.05$, $\eta_p^2 = .181$. This demonstrates that Arabic ESL participants with high English proficiency ($M = .863$, $SE = .058$) scored significantly higher than those subjects with lower levels of English proficiency ($M = .702$, $SE = .022$).

There was a significant interaction between preposition and meaning, $F(1.975, 59.247) = 3.728$, $p < 0.05$, $\eta_p^2 = .111$. As can be seen by the graph below, a significant difference is evident between the scores of the prepositions *in* and *at* tasks, in terms of both core and peripheral meanings. However, a reversal relationship was detected with respect to the meanings of the preposition *on*. Arabic ESL participants scored higher in the peripheral meaning tasks for the preposition *on* than they did for the tasks testing core meaning (see Figure 5-2).

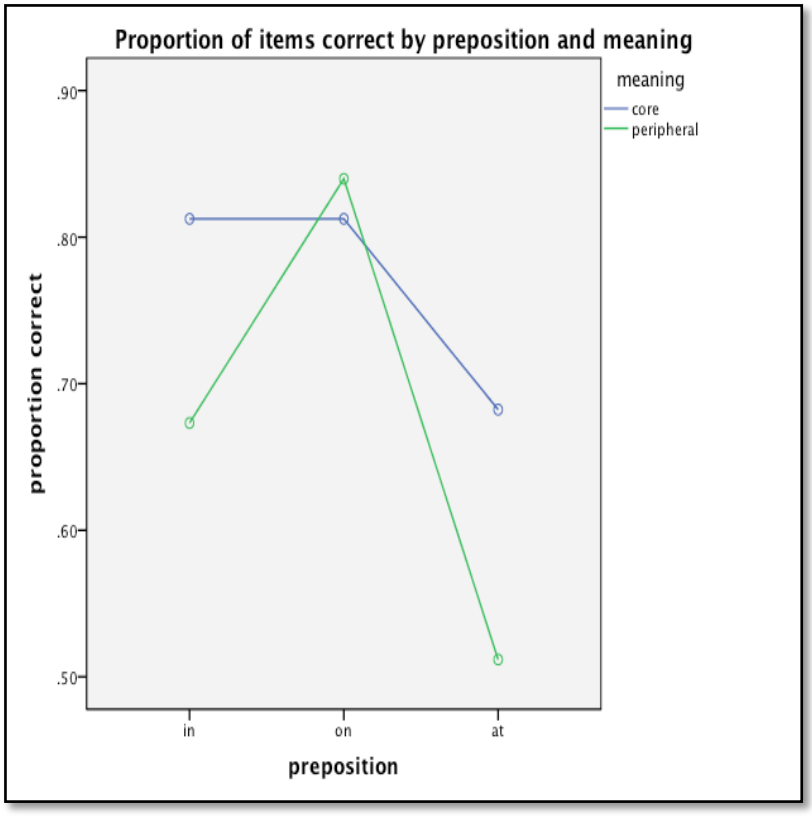


Figure 5-2: The interaction between the prepositions *at*, *on* and *in* and meaning (core and peripheral).

Overall, the findings of the four-way (RM) ANOVA test showed that only the hypotheses one and two were supported (see Table 5.8 below). The Arab ESL participants scored higher on tasks that included the prepositions *in* and *on* than the

tasks examining the preposition *at*. The core meaning trials were shown to be easier for participants to answer than the peripheral meaning trials. Therefore, the data shows that there was a significant interaction between prepositions and meanings. However, hypothesis three was not supported, because the tasks including images did not influence the performance of the Arabic ESL participants. Accordingly, I conducted another analysis in which the Arabic ESL participants were joined into one group with other ESL learners (Japanese and Spanish). The purpose of the second analysis is to identify more main variable effects, especially with regard to whether or not the tasks including images can make a difference for the performance of Japanese and Spanish ESL learners. I was also interested in finding more interactions between the same variables and L1, since the L1 of participants was added as one of the between-groups variables.

5.6.2 Analysis of the results of the Arabic, Japanese and Spanish ESL learners' groups

5.6.2.1 Five-way (RM) ANOVA test

This analysis also utilises a repeated measures (RM) ANOVA design (2X2X2X3X3) (meaning: core/peripheral, sentences: with-images/without-images, English proficiency level: low/high, prepositions: *at*/*on*/*in*, participants L1: Arabic, Spanish, Japanese). I carried out this analysis by means of five-way (RM) ANOVA. The variables of the test are a) a 'dependent' continuous variable, denoting the scores of the semantic test, and b) 'independent' categorical variables. The independent variables are divided into between-groups variables and within-groups variables (see Table 5-8).

Table 5-8: The independent variables for the five-way (RM) ANOVA analysis test.

Between-groups variables	Within- groups variables
1) English Proficiency level (high/low) 2) L1 (Arabic/Japanese/Spanish)	1) Prepositions (at/on/in) 2) Meaning (core-peripheral) 3) Images (with/without)

A five-way (RM) ANOVA test was conducted to determine whether there were statistically significant differences in the proportion of the test items answered correctly across the above five variables. The (RM) ANOVAs were also run using SPSS version 19. According to Laerd,[45] the (RM) ANOVA test works especially well with experiments that seek to identify a difference between measurements taken from the same participants. In this case, the different measurements refer to the proportions of correct answers provided in each of the twelve combinations between the language groups (see Table 5-8 above).

This five-way (RM) ANOVA analysis did not find any outliers. The assumption of sphericity was violated, as assessed by Mauchly's test, which was significant for the variable of preposition, $W(2) = .841$, $p < 0.05$, indicating a lack of sphericity, so the Greenhouse-Geisser adjusted F is reported in the respective statistics. Mauchly's test was also significant for the interaction of prepositions, meanings, and images $W(2) = .839$, $p < 0.05$, indicating a lack of sphericity, though no significant interaction was found, so no F value is reported.

[45] Laerd is an on-line statistical guide (https://statistics.laerd.com).

5.6.2.2 Findings of the five-way (RM) ANOVA test

In this section, I will present the main effects and interaction effects of the different independent variables of the five-way (RM) ANOVA test used for analysing the results of the semantic test done by the ESL participants (Arab, Japanese and Spanish). I will report the effect of the L1 (Arabic, Japanese, Spanish) and the effect of proficiency (low proficiency level-high proficiency level) between-groups. Additionally, I will outline the main effects of prepositions (*in, on, at*), the effect of meaning (core meaning, peripheral meaning) and the effect of images (with image, without image) within-groups.

The five-way (RM) ANOVA analysis of the data reveals that, for the between-groups variables, there was no significant effect of the first language, $F < 1$, $\eta p2 = .039$. This is a very significant finding that I will discuss in section (5.7) below. However, there was a significant effect of English proficiency, $F(2, 48) = 8.464$, $p < 0.05$, $\eta_p^2 = .150$, indicating that speakers with high English proficiency ($M = .845$, $SE = .029$) scored higher than speakers with low English proficiency ($M = .698$, $SE = .041$).

For the within-groups variables, there was a significant effect of the preposition (*at, on* and *in*): $F(1.725, 82.821) = 20.310$, $p < 0.001$, $\eta_p^2 = .297$. Pair wise comparisons showed that scores were higher on the prepositional *in* tasks ($M = .818$, $SE = .034$) than the preposition *at* tasks ($M = .625$, $SE = .040$), $p < 0.01$, and that the scores of *on* tasks ($M = .871$, $SE = .028$) were also significantly higher than those of the preposition *at* tasks, $p < .001$. No difference was found between the scores of the *in* and *on* tasks, unlike the differences found earlier between

prepositions in and *on* in the four-way (RM) ANOVA analysis. Figure (5-3) below showed this significant effect clearly. There was a significant effect of meaning, $F(1, 48) = 7.752$, $p < 0.01$, $\eta_p^2 = .139$. Participants scored higher on tasks with core meanings ($M = .806$, $SE = .023$) than those with peripheral meanings ($M = .737$, $SE = .032$). The five-way (RM) ANOVA reveals that there was no significant effect of images either, $F < 1$, $\eta_p^2 = .000$.

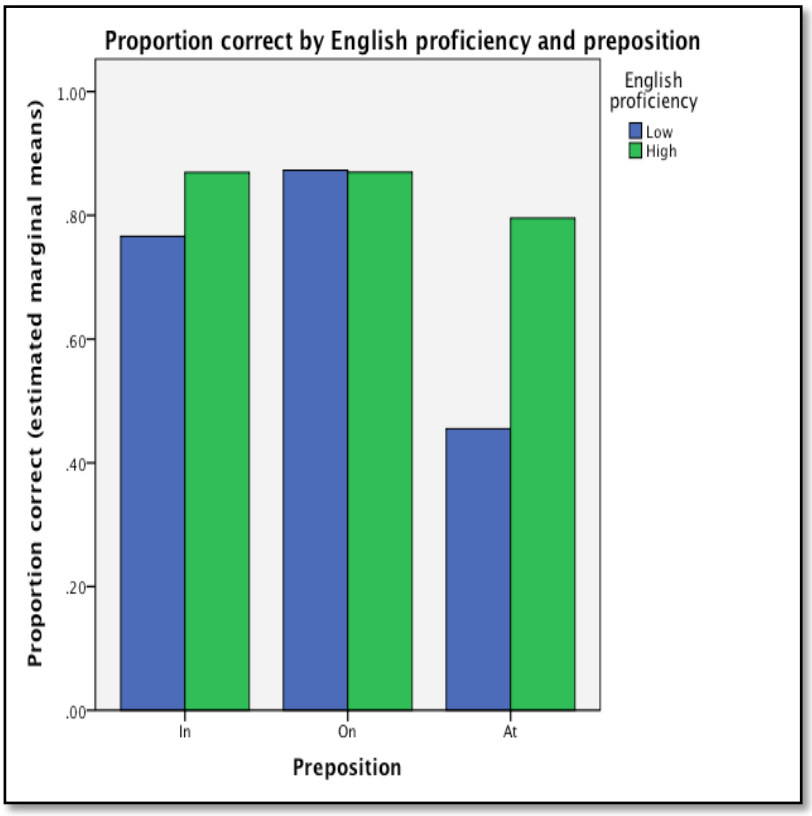


Figure 5-3: The significant effect of the prepositions *at, on and in* and English proficiency (low/high).

