

The Role of Morphological Knowledge in Second Language Lexical Inference for Saudi student - teachers

Dr. Fayza S. AL-Hammadi

Department of Foreign Languages-College of Education
King Faisal University - Al-Ahsa
Kingdom of Saudi Arabia

ABSTRACT

Morphology is the study of the internal structure of words. A vigorous ongoing debate surrounds the question of how such internal structure is best accounted for: by means of lexical entries and deterministic symbolic rules, or by means of probabilistic sub symbolic networks implicitly coding structural similarities in connection weights. Information Retrieval has generally not paid much attention to word structure, other than to account for some of the variability in word forms via the use of stemmers. Further, words are the fundamental units of natural language, lying at the intersection of form and meaning. While there are significant generalizations within the lexicons of natural languages, such as the regular inflection rules of English, much lexical knowledge is idiosyncratically related to individual word forms. This study will describe an experiment to determine the importance of morphology, and the effect that it has on lexical inference. Also there will be a description of the role of morphological analysis in word sense disambiguation. The study aimed at determining the role of inflectional morphology in lexical inference, the role of derivational morphology in lexical inference, and measuring the effectiveness of a suggested program for developing lexical inference of Saudi student-teachers studying English as a foreign language.

The study is a quasi-experimental as it is based on the quasi-experimental methodology: the researcher selected 64 student-teachers (32 males and 32 females) who are studying English as a foreign language as a study sample. The researcher rejected those whose age exceeds the natural rate which is between 20 and 21 years old.

The tools of the study consists of (1) a program which consists of different kinds of morphology; especially, inflection and derivation to determine their role in lexical inference; and (2) a pre-post test in lexical inference.

The tools are administered and the data was treated statistically and results indicated that derivational morphology has a greater influence on lexical inference than inflectional morphology. Also the effectiveness of the suggested program in developing lexical inference of the Saudi student-teachers was indicated.

The study recommended that there should be programs for training student-teachers to lexical inference by derivation. Also it recommends that university courses and lectures should focus on derivation in order to help them in lexical inference.

Introduction

Vocabulary is the most important aspect of English language that needs enrichment all the time and morphology is the way through which one can enrich his/her vocabulary well. Fromkin (1993) ensures that every speaker of every language knows thousands, even tens of thousands of words. The words every one knows are a part of his/her linguistic knowledge; a component of his/her mental grammar. When one knows a word, s/he knows its pronunciation and its meaning. If one hears someone utter the sounds represented by the string of letters morpheme, and does not know that it means "smallest unit of linguistic meaning," s/he does not know that word. Once one learns that this particular sound sequence has such a meaning, if s/he stores that knowledge in his/her mental lexicon, one now knows the word morpheme. Each word listed in the mental dictionary must include other information as well, such as whether it is a noun, a pronoun, a verb, an adjective, an adverb, a preposition, a conjunction. That is, it must specify its grammatical category, or syntactic class.

That speakers of a language know the morphemes of that language and the rules for word formation is shown as much by the "errors" made as by the no deviant forms produced. Morphemes combine to form words. These words form internal dictionaries. No speaker of a language knows all the words. Given knowledge of the morphemes of the language and the morphological rules, one can often guess the meaning of a word s/he does not know (Fromkin *ibid*).

A prerequisite for learning a second or foreign language is that the learner is exposed to the language, in writing and/or in speech. Such language exposure or input may either be comprehensible or incomprehensible to the learner. Since vocabulary is a sizable component in the learning process, learners across proficiency levels will encounter situations where they can understand only part of the written text or a sentence due to the fact that they do not know all the words. Encountering some unknown words might not hinder the overall understanding of the text, but if too many words or the most essential ones are unknown, then comprehension will suffer. As this is the case, learners will resort to comprehension and communication strategies in order to compensate for the inadequacy of their second language (L2) resources in their L2 use. "While in production learners use communication strategies to compensate for the absence of words for which they have meanings, in comprehension inferencing strategies are needed to compensate for the absence of meanings attached to unknown words" (Haastrup, 1991, p. 121). Communication strategies (CSs) generally have been defined as devices employed by L2 learners when they encounter problems in L2 communication because of their communicative ends have outrun their communicative means (Corder, 1983; Faerch & Kasper, 1983; Paribakht, 1985). Comprehension strategies, on the other hand, indicate how readers conceive a task, what textual cues learners attend to, how learners make sense of what they read, and what they do when they do not understand (Block, 1986).

Morphology is the area of linguistics concerned with the internal structure of words. It is usually broken down into two subclasses: inflectional and derivational. Inflectional morphology describes predictable changes a word undergoes as a result of syntax - the plural and possessive form for nouns, and the past tense and progressive form for verbs are the most common. These changes have no effect on a word's part - of - speech; a noun still remains a noun after pluralisation. In contrast, derivational morphology may or may not affect its meaning (e.g., "-ize", "-ship").

The different forms of a word can have a strong impact on the effectiveness of a retrieval system. English has relatively weak morphology and does not suffer from these problems as other languages (e.g., Hungarian or Hebrew, which may have thousands of variants on any

given word; experiments with a Hebrew retrieval system have shown that a failure to process morphological variants resulted in retrieving only 2%-10% of the documents retrieved with such processing (Krovertz 2005). However, even in English, retrieval based on conflating word forms leads to significant performance. Such conflation is referred to as "stemming".

Stemming can be viewed from several different perspectives. It can be thought of as a mechanism for query expansion - as a way of enhancing the query with terms that are not the literal word - forms given by the user. From another perspective, it can be viewed as clustering, in which the clusters are based on the rules for conflation. From a third perspective, it is a way of normalizing the concepts used in the query. The concepts are the senses of the query words, and the rules for deciding which word forms are related and can be considered as inferences.

Various stemming algorithms have been discussed in the literature. They range from simply removing plural endings (and also perhaps other inflectional forms such as the past participle - ed and the gerund or present participle - ing), to approaches that handle a variety of suffixes. The two most common stemmers are the Lovins' stemmer (Lovins: 1988) and the Porter's stemmer (Porter: 1980). The Lovins' stemmer removes over 280 different suffixes using a longest-match algorithm, and the Porter's stemmer removes about 80 suffixes in a multi- step approach; each step successively removes suffixes or makes some transformation of the stem (e.g. -y to - I). One of the problems with stemming is that it does not pay attention to the difference caused by a word's meaning. For example, the word "gravity" is related to the force - of - gravity sense of the word "gravity" rather than the sense meaning "serious".

Significance of the Study

The present study is a comprehension study, in the sense that, the main inspiration comes from inferencing at text level through the processes of reading comprehension (i.e., schema-theoretic view), focusing primarily on learners processes in a lexical inferencing task. A second source of inspiration in examining learners processes in comprehension was Haastrups (1991) notion of receptive competence, which

refers to “the way in which learners of a foreign language understand written or spoken text in this language” (p. 11). Haastrup acknowledges a deficit in the receptive competence among learners that is often unnoticed by both the learners themselves and their teachers. Inferencing, as a reception process, is considered an essential task in language use in the real world as well as inside the foreign language classroom. Learners engage in lexical inferencing when, for example, a new word appears in the text under discussion. Since most of studies on lexical inferencing have been conducted in an English as a second language (L2) setting, it would be equally interesting to investigate learners’ lexical inferencing procedures in another language, to see whether the outcome will complement the findings from earlier studies.

Purpose of the Study

The study seeks to achieve the following main objective which is determining the role of morphological knowledge in lexical inference for the Saudi student - teachers. As already mentioned, the long-term goal of the present study is pedagogical. In relation to the focus on learners lexical inferencing procedures, a classroom-related study is set up, retaining several design features of Haastrups (1991) empirical study. The research questions driving the present study are directly related to recent studies of lexical inferencing:

- What is the role of derivation in L2 lexical inference?
- What is the role of inflection in L2 lexical inference?
- What is the effectiveness of the proposed programme for developing L2 lexical inferences for Saudi student teachers of English?

