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Creating a Formulas List for EFL Medical Professionals

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ABSTRACT

This study describes the attempt to create a pedagogically useful list of formulaic sequences for medical professionals, called the Medical Formulas List (MFL). The multi-word expressions selected were derived from a corpus containing 5.8 million tokens of 1,120 research articles across 28 medical subjects. Through *Collocate* and manual checking, four criteria were applied: frequency, range, cohesiveness of word groups for meaningful units and grammatical well-formedness for comprehensible units. Totally the 738 most frequent formulas of 2 to 6 words were chosen, and they accounted for 12.64 % of the running words in the medical corpus. Furthermore, the attributes of the MFL were analyzed functionally and structurally. For EFL medical professionals who need to publish research papers in their field, the MFL may help in providing a pathway to the academic register. The present procedure may also apply to other academic subjects for the establishment of a discipline-specific formulas list.

Keywords: multi-word units - formulas - lexical bundles - collocations

INTRODUCTION

This research aimed to go beyond single words to compile a universal Medical Formulas List (MFL) for EFL medical professionals. The MFL was inspired by Author's (2013) Medical Word List (MWL) commonly used in the medical field. She compiled a 15-million-token corpus containing 155 textbooks across 31 medical subject areas and examined the range and frequency of words outside the most frequent 3,000 word families along the word-frequency scale of the British National Corpus. To reach 98% lexical coverage for adequate comprehension of medical texts, 595 of the most frequently-occurring word families were chosen and formed the MWL, which accounted for 10.72% of the running words in the medical textbook corpus. Excluding highly-specialized medical terms of Greek/Latin sources, the MWL encompassed various sub-technical and lay-technical vocabularies and aimed to bridge the gap between non-technical vocabulary and technical terms. As admitted by Author, focusing on specialized words common to medical subjects is still not enough for EFL medical students. Apart from individual words, learners may be interested in recurrent multi-word sequences, because they help to develop reading fluency and native-like selection of lexis in writing (Pawley & Syder, 1983). The use of chunked expressions enables learners to reduce cognitive effort to save processing time and to have language available for immediate use. Moreover, if instructed, formulaic expressions may raise students' awareness of native speakers' preference for certain multi-word sequences over others so as to avoid unnatural English chunks, even though they are grammatically correct. In the case of '*Pass the salt*' versus '*Give me the salt*', the latter is rarely used in the target language.

The present research targeted medical research articles as a starting point in the hope of easing EFL medical professionals' burden on notoriously difficult lexis and ubiquitous, esoteric terms when they need to publish medical case studies. As such, the purpose of this research was twofold: First, an effort was made to develop a Medical Formulas List (MFL) common to medical subjects. Second, an attempt was made to analyze the MFL in terms of its importance, functions and structures. This research sought to answer the questions below.

1. What high-frequency multi-word units make up the Medical Formulas List (MFL)?
2. How important is the MFL in the medical research article corpus (specifically, text coverage in %)?
3. What are the most common formulaic patterns in medical research articles?

LITERATURE REVIEW

With the help of computer programs, a corpus-based methodology provides teachers and learners with opportunities in taking a wider view of language beyond a stock of individual words. Certain words co-occur in natural text with greater than random frequency and may constitute a large portion of discourse (Schmitt & Carter, 2004).

In the literature, a variety of terms have been used to refer to multi-word sequences and have been studied under different rubrics, such as collocations (Lewis, 1993), formulaic sequences/formulas (Martinez & Schmitt, 2012; Schmitt & Carter, 2004; Simpson-Valch & Ellis, 2010), lexical bundles (Biber et al., 1999; Biber, Conrad, & Cortes, 2004; Cortes, 2004; Hyland, 2008ab), clusters (Scott, 1996), prefabricated units/prefabs (Bolinger, 1976; Cowie, 1992), sentence stems (Pawley & Syder, 1983) and lexical phrases (Hunston & Francis, 1996; Nattinger & DeCarrico, 1992).

Recurrent multi-word sequences involve a set of characteristics (Benson et al. 1997; Bolinger, 1976; Lewis, 1993; Nation, 2001; Sinclair, 1991). They are word combinations which are (1) frequent, (2) adjacent, (3) grammatically fixed or semi-fixed in forms, allowing changes in part of speech or word order, (4) lexically fixed or semi-fixed, permitting substitution of their component words, (5) transparent or opaque in meanings and (6) prefabricated or semi-prefabricated, and formulaic in nature.

In terms of the degree of substitution, multi-word sequences can be represented by a continuum of compositionality with idioms on one end, which lose the surface meanings and are fixed in structure (e.g. *a storm in a teacup*), and free combinations on the other end, which deliver simply the literal meanings of the lexical components and allow substitution (e.g. *Japanese cars, cable cars and police cars*). In this research, the selected multi-word units fall between the two extremes, since they combine together the syntagmatic restrictions of idioms and the semantic transparency of free combinations.

In light of the length of multi-word units, there are four structures (Nattinger & DeCarrico, 1992): (1) short polywords, functioning like individual lexical items, such as '*so to speak*'; (2) short to medium-length phrases, allowing variation, such as '*from ~ to ~*', '*~ and ~ respectively*' and '*~ years of age*'; (3) sentence builders providing the framework for whole sentences, such as '*It is ~ to*', and (4) sentence-length expressions, like '*Have a nice day*'.