It is also important to look for interactions between the variables. (1) There were no significant interactions between the first language and prepositions, meaning or images, all *p*s > 0.05. (2) There was a significant interaction effect between English proficiency and the prepositions, $F(2, 96) = 9.390$, $p < 0.001$, η_p^2

=.164. A significant difference was found in the trials on the preposition *at*, in which high-proficiency speakers (M = .796, SE = .046) scored significantly higher than low-proficiency speakers (M = .455, SE = .066), $p < .001$. (see Figure 5-4)

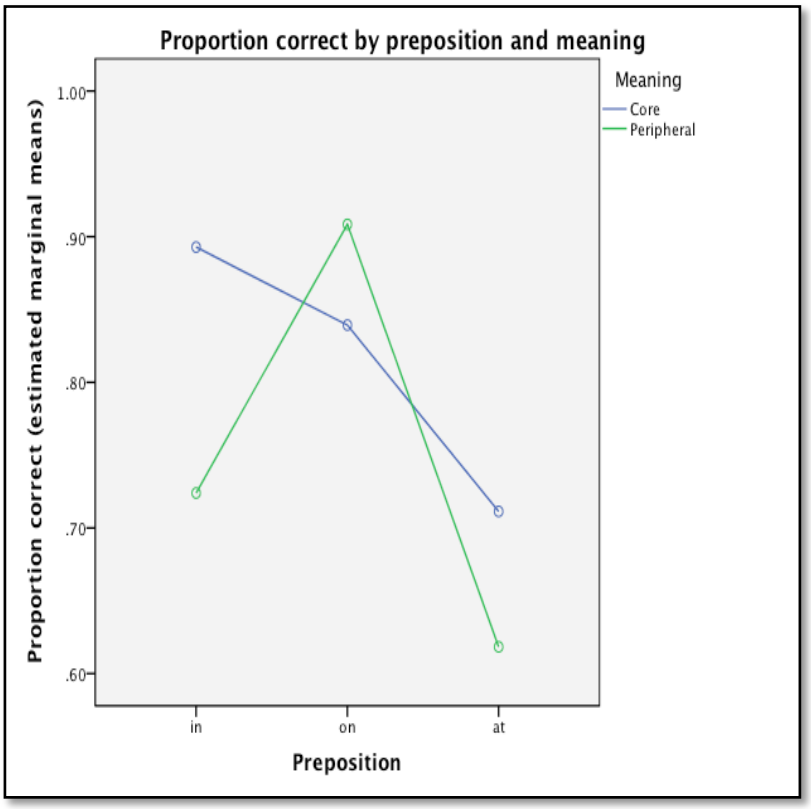


Figure 5-4: The significant interaction between the prepositions *at*, *on* and *in* and meaning (core/peripheral).

While a small number of the assumptions of the (RM) ANOVA test have been violated in the second analysis, these results echo the results from the smaller datasets, supporting their validity. The interaction between English proficiency, language, and preposition was shown to be significant. Furthermore, pairwise comparisons indicated that this relationship was not driven by differences between language or proficiency groups, but by intra-language differences in proficiency and prepositions (see Table 5-9). A significant interaction was found between

prepositions, meaning, and English proficiency. The interaction in figure (5-4) showed a similar trend to the previous results (the four-way (RM) ANOVA), and this significant result was likely driven by unequal sample sizes.

Table 5-9: The means and standard deviation (Std.Dev.) of the participants comparing their English proficiency levels (High/Low) to their performance in the tasks of *at*, *on* and *in.*

L1	Proficiency	Mean (*in*)	Std.Dev. (*in*)	Mean (*on*)	Std.Dev. (*on*)	Mean (*at*)	Std.Dev. (*at*)
Arabic	High	.899	.118	.890	.096	.708	.139
	Low	.699	.625	.808	.050	.566	.073
Spanish	High	.910	.099	.921	.080	.873	.116
	Low	.917	.312	1.000	.254	.333	.368
Japanese	High	.799	.163	.799	.146	.806	.146
	Low	.682	.110	.810	.090	.466	.130

In summary, the second analysis was conducted to search for more main variable effects, especially in an attempt to discern whether the tasks with images would make a meaningful difference for the Japanese and Spanish ESL learners. It also sought to identify more interactions between the same variables and L1, since the participants' L1 (Arabic, Japanese, Spanish) was added as one of the between-groups variables. The findings of the five-way (RM) ANOVA test showed that only hypotheses one and two were supported. These findings coincide with the results for the first analysis, in which the results of Arab ESL learners were analysed separately. In chapter 6, I will explain how these outcomes provide significant

insights into the implications of cognitive linguistics for SLA, language pedagogy, and applied linguistics.

All groups of ESL participants (Arab, Spanish and Japanese) scored higher on tasks that included the prepositions *in* and *on* than they did on tasks that tested the preposition *at*. The peripheral meaning trials were more difficult for ESL learners than the core meaning trials. Unlike the findings in the four-way (RM) ANOVA, there were no significant interactions between prepositions and meaning; however, a significant interaction effect was noted between English proficiency and preposition. It should be noted that the number of the participants was not evenly distributed, with varying levels of L2 proficiency levels, which may be attributable to the restricted selection criteria under which the participants were chosen.

The five-way (RM) ANOVA test showed that hypothesis three was not supported either. The integration of images with tasks did not measurably influence the performance of the participants. The non-significant effect of the presence of images will be discussed further in the following section. In (5.7), I will discuss the results of the semantic test experiment in light of these main effects and the interactions reached through these two analyses.

5.7 General discussion of the semantic test results

The two (RM) ANOVA analyses of the semantic test raise three significant findings: the non-significant detection of Participants' L1 interference on their performance; the poor performance of participants in the tasks that included the English spatial preposition *at* either in the central or the peripheral meanings; and the non-significant effect of images. These significant findings will be discussed in

detail throughout this section. The findings also suggest a number of important pedagogical implications with regards to the ways in which the cognitively based account of prepositional meaning can inform and improve ESL teaching and learning. These significant insights on SLA, language pedagogy and applied linguistics will be presented in Chapter 6. In Table (5-10) below, I will present an overview of the semantic test experiment that summarises the two analyses.

Table 5-10: An overview of the two analyses of the semantic test experiment.

Type of Analysis	Between-groups Variables	Within-groups Variables	Main Effects	Significant Interactions
Four-way (RM) ANOVA	1.Proficiency level (low/high)	1.Prepositions (*in*/*on*/*at*) 2.Meaning (core-peripheral) 3.Images (with/without)	1.Significant prepositions effect (difficult *at* trials) 2.Significant meaning effect (difficult peripheral meaning tasks) 3.Non-significant image effect	There is a significant interaction between prepositions (*in*/*on*/*at*) and meaning (core/ peripheral).
Five-way (RM) ANOVA	1.Proficiency level (low/High) 2.L1 (Arabic/Japanese/ Spanish)	1.Prepositions (*in*/*on*/*at*) 2.Meaning (core-peripheral) 3.Images (with/without)	1.Significant prepositions effect (difficult *at* trials) 2.Significant meaning effect (difficult peripheral meaning tasks) 3.Non-significant image effect	There is a significant interaction between English proficiency (low/high) and prepositions (*in*/*on*/*at*)

5.7.1 Identification and description of the performance of the ESL participants

First of all, there was no significant effect of the participants' L1 (Arabic, Spanish and Japanese) on choosing the correct preposition. This is an important finding because it is not consistent with the findings of many other studies in the SLA literature, in which L1 interference has been hypothesised as the main and the most prominent source for L2 difficulties that are typically encountered by SL learners. This finding is important in the sense that it was strongly emphasised by the type of significant interaction that has been identified, either in the four-way (RM) ANOVA or the five-way (RM) ANOVA. The deviations in the performance of the participants must be explained in light of the complex semantic nature of the English spatial prepositions *at*, *on* and *in.* In the four-way (RM) ANOVA analysis, there was a significant interaction between prepositions (*in*/*on*/*at*) and meaning (core/ peripheral). In the five-way (RM) ANOVA analysis, there was a significant interaction between English proficiency (low/high) and prepositions (*in*/*on*/*at*). As previously explained in (5.6.2.2), while the interaction between English proficiency, languages, and prepositions was shown to be significant, pairwise comparisons illustrated that it was driven by intra-language differences in proficiency and prepositions, rather than differences between language or proficiency groups. It is due to the polysemous nature of the English spatial prepositions *at*, *on* and *in*. They are used to convey different meanings (both core and peripheral) according to different geometric features, extra-geometric features and different contextual factors. The complex semantics of the English spatial prepositions (*at*, *on* and *in*) suggests that ESL learners need to have a high proficiency level in order to

appropriately use these prepositions in different contexts. The findings show that, generally speaking, having a high proficiency level in L2 is not only essential for the correct usage of prepositions, but can also help in the acquisition of native-like intuition in many aspects of the English language.

Secondly, one of the most significant findings of both (RM) ANOVA analyses is the meaning effect. Tasks that included the peripheral meaning of the prepositions *at*, *on* and *in* were shown to be highly problematic for the participants, regardless of their L1. Table (5-11) illustrates that both Arabic and Japanese ESL participants performed better on tasks that included the core meaning of a preposition, while speakers of Spanish scored higher on peripheral meanings. These conclusions should take into consideration the unequal participant numbers in each language group and their different proficiency levels. Moreover, in terms of the expression of either core or peripheral meanings, ESL participants encountered more difficulty in the tasks that tested the preposition *at* than those including the prepositions *in* or *on*. This result is consistent with studies and research in the fields of cognitive semantics and SLA theory. For example, Lindstromberg (2010) claims that the spatial relation encoded by the preposition *at* does not entail specific information for the LM, such as volume or surface, in the same way as occurs with the prepositions *in* and *on*. Therefore, the English preposition "*AT* in its spatial sense often involves a mental act of 'zooming out' so that the Subject and Landmark are visualized from such a distance that they merge into a single point" (Lindstromberg, 2010, p. 173).

Table 5-11: Estimated marginal means of the type of meaning in the sentences in the semantic test.

	95% confidence interval			
Meaning	Lower bound	Mean	Upper bound	Std. error
Core	.760	.806	.851	.023
Peripheral	.672	.737	.803	.032

Thirdly, the (RM) ANOVA analyses showed that there was no significant effect for the presence of images on the ESL participants' performance. After the completion of each semantic test, I was able to converse informally with most of the participants. During these conversations, I asked them about the effect of the images that had been provided for some of the items for the test. The majority of the ESL participants liked the idea of including images in the test; however, these pictures did not contribute to their choice of the right preposition. The underlying aim for the inclusion of these images had been to clarify the geometric features of the spatial scene expressed by prepositions. For this reason, each image was a description of the spatial scene, however, when they were visualised by the ESL learners, they reflected the metal concepts for the spatial relations that each participant had already mentally encoded for the prepositions *at, on* and *in,* instead of evoking the way in which English NSs conceptualise these spatial relations.

5.7.2 Explanation of the performance of the ESL participants

In this section I will include some examples of the semantic test items that are generally considered to be problematic for the ESL participants (Arab, Japanese and Spanish) and which are good examples for discussion. I will explain the

differences between the performance of participants in the light of the assumed hypotheses, as well as from the cognitive semantic perspective. I will adopt the lexical-semantic analysis of the spatial senses of the English preposition *at*, *on* and *in* (cf. Herskovits, 1986; Lindstromberg, 1998, 2010; Tyler and Evans, 2003; and Coventry and Garrod, 2004), as discussed in chapter 3.

