Applying corpus linguistics methodology to psycholinguistics research

(Aplicando a metodologia da linguística de corpus à pesquisa psicolinguística)

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Abstract: *This study concerns the use of corpus linguistics methodology in psycholinguistics research. Ten linguistic metaphors were selected from English and American newspapers. After that, we identified the underlying conceptual metaphor based on the conceptual metaphor inventory by Lakoff and Johnson (1980, 1999). We seek to investigate what sort of knowledge EFL-learners use when trying to understand a linguistic metaphor. We examined how EFL-learners comprehend linguistic metaphors, firstly without using the context and then using the context. The sample comprised 221 Brazilian students and 16 American students at UCSC. We have also carried out an empirical research using WebCorp.*
Key-words: *cognitive linguistics; foreign language acquisition; conceptual metaphor theory; corpus linguistics.*

Resumo: *Este estudo investiga o uso de metodologia de lingüística de corpus na pesquisa psicolingüística. Selecionaram-se dez metáforas em jornais ingleses e norte-americanos. Depois, identificou-se a metáfora conceptual subjacente com base no inventário de metáforas conceptuais apresentado por Lakoff e Johnson (1980, 1999). Buscou-se investigar que tipo de conhecimento os aprendizes de LE empregam ao tentar compreender metáforas. Analisou-se a maneira como os aprendizes de LE compreendem metáforas lingüísticas sem usar o contexto e, depois, utilizando o contexto. A amostra incluiu 221 estudantes brasileiros e 16 estudantes norte-americanos da UCSC.*
Palavras-chave: *linguística cognitiva; compreensão em língua estrangeira; teoria da metáfora conceptual; linguística de corpus.*

INTRODUCTION

An experiential approach explains meaning in terms of the nature and experience of thinking organisms. Experientialism postulates that conceptual structure is meaningful because it is embodied, that is conceptual structure emerges and is related to our pre-conceptual bodily experiences (Lakoff 1987). Therefore, trying to understand the embodied nature of human cognition involves the search for possible connections between mind and body and language and body. This view of comprehension is in line with cognitive linguistics, which aims at investigating the way linguistic structures are related to and motivated by human conceptual knowledge, bodily experience and discourse. Hence, metaphor plays a fundamental role in mapping physical and bodily experiences to help structuring the comprehension of abstract ideas which form the basis of human thought.

Consider the following narrative published in The San Francisco Chronicle under the title "*How Aids changed us*" which shows how embodied experience helps the speaker to structure the description of what happened:

> Even after the devastating wave of death from AIDS subsided in San Francisco's gay community, powerful effects of AIDS still impact men here. Millions of dollars poured into research and prevention efforts have reduced the number of diagnoses and deaths in the United States over the years. (SFC, 19.11.2006)

The image of 'the devastating wave' with its deadly consequences for its environment is related to the abstract target domain of death. The metaphorical expression 'the devastating wave of death' was employed in order to express that a significant number of people have died and that the effects of AIDS are unpredictable, to mention some of the possible entailments of the metaphor in question. In the same text, the concrete concept of 'money' is related to the image of a liquid which is 'poured into' something. 'Poured into' introduces the image-schematic structure of a CONTAINER linked to 'research', leading to the conclusion that a huge amount of money is invested in this kind of research. In both cases, the author has used conventional metaphorical expressions to create some extra contextual effects.

Lakoff and Johnson (1980) posit that comprehension occurs through a conceptual mapping across domains. They propose a systematic mapping from a concrete source-domain to a more abstract target domain of experience. For instance, we understand the conceptual metaphor LOVE IS A JOURNEY because we have a systematically organized knowledge about the concrete conceptual domain of JOURNEY, and we rely on this knowledge in order to understand the target domain of LOVE. We comprehend and experience love in terms of a journey due to the fact that we follow a certain routine and conceptualize love metaphorically in terms of a journey when we experience it. Therefore, we use our daily experience with journeys to conceptualize love in terms of departure and arrival as expressed in the following metaphorical expressions:

(1)   We have decided to *go separate ways*
(2)   Our relationship *is going nowhere*

Such examples illustrate how love is conceptualized in terms of a journey, where the lovers correspond to the travelers and the relationship corresponds to the road traveled. Hence, according to the conceptual mapping view, metaphorical expressions derive from an underlying conceptual metaphor. Grady (1997) posits that primary metaphors link different concepts that arise from primary scenes and their correlations. The source concepts of primary metaphors have a content related to physical perception or sensation. For instance, when playing 'hide and seek', Brazilian kids give hints about the place they are hiding shouting 'you are *hot*' (Ferreira, 2007). This metaphorical utterance has as underlying conceptual metaphor PROXIMITY IS HEAT, which is a primary metaphor motivated by the basic perceptual experience of warmth, of being close to the mother's body when we are born.