From the perspective of parts of speech, multi-word sequences (so called extended collocations) are of two major types, grammatical collocations (colligations in Bolinger's term, 1976) and lexical collocations (Benson et al. 1997). Grammatical collocations demonstrate the tie between vocabulary and grammar. They consist of a content word (verb, noun, adjective or adverb) and a preposition or a grammatical structure as its complement (e.g. a that-clause, an infinitive or a gerund) as in the cases of '*finish + V-ing*' or '*the fact that + clause*'. In contrast, lexical collocations are word associations where one content word recurrently co-occurs with one or more other content words as the only one or one of few possible lexical choices (e.g. *fall/fast/sound asleep* and *misty gray*).

In an influential grammar book, *Longman Grammar of Spoken and Written English*, Biber et al. (1999) referred to multi-word sequences as lexical bundles and defined them as combinations of three or more words that co-occur frequently in a particular register and function as building blocks of discourse. According to Biber and his colleagues (1999, 2004), lexical bundles are (1) usually not complete structural units, (2) not idiomatic in meaning, and (3) structurally complex, often composed of a matrix phrase/clause and the beginning of an embedded phrase/clause (e.g. '*I don't know if*' and '*to do with the*').

Concerning the functions of lexical bundles, Biber, Conrad and Cortes (2003, 2004) and Cortes (2004) designed a categorization scheme for academic writing and university teaching. There are four core categories in their taxonomy: referential bundles, discourse organizing bundles, stance bundles and interactional bundles. Referential bundles perform an ideational function (e.g. '*one of the things*' and '*the nature of the*'). Discourse organizing bundles are concerned with the organization of the text such as contrast, inference and focus (e.g. '*on the other hand*', '*as a result of*' and '*It is important to*') or signal transition (e.g. '*in addition to the*' and '*with respect to the*'). Stance bundles express attitudes that frame some propositions as in the cases of '*are more likely to*' and '*the fact that the*'. Interactional bundles are used in conversation to express politeness as in '*Thank you very much*' and inquiry such as '*What are you doing?*'

Although researchers give different definitions to multi-word sequences, there are two fundamental criteria generally used to retrieve them, i.e. recurrence and dispersion. More specifically, a sequence of words must occur frequently in a register and it must occur in multiple texts in that register to avoid idiosyncratic tendencies caused by individual authors.

The cut-off points determined in the literature for frequency and range have been arbitrary, subject to researchers' goals. Biber et al. (1999) set out to adopt a very flexible cut-off point at ten times in a million words. Defining lexical bundles as combinations that recur at least 10 times per million words and across five or more texts, Biber et al. (1999) found that 3-word bundles occur over 60,000 times and 4-word bundles over 5,000 times per million tokens in academic texts, accounting for about 21% of the 5.3 million words of the academic component of the Longman Corpus. They also found that 60% of the lexical bundles in academic prose are noun phrases or prepositional phrases as in the cases of '*a measure of the*' and '*on the basis of*'. Cortes (2004) was more conservative and opted for 20 times, when conducting a study on a comparison of the frequency and function of lexical bundles in the written production of published authors and student writing in history and biology. Biber, Conrad and Cortes (2004) were even more cautious in choosing lexical bundles from their corpora by setting a relatively high frequency cut-off at 40 times per million words. Following Biber et al.'s approach, Hyland (2008ab) increased the frequency cut-off point from a minimum of 10 times to 20 times per million words and decided on the breadth of lexical bundles at occurring in at least 10% of the texts in the sample, when selecting lexical bundles in his 3.5-million-word corpus of academic writing in articles, PhD dissertations and Master's theses. Hyland (2008a) found that many of the most frequent bundles in academic writing are general and the frequencies drop dramatically, as strings are extended to five or more words. Furthermore, many 3-word bundles are embedded in 4- and 5- word strings. Most lexical bundles are semantically transparent, providing the building blocks of coherent discourse.

Present-day phrase extraction programs ensure the properties of frequency and multi-text occurrences. Nevertheless, they do not adequately deal with meaningful retrievals. Purely based on frequency and distribution, a lexical bundle retrieved by a phrase extractor may cross an immediate constituent boundary and span two structural units, as in the examples of '*is one of the*', '*on the other hand the*', '*was found in the*' and '*of the distribution of*'. As can be seen, the last words of these bundles are the first elements of the next structural units. These instances all appeared in the top fifty 4-word bundles across at least 3 disciplines in Hyland's (2008a) corpus and met the selection principles, i.e. frequency and breadth of use. They also reveal that based solely on occurring frequency and distributional range, a software program may generate long lists of lexical bundles, part of which are not suitable for teaching. To tackle the problem of teachability, Simpson-Vlach & Ellis (2010) put forward the notion of Formula Teaching Worth (FTW) by incorporating mutual information (MI) (a statistical measure of the cohesiveness of words) into their weeding procedure in lieu of a purely frequency-based approach. In one of their cases, the sequence of words '*and of the*' occurred more frequently than expected (passing a certain threshold of both frequency and distributional range); however it does not seem to be pedagogically useful. On the other hand, the expression '*on the other hand*' cohered much more than would be expected by chance based on the high mutual information score and is more likely to be pedagogically relevant. The former expression '*and of the*' comes at the top if frequency is a top priority in listing formulaic sequences, while '*on the other hand*' ranks higher if mutual information (the degree to which the words are bound together) is considered first. After a series of reliability and validity checks, Simpson-Vlach and Ellis (2010) came up with a standardized solution whereby Formula Teaching Worth (FTW) = $\beta 0.56 * \text{Mutual Information} + \beta 0.31 * \text{Frequency}$. The FTW that combines both factors (i.e. MI and frequency) may provide instructors with a basis of prioritizing formulaic expressions for instructional uses, when judging lexical bundles in terms of whether they are worth teaching.