Table 5-12: The proportion of the correct answers of the selected items from the semantic test divided according to the language groups.

Items	Meaning	Arabic	Spanish	Japanese
1. The children are all ***in*** bed.	Core	**65.6**	**100**	**81.8**
2. In exams, you're not allowed to write ***in*** pencil.	Peripheral	**75**	**100**	**36.3**
3. I live ***in*** hope of a better fortune.	Peripheral	**46.8**	**72.7**	**63.6**
4. Jenny went to school ***on*** bus this morning.	Core	**43.7**	**81.8**	**90.9**
5. You should find the keys ***on*** the kitchen table.	Core	**93.7**	**100**	**72.7**
6. Wow! You are ***on*** time.	Peripheral	**56.2**	**90.9**	**90.9**
7. How are you getting ***on*** with your new job?	Peripheral	**93.7**	**90.9**	**45.4**
8. I'm still sitting ***at*** my computer desk.	Core	**15.6**	**54.5**	**45.4**

The above Table, (5-12), shows the proportion of the correct answers of the selected items from the semantic test divided according to the L1s and types of meaning. In items (1) and (2), where the preposition *in* is used in both core and peripheral meaning, the Arabs and the Japanese scored less than the Spanish. The Arab and Japanese students overwhelmingly substituted the preposition *in* with the preposition *on*. In (1), Arab and Japanese ESL participants perceived the LM, *the bed,* as being a container that includes the sleeping children in its boundaries. As a consequence of this, they were unable to correctly match the geometric features of the LM and the functional properties of the preposition *on*. The same explanation is also applicable to the Landmark (pencil) in item (2).[46] This supports previous studies, that argue that the difference between "*in* and *on* is the geometric routine that applies, and also the degree of locational control that *in* versus *on* affords" (Coventry and Garrod, 2004, p.89). Thus, the incorrect answers given by participants are likely due to a mismatch between the location control properties between *in* and *on.*

In item (3), where the peripheral meaning of the preposition *in* is used, Arab, Japanese and Spanish participants scored relatively low in this task compared to the overall tasks for the preposition *in*. In the semantic test, hypothesis 2 is supported**.** Participants scored higher on tasks that included the core meanings of prepositions than on the tasks that included a peripheral meaning. This result is supported by the extant literature on both L1 acquisition and L2 acquisition (see Section 2.3).

The scores of item (4) show a very significant finding. Arab ESL participants have scored lower than their Japanese and Spanish ESL counterparts. The

[46] In Table (5-12), the high percentage of the Spanish participants, compared to the Arabic and the Japanese participants, is due to their high English proficiency level: 10 of the Spanish participants had high English proficiency levels.

conceptualisation of the meaning of the relation expressed by a preposition is different for speakers of different languages in this case of English and Arabic. For English speakers, the preposition *on* expresses a contact relation in which the LM, *the bus*, is considered a surface. However, comparison of the overall performance of participants in this semantic test does not support the theory that this can be attributed solely to L1 interference.

In item (5), the Japanese ESL participants scored lower than both the Arabs and the Spanish. Japanese ESL participants consider the nouns in the NP that follow the preposition (kitchen table). Since the core meaning of the preposition is expressed in this example, I expected all of the participants to get this answer correct. However, most of the participants answered item (6) correctly, despite it being a metaphoric extension of the meaning of the preposition *on*. This idiomatic nature of the meaning is frequently presented in textbooks and used in this way during daily life interactions, which seems to have made this item easier for the majority of ESL learners to comprehend and use.

The peripheral meaning of the preposition *on* is expressed in item (7). Perhaps because many of the Japanese speakers fall into the lower English proficiency group, they did not score highly on this task. However, those Spanish and Arabic speakers who had higher proficiency ratings scored better on those tasks that included the peripheral meanings of the preposition, such as item (7).

Item (8) seems very problematic. This is because the preposition *at* expresses a spatial relation that does not entail a specific information for the LM, such as volume or surface, as entailed in the prepositions *in* and *on*. The primary

consideration for English speakers is how one could make use of being in the same place (coincidence) with the computer desk, rather than being close to it. The source of the problem is the vagueness of the spatial relationship encoded by the preposition *at,* exacerbated by the fact that ESL participants could not develop clear borders between the spatial relations encoded by the three prepositions *at, on* and *in*. The English NSs also expected that tasks including the preposition *at* might be difficult for non-native speakers of English.

5.7.3 Evaluation of the ESL participants' performance

In this section, I will provide a summary of the performance of the ESL participants (Arab, Japanese and Spanish) and explain the deviation in their prepositional usage in order to offer an interpretation and definition of the general problems and challenges faced by ESL learners in general:

1) English prepositions are semantically complex and are polysemous in nature. ESL learners should be helped to understand how this diversity of meaning could be organised in a semantic network where the multiple meanings of a preposition are linked to a primary/core meaning.

2) The role played by the learners' L1 in second language acquisition is important. Although the results of this semantic experiment reveal that L1 interference is not significant, the effect of L1 on L2 acquisition should not be excluded from the factors under consideration. Recognising the similarities and the differences that exist between the preposition systems of L1 (Arabic, Japanese, Spanish) and L2 (English) leads me to assume that the participants' L1 could have a negative effect on the performance of the participants. However, the empirical findings of the

semantic test suggest that the problem is intra-lingual, that is specific to English. The problems and challenges encountered by this sample of ESL learners are due to the nature of the complex semantic features of the English prepositions. During the analysis of the results of the semantic test, a number of factors interfered with the L1 effect, such as the types and numbers of prepositions, the test items and layout, the number of participants in each language group and their English proficiency levels. Therefore, the data outcome suggests that the problem facing many ESL learners is specifically intra-lingual.

3) In cognitive linguistics, the geometric features of the spatial scene can influence ESL learners' acquisition and usage of prepositions. However, we should also consider the extra-geometric factors, such as the 'context of the utterance' and the specific properties of the TR and the LM. The findings from the developmental data and research mentioned in Chapter 2 (Section 2.3.5) showed that these factors often profoundly influence language acquisition (FL acquisition) among children. Indeed, these studies have revealed that a correct mapping of the spatial scene and the linguistic form is dependent on both geometric and extra-geometric factors. In addition, Herskovits (1986) and Talmy (2000) argue that one of the possible sources for the difficulties that students experience in acquiring the semantics of spatial prepositions is recognising the properties of the LM, the reference object.

5) In order to use English spatial prepositions appropriately, ESL learners should understand that they have multiple meanings and functions. Understanding the meaning of the English prepositions *at, on* and *in* also requires an understanding of the geometric features of the spatial scene and the functional information involved (Munnich and Landau, 2010). This means that the process of acquiring these

prepositions requires an ESL learner to match and relate the geometric features with the functional properties of these prepositions, e.g. the functional property of the preposition *in* is to constrain the movement of the TR and requires a volume reference object (LM), whereas the functional property of the preposition *on* is to support and requires a surface object.

6) The performance of ESL learners may be linked to a large extent to the way in which prepositions are taught to them and how these lexical items appear in textbooks. This effect is not measured in this study; however, paying attention to this pedagogical effect is crucial. The implications of the cognitive based account for teaching English prepositions will be discussed in chapter 6.

5.8 Conclusion

The most fundamental findings of the semantic test conducted during the fieldwork stage of this study are that there was a non-significant level of L1 interference on the performance of participants; the images had a non-significant effect; and the low performance of participants in the tasks that include the English spatial preposition *at* either in the central or peripheral meanings. These findings will be discussed in the light of the cognitive semantic approaches to prepositions and spatial representations and the implications of these approaches on SLA theory, language pedagogy and applied linguistics. In the following chapter, I will discuss how the outcomes of the experimental phase of this study might enable a better understanding of the conceptual mapping of the English prepositions *at*, *on* and *in* by ESL learners. A full interpretation of the semantic test results will be given in light of the CS approaches to preposition meaning.

Chapter 6 General Discussion

6.1 Introduction

Acquiring the English spatial prepositions *at*, *on* and *in* is a significant language problem for ESL learners. A core reason for this seems to be the fact that the appropriate usage of these prepositions is influenced by a number of factors. The findings of the semantic experiment conducted in the current study reveal that the problem of Arab, Japanese and Spanish ESL learners is intra-lingual, meaning that it is specific to English. The main difficulties seem to be attributable to the polysemy, the idiomaticity and the diversity in the usages of these prepositions in English. As a consequence of these findings, this comparative investigation has potential pedagogical benefits. When teaching English prepositions, the learner's attention should be drawn to the semantic features of prepositional meaning. As the findings show that the identification of a one-to-one equivalent is typically not the cause of the learning difficulty but rather, the manner through which the speakers of these languages conceptualise and categorise spatial relations. Therefore, using translation as a method in teaching a language can sometimes be misleading. In this chapter, I will present an interpretation of the results of the semantic experiment, seeking better understanding of prepositions by bringing together ideas from SLA theory and applied linguistics, as well as contemporary cognitive semantic approaches.

6.2 Interpretations of the Results

In the following section, I will present an interpretation of the results and findings of the semantic test, as previously discussed in chapter 5. These findings are

informed by a cognitive semantic approach to prepositions (6.2.1), SLA theory and applied linguistics (6.2.2).

6.2.1 The Cognitive Semantic Approach to Prepositions

> Although the semantics of spatial terms may appear to be straightforwardly grounded in spatial cognition and therefore relatively simple, they are known to differ significantly across languages, packaging geometric and functional relationships in different ways, and relying on culture-specific representation of objects (Munnich and Landau, 2010, p.32).

In this section, I will recapitulate the main CL and CS assumptions regarding meaning, with specific reference to preposition meaning. In addition, I will present the semantic factors that influence the choice of the English spatial prepositions *at*, *on* and *in,* after which I will discuss the main findings of the semantic experiment. This will enable the manner in which speakers conceptualise and categorise spatial relations to be highlighted, thereby explaining the learning problem.

I will begin by illustrating the principles and guidelines of the cognitive semantic approach, as outlined in Cadierno (2008). The conceptual structure of meaning is embodied in our interaction with the physical world and is therefore highly dependent on the ways that we perceive, experience and conceptualise the world around us. In this, semantic structure denotes a conceptual structure and meaning consists in our conceptualisation of mental experiences. The meaning of lexical items, such as prepositions, is motivated in perceptual and conceptual processes, e.g. TR/LM organization. In CS there is no clear-cut boundary between semantics (linguistic knowledge) and pragmatics (extra-linguistic knowledge) because meaning representation is encyclopaedic and constructional. Human

cognition governs cognitive processes and thus language, which is the result of cognitive processes, is intrinsically linked to human cognition. In this sense, prepositions have a conventionalised meaning that is mapped onto a linguistic form, enabling users of a language to achieve their communicative purposes. This conventional meaning of lexical items is schematic, with the associated concepts motivating the process of meaning construction by supplying 'prompts' for the use of the appropriate lexical item in different contexts. Through the process of conceptual projection these schematic concepts can also be used to express abstract concepts, such as metaphor. In line with these CL and CS assumptions, polysemy, the different meanings of a lexical item, is regarded as systematic and is motivated by a schematic conceptualisation process that facilitates the mapping of lexical meaning onto language usage.