For cognitive linguists, language reflects some important aspects of our conceptual system which is motivated by embodied cognition (Gibbs 2006). Systematic patterns of structure and linguistic behavior are not arbitrary but motivated by recurrent patterns of embodied experience reflecting our perceptual interactions, bodily actions and the manipulation of objects. Those patterns are experiential *gestalts*, known as image schemas which derive from our interaction when we manipulate objects or orient ourselves in space and time (Johnson 1987). Some examples of these schematic structures are CONTAINER, BALANCE, SOURCE-

PATH-GOAL, PATH, CENTER-PERIPHERY and CORRELATION. Things we consider as being of physical nature are usually something we conceptualize in terms of our bodily experience (Lakoff and Turner, 1989). Concepts like departure, journeys or cold are conventionally and unconsciously understood because they are linked to our embodied and social experiences. Although cognitive linguistics research has faced many criticisms (Murphy 1997; Haser 2005), due to its emphasis on language and on the linguist's individual intuitions, Gibbs (2007) considers cognitive linguistics evidence as the main theoretical and empirical support to the importance of embodiment for human cognition. Polysemy constitutes one of the main topics of interest in cognitive linguistics, since many polysemic senses are metaphorically or metonymically motivated.

An important question might be asked regarding the representation of the intended polysemic senses: are polysemous senses represented separately or do they have a core meaning? Klein and Murphy (2001) present evidence that polysemous words have separate representations for each sense. In the authors' view, if they have a core meaning, the core meaning is minimal. The authors try to elaborate on a core meaning view more consistent with their results, which relies on temporary, episodic constructions of word senses according to which when a word like 'paper' appears in a specific context, a more detailed context-appropriate sense is constructed in the sentence representation. Once one has interpreted 'paper' to mean a daily publication of news, next time the word appears in the same context the same sense can be more easily retrieved. The inhibition of a different sense could be accounted for on the basis of Sperber and Wilson's (1995) Relevance Theory. Only the most relevant sense, which is the sense capable of reaching the most contextual effects in that context will be derived; due to economy reasons, the other – less relevant sense in that context – will be discarded.

To sum up, a psycholinguistic theory of understanding should take into account the fact that expressions with a specific sense, which is context dependent, are ubiquitous. Common ground (Clark 1996), that is the set of mutually held beliefs and assumptions of interlocutors engaged in communication, plays an important role in solving ambiguity and in identifying the intended meaning of polysemous words. In spite of the relevance of studies like Swinney's (1979), which aim at bringing some light into the discussion about how and when we select the most appropriate

sense of an ambiguous word, in my view lexical access should not be seen as a context autonomous process independent of embodied motivated comprehension.

The main goal of the present study is to present empirical data in order to support the hypothesis that metaphor comprehension is based on the foreign language learners' embodied experience. From a conceptual metaphor perspective, our hypothesis is that there is a universal pattern in the structuring of abstract concepts which facilitates metaphor comprehension in a foreign language in a similar way as it occurs in the mother language (Gibbs 1994). Therefore, a metaphorical expression in a sentence without a context would be sufficient for Brazilian learners of English as a Foreign Language (EFL) to derive the metaphorical meaning of those metaphorical concepts with a strong bodily basis. We have also tested the comprehension of the same metaphorical expressions by American-English native speakers. We seek to investigate the degree of conventionality of the metaphorical expressions used in this study. For this purpose, we have carried out an empirical investigation using corpus linguistics methodology. Another goal of the present study was to compare the comprehension of different metaphorical expressions by foreign language learners belonging to four different English proficiency levels (pre-intermediate, intermediate, upper-intermediate and advanced), aiming at gathering some evidence for an evolution in the semantic acquisition of a foreign language.

In following, we are going to review some important contributions of cognitive linguistics to second and foreign language acquisition research.

1. Metaphor Comprehension in Foreign Language

The study of figurative language has raised growing interest in the area of applied cognitive linguistics. This might be due to the fact that metaphor, metonymy and idioms are part of our daily language and posit a challenge for teachers in the foreign language classroom. The present study adopts a cognitive approach to foreign language learning and acknowledges the importance of learners' interaction with the environment, as well as the importance of the social context in learners' embodied cognition (Gibbs 2006). Cognitive linguistics regards language as closely interacting with other mental faculties, such as perception, vision, memory and sensorimotor

skills (Cienki 2005), and not as an autonomous module (Fodor 1983) in our minds. These domain-general mechanisms are responsible for all learning, and not only language learning.

Cognitive linguistics acknowledges certain language universals which result from general human cognitive processes, but it also emphasizes non-universal aspects related to the perception of language in its environment. Some of the major topics of research in cognitive linguistics are metaphor, categorization, polysemy, and prototypicality. These topics of language usage apply not only to lexis but also to grammar. They are regarded as belonging to the general organization principles related not to language alone but also to other areas of cognition (Niemeier 2005). The investigation of linguistic phenomena relies on general organizing principles, and also relates language to culture (Kovecses, 2005). However, there might be other reasons (e.g. salience) which call learners' attention to a certain expression and which may not be culture related.

The major concern of Applied cognitive linguistics is to highlight for learners the motivation behind linguistic phenomena (Kovecses and Szabo 1996; Charteris-Black, 2000), helping them to figure out how language functions. Niemeier's (2005) main interest in working with conceptual metaphors in the foreign language classroom has been to raise learner's awareness for intercultural differences, as well as to structure principles in language and thought. Working with metaphors, the author expects to encourage learners to develop a new perspective on language. Niemeier argues that learners' awareness of the metonymic background of the meaning of expressions like 'red tape' or 'blue movie' will help them to comprehend those expressions. Certainly, knowing the metaphorical motivation for those expressions will help learners to remember the meaning due to its salience (Giora 1997).