Formulaic sequences help to shape meanings in specific contexts as well as contribute to coherence in a text, and even the distinctiveness in a register. Discipline-bound formulaic sequences allow users to express identity with a disciplinary community (Wray, 2002). In their investigation into the teaching of certain formulas to non-native university students taking EAP

classes, Jones and Haywood (2004) advocated that the use of formulaic sequences can help novice writers to express technically complex ideas in an economical way, to mark different stages in their academic writing and to show a certain level of formality. In view of such utilities, directly learning the most frequent formulas in a target domain may be fast and effective for EFL professionals who need to publish research papers in their fields.

RESEARCH METHOD

The corpus

The researcher compiled a corpus covering 1,120 medical research articles (RAs) across 28 medical subject areas from online resources, totaling approximately 5.8 million tokens (hereafter referred to as the Medical RA Corpus). All the sampled medical RAs (forty RAs being selected for each sub-discipline) were downloaded from databases such as Medical Online, Medicus and Medline, ScienceDirect and ProQuest, which were purchased by the researcher's university and can be used freely for research purposes. These electronic databases contain leading medical journals such as the *British Medical Journal* and the *New England Journal of Medicine*. The subject areas included in the Medical RA Corpus based on the discipline of Medicine and Dentistry of ScienceDirect Online involved: (1) anesthesiology, (2) allergology/immunology, (3) alternative/complementary medicine, (4) cardiology, (5) dermatology, (6) dentistry, (7) endocrinology/metabolism, (8) emergency medicine, (9) forensic medicine, (10) gastroenterology, (11) hematology, (12) hepatology, (13) health informatics, (14) urology, (15) infectious diseases, (16) intensive care medicine (17) neurology, (18) nephrology, (19) obstetrics/gynecology, (20) oncology, (21) ophthalmology, (22) orthopedics/rehabilitation, (23) otorhinolaryngology, (24) perinatology/pediatrics, (25) psychiatry, (26) pathology, (27) pulmonary/respiratory medicine, and (28) surgery & transplantation. Consequently, there were 28 sub-corpora/files. Excluding tables and references, every sub-corpus consisted of an approximately equal number of running words, namely around 0.2 million words.

The procedure

The computer program *Collocate* (Barlow, 2004) was used to retrieve multi-word sequences from the Medical RA Corpus. The first decision was what length of formulas would be included in the data. In the literature review of lexical bundles, 2-word bundles have often been excluded in order to keep the data set to a more manageable size. For the sake of thoroughness, strings of 2 to 6 words were selected in the present study, although 6-word phrases are relatively rare. The next decision was what frequency level was to be used as a cut-off. The frequency cut-off points in previous studies ranged between 10 and 40 instances per million words. Since this research used other measures to sift out multi-word sequences across sub-disciplines, a less restricted threshold was set to start with, namely 10 times per million running words (i.e. a minimum of 58 times as far as 5.8 million words in the present corpus are concerned). The frequency-based 2 to 6-word formulaic sequences selected at this stage was approximately 1,608 items. From this master list, the next goal was to identify those formulas that are general in the genre of medical research articles. If the formula occurred with a very high frequency but appeared in one or two medical subject areas, they would not be included in the MFL. This may have been attributable to particular medical cases or individual writers' habitual use of fixed phrase. Therefore, cut-off values for distributional range was established at having to occur at least more than half of the total subject areas, namely at least 14 out of 28 medical sub-disciplines. Appearing across at least half of the sub-disciplines as the range criterion for inclusion followed the same decision made by Coxhead (2000) in developing the AWL. This selection principle aimed to select the formulaic sequences that are general in nature in medical studies. The decision was admittedly arbitrary but resulted in a reduction of one-sixth of 1,608 raw items.

Another consideration given to the formulaic sequences for inclusion in the MFL was meaningfulness. The multi-word sequences to be selected must have meaning(s) and can be learned as a whole. This criterion would select formulas that can be comparable with the individual words in a frequency-based wordlist. Inevitably, this involves a winnowing phase. Before manual checking for meaningful units, the measure *Mutual Information* did the initial screening.

As mentioned in the *Literature Review*, Mutual Information (MI) is a statistical measure to assess the degree to which the words in a phrase occur together more frequently than would be expected by chance (Oakes, 1998). Its value is the quantity that measures the mutual dependence of the two words or multi-word combinations. A high MI score means a stronger association between the words, while a lower score indicates that their co-occurrence is more likely due to chance. MI is a scale, not a test of significance, so there is no minimum threshold value, although the default value is set at 3 in some phrase extraction programs. Many of high-frequency sequences of words occur simply by means of the high frequency of their component words, like 'patients' in 'in patients with', 'shown' in 'has been shown to' and 'approved' in 'was approved by the'. These purely frequency-based word combinations are neither pedagogically compelling nor ready for use for EFL learners. On the other hand, MI tends to identify less frequent phrases comprised of rare constituent words. High MI multi-word sequences are those with much greater coherence, which may have more easily identifiable, distinctive functions and meanings, and may thus be suitable for teaching. With the help of the ordering function in the *Collocate* software, those candidate bundles at the top of the ranked lists by MI may be closer to being integral in meaning. As a consequence, those lexical bundles with both high frequency and high MI were first and foremost chosen while those appearing at the bottom of both frequency and MI rankings were eliminated. Roughly 500 items with the MI score lower than 3 were removed at this phase, although they appeared more than 58 times and across over 14 medical subjects. They were, for example, 'as to the', 'and specificity of' and 'indicated that the'.