On the basis of these rules of CL and CS, cognitive linguists (e.g. Herskovits, 1986; Talmy, 2000; Tyler and Evans, 2003; and Coventry and Garrod, 2004) have attempted to explain the meaning of spatial expressions and prepositions, and to describe their meaning diversity, idiomaticity, and polysemy. These approaches to the meaning of prepositions are founded on cognitive bases, such as polysemy, metaphoric extension, primary meaning, and semantic network. Accordingly, scholars have generally agreed upon a number of semantic factors that determine the choice of preposition, which are reviewed again below. The primary meaning of prepositions is spatial and consists of a conventional abstract representation that is determined and constrained by geometric factors. The contextual factors are important for the spatial scene because they facilitate the pragmatic inferences, such as knowing the intention of the speaker. These pragmatic inferences, otherwise

known as ‘the situation type’ proposed by Herskovits (1986), limit the core primary sense of the preposition by modifying or stretching its concepts. It has been assumed that contextual cues and pragmatic strengthening strategies may motivate the construction of on-line meaning (Tyler and Evans, 2003). Talmy (2000) suggests that there seems to be an asymmetrical relationship between the TR (the primary object) and the LM (the secondary object) in the spatial scene, due to the fact that they both have different geometrical configurations (see Table 3-3). These properties of the elements of the spatial scene, which are similar to what Coventry and Garrod called ‘object knowledge’, also constrain the encoded spatial relation, and hence, the choice of preposition. It is possible to argue that the primary meaning of a preposition (the proto-scene) can be distinct from the extended non-spatial meanings (the distinct meanings) because of certain configurations of TR and LM (Tyler and Evans, 2003). Although the extended meaning of a preposition is motivated by its primary sense, it involves different configurations between the TR and the LM, and thus constitutes an additional meaning. Herskovits (1986) explains that the extended meaning of a preposition results from the manipulation of the geometric factors that control the primary meaning. Tyler and Evans (2003) argue that the different preposition meanings are systematic and are therefore motivated by a semantic network that links the primary meaning and its distinct extended meanings.

On the basis of the assumptions of the CS approaches to the meaning of prepositions, a semantic test was conducted to investigate the problems and difficulties faced by ESL learners when learning and using a specific set of English spatial prepositions (*at*, *on* and *in*). It has been generally assumed that L1 interference is responsible for the difficulty of the acquisition of L2 spatial

expressions. However, L1 interference was not shown to be significant in the results of the semantic test for the participants of this study, illustrating that it is not the main cause of the language problem. This means that other factors should be considered in order to explain the deviations in the performance of ESL learners. The semantic test findings suggest that the main causes for this difficulty are the relation between meaning (core and peripheral) and prepositions, and the semantic complexity of the English prepositions *at*, *on* and *in* and their highly polysemous nature. The meaning of prepositions is seen to be geometric, with prepositions being considered functional words that encode a relationship between two elements in accordance with certain configurations. The acquisition of English prepositions relies upon geometric factors (the properties of TR and LM) and extra geometric factors (those unrelated to the scene, or context, of the utterance). Therefore, the ESL learner should seek to correctly match these entities (TR and LM) and the relations that are encoded by these prepositions, in order to acquire spatial prepositions and use them appropriately. Considering the semantic factors that determine the use of the English preposition *at*, *on* and *in* can facilitate better understanding of the nature of the problem and help us to identify its causes.

In examining prepositional meanings, I shall refer to the notion of 'categorisation of space', as discussed by a number of respected CS scholars (e.g. Evans and Green, 2006). Categorisation of space is an important semantic factor that influences the acquisition and the appropriate usage of the English prepositions *at*, *on* and *in*. As has been noticed through the lexical semantic comparison between English and Arabic, the variation in the conceptualisation of space between these

two languages can be due to what Slobin[47](1996), a cognitive linguist, has described 'thinking for speaking'. Slobin argues that "each native language has trained its speakers to pay different kinds of attention to events and experiences when talking about them. This training is carried out in childhood and is exceptionally resistant to restricting in adult second-language acquisition" (Slobin, 1996, p.89). In section (4.3.1), I utilised Arabic examples to show that the three chosen English spatial prepositions (*at, on,* and *in*) can be expressed by using one Arabic preposition, namely *fi,* the use of which is equally correct as a replacement for *at* school, *on* the farm and *in* the club. Therefore, the task of the Arab ESL is to find the correct dimensional semantic counterpart that properly expresses the relationship encoded by these prepositions, namely coincidence, contact, and containment. The semantic test findings also showed that Japanese and Spanish ESL learners face similar problems. The prepositions *at, on,* and *in,* are mapped onto the Spanish preposition *en* and onto the Japanese postpositions *ni* and *de*. The Arab, Spanish and Japanese ESL learners could not understand this kind of semantic categorisation or distinguish between the three spatial prepositions, bearing in mind that "these differences reflect the capacity that speakers of different languages have to categorise objectively similar experiences in different ways" (Evans and Green, 2006, p.90).

6.2.2 SLA Theory and Applied Linguistics

> What CL brings to the multifaceted field of language pedagogy – more than any other contemporary form of linguistics – is "a strong conceptual unity"(Kristiansen et al., 2006, p.14). It is this unity in theoretical assumptions, basic units, and constructs that is expected to offer a better insight into the nature of language and grammar and further improve the efficiency and effectiveness of existing second and foreign language teaching (De Rycker and De Knop, 2009, p.41).

[47] Cited in Evans and Green (2006, p.90).

The findings of the semantic experiment reveal that the problem of the participating ESL learners (Arab, Japanese and Spanish) is intra-lingual, meaning that they are specific to English. There are certain clear pedagogical benefits to this comparative investigation, such as the importance of highlighting that when teaching English prepositions, the attention of learners should be drawn to the semantic features of prepositional meaning. They should also be warned that using translation in teaching a language can sometimes be misleading. In this section, I will demonstrate how the theory of SLA and applied linguistics can employ these CS approaches in the acquisition and teaching of L2 prepositions. These strategies will be supported with reference to the results from selected studies in the field (Lowie and Verspoor, 2004; Tyler and Evans, 2004; Cho, 2010; Nacey, 2013, Giovanelli, 2015). This section will conclude with Niemeier's (2005) crucial appeal to consider applied cognitive linguistics (ACL) as an approach motivating teaching.

Lowie and Verspoor (2004) suggest that a usage-based approach to language be employed, in recognition that entrenchment plays a role in L2 acquisition. Entrenchment can be defined as frequency of occurrence, in other words how often a particular structure is utilised, and how this frequency influences its mastery and activation (Langacker, 1991). Lowie and Verspoor (2004) examined the relation between entrenchment (frequency of L2 input) and the similarities between L1 (Dutch) and L2 (English), and have studied the role of learners' L1 in L2 acquisition. They argued that "the cross-linguistic influence will be related to the degree of semantic overlap between lexical items in different languages" (Lowie and Verspoor, 2004, p.82). They tested the role of frequency for L2 input and its effect on the process of lexical activation in the lexicon. They showed that the activated

nodes (lexical items) typically extend this activation to those nodes to which they are connected (share similar meanings). This led Lowie and Verspoor (2004) to assume that entrenchment is a major drive behind lexical acquisition. They conducted an experiment to examine the effect of two variables, which are, L1 related variable similarity and L2-related frequency for Dutch ESL learners (high school students). The Dutch ESL learners were divided into four proficiency levels. A set was included of the most frequently used prepositions (e.g. in, on, at, for, to, of, over, below, under, between, among, by, in front of). These were used in their central meanings, in order to account for the low proficiency levels. The results showed that: the similarity of L1 prepositions to L2 can facilitate preposition acquisition and usage; and that these similarities influenced the acquisition of English by Dutch ESL learners at beginner or intermediate proficiency levels, but not those at higher proficiency levels. The findings supported the assumption that L1 positive transfer reinforces and influences the acquisition of L2, especially at early stages (Lowie and Verspoor, 2004).

Tyler and Evans (2004) studied how the different meanings of the English preposition *over* are motivated by semantic extension of the meaning from a central meaning. These different meanings of the preposition *over* are linked together and form a semantic network. They argue that "[u]nderstanding the motivation behind the extended senses as experientially motivated and coherent with the learners' own observation of the external, spatio-physical world, reflects the learners' own experiences with the world" (Tyler and Evans, 2004, p.273). Their research argues that this semantic network model is a useful tool for teachers to utilise when explaining the relationships between the multiple meanings of polysemous lexical

items, such as prepositions. This is because the different meanings of a preposition in this model are presented as 'conceptualisations' of scenes and are systematically connected as a network. Therefore, they explained a teaching procedure that will help learners to understand the 'unfamiliar' senses of the preposition *over* in context. Tyler and Evans (2004) suggest that teachers should: (1) begin the lesson by explaining the elements of the proto-scene and compare the extended distinct meanings to this proto-scene; (2) show the learners several pictures (visual representations of the proto-scene) to explain the configurations of the TR and LM; (3) explain that each proto-scene must constitute the central sense from which a sense extension is systematically derived; and (4) demonstrate that the non-spatial meaning can be understood by using inference strategies and pragmatic strengthening cues that explain the usage of the preposition *over* in context. This procedure bears in mind the fact that,

> a speaker would only use an established lexical form to mean something new if they believed the listener had a reasonable chance of understanding the new meaning through inferencing and contextual cues. With repetition across a number of similar contexts, the inferences come to be independently associated with the lexical form as additional senses (Tyler, 2012a, p.132).

This usage-based approach to preposition teaching implements the semantic network technique, assisting learners in the formation of meaningful connections between the different meanings of prepositions, as well as in the actual process of language usage (Tyler and Evans, 2004). This might be useful in helping learners to remember, retrieve and motivate the meanings more easily.

Cho (2010) investigated the effectiveness of applying the cognitive linguistics approach (cf. Herskovits, 1986; Lakoff, 1987; Langacker, 1987; Talmy, 2000; Tyler and Evans, 2001, 2003) to teaching the English prepositions *at*, *on* and

in to Japanese second language learners of English. This CL approach "treats polysemy as the outcome of systematic meaning extension. […] [and] all the senses of a polysemy are considered to be semantically motivated and form a network" (Cho 2010, p.259). In two separate studies, Cho (2010) found that Japanese ESL learners find prototypical/topological (spatial) uses of English prepositions easier to understand than their functional uses, and that a cognitive approach is pedagogically effective in teaching English prepositions. These outcomes suggest that teaching instructions based on motivated connections between the prototypical uses (core meaning) and the functional uses (peripheral meaning) of prepositions positively affect and facilitate the learning process (Cho, 2010).