Theoretical Background

The Concept of Lexical Inference

Lexical inferencing is the way through which the hearer can understand the message of the speaker or writer. Brown, et.al (1983) indicate that since the discourse analyst, like the hearer, has no direct access to a speaker’s intended meaning in producing an utterance, he/she often has to rely on a process of inference to arrive at an interpretation for

utterances or for the connections between utterances. They add that the term "inference" must be treated as pragmatic concept in the analysis of discourse. This term will be used to indicate relationships between discourse participants and elements in the discourse. The rather general notion of inference appealed to is used to describe that process which the reader (hearer) must go through to get from the literal meaning of what is written (or said) to what the writer (speaker) intended to convey. One of the central cognitive processes in reading comprehension is inferencing (R.C. Anderson & Pearson, 1984; Graesser & Bower, 1990; Kintsch, 1988, 1998; Monzo & Calvo, 2002; Nassaji, 2002, 2003a, 2003b; Whitney, 1987). Inferencing has been defined as the connections that people establish when they try to interpret texts (G. Brown & Yule, 1983). Inferencing occurs at all levels of the reading comprehension process, ranging from integrating the text with background knowledge (Kintsch, 1988), to connecting the different parts of the text together (Garrod & Sanford, 1990; Kintsch, 1988, 1998), to linking known to unknown elements in the text in order to arrive at a coherent structure of the information in the text (Garrod & Sanford, 1990; Graesser & Bower, 1990; Graesser & Zwaan, 1995). Such processes are assumed to involve prediction and interpretation of the text for meaning; hence, they are considered important processes by theories in cognitive psychology that conceptualize reading as an active meaning-construct-a mental representation of the text (Kintsch, 1988, 1998).

The present study focuses on lexical inferencing that is, making informed guesses, about the meaning of unknown words based on the available linguistic and non-linguistic cues in the text (Haastrup, 1991, p. 40). Lexical inferencing has been found to be widely used by second language (L2) learners when dealing with unknown words in their reading (de Bot, Paribakht, & Wesche, 1997; Frantzen, 2003; Fraser, 1999; Huckin & Bloch, 1993; Morrison, 1996; Paribakht & Wesche, 1999; Parry, 1993). Lexical inferencing has also been found to be closely associated with incidental vocabulary learning, that is, learning vocabulary through reading natural texts (Huckin & Coady, 1999; Nagy, 1997). Thus, Wesche and Paribakht (1999) argue that much _ if not most lexical development in both L1 and L2 appears to occur as learners attempt to comprehend new words they hear or read in context. (p. 176).

Although researchers have attributed an important role to lexical inferencing, the nature of this process has not been well understood in second language acquisition (SLA) (Paribakht & Wesche, 1999). To this end, and given the important role currently attributed to L2 learners. Lexical knowledge in L2 reading comprehension (Laufer, 1996, 1997; Nassaji, 2002, 2003a; Nation, 2001; Qian, 2002; Read, 1993, 1997, 2000).

Inferences as Missing Links

Brown (ibid) declares that it is possible to think of an inference as a process of filling in the missing links between two utterances. It seems that there are two categories of missing links. One kind is automatically made and does not result in additional processing time and the other is not automatic, but is the result of a bridging assumption and leads to additional processing time. If it is maintained that inferences take time, then it should follow that those missing links which are automatically made (and do not take additional processing time) are not to be described as inferences. The process of grammaticalization is often achieved via routinization and language change mechanisms (Haiman, 1994). Specifically, the path from lexicon to grammar takes place via reanalysis (rule change) and analogy (rule generalization), and both strategies occur through pragmatic inferencing (Hopper & Traugott, 2003). The incorporation of pragmatics within grammaticalization brings to focus the role of different contexts within discourse and the interaction of speakers in their use of language. This means that what is grammaticalized is not a concrete lexical unit, but a unit or structure within a precise morphosyntactic and discursive context. Furthermore, grammaticalization occurs in contexts that can be characterized as highly redundant, since the grammaticalized form emerges in a context that is reinforced by the influence of several factors: lexical, morpho-syntactic, and discursive. The Catalan periphrastic past form exemplifies the redundancy of grammaticalization.

Kinds of Inference

To refer to the different kinds of inference, Moulsing (2005) gave three different inferences for a single sentence:

Bill has been in London since last week.

- a. X(s): Bill is in London.
- b. X(s): Bill is not too familiar with the tube system.
- c. X(s): Bill got coverage of the McDonald's bombing.

The first influence is of a lexical nature and the second of a conversational nature. The third inference cancels the continuative nature of the prior eventuality. In this situation, it could be understood that Bill is a field news reporter based in New York. The bombing of a McDonald's in London occurred a week prior to the utterance and some time between the bombing and the utterance, Bill went to London to get coverage of it and has already left. In Coker et al. (1990), a number of inference methods are evaluated:

- Stress-Neutral Suffixes (including regular inflection): abandons = abandon + s, abandoning = abandon + ing, abandonment = abandon + ment, Abbotts = Abbott + s, Abelson = Abel + son.
- Primary-Stress Ending: addressee = address + ee, accountability = account + ability, adaptation = adapt + ation.
- ity-Class Ending: abnormality = abnormal + ity, Adomovich = Adam + ovich, Ambrosian = Ambrose + ian.
- al-Class Ending: accidental = accident + al, combative = combat + ive.
- Suffix Exchange: nominee = nominate - ate + ee, Agnano = Agnelli elli + ano, Bierstade = Bierbaum - baum + stadt.
- Prefix: adjoin = ad + join, cardiovascular = cardio + vascular, Obrien = O + brien, Macdonald = Mac + donald.
- Compound: airfield = air + field, anchorwoman = anchor + woman, AbdulAllah = Abdul + Allah, Baumgaertner = Baum + gaertner. Rhyming: Plotsky (from Trotsky), Alifano (from Califano).

Inferences as Non- automatic Connections

Inference is not an automatic process; in a sense that many processes are contributed to accomplish it. Stanford & Garrod's

proposal that automatic connections are made between elements in a text via pre-existing knowledge. Representations could be used as a basis for deciding which missing links are, and which are not, likely to be inferences. The idea of "automatic connections" can also be usefully applied to an aspect of text understanding which has been discussed in terms of "informational inferences" (Warren et al., 1979). Since the type of "information" described appears to involve automatic connections across text sentences, it may be that the phenomenon has been inappropriately characterized as an example of "inference". Warren (ibid) claim that in an understanding of a text, there is a constant need to know the answers to a set of who, what, where and when questions. Arriving at the answers to these questions, at a particular point in a text, is accomplished, they suggest, by making "informational inferences".

Inferences as Filling in Gaps or Discontinuities in Interpretation

It's argued that inferences are connections people make when attempting to reach an interpretation of what they read or hear. The more interpretive "work" the reader (hearer) has to undertake in arriving at a reasonable interpretation of what the writer (speaker) intended to convey, the more likely it is that there are inferences being made. The problem with this view is that it leaves "inferencing" as a process which is context - dependent, text - specific and located in the individual reader (hearer).

Factors Affecting Learners' Success in Lexical Inferencing

Many factors have been shown to affect success in lexical inferencing, including the nature of the word and the text that contains the word (Paribakht & Wesche, 1999; Parry, 1993); the degree of textual information available in the surrounding context (Dubin & Olshtain, 1993), the learner's ability to make use of extra-textual cues (de Bot et al., 1997; Haastrup, 1991); the importance of the word to comprehension of the text (Brown, 1993); the degree of cognitive and mental effort involved in the task (Fraser, 1999; Joe, 1995); and the learner's attention to the details in the text as well as his or her preconceptions about the possible meaning of the word (Frantzen, 2003). In a

discussion of the factors involved in lexical inferencing, Nagy (1997) considers the role of learners' pre-existing knowledge bases and how these knowledge bases influence learners' strategy use and success.