In a study with English as a Second Language learners of business English, Littlemore (2003) investigated how the use of images related to the metaphor could help students understand the meaning of metaphorical expressions. Littlemore uses the expression 'metaphoric competence' to refer to the ability of ESL-learners to understand novel metaphorical expressions in the second language. Littlemore points out that mistaken interpretations of metaphorical expressions occur when learners attribute different meanings to the source-domain of the metaphor than those originally intended by the

speaker. According to the author, ESL-learners tend to perceive contextual clues which are closer to their cultural expectations.

Another author who pointed out pedagogical implications of conceptual metaphor research for second language learning is Charteris-Black (2000). Charteris-Black argues that *teaching the language is, at least in part, teaching the conceptual framework of the subject* (Charteris-Black 2000: 150). His research aims at revealing the implications of Conceptual Metaphor Theory for a content-based approach to the teaching of lexis for English for Specific Purposes (ESP) learners from an Economics background. Charteris-Black used corpus-based analysis in order to compare the relative frequency of metaphorically motivated words, taken from a corpus of *The Economist* magazine, with some words in the general magazine section of the Bank of English. The author illustrates how the economist is shown in the corpus as a doctor who can take an active role in influencing economic events. He also demonstrates how the use of some animate metaphors in the corpus implies some potential for control, while the use of inanimate metaphors implies the absence of control.

Charteris-Black (2000) claims that vocabulary lessons which teach these metaphors could enhance the understanding of central concepts for economics students. He suggests that knowing the metaphors through which impersonal concepts are conceptualized *seems a valuable addition to content-based ESP approaches* (2000: 164). Those findings have implications for the present study.

In following we report the experiments.

2. EXPERIMENT 1: METAPHOR COMPREHENSION TESTS WITH BRAZILIAN EFL LEARNERS

Ten novel metaphorical expressions were selected from online editions of American and English newspapers (see appendix). We departed from the metaphors we have found in discourse employing a top down analysis. After that, the underlying conceptual metaphors were identified based on the metaphor inventory presented by Lakoff and Johnson (1980, 1999) and Grady (1997). Regarding the difficulties that texts containing metaphorical expressions posit to foreign language learners, we seek to

investigate what sort of knowledge EFL learners employ when trying to comprehend a metaphorical expression in a foreign language. Another goal is to examine if foreign language learners access conceptual knowledge when comprehending a metaphorical expression in a similar way as they do it when comprehending a metaphorical expression in the mother tongue (Gibbs 1994). Our main hypothesis here is that there is a universal pattern in the structuring of abstract concepts which facilitates metaphor comprehension in the foreign language. In order to investigate this, we examined how subjects comprehend metaphorical expressions with and without a context.

2.1. Method

Participants. The sample comprised 221 Brazilian undergraduate students, Brazilian Portuguese native speakers and learners of English as a Foreign Language, aged 16 to 67 years-old.

Materials. We have generated a lexis test of the metaphorical expressions, which aimed at investigating if subjects really understood the lexical item, in case they marked they knew its meaning, subjects were asked to write it down.

We have also formulated two multiple choice tests: one test containing only the ten selected metaphorical expressions and another one containing the same expressions embedded in a short context. Each question had four answer options, the correct option corresponds to the underlying conceptual metaphor of the metaphorical expression in the question. The order of the questions, as well as the order of the options was randomized in both questionnaires.

Procedure and design. In the first sitting, subjects responded the reading part of a validated proficiency test, in order to classify them in four different proficiency levels (pre-intermediate, intermediate, upper-intermediate and advanced). We opted for discarding subjects with a basic level of English. Having answered the proficiency test, subjects received the lexis test.

In the second sitting, subjects responded both metaphor comprehension tests. The data collection questionnaires were applied to groups of about 40 subjects each time in the two sittings.

2.2. EXPERIMENT 2: METAPHOR COMPREHENSION TESTS WITH AMERICAN ENGLISH NATIVE SPEAKERS

Our goal here was to examine the degree of conventionality and the degree of familiarity of those ten metaphorical expressions according to the intuitions of American English native-speakers.

Participants. Sixteen American English native-speakers, undergraduate Psychology students at University of California, Santa Cruz took part in the experiment.

Materials. The experiment used the same ten metaphorical expressions employed in Experiment 1. We formulated three questionnaires in order to ask subjects how well they understood each metaphorical expression, how common those metaphorical expressions were and if the speaker would ever use those expressions.

Procedure and design. For the experiment, each participant was given a booklet which contained the instructions and the experimental materials. Participants were specifically instructed, "Please rate each item on a 1 to 7 scale to answer if you understand what those utterances mean from 1 (= not at all well) to 7 (= very well). Write down the number reflecting this (1-7) in the column on the right of the utterances." Subjects were encouraged to use all portions of the rating scale in making their judgments. The experiment took about 20 minutes to complete.

We analyzed the data by calculating participants' mean ratings for each type of stimuli.

2.3. USING CORPUS LINGUISTICS METHODOLOGY IN METAPHOR RESEARCH

The main goal of this study was to compare the results of both psycholinguistic experiments with empirical evidence from corpus linguistic research. A corpus based research allows us to identify patterns of language use faster than the use of intuition or the analysis of isolated texts to the extent that words or expressions are automatically retrieved from the corpus and classified. Deignan (2005) argues that a corpus linguistics approach can give a substantial contribution to our understanding of metaphor.