Comparing the results of the two main instruction types, the traditional approach and the cognitive approach, the results support the use of the cognitive approach in teaching instruction (Cho, 2010). In the cognitive approach, the instruction phase involves the teacher explaining that all of the different usages of English prepositions are correlated around a central image schema, which is supported by the presentation of examples that encode both topological relations and functional relations. In the practice phase, the teacher displayed examples for each of the prepositions *at*, *on* and *in* and asked the students to draw semantic networks for each preposition based on one central image schema that covers all the provided examples. In the subsequent testing phase, the learners completed a two tasks test, meaning a blank complete task and an error recognition task. The results showed that the cognitive instruction was more effective, and it is for this reason that Cho argues that those students "who were shown the motivations for the semantic extensions from a prototypical sense to more peripheral usages (i.e., in this study,

the extension from the topological to functional meanings) actually managed to transfer this insight autonomously to new instances" (2010, p.270).

Nacey (2013, p.206) suggests that the difficulties that ESL learners encounter with English prepositions often occur as a result of the random nature of preposition use in textbook and grammar book presentations. She argues that the books for ELT courses often present the semantics of prepositions as unsystematic, therefore implying that they can only be acquired by means of memorization. This situation is exacerbated by the failure of many grammar textbooks to provide logical or reasonable clarifications of why one preposition is more appropriate than another in certain contexts. In addition, some textbooks and reference books arrange the various meanings associated with prepositions in a list of homonyms, meaning that although they are spelt or pronounced alike, they have different unrelated meanings. These factors conspire to lead learners to assume that prepositional meanings are arbitrary and that there is therefore no motivation behind the choice of prepositions (Nacey, 2013).

Some cognitive linguistics scholars (e.g. Tyler and Evans, 2003) state that the various meanings of a preposition are systematically related. Similarly, Nacey (2013) also argues that a systematic approach to prepositional meaning could guide SL teaching and learning processes. Dabrowska (2004, p.99) supports this claim, explaining that "[i]n spite of the fact that spatial conceptualisation is strongly constrained by the nature of the world and by our own psychobiology, there is tremendous variation in the way that different languages structure space" (Cited in Nacey, 2013, p.209).

Nacey (2013) compared Norwegian and English prepositions, and found that lexical semantic divergence means that "a single preposition from the learner's L1 may correspond to more than one preposition in the target language" (p.232) Nacey illustrated this point by examples from the usage of the Norwegian preposition *på*:

1) Han er *på* fjellet. He is in the mountains.
2) Han er *på* skolen. He is at school.
3) Han er *på* taket. He is on the roof.
   (Cited in Nacey, 2013, p. 232)

Norwegian learners often take the Norwegian preposition *på* to correspond to the English preposition *on*, therefore, they tend to over-use the English preposition *on*. Nacey (2013) explains that this may not only be due to L1 transfer, but potentially also to the mental concepts underlying prepositions. As both prepositions share the same basic meaning, learners do not differentiate between their conceptual structures (Nacey, 2013). However, she also states that the preposition *on* is not always the appropriate correspondence to the Norwegian preposition *på.* Therefore, Norwegian learners of English should pay attention to the context and know which English preposition to use (*in, on* or *at*). However, this can potentially lead to 'linguistic insecurity':

> [L]earners may realise that they cannot automatically reproduce L1 patterns in the L2, but may not be quite sure when caution needs to be exercised nor how to choose alternative prepositions […] [And] [w]hen it comes to prepositions, conceptual transfer is difficult to differentiate from linguistic transfer. It is possible that different ways of encoding time and space in an L1 and L2, for example, may result in infelicitous preposition choice in the L2 (Nacey 2013, p.236).

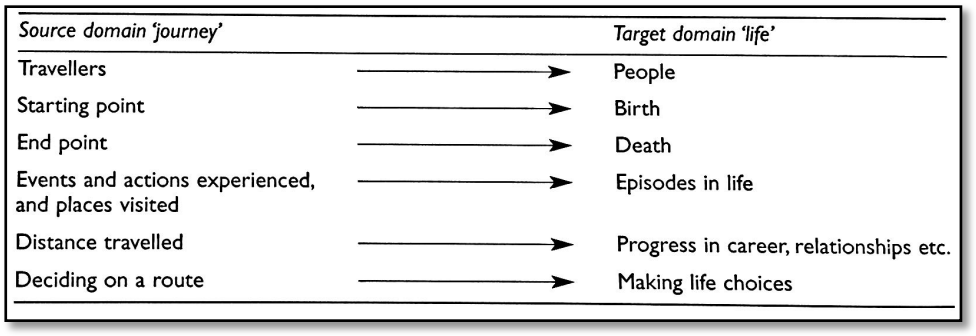
Nacey (2013) concludes that while the Norwegian learners share many concepts with English speakers, the linguistic transfer is more dominant than the conceptual transfer in the use of prepositions.

Giovanelli (2015) explored how teachers can benefit from the fundamental principles of CL as effective teaching tools supporting teaching grammar and meaning. He explored how "the conceptual basis of language (including aspects of lexis, semantics and grammar) originated from experience that is rooted in physical movement and physical imagery"(Giovanelli, 2015, p.2) can inspire language pedagogy. Giovanelli (2015) proposed teaching models, which are informed and supported by CL principles, that can make teachers "think about language and how some key aspects of grammar and meaning might be taught to students" (p.28). He provided a number of activities and resources that guide teachers in teaching different aspects of the language such as container schemas, source-path-goal schemas, figure/ground distinction, modality and metaphor.

Giovanelli (2015) explained how the CL principle of embodiment to word meaning is important for language teaching and learning. This principle entails "navigating our environment, recognising people and places and undertaking tasks"(p.30). Therefore, mental image schemas are seen as "basic templates for organising experience" and interactions with physical world as well as providing "a structure for understanding more complex conceptual content" (Giovanelli, 2015,p.31). Building on the fact that "meaning itself is derived from our understanding of physical experience" (Giovanelli, 2015,p.36) teachers are asked to use learning activities that motivate the principle of embodiments. Giovanelli (2015) clarified that this "physical and experience-based pedagogy (embodied learning) is informed by how the mind organises and stores concepts (embodied cognition)" (p.36). A good example for meaning embodiment is metaphor. When explaining conceptual metaphors, e.g. *Life is a journey*, teachers should explain the source

domain (journey) and the target domain (life) and the relationship between these domains; in other words, how elements of the source domain are mapped to the target domain. Figure (6-1) explains this conceptual metaphor mapping suggested by Giovanelli (2015).

Figure 6-1: Mapping the source domain to the target domain of the conceptual metaphor *Life is a journey*. (Cited in Giovanelli, 2015, p.70).



In summary, applying insights and perspectives of CL to SLA and applied linguistics has its pedagogical benefits and advantages. Niemeier (2005) refers to this kind of relation and connection as finding what is called applied cognitive linguistics (ACL), claiming that the CL approach is unique because its language strategies apply to both grammar and lexis. The strategies "are understood as belonging to the general mental organization principles, which apply not to language alone but also to other areas of cognition" (Niemeier, 2005, p.102). Niemeier (2005) argues that the field of ACL is still in its development, even claiming that the ACL perspective on language is seen as 'revolutionary'. ACL regards universals as an outcome of our general cognitive processes and it emphasizes that the 'non-universal' aspects of languages are due to the relation between language and culture,

meaning that they are language-specific. The aim of ACL is "to make learners aware of the motivation behind linguistic phenomena and to help them understand how language works, [and hence], it regards understanding as a precondition for learning" (Niemeier, 2005, p.103). From the perspective of preposition learning, Niemeier (2005) suggests that the learners' knowledge about preposition use should be supported by access to a visual semantic network of preposition meaning. This would enable teachers to explain how more abstract meanings are constructed in connection to this network. The learners should then be provided with examples that are taken from daily life interactions; the teacher should encourage them to deduce the meanings in context and to make inferences about the speakers' intentions. This type of usage-based teaching instruction has been shown to help many learners to understand and focus on the different aspects of meaning. Consequently, Pütz (2007) stresses that

> students should not be geared toward random blind memorization of symbolic units, but should rather be offered explanations of the systematicity and schematic nature idiomatic language and metaphorical expressions. When linguistic expressions are paired with their underlying conceptual metaphors, they will become more transparent to the language learner; in other words, the motivation behind their idiomatic meaning will become obvious (Pütz, 2007, p. 1146).

6.3 Conclusion

A number of studies in the field of SLA and applied linguistics have utilised CS assumptions in the cross-linguistic investigation of prepositions. These research studies have revealed that the CS approach to prepositions can define the causes of the problems and difficulties of L2 learners, in addition to providing an explanation

for this cross-linguistic phenomenon based on empirical evidence. From my perspective, the results of these studies help to reinforce and support the findings of the semantic test conducted in the current study. In this way, they guide the fulfilment of my study aim and purpose, namely: a) to increase our understanding of the semantic properties of the English spatial prepositions *at*, *on* and *in* and to emphasise the semantic aspects that influence the choice of these prepositions; and thus, b) to explain the difficulties and challenges that ESL learners encounter when acquiring them.

Chapter 7 Conclusion: summary and implications of findings

7.1 Introduction

In this chapter, I will present an overall summary of the thesis and outline the main findings in relation to the research questions formulated in Chapter 4, thereby illustrating the most salient research findings. In section (7.2), I will describe the factors involved in the acquisition of the English spatial prepositions *at*, *on* and *in* by ESL learners, with the ultimate goal of developing a native-like intuition. In section (7.3), I will discuss the pedagogical implications of the current study and how the cognitively based account of prepositional meaning could inform and optimise ESL teaching and learning. Finally, in section (7.4), some suggestions for further research will be provided.

7.2 Overall summary

The thesis has examined the semantic factors that influence the acquisition of the English spatial prepositions *at*, *on* and *in* by Arab, Japanese and Spanish, ESL learners within a CS framework as proposed by Herskovits (1986), Lindstromberg (1998, 2010), Talmy (2000), Tyler and Evans (2003), and Coventry and Garrod (2004). As stated previously, the aim of the current research is to a) increase the current level of understanding regarding the semantic properties of the English spatial prepositions *at*, *on* and *in* and to emphasise the semantic aspects that influence the choice of these prepositions, and in so doing, b) to explain the difficulties and challenges facing those ESL learners attempting to acquire them.