Nagy groups learners' knowledge bases into three main categories: linguistic knowledge, world knowledge, and strategic knowledge. The linguistic knowledge category covers all knowledge that learners possess about the linguistic context in which the word has occurred, including their syntactic knowledge, lexical knowledge, and knowledge of word schema (i.e., knowledge of the possible meanings of the word). World knowledge is the learner's understanding and use of the relevant domains of knowledge. Strategic knowledge is knowledge of the actual strategies learners employ during the act of inferencing and attempting to deduce the meaning of the unknown word from context.

Nagy suggests that strategic knowledge may not be necessary for acquiring word meaning from context, but that sometimes, when the learner is aware of the existence of new words in the text, he or she may make deliberate attempts to derive the meanings of these words from context. Nagy then reviews several studies that have highlighted the importance of such strategic attempts in deriving word meaning from context (Buikema & Graves, 1993; Huckin & Jin, 1987; Jenkins, Matlock, & Slocum, 1989). Similarly, in a discussion of what is involved in a successful strategy use, Pressley, Borkowski, and Schneider (1987) propose a framework that distinguishes between a cognitive strategic component, which includes a repertoire of general as well as domain-specific strategies learners have, and a knowledge-base component, including various knowledge bases constructed from learners' various experiences with the world. These knowledge bases range from well-established and integrated pieces of information about particular phenomena or situations, to knowledge about specific strategies and skills, to knowledge about when and how to apply these in a particular situation. Knowledge the strategy user needs to evaluate the causes of his or her failure and the relationship between his/her efforts and achievement also fall into this category. In the context of L2 lexical inferencing, and based on an exploratory study with intermediate ESL learners, Huckin and Bloch (1993) propose a lexical inferencing model that incorporates similar components. These components include a knowledge module component (e.g., a vocabulary knowledge module, a

text schema module, syntax and morphology module, and a text representation module) and a metalinguistic strategic component. The metalinguistic strategic component includes a sequence of cognitive and decision-making strategies that the learner uses when trying to generate and test word meanings and hypotheses. According to Huckin and Bloch, these strategies play an important role in lexical inferencing in that they help the learner decide when and how to proceed and seek help from context and various sources of knowledge available.

The above frameworks underscore the multidimensionality of strategy use. In particular, they highlight the fact that multiple knowledge sources and strategies (i.e., the various cognitive and metacognitive activities learners use when identifying and constructing word meaning from context) are involved in inferencing word meanings from context. A number of recent studies have documented the range of knowledge sources and strategies learners employ during lexical inferencing (Chern, 1993; de Bot et al, 1997; Haynes, 1993, Huckin & Bloch, 1993; Morrison, 1996; Paribakht & Wesche, 1999). For example, in a study with university students, de Bot et al. (1997) found that when attempting to infer word meaning from context, L2 readers used knowledge sources ranging from knowledge of grammar, morphology, phonology, and knowledge of the world, to knowledge of punctuation, word association, and cognates. Analyzing the lexical inferencing strategies of Danish learners of English, Haastrup (1991) found that learners used different strategies ranging from those related to the internal structure of the word (such as analysis of the phonological and orthographic structure of the word) to those involving the use of top-down contextual and sentence-level clues.

Morphological Productivity

Some affixes (e.g. -ness as in sadness) are more likely to be used to create new words than others (e.g. -th as in warmth). The suffix -ness is said to be productive, and -th to be unproductive. Although there is some discussion as to whether an affix is ever truly and totally unproductive (Baayen 2003), most morphologists agree that affixes do display very different degrees of productivity (Bauer: 2001). An initial challenge to understanding the source of these degrees of productivity rests with finding a measure of productivity itself. Measures which

formalize the notion of degree of productivity in terms of conditional probabilities that go back to Turing are now available. These measures provide tools which can rank affixes according to different aspects of productivity, and have opened the door to studies probing the question of the source of differences in productivity. Whereas affixal productivity cannot be straightforwardly predicted by an affix frequency of use, it can be predicted from the degree of paradigmatic support that the affix receives. The reason that simple frequency counts fail is that not all words contain the affix to the same degree. The relative salience of the whole and the parts, as gauged by their relative frequencies and junctural phonotactics, are significantly correlated with affixal productivity. In other words, the degree of productivity of an individual affix is co-determined by the degrees to which the various words containing that affix (its affixal paradigm).

Graded Structure in Morphology

Traditionally, morphological theory posits a categorical distinction between simple words (e.g. *govern*) and complex words (e.g. *government*). However, people's behavior in experimental tasks is anything but categorical. Individuals can rate affixed forms consistently on a scale from unaffixed to affixed, and can assess which member of a pair of complex words is more complex (e.g. *settlement* is reported as more affixed than *government*) (Wurm, 1997, Hay, 2003). This suggests that morphological complexity is not a binary category. In addition, similarity judgments between affixed forms and their bases are continuous, with no clear division between semantically compositional, transparent forms (e.g. *leader*) and semantically non-compositional, forms (e.g. *dresser*) (Gonnerman, 2000, 2003). Different degrees of semantic transparency are reflected in degrees of priming (Gonnerman, 2000, 2003, Feldman, 2002), and graded priming effects are also observed with different degrees of phonological or orthographic similarity (Plaut, et al, 2000, Ruekl, et al, 1997). Supporters of discrete models of morphological structure may argue that gradient behavior in experimental tasks reflects gradience in processing, or in response strategies, but not in underlying structure. This interpretation becomes problematic in the light of evidence that gradience is also reflected in speech production, and constrains morphological processes such as affix-

ordering. The clearest interpretation of the combined evidence from speech perception and speech production is that morphological structure is inherently graded. But how can structure be graded? If "walked into" is decomposed into the morphemes "walk" and "ed", a discrete, deterministic compositional structure have been assigned to "walked"? It is certainly difficult to see how morphological structure might be graded as long as the morpheme is viewed as the cornerstone of a morphological system which consists of morphemes and rules operating on these morphemes.

Review of Literature

Inference is one of the most important topics in linguistics that attracts the attention of many researchers.

In a study carried out by (Witten et al: 1997) a wide variety of sequences from various sources, from music and text to DNA and computer programs, two different but related kinds of structure can be discerned. First, some segments tend to be repeated exactly, such as motifs in music, words or phrases in text, identifiers and syntactic idioms in computer programs. Second, these segments interact with each other in variable but constrained ways. For example, in English text only certain syntactic word classes can appear after the word 'the' many parts of speech (such as verbs) are necessarily excluded. This study shows how these kinds of structure can be inferred automatically from sequences. They begin with an example that both illustrate the utility of inferring the kinds of structure we seek and shows what our techniques can do. Next they present an efficient and non-obvious algorithm for identifying exact repetitions-including nested repetitions-in time which is linear with the length of the sequence. Then they describe a very simple algorithm for identifying interactions between sequence elements. The focus of this paper is on how these two algorithms can work together, for their combination is far more powerful than either alone. They show how they combine to generate the kind of structure sought in the original motivating example. Although the two methods work well together on many simple examples, the results frequently conflict with intuition in the inference of branching structure. The minimum description length principle seems to provide the only satisfactory general approach.

Bridge et.al (1993) give a framework for learning plausible unification-based natural language grammars. The authors assume that the system will have some initial unification-based grammar and they use learning to overcome the incompleteness of this grammar (its under-generation, i.e. where it fails to generate strings that humans would regard as grammatical). The authors use both model-driven (deductive) and data-driven (inductive) learning. The framework requires no a priori decision to be made about the balance between being model-driven or data-driven. One can experiment using anything from being purely model-driven to being purely data-driven. The authors expect the data-driven learning to compensate for weaknesses of the model-driven learning (most notably the problems of incompleteness of the model), and they expect the model-driven learning to compensate for weaknesses of the data-driven learning (most notably the likelihood that data-driven learning will learn a linguistically implausible grammar). Structural knowledge is also important.