Research using empirical methods in order to explore metaphor data in a corpus (Boers 1999; Charteris-Black 2000) reveals that metaphorical language used in natural contexts is much different from the metaphorical data collected through introspection. Therefore, we believe that the use of corpus linguistics methodology can contribute to a less subjective analysis of metaphorical expressions.

Corpus linguistics is in the search of typical linguistic patterns. In the case of metaphor research, the main focus of corpus linguistics is conventional metaphor (Deignan 2005). Deignan considers any sense of a word found less than once in thousand words as being an innovative or rare use. Although the corpora might be limited, they offer natural occurring data, whereas the alternative would be data derived from the own speaker's intuition, a methodology commonly used in cognitive psychology (Gibbs 2007).

An important argument against the use of the intuitive knowledge of linguists as the only source of data is the fact that corpus researchers and lexicographers often find unpredicted use of lexis (Deignan 2005). Corpus linguistic evidence pointed out that speakers find it difficult to describe linguistic knowledge out of context, for instance. Obvious facts about metaphor use that sometimes remain unnoticed point in the direction of using large corpora in order to investigate linguistic metaphors. The results of the study of concordances for many words in corpus linguistics reveal that the frequency of occurrence of metaphorical senses might be higher than the frequency of occurrence of non-metaphorical senses (Deignan 1999).

The register of the number of occurrences of each metaphorical expression in the web is relevant in order to establish a comparison based on the reality of use of the written language, such as the result of the corpus research carried out in the web using the WebCorp tool[2], compared to the data collected with American English native speakers in the psycholinguistic experiment.

For the corpus linguistics research presented here, ten metaphorical expressions selected from English and American online newspapers were used[3]. Those expressions were included in the psycholinguistic experiment.

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2. www.webcorp.org.uk

3. The use of texts selected among different subjects, such as fashion, sports and politics, taken from anglo-american newspapers as *The New York Times*, *The International Herald Tribune* and *The Guardian* is justified by the main goal of the study, which is to investigate metaphor comprehension

According to the metaphor analyst's intuition, five expressions used in the study were classified as conventional metaphorical expressions, whereas five expressions were classified as novel metaphors, that is, extensions of conventional metaphors, considered creative and innovative uses (Lakoff and Turner 1989). In order to compare both groups, the empirical study presented here employed cognitive psychology (Gibbs 1994, 2007) and corpus linguistics methodology (Deignan 2005).

3. RESULTS AND DISCUSSION

If we compare the means scores of the questionnaire containing the metaphors without a context, which is 7.4, to the means scores of the questionnaire containing the metaphor in a short context, which is 7.6, we can conclude that context did not play a significant role in metaphor comprehension, since the difference in the results of both questionnaires is only 0.2. Those data point out that the participants in the study based their interpretation on other mechanisms, such as embodied experience, when trying to comprehend metaphorical expressions.

The results of both tests were verified through variance analysis (ANOVA). We considered a significance level of $p < 0.05$ in the analysis. The difference between the different levels of proficiency (pre-intermediate, intermediate, upper-intermediate and advanced) is significant only between the pre-intermediate and the intermediate level, as it appears below:

Reading proficiency level	Subjects (N)	Test with metaphors out of context (1)	Test with metaphors in context (2)
PI	60	6,6	
I	79		7,6
U	62		7,7
A	20		8,4

Figura 1: Comparison scores in the metaphor test according to the reading proficiency level

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from a Conceptual Metaphor (Lakoff and Johnson, 1980, 1999) perspective. Lakoff and Johnson claim that metaphor is ubiquitous.

There is a significant correlation (p < 0.05) between the previous knowledge of the lexis which is part of the metaphors and the scores of the reading proficiency test answered by the participants. This data corresponds to our expectations since the previous knowledge of the lexis seems to facilitate reading.

There is also a significant correlation between the variable lexis and the scores of the questionnaire containing the metaphors without a context. Hence, we can assume that the FL-learner knows the vocabulary which is part of the metaphorical expressions in the questionnaire without accessing contextual information, but accessing conceptual knowledge and embodied experience (Gibbs 2006) in order to understand the metaphorical meaning. The answer options related to the underlying conceptual metaphor obtained a high score in the questionnaire without a context.

In order to analyze the scores per metaphor separately, we chose a population of 50% of the sample of 221 subjects and carried out a planned t-test. The t-test pointed out that there was no difference between this sample (N = 118) and the total sample (N = 221), since the results did not reveal a significant difference (p > 0.05). We chose at random 118 participants among the four proficiency levels (pre-intermediate, intermediate, upper-intermediate and advanced) in order to examine the distribution of the scores per metaphor, comparing the results of the questionnaire containing the metaphors with and without a context.

According to this analysis, there was a high score in the questionnaire without a context for the metaphors (1) *It is all about getting a pound of flesh from them*, which correct option had a score of 93 (T=118), compared to a score of 71 in the questionnaire containing the metaphors in context; (3) *Somebody was trading the keys to the kingdom*, which right option had a score of 91 (T=118), compared to a score of 54 in the questionnaire containing the metaphors in context; (4) *You are in the middle of a dark forest*, which right option had a score of 116 (T=118), compared to a score of 75 in the questionnaire containing the metaphors in context; (6) *The temperature went from boiling to subzero,* which right option had a score of 103 (T=118), compared to a score of 98 in the questionnaire containing the metaphors in context; e (7) *I was at the edge of my limit,* which right option had a score of 115 (T=118), compared to a score of 68 in the questionnaire containing the metaphors in context. In case of the metaphorical expressions (4) *You*

are in the middle of a dark forest, (7) *I was at the edge of my limit* and (10) *It disappeared two months later in quick rotation,* which right option had a score of 109 (T=118), compared to a score of 101 in the questionnaire containing the metaphors in context, the fact that the metaphorical expression in Portuguese was the literal translation of the metaphorical expression in English has probably biased the results. However, further research is needed here in order to confirm this.