The other crucial factor in determining the MFL for immediate use was "grammatical well-formedness" (Shin & Nation, 2008, p. 341). A grammatically well-formed lexical bundle refers to a sequence of words which do not span two structural units and can thus be regarded as a comprehensible unit. Take the two lexical bundles 'fact that the' and 'the fact that' as an example. They both come from the fragment 'due to the fact that the short-term substitutability of orthodox medical treatment is low'. 'The fact that' is more understandable than 'fact that the', since the retrieval of the latter bundle does not follow the dividing principle of "immediate constituents" (Bloomfield, 1933, p. 161).

Subsequently, meaningfulness and grammatical well-formedness guided manual checking. A great deal of analysis was carried out by the researcher and her colleague to sift meaningful units from those straddling two immediate constituents but having the MI value higher than 3. Altogether, 102 'cross-over' bundles were identified. The inter-rater alpha value of the reliability test was 0.95. It is worth mentioning here that in the process of a manual vetting, we found that the discarded bundles, either bridging two structural units or having no meanings, had MI scores lower than 6. This may be an important finding for phrase extraction programmers but beyond the current research focus.

Data processing

To make the MFL serve the pedagogical purpose, two major modifications were performed. One was made for similar word sequences that appeared in different inflected forms. They were combined, together with an accumulative frequency of occurrence, to form a single item with their lemma as the representative form, which would be listed in the MFL. For example, *depend on* (a sum of 726 times) = *depend on* (occurring 241 times) + *depending on* (285) + *depends on* (177) + *depended on* (23). The assumption was that focusing on a single entry at a time (*depend on* in this case) may be simpler for EFL students to learn at the onset. After some familiarity with its meanings (to rely for support, to place trust or to be contingent) and core pattern (followed by a noun), its variants may be acquired with more exposure later.

The other revision was undertaken for overlapping word sequences. There were two degrees of overlap: complete overlap and partial overlap. For instance, 'due to the fact' appearing 147 times came from the longer bundle 'due to the fact that' with 147 occurrences. The identical frequency confirms that they overlapped completely. The longer expression 'due to the fact that' instead of 'due to the fact' was included in the MFL, because, from a pedagogical perspective, the former having the subordinate conjunction 'that' reminds learners of the use of a noun clause as a complement of *the fact*.

Partial overlap refers to a situation where a longer phrase was the combination of two or more shorter phrases, each of which could occur as an independent subset of the longer one. Take 'due to the fact that' as an example again. One of its subset 'due to' appeared 4,341 times, while the other two 'the fact' and 'the fact that' appeared 1,077 and 493 times respectively. The prepositional phrase 'due to' may have been connected with other nouns or noun phrases other than 'the fact that'. 'Due to the fact that' was one of the combinations in connection with due to, as a substantial reduction of frequency from 4,341 times to 147 times has shown. By inference, 'the fact' may not need to appear with 'that' each time because it can be a subject of a verb and an object of a verb or a preposition. 'The fact that' is one of the extended phrases in association with 'the fact'. 'That' in 'the fact that' serves as a noun clause marker. The noun phrase 'the fact that' in combination with a noun clause performs the same functions as a noun does. Since these three phrases (due to, the fact that and due to the fact that) can stand alone as a comprehensible and meaningful unit, they were separately compiled into the 2-word, 3-word and 5-word units in the MFL. However, 'the fact' is a free word combination, so it was decided not to be included in the MFL.

To sum up, the selection of formulas for the MFL involved the following sequence: (1) frequency (a minimum of 10 times per million words, namely at least 58 times for the present corpus of 5.8 million words), (2) range (across over a half of medical sub-disciplines, i.e. 14 out of 28 medical subjects), (3) cohesiveness of words for meaningfulness (MI greater than 3), and (4) manual checking for comprehensible units which do not span two grammatical constituents. Steps 3 and 4 led to effective MI scores greater than 6.

RESULTS AND DISCUSSION

RQ1: What high-frequency multi-word units make up the Medical Formulas List (MFL)?

A total of 738 different formulaic sequences of 2 to 6 words were ultimately chosen and formed the Medical Formulas List (MFL). The appendix displays a full list of frequent medical formulas. There were 127 two-word, 405 three-word, 159 four-word, 44 five-word and 3 six-word units. They were general formulaic expressions across various medical subject areas rather than within one single sub-discipline of medicine. For a glimpse, Table 1 lists the top 15 most commonly-used 2 to 5-word formulas.

Table 1- Top 15 formulaic sequences prioritized by frequency

	2 words	3 words	4 words	5-word bundles
1	this/the/our study	be associated with	be used to V	be shown in figure/table #
2	such as	an increase in	be the same as	there was/were no significant difference(s)
3	due to	be compared with	from ~ to ~	the_aim/purpose of the/this study/research
4	based on/upon	be found in	between ~ and ~	~ studies have shown that
5	result in	be related to	as a result of	range from ~ to ~
6	the/these/our results	be compared to	# years of age	the analysis/analyses was/were performed using
7	according to	be treated with	at the time of	it has been found that
8	in addition	as well as	it is/was suggested that	be summarized in table #
9	as well (=too)	the presence of	in the present study	it is worth V-ing that
10	lead to	the use of	not only ~ but ~ also	it has been assumed that
11	because of	in order to	in the treatment of	the presence/absence or absence/presence of