Grabe and Stoller (2002) highlight the importance of grammar in L2 reading context, especially through hours of exposure to print in order to develop automaticity in using information from grammatical structures to facilitate reading. The skill of word structure analysis encourages the learner to study prefixes, roots, and suffixes and use this knowledge to learn new vocabulary. The game like Stemgo (Bernbrock, 1980) is a good way to get students familiar with the prefixes and stems. Students work in pairs and write three words for each prefix and stem. The teacher announces and explains two words of his/her own that contain the prefix or stem for each square. If one pair of students has these two words on its sheet, it ticks that square. When a pair has four ticks in a line down, across, or diagonally, it wins. Teachers give the worksheet beforehand as homework, and can do this activity as a warming-up sometimes instead of other vocabulary building activities.

Diana (2007) carried out a study which examines the impact of topic familiarity and passage sight vocabulary on lexical inferencing and retention. Independent variables include (a) a topic familiarity questionnaire, and (b) a passage sight vocabulary test. A repeated-measures design was used with a cross-sectional sample of 35 adult L2 learners of Spanish. Ss read narratives. It is an open question to what extent bound stems, affixes, and phone themes develop independent

form and/or meaning representations. Experimental evidences often interpreted as supporting composed morphological representations (see, for example, Reeid 2003). However, the influence that effects observed for shared lexical structure reflects independent representations, although possible and attractive in its simplicity, is logically not compelling. It is thought that although independent representations might indeed develop, they depend for their existence on the degree of continuing probabilistic support received from paradigmatic analogy.

Hay et.al (2005) carried out a study to solve the vigorous ongoing debate surrounds the question of how such internal structure is best accounted for: by means of lexical entries and deterministic symbolic rules or by means of probabilistic subsymbolic networks implicitly encoding structural similarities in connection weights. In this study, they separate the question of subsymbolic versus symbolic implementation from the question of deterministic versus probabilistic structure. A growing body of evidence is outlined, mostly external to the above debate, indicating that morphological structure is indeed intrinsically graded. By allowing probability into the grammar, progress can be made towards solving some long-standing puzzles in morphological theory. It is argued that the notion of lexical rule can capture the productive linguistic element of derivational morphological processes and metonymic and metaphorical sense extensions. In order to do this adequately rich lexical semantic information is needed, but there is no need to general deductive or adductive inference on unconstrained world knowledge. By using semantic information to structure the lexicon, by means of types and inheritance, relationships between lexical rules can be represented and viewed as essentially fully productive over denied subparts of the lexicon, while providing an initial account of blocking and lexicalizations. However, the work described here is at a preliminary stage. It is needed to provide detailed accounts of a range of derivation and conversion processes to see how adequately they are represented as lexical rules, while structuring the lexicon and type system appropriately to constrain their operation.

Soria's study (2005) aimed at describing and understanding the different types of processing involved when foreign language learners infer the meaning of unknown words in a written text. Pair think-aloud protocols were used to examine the lexical inferencing procedures used

by college-level students. Think-aloud protocols, a version of verbal report in which participants state their thoughts and behaviors, have become increasingly popular as a means of studying learners comprehension processes. The informants were intermediate and advanced Ilokano language learners of high and low proficiency in the target language. Informants use of interlingual, intralingual, and contextual sources is examined and compared across proficiency levels.

Additional strategies employed by the informants as well as individual differences were also explored. Morphology proved to be the most prolific source informants appealed to in inferring the meaning of unknown words. The general finding of this study suggests that student proficiency is not a decisive factor in successful lexical guessing. Inferencing is defined as the cognitive process a reader goes through to obtain the implicit meaning of a written text (Chikalanga, 1993). It is considered to be a compensation strategy essential for skilled first language (L1) as well as second language (L2) reading comprehension (Bialystok, 1983).

Furthermore, it is recognized as an essential component of the process of reading comprehension according to psycholinguistic models of reading comprehension, which postulate that reading involves an interaction between textual information and prior knowledge of the reader. According to schema theory (Rumelhart, 1980; Widdowson, 1983), word inference can be seen as a process of search for and use of, relevant schemata to identify unfamiliar verbal stimuli. Schemata can be seen as frames of reference which provide a basis for prediction and allow for the organization of information in long-term memory. The amount and quality of contextual cues can determine the outcome of such processes. From her early research with schema theory and reading, Carrell (1983) distinguishes three forms of schemata: linguistic (language knowledge), content (knowledge of topic), and formal (background knowledge of the rhetorical structures of different types of texts). Each of the three plays a part in the interaction among the writer, the text, and the reader. Schema-based inferencing, however, can be difficult for poor readers (Winne, Graham, & Prock, 1993). They may fail to stimulate relevant prior knowledge because of a production deficiency for making use of past experiences when reading, and they may lack relevant prior knowledge needed as input to inference -making

processes. Lexical inferencing, as one aspect of inferencing, “involves making informed guesses as to the meaning of a word in light of all available linguistic cues in combination with the learners general knowledge of the world, her awareness of context and her relevant linguistic knowledge” (Haastrup, 1987, p. 197).

If successful, it can serve for purposes of immediate comprehension in a listening, interaction, or reading context, and under favorable conditions, it may lead to retention of the word form as well as semantic and other lexical information (Paribakht & Wesche, 1999).

Moreover, lexical inferencing is frequently recommended by writers on second language pedagogy, researchers, and authors of reading textbooks (Moran, 1991). Moran (1991) added that the great majority of reading textbooks at all levels published for English as a Foreign Language (EFL) learners since the early 1980s feature tasks which require the reader to guess the meaning of unknown words.

The importance of lexical inferencing is emphasized in top-down reading (Goodman, 1976; Smith, 1978). These models underline the important role played by the reader as the sampler of text, who uses his or her knowledge to read better and who takes short-cuts in bottom-up processing of letters and words. Fortunately, the development of interactive models of reading has renewed interest in researching lower-order reading skills (Morrison, 1996).

These models acknowledge a great deal of communication between the differing bottom-up and top-down models (Hudson, 1998). On the interactive view, “if sight word recognition is successful then information can be delivered to higher level skills that make associations between the incoming lexical items and hence help the lower level skills by narrowing the possible new pieces of information that would be acceptable to complete a coherent message” (Hudson, 1998, p. 48). The reader applies reading strategies and attends to text structure. There are three main types of cues available to learners when making lexical references. Cartons (1971) taxonomy of knowledge sources includes three main cue types: contextual, intralingual, and interlingual.

Haastrups (1991) taxonomy of knowledge sources employed in her empirical research on Danish-speaking learners of EFL was drawn from Cartons (1971) established cue types. Haastrups (1991) taxonomy of knowledge sources will partly serve as analysis tool for the present

study. When using contextual cues (also called extra lingual or pragmatic cues), learners draw on their knowledge of the world and from the co-text. Knowledge of the world is “viewed as part of language users and language learners general socio-cultural knowledge” (Haastrup, 1991, p. 47). The role of co-text, on the other hand, refers to the way in which the interpretation of a lexical item is influenced by the particular linguistic context in which it is placed. For contextual cues to be of real help for word inference, Li (1988) indicated that they must (a) be perceptually and conceptually familiar to the text-receiver and (b) contain the information available for the text-receiver to find the relevant schemata in order to account for the oncoming input in the text and identify unfamiliar stimuli in context. Without such cues, inferencing may lead to misguesses (Bensoussan & Laufer, 1984). They concluded that lexical guessing is a very difficult task either because of the complexity of the text or because of the limitations of the reader, or both. Some words do not have clues in the text in which they appear; when there are clues for such words foreign language learners will not necessarily look for them; and when readers do look for these clues very often they cannot locate or understand them. (p. 27). Intralingual cues are cues based on the learners knowledge of the target language.