We would like to focus the discussion on the results of items (6) and (8) of the questionnaire which raises interesting questions from a methodological point of view concerning Conceptual Metaphor Theory. In question (6), *The temperature went from boiling to subzero,* the right option 'the situation changed quickly' has as underlying primary metaphor CHANGE IS MOTION (Grady 1997: 286). In the analysis of the score per metaphor, the right option was rated with 103 (T=118), compared to a score of 98 in the questionnaire containing the metaphors in context. In question (8) *Somebody has managed to sneak into their hearts*, the correct option 'to find an important spot' had as underlying primary metaphor IMPORTANT IS CENTRAL.

Our hypothesis is that the same pattern at work in the comprehension of metaphorical expressions in the mother tongue (Gibbs 1994) is also at work when the language learner reads a metaphorical expression in the foreign language. Such hypothesis suggests the existence of a universal pattern in the structuring of abstract concepts which facilitates metaphor comprehension also in the foreign language. This universal pattern allows learners even at pre-intermediate proficiency level to comprehend metaphorical language based on their embodied cognition, that is it enables learners to understand metaphorical expressions without relying on contextual information. For instance, in case of the expression *the temperature went from boiling to subzero*, the option corresponding to the underlying conceptual metaphor CHANGE IS MOTION (Grady 1997: 286), which is 'the situation changed quickly', obtained a high score in the questionnaire without context. However, only a thorough study of the inferences related to each conceptual metaphor tested in the study will gather more evidence on the comprehension of those metaphorical expressions.

3.1. RESULTS OF THE SEARCH USING CORPUS LINGUISTICS METHODOLOGY

We opted to use WebCorp[4], which is a tool with examples of language use extracted from the web in an adequate form for linguistic analysis. WebCorp has been developed to operate using the available search tools and it uses Google, among other tools, in order to locate relevant sites on the web. It accesses each of these pages and extracts every concordances of a Word or sentence specified by the researcher. The result is presented in concordances in a context with 1 to 50 words to the left and to the right.

WebCorp accesses each of these pages and extracts lines of concordances. In Google, a searched item can be repeated in the same search, but the user will only find it out when clicking on each link individually. WebCorp presents options like the spam of concordances and the output format, which were specifically developed for linguistic research.

The result of the WebCorp search on the number of concordances for the metaphorical expressions follows below.

Chart 1 – Results of the WebCorp[5] search

Metaphorical expressions	Accessed pages	Number of concordances	Literal use of the expression	Metaphorical use
To bump its premium subscribers up to a virtually unlimited capacity.	9	7	-	7
To trade the keys to the kingdom.	36	23	3	20
You are in the middle of a dark forest.	134	99	90	9
…the most recent season of corporate financial manipulations has as its latests storms.	5	5	-	5
The temperature went from boiling to subzero.	1	1	-	1
I was at the edge of my limit.	14	12	-	12
It has managed to sneak into their hearts.	7	7	-	7
It exploded onto the radar.	6	6	-	6
It disappeared later in quick rotation.	54	33	25	8

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4. WebCorp was created and is maintained by the Higher School of English at University of Central England, Birmingham. It is of free access. (www.webcorp.org.uk)
5. Accessed in 13.09.2006

The result of the WebCorp search pointed out that the ten expressions used in the study are novel metaphorical expressions, they are not five conventional and five novel metaphors as previously planned when the data collection questionnaire was designed. According to Deignan (2005), each sense of a word found less than once in thousand occurrences of a word can be considered of rare use. The specificity of the employed linguistic search tool allowed an increase in the number of concordances for seven of the ten metaphors studied[6]. WebCorp has also facilitated the analysis of the context of the studied expressions and supported the investigation on the nature of the use of each expression, that is the examination as to whether the expression was of literal or metaphorical use. The WebCorp search revealed that the following metaphorical expressions (1) *To get a pound of flesh from human beings*; (2) *To bump its premium subscribers up to a virtually unlimited capacity*; (3) *To trade the keys to the kingdom*; (5) *…the most recent season of corporate financial manipulations has as its latests storms*; (7) *I was at the edge of my limit*; (8) *It has managed to sneak into their hearts*; (9) *It exploded onto the radar* present mainly metaphorical uses.

Expressions as (6) *The temperature went from boiling to subzero* and (7) *I was at the edge of my limit*, which judgment of the EFL-learners had a score of 103[7] for (6) in the instrument without context and a score of 115 for (7) under the same conditions, obtained a very different result in the empirical and in the WebCorp search. The expression *The temperature went from boiling to subzero* (6) generated only one concordance in WebCorp, which was a metaphorical use, and expression (7) *I was at the edge of my limit* generated twelve concordances, all of them metaphorical uses.