12	the first ~	be observed in	between the two ~	~studies have demonstrated that
13	at least	the effect(s) of	on the other hand	it can be seen that
14	the/these/our data	in this study	in the case(s) of	The results of the/this study
15	more than	be defined as	in the presence of	as shown in table #

Table 1 gives us a snapshot of the MFL. Most of the frequent formulaic sequences derived from medical RAs are made of common words in common patterns or in slight variants of the common patterns, such as 'in order to', 'due to', 'as well as', 'based on/upon' and 'from ~ to ~'. The results support Sinclair's (1991) observation that "most everyday words do not have an independent meaning or meanings, but are components of a rich repertoire of multi-word patterns that make up a text" (p. 108). Parallel to this finding, Wray and Perkins (2000) maintained that phrases function as processing short-cuts by being stored and retrieved whole from memory at the time of use rather than generated anew on each occasion. If Wray and Perkins's claim is right, a reduction of cognitive loads in research writing may be attainable for EFL professionals when they are equipped with adequate fixed phrases.

RQ2: How important is the MFL in the medical research article corpus (specifically, text coverage in %)?

The established MFL contained a total of 738 formulas of 2 to 6 words with an accumulation of 251,303 individual instances and 732,958 running words, which accounted for 12.64% of the tokens in the present Medical RA Corpus. In the development of the MFL, a large number of highly-frequent multi-word sequences were discarded because they crossed the borderline of two phrase structures (e.g. 'to address the' and 'role in the'). If adopting loose criteria, more lexical bundles would have been included in the MFL and the text coverage would have been higher. However, such a cumbersome MFL would contain the items that students do not urgently need or that are not suitable for direct learning.

A short excerpt from the Medical RA Corpus is shown below. This passage is randomly selected from a medical research article in relation to oncology. The formulas included in the MFL are underlined and in bold, and may give us a picture of the academic formulas used in medical prose.

Prostate cancer (CaP) is **the second** most prevalent **type of** cancer in males particularly in Northern America and Australia, and **results in** the sixth highest mortality rate in men worldwide in 2002. **It has been reported that** approximately 1 in 8 men will develop CaP by **75 years of age** and 1 in 5 by **the age of 85 years**. **In order to** cure CaP patients successfully, **it is important to** detect the disease at an early stage **as well as** to monitor its progress accurately. Currently available diagnostic techniques include **the pathogenesis of** prostate biopsies, digital rectal examination, transrectal ultrasonography and assaying prostate-specific antigen...Gleason score is **based on the architecture of** cancer tissue observed under a microscope. The lower the Gleason score is, the better the prognostic outcome. However, there are **limitations to the method of** screening. **First of all**, a biopsy or similar operation must be performed **in order to** obtain the cancer tissue for testing. Second, the Gleason's grading scale **used by** pathologists is **at least** semi-quantitative since **it may be difficult to** search every cell of every tissue slice. Third, there is **a lack of** concordance between **the thresholds of** scoring by different pathologists. For these reasons Gleason scores themselves have limited quantitative value. (You, et al., 2010, p.11) (Source: *Critical Reviews in Oncology/Hematology*, vol. 73)

Among the 208 running words in the passage, 20 different formulas belonged to the MFL (Note: The phrase 'in order to' appeared twice but was counted as one type). Their coverage in the passage was 29.32% (=61/208) in tokens, which was much better than the average coverage of the MFL in the corpus (12.64%).

RQ3: What are the most common formulaic patterns in medical research articles?

Two-word formulas

Concerning the structure, 11.8% of the 2-word phrases (15/127 items) were used as prepositions which are not confined to particular fields and may slip in and out of everyday conversation, as in the cases of 'such as', 'due to', 'according to', 'because of', 'together with', 'regardless of', 'subject to', and 'instead of'. A majority of them was the grammatically-conditioned pairs, a content word combined with a preposition. Five sub-patterns of such type are identified.

1. Past participle + preposition: (21% of the total occurrences of the MFL)

associated with, stained with, treated with, infected with, incubated with, combined with, compared with/to, presented with/as, derived from, isolated from, excluded from, extracted from, obtained from, related to, exposed to, admitted to, subjected to, limited to, attributed to, classified as/into, identified as, expressed as, known as/to, divided into, based on, caused by, determined by, defined as/by.

In the present corpus, past participle phrases came from a reduction of an adjective clause by omitting the relative pronoun and the verb-be form, and used as a post-nominal adjective phrase. Some of them appeared in the form of the passive, preceded by the verb-be (*are/is/were/was/have been/has been*) or a modal verb which expresses tentativeness (e.g. 'may be', 'should be' and 'would be'), and were thus extended to 3-word or 4-word formulas. As such, the MFL lists the past participle phrases (83 items) separately from the two- and three-word combinations. They took up over one-fifth of the total 251,303 occurrences of the MFL. For the sake of thoroughness and flexibility, they are presented as '(be) + past participle + preposition', as in the case of '(be) + derived from'. The parenthesis beside the verb-be represents the omission notation.

2. Adjective + preposition: (9.45% of the 2-word phrases=12/127)

comparable to, higher than, less than, more than, other than, younger than, older than, better than, greater than, specific to, necessary for, sensitive to.

As can be seen, most of such formulas appeared in the context of two things under comparison.

3. Verb + preposition: (14.17% of the 2-word phrases=18/127)

result in/from, refer to, contribute to, attribute to, respond to, depend on, focus on, benefit from, serve as, account for, care for, correlate with, and consist of.