For example, learners of English may infer the meaning of words by making use of their knowledge that suffixes -er and -or express notion of agency (Carton, 1971). The ability to exploit intralingual cues presupposes that the learners already have some knowledge of the foreign language they are expected to make lexical inferences about. Finally, interlingual cues are judgments made by learners about the identity of similarity of structures in two languages. For example, second language learners may derive word meanings on the basis of cognates and regularities of phonological transformations from one language to another.

Morrison's (1996) examination of the lexical inferencing procedures of university-level French as second language (FSL) learners supported Haastrup's (1991) observations, who found that context was by far the most frequently used knowledge source by her participants, almost twice as frequent as the use of intralingual cues and more than twice as frequent as the use of interlingual cues. As far as the two proficiency groups in Morrison's study were concerned, there was a clear and

significant difference between the high-proficiency (HP) and low-proficiency (LP) groups in that the HP group used intralingual sources much more frequently than the LP groups. The same results applied with regard to the number of knowledge sources activated and the possible combinations. HP learners used more knowledge sources and more combined sources.

Krovetz (1998) asserts that morphology is the area of linguistics concerned with the internal structure of words. Information Retrieval has generally not paid much attention to word structure, other than to account for some of the variability in word forms via the use of stemmers. This study described experiments to determine the importance of morphology, and the effect that it has on performance, the role of morphological analysis is also described in word sense disambiguation, and in identifying lexical semantic relationships in a machine-readable dictionary. A brief overview of morphological phenomena will be provided first, and then describe the experiments themselves.

Paribakht and Wesches (1999) introspective study of intermediate L2 learners in a university ESL class demonstrated that word category interacted with strategy use. Learners used more inferencing for verbs in the question task than in the summary task. Furthermore, learners used varied kinds of previous knowledge as well as textual cues, when attempting to infer meanings of unfamiliar words. Sentence-level grammatical knowledge was the type of knowledge most often used in lexical inferencing for both tasks and for all word categories. Morphology, punctuation, and world knowledge were the other knowledge sources used by the learners. Overall, the individual differences in the knowledge sources used in the study appeared to be related to individual learners previous L2 learning experience, their L1, and their familiarity with the text topic.

Methodology

The Experimental Study

The data examined in the present study come from a larger project on lexical inferencing strategies and knowledge sources. The study was carried out in two phases. In Phase 1, data were gathered and analyzed to determine the relationship between learners' lexical inferencing strategies and knowledge sources and their lexical inferencing success.

In Phase 2, the researcher gathered data about learners' morphological knowledge and analyzed them to determine its relationship with lexical inferencing strategy use and success. The group design used in this study is of the type: experimental and control group design. This design involves two groups, both of which were formed by random selection. Both groups were given the test as a pretest of the dependent variable (lexical inference); the experimental group received the programme, as a new treatment, while the other group did not, and both groups are post tested using the same test developed by the researcher. Posttest scores were compared to determine the effectiveness of the new treatment. The socio-economic levels of the students of the sample were similar to be sure that this variable would not affect the results of the present study.

Participants

The sample of the study consists of sixty four Saudi intermediate student teachers (32 males and 32 females) who study English as a second language and are randomly selected. Most of the students of the sample are aged between 20-21 years old. The researcher excluded the students beyond this age.

Hypotheses of the Study

The study attempts to validate the following two hypotheses:

- (1) There are no statistical significant differences between the members of the experimental group and the control group on the achievement test before administering the suggested programme.
- (2) There are statistically significant differences (in favor of the experimental group) between the mean scores of the members of the experimental group and the control group on the pre/post test after administering the suggested programme.

Instrumentation

The tools of the study are represented in the following:

- 1 - A program to make students recognize and study the different branches of morphology: inflectional and derivational to decide on their role in lexical inference.

It consists of four units: the first unit is entitled "Bound and Free Morphemes". It has three lessons: prefixes and suffixes, infixes and circumfixes. The second unit is about word formation. It has two lessons: lexical gaps and derivational morphology. The third unit is entitled: "Word Coinage". It contains two lessons: compounds, acronyms. The fourth unit is entitled "Inflectional Morphemes". It has two lessons: grammatical morphemes and morphology & syntax.

2 - A pre- post lexical inference test. (Appendix II).

It consists of three parts: In the first part, students are required to read a passage and infer the meaning of ten italicized words. In the second part, students are required to read a passage and answer the questions that follow. In the third part, students are asked to give the lexical inference of five sentences. In the fourth part, students are asked to give the meaning of five compound words. In the fifth part, students are required to read a passage and give the meaning of ten words.

Administration

The test was administered during a class period. Before learners took the test, they were notified of the general purpose of the study and were informed that their performance on the test would not affect their course outcome. They were instructed to read each of the target words and then circle the four words closely related to the target word. The time allocated to the test was 30 minutes. The split-half reliability of the test in the current study was 0.89. The pre- post lexical inference test was administered in order to recognize the branches of morphology that have an effect on lexical inference. The time needed for finishing the test was one hour. The one group design with pre - post testing was used in the experiment of the study. The program is administered also in order to increase the awareness of the learners concerning the morphological knowledge whether inflectional or derivational. After that the pre-post test will be administered again to decide on the program's effectiveness.

Research and Pedagogical Implications

Vocabulary is indeed a sizable component in second or foreign language learning, and often students are overwhelmed with the amount

of vocabulary that they need to know. When assigning reading materials, teachers should not just provide a glossary for students and have them refer to it when they do not understand certain words. Instead, it will be a stimulating classroom task for students to be able to infer the meaning of unfamiliar or unknown words that they encounter in written text. The students who participated in this study reacted positively to the pair think-aloud procedure. All participants reported learning something from the experience.

Learner familiarity with the theme and topic of the text was an important source of clues for inferring the meanings of unknown words. Most students enjoyed the theme of the passages. The majority of the students gave favorable feedback on the text that was used for this study. Thus, the text type and theme evidently influenced learners in terms of both their motivation and their success in lexical inferencing. This brings the researcher to another point that needs to be mentioned: teachers should be selective in terms of the text used in the inferencing task. Although culture is intertwined with language teaching, foreign language teachers must make sure that students are culturally-familiar with the text they give to students for performing a lexical inferencing task.

The reading text used in this study was carefully selected from the Internet. The Internet is a great tool for obtaining interesting, authentic, and multilevel reading materials (Forsyth, 1998; Godwin-Jones, 1996). The material should then be tailored to both high and proficient learners by simplifying the text to make it more comprehensible to the learners. The structure of the target language, English, helps explain the proliferation of morphological cues activated by the informants. With its complex morphological structure typical of English language, a lexical inferencing task can be an avenue for English language learners to better understand the morphology of English words.

In English, morphology is used not only to specify grammatical information, but also to create new lexical items. Familiarity with the connotations of English affixes can provide important and reliable information about word meaning. Such information may be particularly valuable in inferring the meaning of unfamiliar and low-frequency English words. Morphological features provide cues to such aspects of general word meaning as number, tense, manner, quality, and many other nuances.

This study demonstrated that while students have the ability to extract the correct root of the test word, they were unsuccessful in determining the functions of those affixations. This is true in the case of the word *handsome*, which posed some problems for the learners. The informants were not able to distinguish whether the prefix *hand-* functions as an adjective or what. The test words for this study were all morphologically derived words.

Lexical inferencing is an effective task that can promote more frequent use of contextual cues in guessing the meanings of unknown English words. As long as students understand that a pair thinking-aloud is a collaborative activity, there is no reason why it could not be used in the classroom. The instructor could also present learners with some think-aloud samples and entertain open discussion of the different knowledge sources students actually use.

For this study, students of equal proficiency were paired to perform the task. Students were paired based on the teachers assessment of individual students general proficiency. Although students level of proficiency was not a variable for the present study, the results demonstrated that proficiency level of learners is not always a decisive factor in effective inferencing procedures. Poullisse and Schils (1989) investigation on the effect of foreign language learners proficiency level and task-related factors on the use of compensatory strategies (CpS) found that proficiency level has a limited effect on the choice of CpS by the subjects and that task-related factors played a larger role.