The result of the corpus search on the web using WebCorp revealed that the ten linguistic metaphors used in the study are novel metaphors with a low number of concordances. The expression which received the highest number of concordances with metaphorical sense in the WebCorp search was (1) *To get a pound of flesh from human beings* with 58 concordances, of which 56 were metaphorical uses. The result of the tests carried out with EFL-learners revealed that 93 out of 118 subjects related this metaphorical expression to its underlying conceptual metaphor HARM IS TO CAUSE PHYSICAL INJURY in the questionnaire without context. Apparently,

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6. A preliminary study was carried out using Google – advanced search.
7. With a sample of 118 subjects.

the context did not help subjects to comprehend this linguistic metaphor. The opposite seems to have happened and the EFL-learners scored more distractor options in the test after reading the linguistic metaphor embedded in a context. Such a result points out a problem of the psycholinguistic experiment, since one of the goals of the empirical study with EFL-learners was to test five novel and five conventional metaphorical expressions, and we have finally found out that all metaphors tested in the study are novel metaphors according to the results of the WebCorp search.

Discussion

In the present study we dealt with a methodological issue of Conceptual Metaphor Theory, which is the fact that sometimes there is more than one possible conceptual metaphor for the same metaphorical expression (Semino, Heywood and Short 2004). The utterance *The temperature went from boiling to subzero* refers to a sudden change. It is a sudden change in temperature. Hence, the underlying primary metaphor which motivated this utterance could be CHANGE IS MOTION, but this utterance could have also been motivated by the primary metaphor INTENSIONS OF EMOTION IS HEAT (Grady 1997: 295). According to Grady, CHANGE IS MOTION establishes "the correlation between the perception of movement and being aware of a change in the world-state around us" (Grady 1997: 286), whereas INTENSITY OF EMOTION IS HEAT correlates "skin temperature to agitation" (Grady, 1997: 295). We chose to include only the source-domain of MOTION in the correct option (the situation changed quickly) of question 6 and decided to leave the source-domain HEAT out. We would like to draw attention to the fact that respondents have apparently identified the linguistic expression 'the situation changed quickly' with the underlying primary metaphor since 103 (N=118) scored this option in the multiple choice test.

In case of question (8) *Somebody has managed to sneak into their hearts,* we intentionally did not include among the distractors any word relating to the experiential domain of emotion, in order to avoid that the respondent would relate it to *hearts.* The rating per metaphor in the tests pointed out basically no difference between the scores of both tests, where 75 (out of 118) subjects chose the answer option related to the conceptual metaphor in the questionnaire without a context and 74 scored the same option in the

questionnaire with a context. This question has also raised a methodological issue regarding the definition of the underlying conceptual metaphor. At first, we defined the target-domain of the conceptual metaphor related to the metaphorical expression (8) *Somebody has managed to sneak into their hearts* as being IMPORTANCE. Kovecses[8] suggested that its target-domain is LOVE, in the sense of 'for Y to love X is for X to be in Y's heart'. However, in the metaphorical expression *Somebody has managed to sneak into their hearts*, *heart* seems to refer an important place - and not to an emotion. *Heart* might be seen here as a metonymy for emotions. Nevertheless, *heart* could also be referring to a container, and then it could be considered a place, and IMPORTANT IS CENTRAL would be a conceptual metaphor which motivates the metaphorical expression. To sum up, the experiential domain referred in the correct answer option of the test was PLACE, and this option was rated with 75 in the questionnaire without a context and 74 (out of 118) in the questionnaire with a context.

We could state that the foreign language learners who participated in the experiment have a 'metaphoric competence' (Littlemore 2003) which enables them to derive metaphorical meaning in a foreign language. Some of the mistaken metaphorical interpretations by the foreign language learners in the present study occurred, as suggested by Littlemore, when the FL-learner attributed another meaning than the one originally intended by the author, to the source-domain of the metaphor.

As Gibbs, Lima and Françozo (2004) pointed out, not every conceptual metaphor has the same type of experiential correlation, and if we look at questions (1), (3), (4), (6) and (7), we will be able to identify different experiential correlations between the conceptual metaphors of the present study. This is due to the different nature of those metaphors, that is different source and target-domains. For instance, in case of (4) the source-domain DARK, in case of (6) the source-domain of MOTION, and in case of (7) the source-domain CONTAINER have influenced the results of the comprehension tests with the foreign language learners.

In case of the metaphorical expressions (4) *You are in the middle of a dark forest*, (7) *I was at the edge of my limit,* (9) *It doesn't often explode onto the radar* and (10) *It disappeared two months later in quick rotation,* it is also possible that the literal translation of the metaphorical expression into Portuguese

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8. Personal communication.

has biased the results because it is similar to the metaphorical expression in English. Nevertheless, the underlying conceptual metaphors in (4), (7), (9) and (10) relate to bodily experiences which can be easily perceived by our senses, such as vision and the feeling of anger. Therefore, the high score of the questions related to those metaphors in the questionnaire without a context may also be an evidence for embodiment (Gibbs 2006). These conclusions about the scores of questions (4), (6), (7), (9) and (10) are in line with Charteris-Black's (2003) findings that metaphorical language, which has a similar linguistic form and conceptual basis in the mother (L1) and foreign language (LE), is more easily understood by foreign language learners.