4. Noun + preposition collocation: (4.72% of the total 2-word phrases=6/127)

exposure to, access to, sensitivity to, decline (noun) in, limitation to, part of.

5. Preposition + noun or adjective: (11.81% of the total 2-word phrases=15/127)

in addition, in conclusion, in sum, in general, at risk, in turn, in total, in contrast.

In contrast to a majority of formulas used as a preposition or tied with a preposition as above, other miscellaneous frequent bi-grams include grammatical collocations (e.g. 'even though/if', 'tend to' and 'have/has/had to') and lexical collocations (e.g. 'most/more/less likely', 'commonly used', 'long term', 'post hoc', 'so far' and 'each other'). They should not be ignored in terms of frequency.

In addition, it is worth pointing out that many of 2-word medical terms were retrieved initially due to high MI scores and frequency. They were, for example, *blood pressure* (582 times), *lymph node(s)* (901), *health care* (519), *prostate cancer* (491), *bone marrow* (480), *gene expression* (480), *coronary artery* (472), *magnetic resonance* (420) and *myocardial infarction* (409) (The number in the parenthesis indicates the frequency of occurrence). These medical terms were excluded, since the research focus was academic formulas rather than technical terms.

Three-word formulas

The most common pattern in the 3-word phrases was a passive verb followed by a preposition requiring a noun phrase for completion, as in the case of 'be associated with' (including are/is/were/was, a total of 7,587 occurrences). Other examples are 'be infected with', 'be included in', 'be divided into', 'be regarded as', 'be shown in', 'be used as', 'be correlated with', 'be defined as' and 'be isolated from'. The passive voice verb followed by a prepositional phrase is an important means of expressing logical or locative relations, signifying graphical information and highlighting an observation. It should be noted that the frequent use of the passive voice without a by-phrase appears to be one of the grammatical features in academic prose. This also reveals a different picture of how we do the passive exercises from a grammar textbook in a General English class (the passive followed by a by-phrase) and how the passive is used in authentic discourse (the passive followed by a preposition other than by).

The passive followed by a preposition sometimes appeared in the form of past participle phrases when they were used in a reduced adjective clause (i.e. a post-nominal adjective phrase) to modify the preceding noun. As mentioned in the two-word formulas section, the most frequent 83 past participle phrases are listed separately from two- and three-word combinations in the MFL. When the verb-be was added, they formed the passive and appeared in a clause/sentence.

Excluding a separate list of the passive followed by a preposition, the patterns 'the ~ of' and 'a/an ~ of' were the most common among the three-word phrases. They can be simplified as the frame 'the/a/an ~ of', as the fillers in both kinds of triplets share the same part of speech, namely noun, to fill the middle slot. Table 2 lists the top 20 collocates of the pattern 'the/a/an ~ of' in bold, with the second column showing the total number of occurrences in the corpus.

Table 2 - Top 20 collocates of the pattern, 'the/a/an ~ of'

Noun collocate	Occurrences	Noun collocate	Occurrences
the presence of	1799	the treatment of	675
the use of	1688	the level(s) of	626
the effect(s) of	1491	the absence of	603
the number of	1273	the expression of	574
the majority of	1135	the incidence of	573
the development of	1049	a total of	568
the result(s) of	920	the role of	563
a range of	845	a number of	507
the time of	801	the diagnosis of	468
the risk(s) of	795	the end of	459

As can be seen, some of the nouns as the filler of 'the ~ of' reveal a sub-technical sense and can be found across a wide range of medical subject areas, such as *incidence*, *diagnosis* and *treatment*. If considering other frequent noun fillers as in 'the need for' (occurring 424 times), 'an increase in' (3,686 times) and 'the relationship between' (378), we can conclude that the structure 'noun phrase + preposition' (a noun phrase followed by a preposition) predominates triplet bundles, followed by idiomatic phrases which need to be regarded as an individual unit with little possibility of substitution as in the examples 'as well as' (appearing 1990 times), 'in order to' (1618), 'in addition to' (606), 'in terms of' (539), 'in response to' (386), 'with respect to' (393), 'in contrast to' (314), 'in accordance with' (239), 'by means of' (126), 'in case of' (117 times), 'as opposed to' (63), 'in agreement with' (121), 'in view of' (90) and 'in line with' (99).

The functions of 'the ~ of'

Functionally the frame 'the ~ of' can be classified into seven types. They are used:

- (1) To depict medical procedures/treatments/measures.
- (2) To describe attributes/properties.

(3) To present statistical/numerical data.

The following concordance lines derived from the corpus exemplify the above three functions.

...It is morally correct to increase **the dose of** narcotics to whatever dose is needed, even though the medication may contribute to **the depression of** respiration or blood pressure...

...Another important envenomation is caused by the ingestion of pufferfish meat, related to **the intake of** tetrodotoxin (TTX)...

...**The diagnosis of** fat emboli syndrome is clinical, usually one of exclusion.

...up to 75% of subjects over 65 years old have obstructive sleep apnea (OSA). **The prevalence of** OSA in the elderly is so high that authorities are questioning whether OSA in the elderly is...

...Global sclerosis of the glomeruli increases **the proportion of** sclerotic glomeruli from 5% in middle age to 10%–30% by the eighth decade.

...Undergoing surgery, tissue breakdown, or trauma also increases **the risk of** hyperkalemia especially if acute renal failure is present.

Note: *The risk of* is always followed by a noun or a noun group having a negative association with infection, disease or mortality.