Therefore, the main questions addressed in this thesis are:

1) *How do the semantic factors and configurations that determine the choice of the spatial prepositions at, on and in differ from language to language, and influence L2 acquisition?*

2) *How can the deviations in the performance of ESL learners (Arab, Spanish and Japanese) in using these prepositions be explained? How could this language problem be defined? Is the problem inter-lingual or intra-lingual? Are L1 interference patterns (Arab, Spanish and Japanese) significant for the problem?*

There are a number of semantic factors that influence the choice of the English prepositions *at, on* and *in,* which are the focus of the current research. These factors include the asymmetrical relationship between the TR (the primary object) and the LM (the secondary object) in the spatial scene, largely because each of these objects has different geometrical configurations (see Table 3-3). These properties of the elements of the spatial scene also constrain the encoded spatial relations, and hence, the choice of preposition. In addition, Tyler and Evans (2003) have suggested that the primary meaning of a preposition (the proto-scene) can be differentiated from the extended non-spatial meaning (the distinct meanings) by examination of the features and configurations of the TR and LM. Although the extended meaning of a preposition is motivated by the primary sense, it entails different configurations between the TR and the LM, and therefore creates an additional meaning. In this way, it can be argued that the extended meaning of a preposition is the result of the bending or stretching of the geometric factors that control its primary meaning (Herskovits, 1986). Tyler and Evans (2003) argue that the different preposition

meanings are systematic and motivated by a semantic network in which there is a link between the primary meaning and its extended distinct meanings. Finally, the contextual factors are important for the spatial scene because they facilitate pragmatic inferences, such as the intention of the speaker. It is this pragmatic aspect of meaning interpretation, 'the situation type' proposed by Herskovits (1986), which constrains the primary sense of the preposition.

As I have explained earlier, the three English prepositions *in, on,* and *at*, in their spatial usage, look the same from an Arabic perspective. In fact, in some cases, they could be expressed by using one Arabic preposition *fi,* e.g. *in* the club, *on* the farm and *at* school. As a consequence of this, a significant challenge facing Arabic ESL learners is not simply finding a word-to-word equivalent for the English prepositions *at*, *on* and *in*, but rather finding the correct dimensional semantic correspondence that expresses the relationship encoded by these prepositions, e.g. coincidence, contact and containment. Among the participants of my semantic test, I have noticed that Spanish and Japanese ESL learners also demonstrated similar difficulties. The spatial relations expressed by these English prepositions are mapped onto the Spanish preposition *en,* and onto the postpositions *ni* and *de* in Japanese.

It has been noticed that certain aspects of preposition meanings were familiar to ESL learners (core meaning), however, some other aspects were not familiar to them (peripheral meaning). The peripheral meaning of these prepositions posed a significant challenge to the participants of the test, especially during the trials for the preposition *'at'*. The problem was not only limited to the challenge for ESL learners to differentiate between the various senses of each single preposition, but also how to effectively discriminate between the spatial relations encoded by the three English

prepositions (*at*, *on* and *in*). I found that this is likely to be the case for not only Arabic ESL learners, but also for other language speakers. Spanish and Japanese ESL learners mapped the spatial relations expressed by these English prepositions, namely coincidence, support and containment, onto different conceptual relations and thus they use the prepositions *at*, *on* and *in* incorrectly in some contexts. This sample of ESL learners could not distinguish between the topological relations expressed by *at*, *on* and *in* because they engaged themselves in finding the linguistic correspondence, seeking for the correct preposition to use in a sentence, rather than with interpreting their conceptual transfer. In other words, they were unable to properly consider the mental concepts or spatial relations underlying each preposition. Because Arabic, Japanese and Spanish speakers differ from English speakers in the way in which they categorise the relations encoded by these prepositions (*at*, *on* and *in*), it was difficult for those learners to draw clear-cut borders between these prepositions and use them appropriately.

7.3 Implications of findings

A primary aim of this study is to deliver significant insights into the performance of ESL learners, especially those from Arabic speaking backgrounds. The semantic comparison between English and the languages observed (Arabic, Spanish and Japanese) is defined by semantic considerations. This is especially true in the case of Arabic. In (4.4), I have provided a linguistic comparison between the semantics of the English spatial prepositions *at*, *on* and *in* and Arabic. I have also outlined a concise summary of salient information about their Japanese and Spanish counterparts, in an attempt to display the similarities and differences between the English preposition system and these languages, before the presentation of the

results of my semantic experiment in chapter 5. This linguistic comparison, which was displayed preliminarily in the experimental part of my study, is considered my provisional point for integrating the results and findings for the semantic experiment. It is upon this basis that a judgement can be made about this language problem, namely whether the language problem is an inter-lingual problem, attributed to L1 interference in the form of L1 patterns or rules interfering with the acquisition of L2 patterns and rules, or an intra-lingual problem, due to the L2, in this case the polysemous nature of English prepositions. The main findings for the semantic test experiment are: 1) the non-significant detecting of L1 interference on the performance of participants; 2) the non-significant effect of images[48]; and 3) the low participant performance in the tasks that include the English spatial preposition *at,* either in the central or peripheral meanings. I should reiterate that the polysemous nature of English prepositions seems to significantly impede the progress of ESL learners, especially in the acquisition of native-like intuition. The identification of a one-to-one equivalent cannot be considered the only cause for the learning difficulty; one must also take into account the manner through which the speakers of these languages conceptualise and categorise spatial relations.

Ideally, the outcomes of this semantic experiment would form the basis for a better understanding of the conceptual mapping of the English prepositions *at*, *on* and *in* by ESL learners. Driven by my motivation for conducting this study, I can suggest that the adoption of a cognitive semantic approach for the teaching of

[48] In the sematic test, in order to look like real objects in the world, pictorial image schemas (photos) were used for expressing the spatial scenes. However, their effects were not significant and they were not helpful for the participants. If this test is going to be conducted on another ESL learners, we suggest replacing these photos with abstract graphic representations or drawings in order to detect image schemas effect.

prepositions could be a useful strategy for ESL learners and teachers alike. Implications of these findings in SLA theory, language pedagogy and applied linguistics could also lead to more investigations of this kind.

7.4 Limitations and further research

The notion of 'space' offers an exciting avenue for future explorations and may direct future research in the fields of cognitive linguistics, cognitive semantics, second language acquisition research, applied linguistics, language pedagogy, typology and lexicography.

It is possible that, to a large extent, the performance of ESL learners may be linked to the way in which prepositions are taught and how they appear in textbooks. This effect is not measured in this study; however, paying attention to this pedagogical effect is crucial. Therefore, I acknowledge the need for new research addressing textbooks, dictionaries, and teaching instructions, all of which are considered as an important resource for L2 knowledge. "[T]he materials that teachers have to draw on (e.g., dictionaries, grammars and handbooks) provide partial lists of nonspatial meanings for the prepositions and represent the nonspatial meanings as highly arbitrary and idiosyncractic" (Tyler, 2012b, p.311). Furthermore, language teachers should also be trained on effective strategies to incorporate instructions that clearly explain the systematic relationship between the multiple meanings of prepositions.

Future research that includes a wide variety of languages and a larger sample of ESL learners would also increase the depth of empirical data, enrich our understanding of this language problem, enable more accurate insights and assumptions to be made about its causes and thereby enabling more effective

teaching and learning. Encouraging collaborative research that can use vast sources of data, e.g. corpus-based analysis studies, to produce answers for research questions. Corpus-based studies can study prepositions in relation to the frequency of usage or the collocation information (preceding or following words) or their semantic functions (Roslim and Mukundan, 2011). Corpus-based studies pool different kind of data, either written texts or spoken materials, from different sources such as newspapers, course books or online resources. According to the aspect of language that is investigated, e.g. the semantics of English prepositions, researchers can use different types of corpus, for example, spoken language corpus, written texts corpus, native speakers corpus (British National Corpus- BNC) or learners corpora (International Corpus of Learner English- ICLE) (Arppe et al, 2010). Researchers interested in SLA can either refer to the ICLE as a source for texts produced by SL learners and identified by their L1 or can develop a particular kind of corpora for particular English language learners. The results of these corpus-based studies will also inform textbook authors, teachers and curriculum planning committees.

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Appendices

Appendix A: Students information sheet.

Date: **Participants Information Form** **Participant No.:**

- Personal Information:

First Name	
Last Name	
Date of Birth	
Place of Birth	
Nationality	
Gender	○ Male ○ Female
Occupation	
Native Language	
All other languages learnt. *If yes, please list the languages and indicate the language levels.	○ No. ○ Yes. Languages:_____ L. level: _____
Country (ies) you lived in and length *Especially English language speaking countries such as USA and Australia	(1) _____ years _____ months (2) _____ years _____ months (3) _____ years _____ months
Years spent in the UK. *Please state whether the stay was for more than a month.	• The current stay _____ years _____ months • Previous stays: (1) _____ (2) _____ (3) _____

➢ Contact Information:

Address	
Postcode	
Phone Number	
E-mail	

➢ Educational Background:

- Highest level of education completed:
  - Secondary School
  - High School Diploma
  - College Diploma
  - University Diploma
  - Post Graduate Degree

- Level of the (English language)course you are enrolled in:
  - Beginner
  - Elementary
  - Intermediate
  - High-intermediate
  - Advanced
  - Professional

- Your current language skill level
  - ILETS: _____ Date: _____
  - TOFEL: _____ Date: _____
  - TOEIC: _____ Date: _____
  - Other: _____ Date: _____

- Any other qualifications:
  _____
  _____

Appendix B: A guide to EFL examinations.

[Adapted from: http://nottinghamlanguageacademy.co.uk/res/pdf/language-levels-and-ex.]

Oxford Placement Test Score	Language levels	Common European Framework and ALTE levels	IELTS	TOEFL iBT Score	TOEIC	Cambridge ESOL Examinations		Cambridge ESOL Examinations: BULATS
198-200	Proficiency	C2 Mastery ALTE Level 5	9	113-120	911-990	CPE		90
161-197	Advanced	C1 Operational Proficiency ALTE Level 4	7-8	92-112	701-910	CAE BEC Higher ESOL SFL Level 2	ILEC ICFE	75
135-160	Upper-Intermediate	B2 Vantage ALTE Level 3	5.5-6.5	62-91	541-700	FCE BEC Vantage ESOL SFL Level 1		60
120-134	Intermediate	B1 Threshold ALTE Level 2	4-5	43-61	381-540	PET BEC Preliminary ESOL SFL Level 3		40
105-119	Pre-Intermediate							
80-104	Elementary	A2 Waystage ALTE Level 1	3-4	32-42	246-380	KET YLE Flyers ESOL SFL Entry 2		20
50-75	Beginner	A1 Breakthrough ALTE Breakthrough	1-2			YLE Movers ESOL SFL Entry 1		
Below 50	Starter							

Appendix C: The items of native speakers semantic test (1-2).

(1) The items of the first version of the semantic test that include *at*, *on* and *in* divided into central meaning and peripheral meaning.

Preposition *in*

Central Meaning

1. We spent two days .....Paris.
2. I left my jacket behind .....the classroom.
3. She put the chair ..... the corner of the room.
4. She got a job..... London.
5. It was very cold.....the cinema.
6. John wrote a book when he was .....prison.
7. The children are all .....bed.
8. A: What would you like to do now?
   B: Let's sit ……the shade.
9. We like to walk ….the rain.
10. There are a lot of holes ……. this old road, so drive carefully.