Lexical Inferencing Strategies

To gather data about learners, lexical inferencing strategies, the students were presented with a reading passage and asked to read the text for comprehension and to try to infer the meanings of the unknown words. Research suggests that successful inferencing depends heavily on the ability to comprehend the text as a whole and most of the words in it (Hirsh & Nation, 1992; Laufer, 1988; Liu & Nation, 1985). To meet these requirements, several passages, including those used in previous research, were examined. The reading passage selected for use in this study was the one developed by Haastrup (1991) in a study on lexical inferencing with Danish learners of English. The passage contained 374 words, with 10 target words highlighted. The passage had been designed

to elicit the use of a variety of inferencing strategies and processes, ranging from those involved in the use of non-linguistic global comprehension processes to those involved in the use and integration of word-level cues such as prefixes and affixes (Haastrup, 1991). Before being used in the present study, the passage was pilot- tested with a group of ESL students assumed to have similar language proficiency to the participants in the main study.

The pilot study revealed that the students had a good overall comprehension of the text (mean of comprehension: 7.6/10). It also showed that the percentage of unknown words in the passage ranged from 4.27% to 2.67%, derived by dividing the total number of the words reported as unknown by the total number of words in the passage and multiplying the results by 100. An introspective think-aloud technique was used to discover the lexical inferencing strategies learners used; in this procedure, learners are asked to verbalize the content of their thoughts while attempting to infer the meaning of an unknown word from context. Data were collected in individual sessions lasting about 45_60 minutes. In each session, the students were first trained as to how to think aloud: they were given a set of pictures and asked to report what they thought was happening in the pictures. They were then presented with an English text and were asked to practice verbalizing their thinking while trying to infer the meanings of the unfamiliar words they encountered. After this practice session, the students were presented with the text intended for the study and were asked to read the text for comprehension and try to verbalize their thoughts when attempting to infer the meaning of the new words in the text.

Results and Discussion

The results of the study are mainly presented to answer the main questions of the research: What is the role of inflectional knowledge in L2 lexical inference? What is the role of derivational knowledge in L2 lexical inference? And what is the effectiveness of the proposed programme in developing lexical inference? The students' scores on the lexical inference test were calculated and tabulated. A t-test formula for the correlated scores was used to calculate the statistical differences in the average percentage of the subjects' lexical inference. It is noticed that knowing the meaning of the distinct morphemes may not always

reveal the meaning of the morphologically complex words. This problem is not true of inflectional morphology, for example, if one knows the meaning of the word "linguist", s/he also knows the meaning of the plural form linguists; if one knows the meaning of the verb "analyze", s/he knows the meaning of analyzed and analyzes. The grammar of the language that is internalized by the language. Morphological compounding rules combine two or more morphemes or words to form complex compounds, like lamp chop, deep-sea diver, and ne'er do well. Frequently the meaning of compounds cannot be predicted from the meanings of their individual morphemes. Learner includes the morphemes and the derived words of the language. The morphological rules of the grammar permit one to use and understand the morphemes and words in forming and understanding sentences, and in forming and understanding new words.

Testing Hypothesis One

Concerning the third question which is "what is the effectiveness of the proposed programme in developing Saudi student teachers ability in lexical" there are two hypotheses that should be examined: the first hypothesis which states that "there are no statistical significant differences between the experimental group and the control group on the achievement test before administering the suggested programme", the study resulted in the following findings analyzed presented in table (1).

Table (1)
Results of the t- test between the experimental
and control groups on pretesting

Group	N	Means	SD	df	Tabular t	Calculated t
Experimental	32	18.19	3.64	62	2.66	0.39
Control	32	17.63	4.64			

Table (1) shows that there are no statistically significant differences between the mean scores obtained by the subjects of the experimental and control groups on the pre- test. Thus the first hypothesis of the

study is confirmed. Such a result may indicate that any significant differences between the mean scores of the pupils in the two groups on the post English test may be due to the programme.

Testing Hypothesis Two:

Hypothesis two which states that "there are statistically significant differences (in favor of the experimental group) between the mean scores of the members of the experimental group and the control group on the pre post test after administering the suggested programme" has been tested. The programme was administered to the experimental group only. Afterwards, the researcher administered the posttest. The following table shows these results.

Table (2)
Results of post - test experimental and control groups

Group	N	Means	SD	df	Tabular t	Calculated t
Experimental	32	46.59	4.57	62	2.66	26.54
Control	32	19.00	3.5			

Table (2) shows that there is a statistical difference between the mean scores obtained by subjects of the control and experimental groups in the posttest in favor of the experimental group where the calculated t is higher than the tabular t-value (= 26.54). The experimental group got a higher mean of (46.59) than that obtained by the control group (19.00). This table shows that the experimental group students outperformed those of the control group in their scores of the English pre post test. This indicates that there are significant statistical differences at 0.01 between the performances of the experimental and control groups in favor of the experimental group on the pre post test. This may shoe the effectiveness of the suggested programme in enhancing students' lexical inference.

The t-value between the pre and post test for the experimental group was calculated before and after the experimental group was calculated before and after the experiment for the experimental group. The following table shows the results.

Table (3)
Results of control and experimental group on the pre- post test

Experimental Group	Means	df	Tabular t	Calculated t	Significance
Pre testing re-sults	18.19	31	2.75	24.70	Significant at 0.01
Post testing re-sults	46.59				

This table shows that the experimental group students' performance on the post test was better than their performance on the pretest. The mean scores of the students on the posttest were (46.59) and on the pretest were (18.19). It can be deduced that the suggested English programme has contributed to a great extent to developing lexical inferences.

Recommendations of the study

The study recommends the followings:

- 1 - Focusing on morphology in courses and lectures.
- 2 - Teaching derivation and its role in lexical inference.
- 3 - Teaching inflection and its role in lexical inference.
- 4 - Developing programs to develop morphological knowledge.
- 5 - Developing programs to develop lexical inference.

"دور المعرفة الصرفية في اللغة الثانية في الاستدلال المعجمي للطلاب المعلمين السعوديين"

د. فايضة بنت صالح الحمادي

قسم اللغات الأجنبية - جامعة الملك فيصل بالإحساء
المملكة العربية السعودية

الملخص

بينما هناك تعميمات معينة بين اللغات من حيث شكل الكلمة مثل الاشتقاقات مثلاً فكثير من المعلومات المعجمية هذه ترتبط بشكل الكلمة. وتهتم هذه الدراسة بتحديد أهمية علم الصرف وتأثيرها على الاستدلال المعجمي بالنسبة للطلاب المعلمين السعوديين. وتهدف الدراسة الحالية إلى تحديد دور الاشتقاق في تخمين معاني المفردات في اللغة الثانية و دور التحويل المعجمي للكلمة في تخمين معناها وقياس فاعلية برنامج مقترح لتنمية تخمين المفردات بواسطة الطلاب السعوديين الدارسين اللغة الانجليزية.

قدمت الدراسة أنواع تخمين المفردات والعوامل التي تؤثر في نجاح الدارسين في هذا التخمين. كما تناولت مراجعة للأدبيات المتصلة بموضوع تخمين المفردات في اللغة الثانية عن طريق معرفة البنية الخارجية في تلك اللغة.

والدراسة تعتبر شبه تجريبية نظراً لأنها قامت على المنهج شبه التجريبي حيث اختارت الباحثة عينة قوامها ٦٤ طالب معلم (٣٢ ذكراً و ٣٢ أنثى) من الذين يدرسون اللغة الانجليزية كلغة أجنبية ولقد استبعدت الباحثة الطلاب الذين يزيد عمرهم عن مستوى العمر المناسب لأغراض الدراسة الحالية وهو (من ٢٠ - ٢١ عاماً).