Each metaphor of the present study is related to a different experiential domain, such as vision (DARK), sense of touch (HEAT), time (MOVING TIME), sensory-motor functioning (CONTAINER). This fact highlights a difficulty in quantifying and establishing comparisons between such varied experiences.

According to our predictions, the absence of a context should have been a problem for comprehending the expressions (3) *To trade the keys to the kingdom*, (4) *You are in the middle of a dark forest* and (5) *…the most recent season of corporate financial manipulations has as its latests storms*, since this result had been pointed out in a previous interview with English native-speakers carried out in Brazil to validate the questionnaire. In fact, participants experienced the expression (5) *…the most recent season of corporate financial manipulations has as its latests storms* (rated with 3,8 out of 7 on a Likert scale) as more difficult to understand than expressions (3) *To trade the keys to the kingdom* (rated with 4,9 out of 7) and (4) *You are in the middle of a dark forest* (rated with 5,7 out of 7). It is possible that the literal meaning of (4) *You are in the middle of a dark forest* and (6) *The temperature went from boiling to subzero* has biased the comprehension of those expressions since participants scored higher in the comprehension task for those expressions (questionnaire 1), which asked participants about how well they understood those expressions. They rated question (4) *You are in the middle of a dark forest* with a score of 5,7, and question (6) *The temperature went from boiling to subzero* with 6,7, although they probably meant that they could understand the literal meaning of that expression. This fact highlights a problem of the questionnaire. However, its is also possible that the close relationship of both primary metaphors to more basic bodily experiences, as it is the case

for the experiential domains of vision (the perception of darkness) and the perception of heat have positively influenced the results.

In the study carried out with American English native speakers, the ten metaphorical expressions were presented in a sentence to respondents, that is the expressions were not embedded in a large discursive context. This questionnaire was similar to the first questionnaire applied to the foreign language learners. The results pointed out that the judgment of the American native speakers was similar to the ratings of the English as a Foreign Language learners for the metaphorical expressions (4), (5) and (6). Expression (4) *You are in the middle of a dark forest* received a high score in the empirical study with EFL-learners (116 out of 118 respondents scored 'danger' in the questionnaire without a context), relating danger to darkness. The same expression was considered easy to comprehend by American English native speakers. However, expression (5) *…the most recent season of corporate financial manipulations has as its latests storms* was rated as average by the American English native-speakers (rated with 3,8 out of 7 on a Likert scale). Many EFL-learners did not relate this expression to the underlying conceptual metaphor in the multiple choice task (79 of 118 respondents scored the option related to the conceptual metaphor in the questionnaire without a context). English native speakers rated expression (6) *The temperature went from boiling to subzero* as easy to understand (6, 7 of 7). EFL-learners scored 102 (in a 118 sample) for the same question containing the metaphorical expression embedded in a sentence.

We had expected that respondents would rate expressions like (3) *To trade the keys to the kingdom*, (9) *It exploded onto the radar*, and (10) *It disappeared later in quick rotation* as being less common. However, respondents rated only expression (10) as being less common according to their intuitions.

The group of American English native speakers judged expression (8) as easy to understand (rated with 6,4 out of 7 in a Likert scale) and common (also rated with 6,4 out of 7). For expressions (9) and (10), the difference between the results of the tests with and without a context is not significant. The score results per metaphor pointed out that expression (10) was easy to understand since 109 EFL-learners chose the option related to the primary metaphor MOMENTS IN TIME ARE OBJECTS MOVING ALONG A PATH in the questionnaire without a context and 101 EFL-learners chose the same option in the questionnaire with a context. This might be due

to the fact that this metaphorical expression contains Latin words like 'disappear' and 'rotation', and the literal translation of the expression is similar to Brazilian Portuguese. The word 'rotation' already triggers the notion of MOVEMENT in the source-domain.

The English native-speakers rated the comprehension of expression (10) with 4,3 and considered it as not very common (3,6 out of 7). The fact that expression (9) presents the Latin expression 'explode' has probably biased the results of the tests with EFL-learners, although we could not confirm this possibility through our findings. Seventy informants chose the option related to the conceptual metaphor in the questionnaire without a context and 69 in the questionnaire with a context. However, the group of English native-speakers judged that they understand well that expression (5,6 of 7), and this expression as being of common use (this expression was rated as the most common of the ten expressions with a score of 6,8 on a Likert scale).

Comparing the results of the psycholinguistic experiments with the result of the study using corpus linguistics methodology, we can see how speaker's intuitions about language differ from data about language in use gathered on the web. While in the empirical study with EFL-learners, the expression (4) *You are in the middle of a dark forest* received a high score for the option associated with its metaphorical sense in the questionnaire without context, the WebCorp search obtained 99 concordances, only nine of them were metaphorical.

FINAL REMARKS

The results of the three empirical studies present strong evidence which corroborates the hypothesis of the universality of metaphor and the role of embodiment in the comprehension of metaphorical expressions from a crosslinguistic perspective. An analysis of the answers of the group of EFL-learners for the questionnaire presenting the metaphorical expressions without a context pointed out high scores for the following metaphorical expressions: (1) *To get a pound of flesh from human beings*, (3) *To trade the keys to the kingdom,* (4) *You are in the middle of a dark forest*, (6) *The temperature went from boiling to subzero* and (7) *I was at the edge of my limit*. This result is similar to the result of the ratings of the same metaphorical expressions obtained

with the group of American English native speakers, which rated expression (4) *You are in the middle of a dark forest* with 5,7; (6) *The temperature went from boiling to subzero* with 6,7 and (7) *I was at the edge of my limit* also with 6,7 on a rating scale from 1 to 7, in which 7 corresponds to an excellent understanding of the expression.