Metaphoric Extension

1. He is ……. trouble now.
2. They are …..love.
3. She is ….. a deep depression.
4. In exams, you're not allowed to write ……..pencil.
5. He is engaged ….. reading.
6. James works..... banking.
7. The next ..... line for promotion is Miss Smith.
8. I live ..... hope of a better fortune.
9. ..... my opinion, the movie wasn't very good.
10. Who could tell the story ..... his or her own words?

Preposition *on*

Central Meaning

1. Who put the poster ..... the wall?
2. She had a diamond ring .....her finger.
3. Don't walk ..... the grass.
4. Brighton is ..... the south coast.
5. Jenny went to school ..... the bus this morning.
6. A: Are the football results in the news?
   B: Yes, they 're .....the back page.
7. You should find the key ..... the kitchen table.
8. She's been ….. the phone for hours and I need to call office.
9. Have you ever worked …… a farm?
10. There's a dirty mark ….. your shirt.

Metaphoric Extension

1. A: Where are your neighbours?
   B: They went ….. holiday.
2. A: Why aren't you eating any cake?
   B: I'm ……. a diet.
3. Wow! You're ……time.
4. This round's …….me.
5. Don't be so hard ….her.
6. How are you getting …. with your new job?
7. Congratulations ….. the prize!
8. Look! That car is ….. fire.
9. All books are …….sale.
10. You should understand that Dr. Helen is always …..call.

Preposition *at*

Central Meaning

1. Can you pick me up .....the station?
2. Sue wasn't ..... the meeting.
3. There is a strike ..... the university.
4. Children, please stop throwing snowballs .....Mrs. Anderson.
5. A dog was standing .....the top of the stairs.
6. We landed ..... a large airport.
7. There's a good film on .....the cinema.
8. See you .....Fred's house.
9. A: Where is Mary?
   B: She should be ……home right now.
10. They used to live ……10 Downing Street.

Metaphoric Extension

1. There's someone .....the door.
2. She waited ..... the back of the queue.
3. I'm still sitting …….my computer desk.
4. Harry isn't sitting .....the table.
5. I'm mad …… you.
6. I've applied for a job …….. the United Nations in Geneva.
7. A: How is Tim now?
   B: He's working ….. getting fitter.
8. Water boils ….. 100 degrees Celsius.
9. Aunt Tracy died ….. the age of 72.
10. Technology has developed …… great speed.

(2) The items of the first version of the semantic test that include *through* and *about* divided into central meaning and peripheral meaning.

Preposition *through*

Central Meaning

1. We drove …….the tunnel.
2. The sand ran ……my fingers.
3. This path leads ……the trees to the river.
4. The Thames River flows……..London.
5. If you go ……this gate, you will be in Shakespeare's garden.
6. There were people standing in the doorway and I couldn't get …….
7. She smiled at him as he walked ……..the entrance of the church.
8. A football came crashing …… the window.
9. Water will be pumped.....a pipe.
10. We passed .....France on our way to Italy.

Metaphoric Extension

1. Her words kept running……..my head.
2. I saw him drive …….a red light.
3. A: Can I speak to the sales department, please?
   B: Ok. I'll put you ……...
4. I got my car ……. my brother.
5. You should seek justice ……..the proper channels.
6. First I have to get .....the exams.
7. I 'm half way …….her second novel.
8. It's a miracle that these buildings came .....the storm undamaged.
9. It took us ages to get ..... passport control.
10. This book guides you .....the whole procedure for buying a car.

Preposition *about*

Central Meaning

1. David is never as late as this. I'm worried ……...him.
2. The book is ……homeless people in the cities.
3. A: You were chatting together for a long time.
   B: We were talking…..Sophie's problems.
4. She said something …… leaving town.
5. She lied …… her weight.
6. ……that car of yours. How much are you selling it for?
7. It's …… Sophie, doctor. She's been sick again.
8. Don't …… missing the party.
9. Naturally, my mother wanted to know all .....it.
10. I spent the whole night thinking .....you.

Metaphoric Extension

1. A: They all like Mr. Bean.
   B: There's something special……..him.
2. A: Susan is late.
   B: She should be somewhere …….the office.
3. The children are running ..... in the park.
4. As I entered the living room, I found the kids and the books were scattered …… the room.
5. A: Let's go out for dinner tonight.
   B: What …… Jack? We can't just leave him alone at home.
6. How …… some salad for lunch?
7. If we don't do something …… it, the problem is going to get worse.
8. What should be done ..... the rising levels of pollution?
9. Taxes were reduced by ..... 5 per cent.
10. We should move quickly. The train is .....to leave.

Appendix D: A sample of the Semantic Test (form 1)

ENGLISH PREPOSITIONS TEST

FORM 1

Participant Number	
First Language	○ Japanese ○ Arabic ○ Spanish
Total Score	

Project Coordinator : PhD Student Mrs.Anwar Almuoseb

SOAS Research Data Consent Form

Project title:

"A Semantic Analysis of English Spatial Prepositions and their Conceptual Mapping Cross-linguistically"

Project coordinator:

Mrs.Anwar Almuoseb

PhD Student at SOAS

Linguistics Research

e-mail: 253716@soas.ac.uk

mobile phone number: 07909288543

Project objectives:

The test is a part of my PhD research that aims at increasing our understanding of the semantic properties of English spatial prepositions and underlining the semantic factors that influence their choice in English.

Reasons for data collection:

The data collected from this test will be used to measure the performance of English second language learners towards the distinct meanings of English spatial prepositions.

Data recipients:

An access to non-anonymised personal data gathered in this project will be available to the above-named researchers.

Methods of publication:

The results and scores of your test will be used in my research and only anonymised results will be published as a part of my thesis and will be submitted for other publications.

Future use:

Future researches, in the field of Linguistics, may refer to my data result analysis when interested in the same investigation.

Data Protection Statement

Information about you which is gathered in the course of this research project, once held in the United Kingdom, will be protected by the UK Data Protection Act and will be subject to SOAS's Data Protection Policy. You have the right to request access under the Data Protection Act to the information which SOAS holds about you. Further information about your rights under the Act and how SOAS handles personal data is available on the Data Protection pages of the SOAS website (http://www.soas.ac.uk/infocomp/dpa/index.html), and by contacting the Information Compliance Manager at the following address: Information Compliance Manager, SOAS, Thornhaugh Street, Russell Square, London WC1H 0XG, United Kingdom (e-mail to: dataprotection@soas.ac.uk)

Copyright Statement

By completing this form, you permit SOAS and the project coordinator to edit, copy, disseminate, publish (by whatever means) and archive your contribution to this research project in the manner and for the purposes described above. You waive any copyright and other intellectual property rights in your contribution to the project, and grant SOAS, the project coordinator and other researchers a non-exclusive, free, irrevocable, worldwide license to use your contribution for the purposes of this project and similar future research projects.

Research Participant Declaration

I confirm that I have read the above information relating to the research project. I consent to my information being used in the manner and for the purposes described, and I waive my copyright and other intellectual property rights as indicated. I understand that I may withdraw my consent to participate in the project, and that I should contact the project coordinator if I wish to do so.

Name: _____

Signature: _____ Date:_____

Dear Participant,

You will be asked to answer 59 questions, choosing the right preposition from a list. Each question will appear individually in a sheet of paper. Some questions will be provided with photos and some without. The test will take around 10-15 minutes to complete.

This test is approved according to the ethical standards of the School of Oriental and African Studies, University of London.

Many thanks for your participation

Mrs. Anwar Almuoseb

PhD Student in Linguistics, SOAS

Choose the right preposition from the list:

1. Water boils …..... 100 degrees Celsius.
   - on
   - through
   - at
   - about
   - in

2. They are …..... love.
   - on
   - through
   - at
   - about
   - in

3. We drove ……..... the tunnel.
   - on
   - through
   - at
   - about
   - in

4. She said something ……..... leaving town.
   - on
   - through
   - at
   - about
   - in

5. Wow! You're ……..... time.
   - on
   - through
   - at
   - about
   - in

6. Aunt Tracy died …..... the age of 72.
   - on
   - through
   - at
   - about
   - in

7. You should find the keys ..... the kitchen table.

- on
- through
- at
- about
- in

8. If you go ……..... this gate, you will be in Shakespeare's garden.

- on
- through
- at
- about
- in

9. All books are ……..... sale.

- on
- through
- at
- about
- in

10. Look! That car is …..... fire.

- on
- through
- at
- about
- in

11. Can you pick me up ..... the station?

- on
- through
- at
- about
- in

12. It's a miracle that these buildings came ..... the storm undamaged.

- on
- through
- at
- about
- in

13. See you ..... Fred's house.

- on
- through
- at
- about
- in

14. How are you getting …..... with your new job?

- on
- through
- at
- about
- in

15. It took us ages to get ..... passport control.

- on
- through
- at
- about
- in

16. She got a job ..... London.

- on
- through
- at
- about
- in

17. The Thames River flows ……..... London.

- on
- through
- at
- about
- in

18. It's ……..... Sophie, doctor. She's been sick again.

- on
- through
- at
- about
- in

19. We passed ..... France on our way to Italy.

- on
- through
- at
- about
- in

20. Technology has developed ……..... great speed.

- on
- through
- at
- about
- in

21. There is a strike ..... the university.

- on
- through
- at
- about
- in

22. I saw him drive ……..... a red light.

- on
- through
- at
- about
- in

23. The next ..... line for promotion is Miss Smith.

- on
- through
- at
- about
- in

24. A: They all like Mr. Bean.

B: There is something special ..... him.

- on
- through
- at
- about
- in

25. We spent two days ..... Paris.

- on
- through
- at
- about
- in

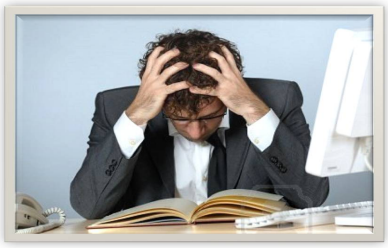
26. A: Why aren't you eating any cake?

B: I'm ……..... a diet.