وتكونت أدوات الدراسة من:

١- برنامج يحتوي على مختلف أنواع علم البنية الخارجية وبصفة خاصة (الاشتقاقات والتحويل المعجمي) لتحديد دوريهما في تخمين المفردات.

٢ - اختبار قبلي - بعدي في تخمين المفردات.

تم تطبيق الأدوات على العينة وعولجت البيانات معالجة إحصائية وأظهرت نتائج الدراسة أن: دور الاشتقاق أكبر من دور التحويل المعجمي في تخمين المفردات. كما أثبتت الدراسة فاعلية البرنامج المقترح في إثراء عملية تخمين المفردات.

وأوصت الدراسة بأنه يجب إعداد برنامج لتدريب الطلاب المعلمين على تخمين معنى المفردات بواسطة الاشتقاق كما أوصت بضرورة تدريب الطلاب على اشتقاق المفردات في المحاضرات والحصص معتمدين على الاشتقاق أكثر من الاعتماد على التحويل المعجمي للكلمة.

REFERENCES

- 1 - Baayen, R.H. (2003) **Probabilistic approaches to morphology**. In **Probabilistic Linguistics** (Bod, R. et al., eds), pp. 229-287, MIT Press
- 2 - Bauer, L. (2001) **Morphological Productivity**, Cambridge University Press.
- 3 - Bensoussan, M., & Laufer, B. (1984). Lexical guessing in context in EFL reading comprehension. *Journal of Research in Reading*, 7, 15-32.
- 4 - Bernbrock, Chris (1980) **Stemgo: A Word-stems Game**. *E.T. Forum* 18, 3:45-46.
- 5 - Bridge, D. et.al (1993): Inductive and deductive learning of grammar: dealing within complete theories Inference: Theory, **Applications and Alternatives**, *IEE Colloquium on*, 22-23 Apr 1993.
- 6 - Briscoe, T. & Copestake A. (2006): Lexical Operations in an Unication-based Framework.
- 7 - Carton, A. S. (1971). Inferencing: A process in using and learning language. In P. Pimsleur & T. Quinn (Eds.), **The psychology of second language learning** (pp. 45-58). Cambridge: Cambridge University Press.
- 8 - Coker, Cecil, Kenneth Church, and Mark Liberman. 1990. Morphology and rhyming: two powerful alternatives to letter-to-sound rules for speech synthesis. In **ESCA Workshop on Speech Synthesis**, pages 83-86.
- 9 - Diana, P (2007): The Effects of Topic Familiarity and Passage Sight Vocabulary on L2 Lexical Inferencing and Retention through Reading. **Applied Linguistics**, V28 n1 p 66-86, 2007.
- 10 - Forsyth, I. (1998). Why use the Internet for teaching and learning materials? In I. Forsyth (Ed.), **Teaching and learning materials and the Internet** (pp. 13-33). London: Kogan Page

- 11 - Fromkin, V. Rodman, R. and Hyams, N. (1993): **An Introduction to Language**, Harcourt Brace Jovanovich College Publishers
- 12 - Grabe, W. and Stoller, FL. (2002) **Teaching and Researching Reading Harlow: Pearson Education. Longman.**
- 13 - Goodman, K. S. (1976). Behind the eye: What happens in reading. In K. S. Goodman & O. S. Niles (Eds.), **Reading: Process and program** (pp. 3-38). Urbana, IL: **National Council of Teachers of English.**
- 14 - Gonnerman, L.M. and Anderson, E.S. (2001) Graded semantic and phonological similarity effects in morphologically complex words. In *Morphology 2000: Selected Papers from the 9th Morphology Meeting* (Bendjaballah, S. et al., eds), pp. 137-148, Benjamins
- 15 - Godwin-Jones, R. (1996). Creating language learning materials for the World Wide Web. In M. Warschauer (Ed.), **Tele collaboration in foreign language learning.**
- 16 - Haastrup, K. (1991). Lexical inferencing procedures or talking about words. Tübingen: Gunter Narr.
- 17 - Hay, J & Baayan, H (2005): Shifting paradigms: gradient structure in morphology. Interfaculty Research Unit for Language and Speech, Radboud University Nijmegen and Max Planck Institute for Psycholinguistics
- 18 - Hay, J. (2003) *Causes and Consequences of Word Structure*, Routledge
- 19 - Haiman, J. (1994). Ritualization and the development of language. In W. Pagliuca (Ed.), **Perspectives on Grammaticalization** (pp. 3-28). Amsterdam: Benjamins
- 20 - Hopper, P., & Traugott, E. C. (2003). **Grammaticalization (2nd ed.)**. New York: Cambridge University Press.
- 21 - Hudson, T. (1998). Theoretical perspectives in reading. **Annual Review of Applied Linguistics**, 18, 43-60.
- 22 - Krovetz, B (1998) *Viewing Morphology as an Inference Process.*

- MA thesis University of Massachusetts Available online at <http://citeseer.ist.psu.edu>
- 23 - Krovetz, R. (1998): Viewing morphology as an inference process, Annual ACM Conference on Research and Development in Information Retrieval Proceedings of the 16th annual international ACM SIGIR conference on Research and development in information retrieval
- 24 - Lovins, J.B. (1988). In Krovetz (1998) Viewing Morphology as an Inference Process. MA thesis University of Massachusetts. Available online at <http://citeseer.ist.psu.edu>
- 25 - McCray AT, Srinivasan S, Browne AC. Lexical Methods for Managing Variation in Biomedical Terminologies. In: **Proceedings of the 18th Annual Symposium on Computer Applications in Medical Care**, 1994, 235-239.
- 26 - McCray, Alexa T. (1996). The Nature of Lexical Knowledge. *Methods of Inf Med*, Vol 37 No. 4-5.
- 27 - Molsing, Karina (2005). The Present Perfect at the Semantics / Pragmatics Interface: American English and Brazilian Portuguese.
- 28 - Morrison, L. (1996). Talking about words: A study of French as a second language learners Lexical inferencing procedures. **The Canadian Modern Language Review**, 53 (1), 41-66. learners Lexical inferencing procedures. *The Canadian Modern Language Review*, 53 (1), 41-66.
- 29 - Porter, William (1980). In Krovetz (1998) Viewing Morphology as an Inference Process. MA thesis University of Massachusetts. Available online at <http://citeseer.ist.psu.edu>
- 30 - Paribakht, T. S., & Wesche, M. (1999). Reading and “incidental” L2 vocabulary acquisition: An introspective study of lexical inferencing. **Studies in Second Language Acquisition**, 21, 195-218.
- 31 - Pastizzo, M.J. and Feldman, L.B. (2002) Discrepancies between Orthographic and unrelated baselines in masked priming undermine a decompositional account of morphological facilitation. *J. Exp. Psychol. Learn. Mem. Cogn.* 28, 244-249

- 32 - Plaut, D.C. and Gonnerman, L.M. (2000) Are non-semantic morpho- logical effects incompatible with a distributed connectionist approach to lexical processing? *Lang. Cogn. Process.* 15, 445-485
- 33 - Reid, A.A. and Marslen-Wilson, W.D. (2003) Lexical representation of morphologically complex words: Evidence from Polish. **In Morpho-logical Structure in Language Processing** (Baayen, R.H. and Schreuder, R., eds), pp. 287-336, Mouton de Gruyter
- 34 - Rueckl, J.G. et al. (1997) **Morphological priming, fragment completion, and connectionist networks.** *J. Mem. Lang.* 36, 382-405
- 35 - Seidenberg, M.S. and Gonnerman, L.M. (2000) Explaining derivational morphology as the convergence of codes. *Trends Cogn. Sci.* 4, 353-36.
- 36 - Smith, F. (1989). *Understanding reading.* New York: Holt, Rinehart, & Winston.
- 37 - Witten, L.H, Manning, N & G. Craig (1997): **Inferring lexical and grammatical structure from sequences, Compression and Complexity of Sequences** 1997. *Proceedings Volume, Issue, 11-13 Jun 1997* Page(s):265 - 274.