The data resulting of both psycholinguistic experiments present some evidence which corroborates the hypothesis that there is a universal pattern in the structuring of abstract concepts which facilitates metaphor comprehension in a foreign language. This universal pattern enables foreign language learners to comprehend linguistic metaphors without contextual information, since the variable context did not play a significant role in metaphor comprehension in the present study.

The comparison of the results of both experimental studies, in which the metaphors (4) *You are in the middle of a dark forest*, (6) *The temperature went from boiling to subzero*, (7) *I was at the edge of my limit*, (8) *Somebody has managed to sneak into their hearts* and (9) *It doesn´t often explode onto the radar* obtained high ratings, allows us to confirm the hypothesis that there is a universal pattern in the conceptualization of concepts related to the experiential domains of MOTION (6), CONTAINER (7), PLACE (8), and VISION for both (4) and (9), related to the linguistic metaphors of the study. This fact seems to be strongly related to a high rating of those metaphorical expressions in the questionnaire without a context. This findings also support the hypothesis that there is a universal pattern in the conceptualization of the abstract concepts of 'danger', 'motion' and 'anger', related to the linguistic metaphors in questions (4), (6) and (7).

Considering the results of the first experiment for the four different proficiency levels from a foreign language acquisition perspective, there is not a significant difference among the different proficiency levels in order to suggest a development in metaphor comprehension with exception of the significant improvement in metaphor comprehension up the intermediate proficiency level. As suggestion for further research, it would be interesting to investigate why this difference is only significant between the pre-intermediate and the intermediate levels, as well as its pedagogical implications for the foreign language classroom.

A comparison of the results of the psycholinguistic experiments with the study which employed corpus linguistics methodology revealed that not

always speaker's intuitions on their linguistic knowledge are in line with the data of language in use represented in the corpus. In this sense, corpus linguistics can be regarded as a support methodology for psycholinguistic research.

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APPENDIX 1

1) To get a pound of flesh from human beings.
2) To bump its premium subscribers up to a virtually unlimited capacity.
3) To trade the keys to the kingdom.
4) You are in the middle of a dark forest.
5) …the most recent season of corporate financial manipulations has as its latests storms.
6) The temperature went from boiling to subzero.
7) I was at the edge of my limit.
8) It has managed to sneak into their hearts.
9) It exploded onto the radar.
10) It disappeared later in quick rotation.

APPENDIX 2

1. Linguistic metaphor: "It is all about *getting a pound of flesh from human beings*. Businesses are all about profit and people feel much more stressed because of that."
Primary metaphor: HARM IS PHYSICAL INJURY

2. Linguistic metaphor: "Yahoo says that it plans to dramatically raise the storage limit given to its free e-mail users while at the same time *bumping* its premium subscribers *up to* a "virtually unlimited" capacity."
Conceptual metaphor: MORE IS UP

3. Linguistic metaphor: "The career of Druyun, once the most powerful woman in the U.S. Air Force, of course, is over. Last week, she was sentenced to nine months in prison for having steered billions of dollars in air force contracts for four critical weapons systems to Boeing and for having overpaid the company as well. [...] "This is just awful," said Richard Aboullafia, [...]."She was trading *the keys to the kingdom*."
PM: MEANS ARE PATHS

4. Linguistic metaphor: "You are in the middle of a *dark forest,* night closing in, with a pack of vicious, hungry wolves wandering back and forth in front of you, taking your measure".
PM: GOOD IS LIGHT/ BAD IS DARK

5. Linguistic metaphor: "Likewise, the most recent *season* of corporate financial manipulations, which by some measures blew in with Enron back in 2001, has as its latests *storms* the likes of Hollinger and Fannie Mae in North America and Hynix in South Korea."
PM: CIRCUNSTANCES ARE WEATHER

6. Linguistic metaphor: "When Mr. McAllister went to a casting call for a commercial for the left-leaning group MoveOn.org and got a part, his girlfriend was dismayed. "Having a spirited debate is one thing, but being part of a political machine that opposes her candidate is another," he said.She broke their next date, and soon the relationship ended. *'The temperature went from boiling to subzero a*fter I did something to get people to support my candidate,' Mr. McAllister said."
PM: CHANGE IS MOTION

7. Linguistic metaphor: "A hundred megabytes is absolutely fantastic because I was bumping *at the edge of my limit* ".
CM: THE BODY IS A CONTAINER

8. Linguistic metaphor: "[…], the Café de Flore, is another example of a well-frequented location that has managed to *sneak into the hearts* of the Paris fashion elite and stay there".
PM: IMPORTANT IS CENTRAL

9. Linguistic metaphor: "Unlike cities like New York and London, hot new places in Paris don´t often *explode onto the radar* and disppear two months later in quick rotation".
PM: EXISTENCE IS VISIBILITY

10. Linguistic metaphor: "Unlike cities like New York and London, hot new places in Paris don´t often explode onto the radar and disppear two months later *in quick rotation*"
PM: MOMENTS IN TIME ARE OBJECTS IN MOTION ALONG A PATH ("*Moving-time*")