As the concordance lines above have illustrated, the empirical, laboratory-focused sense in writing was realized by the frame *'the ~ of'*. This pattern contributes to the description of research goals, experimental environment, equipment, materials and approaches. Other functions of *'the ~ of'* are utilized:

(4) To denote nominalization—turning a verb or an adjective/adverb describing an action or a process into the head of a noun phrase—which contributes to the hiding of the agent-researcher to present the analysis in an impersonal, objective way, and at the same time, the realization of a process/an action in the treatment. The examples drawn from the corpus are *'the addition of'*, *'the formation of'*, *'the activation of'*, *'the detection of'*, *'the discontinuation of'*, *'the assessment of'*, *'the combination of'* and *'the development of'*.

(5) To express effects or results such as *'the effect(s) of'*, *'the impact(s) of'*, *'the benefit(s) of'*, *'the influence of'*, *'the efficacy of'* and *'the importance of'*. The triplets of such type are often associated with the purpose of the research and may occur in the context of having the verbs *examine, evaluate, assess, compare, investigate, present, describe, report* or are concerned with the explanation of unknown pathology.

(6) To demonstrate existence or non-existence such as *'the absence/presence of'*, *'the lack of'*, *'the occurrence of'*, *'the distribution of'* and *'the prevalence of'*.

(7) To show time in a process as in *'the onset of'*, *'the end of'* and *'the duration of'*. The triplets in this category are often followed by items in relation to illness or treatment and may be preceded by a preposition like *at, before or after*.

The functions of 'a ~ of'

The pattern *'a ~ of'* is less productive than *'the ~ of'*, as in the cases of *a number of, a total of, a variety of, a series of, a diagnosis of, a combination of, a case of, a range of, a lack of, an average of, a concentration of* and *a dose of*.

As enumerated above, the noun fillers of this frame *'a ~ of'* serve as one of the three functions: (1) to express quantity, (2) properties, and (3) to describe a treatment.

Different from 2-word combinations used as prepositions or tied with a preposition being the majority, the pattern *'noun phrase + of'* occurred most among the 3-word bundles.

Four-word formulas

There were 159 different 4-word formulas altogether, totaling 32,840 individual cases and accounting for 2.26% of the Medical RA Corpus. As can be seen in the appendix, a prepositional phrase with an embedded *of*-phrase was the most common structure among

the 4-word strings, comprising about 38.36% of all forms in the category of 4-word formulas (61/159 items). The frame '*prepositional phrase + of*' was used:

1. To indicate time and location, like '*at the time of*' (657 times), '*in the case(s) of*' (414) and '*in the context of*' (252).
2. To mark existence or inexistence, like '*in the presence of*' (394) or '*in the absence of*' (326).
3. To highlight logical, inferential or causative relations, like '*on the basis of*' (342), '*as a result of*' (1,132) and '*as a function of*' (72).
4. To refer to status, method or procedure, like '*in/for the development of*' (166; 94), '*in/for the treatment of*' (532; 234), '*in the pathogenesis of*' (95), '*at the level of*' (118) and '*with the use of*' (113).
5. To delineate age groups or other quantification, like '*between ~ and ~*' (1,833), '*# years of age*' (696), and '*from ~ to ~*' (1,938).

The second common pattern appearing in the 4-word strings was the anticipatory-it + verb-be + adjective + clause fragment, for example, '*It is/was important to*' (211), '*It is/was possible that*' (190), '*It is/was difficult to*' (76), or the anticipatory-it + the passive + clause fragment, such as '*It is/was found that*' (206) and '*It is/was noted that*' (189). The *it*-structure employed frequently in the Medical RA Corpus may be due to the fact that it can help to minimize authorial presence, disguising authorial interpretations and show an objective view while presenting arguments or pointing to findings. Such a hedging function can also protect the writer from possible false claims.

Apart from the patterns '*preposition phrase+of*' and '*the anticipatory it-structure*', the third common structure was '*the passive+an infinitive*', as in the cases of '*be used to+V*', '*be needed to+V*', '*be assumed to+V*' and '*be considered to+V*', to express the treatment and the requirement of something or the author's intention and assumption. The fourth kind of 4-word phrase served as text-reflexive markers to direct readers elsewhere in text, for instance, '*in the present study*' (584), '*in the control group*' (173), '*table # shows that*' (66), '*as described previously in*' (218) and '*in the present case*' (66).

The remaining types of 4-word bundles include a noun phrase followed by an embedded fragment of a clause (e.g. '*the extent to which*', '*the degree to which*', '*to the extent that*' and '*the way(s) in which*') and phrases directly stating the goal (e.g. '*this study was to*', '*in an attempt to*' and '*the aim/purpose is/was to*') as well as result-related markers, signaling implications/suggestions from the results (e.g. '*The results suggest that*', '*The data show that*', and '*This study/research supports that*'). Although the last type of formulas did not occur as frequently as the other patterns, they appeared in almost all of the medical RAs of different subjects.

Five-word and six-word formulas

Many 5-word strings held 4-word clusters in their structure, such as '*at # weeks of gestation*', '*are shown/summarized in Table #*', '*ranged from ~ to ~*' and '*the presence or absence of*'. Some of the 5-word strings were even the extension of the two most common triplets '*the ~ of*' and '*a ~ of*', for example, '*the study of the liver*', '*the aim/purpose/results of the study*', '*a total of # patients*', '*the midline of the face*' and '*an average of # years*'. Furthermore, a few prominent formulas reflect a flavor of medical lexis, as in the instances of '*there was no evidence of*', '*there was no effect on*', '*in the differential diagnosis of*' and '*~ cells were treated with*'.