- on
- through
- at
- about
- in

27. He is ……..... trouble now.

- on
- through
- at
- about
- in



28. There's someone ..... the door.

- on
- through
- at
- about
- in

29. She's been …..... the phone for hours and I need to call office.

- on
- through
- at
- about
- in

30. I left my jacket behind ..... the classroom.

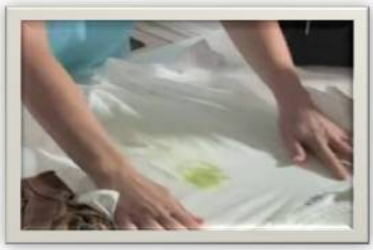
- on
- through
- at
- about
- in

31. She is …..... a deep depression.

- on
- through
- at
- about
- in

32. There's a dirty mark …..... your shirt.

- on
- through
- at
- about
- in



33. Taxes were reduced by ..... 5 per cent.

- on
- through
- at
- about
- in

34. I'm still sitting ……..... my computer desk.

- on
- through
- at
- about
- in

35. She had a diamond ring ..... her finger.

- on
- through
- at
- about
- in

36. The sand ran ……..... my fingers.

- on
- through
- at
- about
- in

37. In exams, you're not allowed to write ……. pencil.

- on
- through
- at
- about
- in

38. John wrote a book when he was ..... prison.

- on
- through
- at
- about
- in

39. Who put the poster ..... the wall?

- on
- through
- at
- about
- in

40. I spent the whole night thinking .....you.

- on
- through
- at
- about
- in

41. How ……..... some salad for lunch?

- on
- through
- at
- about
- in

42. A: Can I speak to the sales department, please?

B: Ok. I'll put you ……..... .

- on
- through
- at
- about
- in

43. First I have to get ..... the exams.

- on
- through
- at
- about
- in

44. We should move quickly. The train is ..... to leave.

- on
- through
- at
- about
- in

45. She waited ..... the back of the queue.

- on
- through
- at
- about
- in

46. A: Where are your neighbours?

B: They went …..... holiday.

- on
- through
- at
- about
- in

47. She lied …….... her weight.

- on
- through
- at
- about
- in

48. James works ..... banking.

- on
- through
- at
- about
- in

49. The children are all ..... bed.

- on
- through
- at
- about
- in

50. Don't be so hard …..... her.

- on
- through
- at
- about
- in

51. David is never as late as this. I'm worried ……..... him.

- on
- through
- at
- about
- in

52. A: What would you like to do now?

B: Let's sit ……..... the shade.

- on
- through
- at
- about
- in

53. Children, please stop throwing snowballs ..... Mrs. Anderson.

- on
- through
- at
- about
- in

54. A: Where is Mary?

B: She should be ……..... home right now.

- on
- through
- at
- about
- in

55. Jenny went to school ..... the bus this morning.

- on
- through
- at
- about
- in

56. A dog was standing ..... the top of the stairs.

- on
- through
- at
- about
- in

57. A: Let's go out for dinner tonight.

B: What …… Jack? We can't just leave him alone at home.

- on
- through
- at
- about
- in

58. Harry is sitting ..... the table.

- on
- through
- at
- about

59. I live ..... hope of a better fortune.

- on
- through
- at
- about
- in

The End

Appendix E: A sample of the Semantic Test (form 2)

ENGLISH PREPOSITIONS TEST

FORM 2

Participant Number	
First Language	○ Japanese ○ Arabic ○ Spanish
Total Score	

Project Coordinator: PhD Student; Mrs. Anwar Almuoseb

SOAS Research Data Consent Form

Project title:

"A Semantic Analysis of English Spatial Prepositions and their Conceptual Mapping Cross-linguistically"

Project coordinator:

Mrs.Anwar Almuoseb

PhD Student at SOAS

Linguistics Research

e-mail: 253716@soas.ac.uk

mobile phone number: 07909288543

Project objectives:

The test is a part of my PhD research that aims at increasing our understanding of the semantic properties of English spatial prepositions and underlining the semantic factors that influence their choice in English.

Reasons for data collection:

The data collected from this test will be used to measure the performance of English second language learners towards the distinct meanings of English spatial prepositions.

Data recipients:

An access to non-anonymised personal data gathered in this project will be available to the above-named researchers.

Methods of publication:

The results and scores of your test will be used in my research and only anonymised results will be published as a part of my thesis and will be submitted for other publications.

Future use:

Future researches, in the field of Linguistics, may refer to my data result analysis when interested in the same investigation.

Data Protection Statement

Information about you which is gathered in the course of this research project, once held in the United Kingdom, will be protected by the UK Data Protection Act and will be subject to SOAS's Data Protection Policy. You have the right to request access under the Data Protection Act to the information which SOAS holds about you. Further information about your rights under the Act and how SOAS handles personal data is available on the Data Protection pages of the SOAS website (http://www.soas.ac.uk/infocomp/dpa/index.html), and by contacting the Information Compliance Manager at the following address: Information Compliance Manager, SOAS, Thornhaugh Street, Russell Square, London WC1H 0XG, United Kingdom (e-mail to: dataprotection@soas.ac.uk)

Copyright Statement

By completing this form, you permit SOAS and the project coordinator to edit, copy, disseminate, publish (by whatever means) and archive your contribution to this research project in the manner and for the purposes described above. You waive any copyright and other intellectual property rights in your contribution to the project, and grant SOAS, the project coordinator and other researchers a non-exclusive, free, irrevocable, worldwide license to use your contribution for the purposes of this project and similar future research projects.

Research Participant Declaration

I confirm that I have read the above information relating to the research project. I consent to my information being used in the manner and for the purposes described, and I waive my copyright and other intellectual property rights as indicated. I understand that I may withdraw my consent to participate in the project, and that I should contact the project coordinator if I wish to do so.

Name: _____

Signature: _____ Date:_____

Dear Participant,

You will be asked to answer 59 questions, choosing the right preposition from a list. Each question will appear individually in a sheet of paper. Some questions will be provided with photos and some without. The test will take around 10-15 minutes to complete.

This test is approved according to the ethical standards of the School of Oriental and African Studies, University of London.

Many thanks for your participation

Mrs. Anwar Almuoseb

PhD Student in Linguistics, SOAS

Choose the right preposition from the list:

1. She lied ……..... her weight.

   - on
   - through
   - at
   - about
   - in

2. There is a strike ..... the university.

   - on
   - through
   - at
   - about
   - in

3. A: They all like Mr. Bean.

   B: There is something special ..... him.

   - on
   - through
   - at
   - about
   - in

4. First I have to get ..... the exams.

- on
- through
- at
- about
- in

5. A: Why aren't you eating any cake?

   B: I'm ……..... a diet.

- on
- through
- at
- about
- in

6. Aunt Tracy died …..... the age of 72.

- on
- through
- at
- about
- in

7. Look! That car is …..... fire.

- on
- through
- at
- about
- in

8. Harry is sitting ..... the table.

- on
- through
- at
- about
- in

9. See you ..... Fred's house.

- on
- through
- at
- about
- in

10. A: Where is Mary?

B: She should be ……..... home right now.

- on
- through
- at
- about
- in

11. How ……... some salad for lunch?

- on
- through
- at
- about
- in

12. Can you pick me up ..... the station?

- on
- through
- at
- about
- in

13. All books are ……..... sale.

- on
- through
- at
- about
- in

14. There's someone ..... the door.

- on
- through
- at
- about
- in

15. I'm still sitting …….... my computer desk.

- on
- through
- at
- about
- in

16. She waited ..... the back of the queue.

- on
- through
- at
- about
- in

17. She said something ……..... leaving town.

- on
- through
- at
- about
- in

18. Wow! You're ……..... time.

- on
- through
- at
- about
- in

19. Who put the poster ..... the wall?

- on
- through
- at
- about
- in

20. How are you getting ……..... with your new job?

- on
- through
- at
- about
- in

21. There's a dirty mark ……..... your shirt.

- on
- through
- at
- about
- in

22. John wrote a book when he was ..... prison.

- on
- through
- at
- about
- in

23. You should find the keys ..... the kitchen table.

- on
- through
- at
- about
- in

24. The children are all ..... bed.

- on
- through
- at
- about
- in

25. David is never as late as this. I'm worried ……..... him.

- on
- through
- at
- about
- in

26. A: What would you like to do now?

B: Let's sit ……..... the shade.

- on
- through
- at
- about
- in

27. A: Let's go out for dinner tonight.

B: What ……..... Jack? We can't just leave him alone at home.

- on
- through
- at
- about
- in

28. We passed ..... France on our way to Italy.

- on
- through
- at
- about
- in

29. Children, please stop throwing snowballs ..... Mrs. Anderson.

- on
- through
- at
- about
- in

30. Technology has developed ……..... great speed.

- on
- through
- at
- about
- in

31. Taxes were reduced by ..... 5 per cent.

- on
- through
- at
- about
- in

32. A: Can I speak to the sales department, please?

B: Ok. I'll put you ……..... .

- on
- through
- at
- about
- in

33. It took us ages to get ..... passport control.

- on
- through
- at
- about
- in

34. We should move quickly. The train is ..... to leave.

- on
- through
- at
- about
- in

35. The sand ran ……..... my fingers.

- on
- through
- at
- about
- in

36. She is …..... a deep depression.

- on
- through
- at
- about
- in

37. She got a job ..... London.

- on
- through
- at
- about
- in

38. It's a miracle that these buildings came ..... the storm undamaged

- on
- through
- at
- about
- in

39. I saw him drive …….... a red light.

- on
- through
- at
- about
- in

40. Water boils …..... 100 degrees Celsius.

- on
- through
- at
- about
- in

41. James works ..... banking.

- on
- through
- at
- about
- in

42. Don't be so hard …..... her.

- on
- through
- at
- about
- in

43. She's been …..... the phone for hours and I need to call office.

- on
- through
- at
- about
- in

44. Jenny went to school ..... bus this morning.

- on
- through
- at
- about
- in

45. She had a diamond ring ..... her finger.

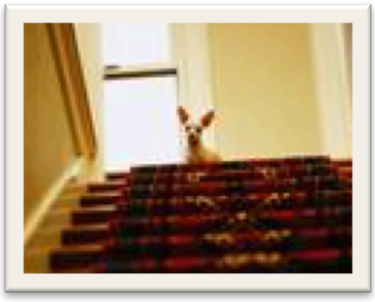
- on
- through
- at
- about
- in

46. I live ..... hope of a better fortune.

- on
- through
- at
- about
- in

47. A dog was standing ..... the top of the stairs.

- on
- through
- at
- about
- in



48. The next ..... line for promotion is Miss Smith.

- on
- through
- at
- about
- in

49. A: Where are your neighbours?

B: They went …..... holiday.

- on
- through
- at
- about
- in

50. I spent the whole night thinking .....you.

- on
- through
- at
- about
- in

51. I left my jacket behind ..... the classroom.

- on
- through
- at
- about
- in

52. It's ……..... Sophie, doctor. She's been sick again.

- on
- through
- at
- about
- in

53. We drove ……..... the tunnel.

- on
- through
- at
- about
- in

54. In exams, you're not allowed to write …….. pencil.

- on
- through
- at
- about
- in

55. The Thames River flows ……..... London.

- on
- through
- at
- about
- in

56. He is ……..... trouble now.

- on
- through
- at
- about
- in

57. They are …..... love.

- on
- through
- at
- about
- in

58. If you go ……..... this gate, you will be in Shakespeare's garden.

- on
- through
- at
- about
- in

59. We spent two days ..... Paris.

- on
- through
- at
- about
- in

The End