Appendix (1)
Complete Taxonomy of Knowledge Sources
(Revised version from Haastrup, 1991)

CONTEXTUAL CUES

CATEGORY

DEFINITION

I. The text

The informant makes use of the text.

- 1 - One or two words from the immediate co-text
The informant makes use of one or more words from the immediate co-text of the test word; s/he chooses a word that is familiar. This is then taken as the point of departure for his/her reflections, which may be of a collocational nature.
- 2 - The informant makes use of the sentences that contain the test word.
- 3 - A specific part of the co-text beyond the sentence of the test word.
The informant refers to specific parts of the text other than the sentence of the test word, for instance to the sentence immediately following it.
- 4 - Unspecified use of the text
The informant makes global use of the text without offering any definite reference.

II. Knowledge of the world

The informant makes use of his/her general knowledge of
The world (semantics/lexical meaning), including factual
knowledge, attitudes, beliefs, prejudices and so forth.
What the informant proposes, s/he cannot have taken
exclusively from the text.

INTRALINGUAL CUES

CATEGORY

DEFINITION

I. The test word

The informant makes use of the features of the test word.

1 - Phonology/Orthography

The informant uses phonological/orthographical similarity. From the results and/or hypotheses, there is no indication that the informant considers meaning.

2 - Morphology

a - prefix

b - suffix

c - stem

The informant uses prefixes or what s/he perceives as prefixes. His/her pronunciation reveals whether s/he thinks of an Ilokano prefix, if s/he does not say so explicitly. The informant uses suffixes or what s/he perceives as suffixes. The informant tries by removing the prefix and/or suffix to use as his/her source the word stem, or what s/he perceives as the word stem.

3 - Word class

The informant converts the test word into a different word class, sets up lines of demarcation with the help of odd classes, or identifies through word classes.

4 - Collocations

The informant tries what his/her proposal "sounds like" or reminds herself of other expressions with the test word.

INTERLINGUAL CUES

CATEGORY

DEFINITION

I. L1

The informant makes use of his/her first language, English.

1 - Phonology/Orthography

The informant uses phonetic/orthographic similarity.

2 - Morphology a. Prefix

The informant uses English prefixes or what s/he perceives as prefixes.

3 - Lexis

The informant proposes an English-sounding word.

4 - Collocation

The informant considers an English equivalent of the test word and potential collocations.

The informant tries out whether the proposed English word sounds right in a translation of the immediate context.

2. Morphology

a. prefix

The informant uses prefixes or what she perceives as prefixes from a different foreign language.

3. Lexis

The informant puts forward a word from a foreign language s/he knows, and uses that as a starting point for reflections about meaning, i.e., s/he moves directly to the semantic level.

Appendix ii

The lexical Inferencing Test

INSTRUCTIONS

1 - This is the English text that you are to work with individually. In the text some words are printed in italics a number of words, the meaning of which you do not know. Your task is to infer the meaning of the italicized words. Please come forward with all the suggestions that occur to you. Speak out, even if you are not sure that it is correct. When you have agreed what the meaning of the word is, you write your solution on the worksheet. You are welcome to write either Arabic words or English explanations, or a combination of both.

There are more than two hundred varieties of sausage that differ according to the meat, the fitness of the chopping or grinding, the seasonings used, and the processing method (smoking, cooking, drying) employed. Per capita sausage consumption in the United States is now an astounding eleven kilograms a year, with the ubiquitous frankfurter, or wiener, accounting for about thirty percent of the total.

The frankfurter (after the German city) is better known in the United States as the "hot dog", especially when in its traditional presentation in a long bread bun, and so popular is it that fourteen billion are eaten every year in the United States, equivalent to sixty for every man, woman, and child in the country - including vegetarians. The contents are strictly governed by law, with the USDA requiring manufacturers to use muscle meat. In fact, heart, liver, and kidney may also be used but only if this is openly stated. Contents must be eighty - five percent meats, ten percent water, and 2.5 percent salt., with the remainder comprising spices and preservatives. Casings were traditionally made from animal intestines, but now ninety percent of the hot dogs consumed are skinless.

And how did this American culinary delight originate? As with so many brilliant inventions, the answer is "almost by accident." At the St. Louis Exposition of 1904 customers wanted to be able to eat while walking about, and vendors provided them with white cotton gloves to eat with. After the sausages had been eaten, they expected the gloves to be returned, but the customers did not oblige. So the vendors began

serving the frankfurters in special bread buns. The idea caught on, and, ever since, the hot dog, served with all kinds of extra (mustard, ketchup, relish, onions, cheese, chili con carne, sauerkraut), has remained particularly welcome at outdoor events such as picnics, barbecues, and, above all, baseball games.

2 - Rubric: Read the following passage then answer the questions below:

The World Health Organization says that almost three million people die each from the effects of smoking tobacco. Most of these people die of lung cancer, heart disease (1) other cancers. Tobacco use is a main cause of these diseases; doctors say. International health specialists believe health problems linked to smoking will get worse in the years to come. A WHO study shows smoking decreased by one percent in industrialized countries; (2), it increased by about two percent in the rest of the world.

1 - Give the meaning of the underlined words.

2 - Choose and insert the following words into (1) and (2).

therefore, however, and, then From One world English course?
Lesson 3 Effects of Smoking on Health

Figure 5.4 Activities developing cohesion, after Cook, 1989.

Appendix (2)

3 - Rubric: Give the lexical inference of the following sentences

- a. John has visited Paris.
- b. John has arrived Paris.
- c. I have just graduated from college.
- d. John has lived in New York for 4 years. (Universal)
- e. Ahmed read this book while traveling.
- f. Ahmed was reading this book while traveling.

4 - Rubric: Give the meaning of the following words

Yellow jackets

Watermelon

Lamp chop

Deep- sea diver

Never - do - well.

5 - Rubric: Read the following passage, then give the meaning of the words in italics

An American journalist, Donorthy Thompson, criticizes the rich world's health programmes in the poor world. She describes her trip to Africa where she got food poisoning and her friend malaria:

"The town is very dirty. All the people are hot, have dust between their toes and the smell of sewage in their noses. We both fell ill, and at ten o'clock in the morning I got frightened and took my friend to the only private hospital in town, where you have to pay. After being treated by a doctor, we caught the next aeroplanes home.

"Now I believe that the money of the World Health Organization (WHO) should be spent on bringing health to all people of the world and not on expensive doctors and hospitals for the few who can pay. But when we ourselves become ill, our beliefs waver. After we came back to the States we thought a lot about our reaction to this sudden meeting with health care in a poor country. When assessing modern medicine, we often forget that without more money for food and clean water to drink, it is impossible to fight the diseases that are caused by infections.

"Doctors seem to overlook this fact. They ought to spend much time thinking about why they themselves do not contract some of the serious and infectious diseases that so many of their patients die from. They do not realize that an illness must find a body that is weak either because of stress or hunger. People are killed by the conditions they live under, the lack of food and money and the squalor. Doctors should analyze why people become ill rather than take such a keen interest in the curative effect of medicine.

"In the rich world many diseases are caused by affluence. The causes of heart diseases, for instance, are far from being mysterious and unfathomable- they are as well known as the causes of tuberculosis. Other diseases are due to hazards in the natural conditions in which we live. Imagine the typical American worker on his death- bed: every cell permeated with such things as chemicals and radio - active materials. Such symptoms are true signs of an unhealthy world. "

Source: Haastrup (1991, p.234) In Nassaji (2004) The Relationship between Depth of Vocabulary Knowledge and L2 Learners' Lexical Inferencing Strategy Use and Success. The Canadian Modern Language Review, 61, 1 (September), 107-134.