Stretching some of the 5-word formulas to 6 words may provide a clearer picture of how statistical results and the research purposes can be conveyed or how to draw readers' attention to propositions or interpretations. Six-word bundles derived from 5 words are, for instance, '*There was/were no statistically significant difference(s)*', '*There was a significant difference between*', and '*There was a significant increase in*'.

In short, the present results are in agreement with Cortes' (2004) finding from the corpora of history and biology that academic writing is structurally more phrasal in nature and is marked for post-nominal modification. Moreover, we also found that some phrase structures were

strongly connected to the number of words in lexical bundles, with the pattern 'noun phrase+of' prominent in 3-word strings as well as the frame 'prepositional phrase+of' and the anticipatory-it structure largely in 4-word clusters. Two-word phrases are often associated with prepositions, either the use as a preposition or the tie-in with a preposition, while 5 to 6-word sequences mostly reflect statistical matters.

PEDAGOGICAL IMPLICATIONS

Although the present MFL provides a window to the medical research register, itemized formulas are still not enough for EFL learners. As with the learning of individual words, the MFL should be learned in context rather than in isolation. Medical English teachers can raise their students' consciousness of how the formulas from the MFL behave in the context with the help of free online concordancers (accessible at <http://www.lextutor.ca/concordancers>, <http://vlc.polyu.edu.hk>, the BNC at <http://www.natcorp.ox.ac.uk>, the COCA at <http://corpus.byu.edu/coca/x.asp?w=1280&h=720> and GloWbe (the Corpus of Global Web-based English) at <http://corpus2.byu.edu/glowbe/>). By using corpora, students can gain direct access to abundant examples of authentic language samples, resulting in a better understanding of the use and patterns of certain formulaic phrases.

In addition, classroom exercises using concordance data may be undertaken as follows. For instance, referring back to a short excerpt from a medical RA in the Results section for RQ2, it can be altered into a fill-in-the-blanks drill or a rewriting exercise by adding formulas, as below.

1. Fill in the blanks with the following formulas: *in order to*, *the age of*, *on the basis of*, *results in*, *as well as*, *a lack of*, *the method of*.

Prostate cancer (CaP) is the second most prevalent type of cancer in males particularly in Northern America and Australia, and _____ the sixth highest mortality rate in men worldwide in 2002. It has been reported that approximately 1 in 8 men will develop CaP by 75 years of age and 1 in 5 by _____ 85 years. _____ cure CaP patients successfully, it is important to detect the disease at an early stage _____ to monitor its progress accurately.

2. Rewrite the following passage where some discourse organizing formulas are missing.

Gleason score is based on the architecture of cancer tissue observed under a microscope. The Gleason score is lower, the prognostic outcome is better. There are limitations to the method of screening. A biopsy or similar operation must be performed obtain the cancer tissue for testing. Second, the Gleason's grading scale used by pathologists is at least semi-quantitative since it may be difficult to search every cell of every tissue slice. Third, there is a lack of concordance between the thresholds of scoring by different pathologists. Gleason scores themselves have limited quantitative value.

Answer Key: *The lower... the better; First of all; in order to; for these reasons*

The two exercises imply that the frequent formulas incorporated with concordance data may enrich specialist learners' language experience. With more exposure to medical RAs, EFL professionals will consolidate the phrase knowledge acquired from the MFL.

CONCLUSION

In sum, totally 738 items of 2 to 6-word formulaic sequences were identified to have occurred more than 58 times (having fulfilled the selection criterion 1: Frequency), in more than 14 medical subjects (Criterion 2: Range), with MI scores higher than 6 (Criterion 3: Meaningful units), and not bridging two constituents (Criterion 4: comprehensible units). The MFL, directly from the target texts to cater to specialist learners' needs, contains the most commonly-used formulaic sequences traversing the subfields of the medical domain. Regardless of majoring in dermatology, cardiology, gastroenterology or other medical subjects, medical professionals may encounter these formulaic expressions very often while reading research articles in their fields since they are shared by different medical specialist groups. Mastery of these frequent formulas may provide a launching pad for fluent academic writing. We suggest that the MFL should be used with concordance data to help students raise awareness of their usage.

Although the present study was intended to be informative, we also hope that the MFL can be used to inform medical English teaching materials development.

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Appendix

The Medical Formulas List (MFL) contains a total of 738 formulaic sequences of 2 to 6 words.

Two-word phrases (totaling 127 items, with the second column showing the occurring frequencies in the corpus)

such as	5094	result from	452	other than	206
due to	4341	over time	435	the future ~	203
based on/upon	3864	exposure to	427	have to	198
this study	3518	after surgery	424	commonly used	189
result in	3208	in conclusion	422	during pregnancy	189
according to	2692	the median ~	406	the follow-up	182
the study	2658	the entire ~	405	in summary	175
in addition	2243	in particular	398	younger than	172
as well (=too)	2149	need to	398	distinguish between	167
lead to	1886	when compared	392	even if	166
because of	1836	the past ~	382	correspond to	164
the result(s)	1569	the remaining ~	369	in turn	159
the first ~	1518	relative to	362	care for	154
at least	1408	along with	355	most likely	152
our study	1329	these studies	346	no longer	152
more than	1322	access to	345	suffer from	151
in all	1282	in general	341	decline in	145
the following ~	1224	these data	337	immediately after	144
less than	1070	the increased ~	328	instead of	144
in contrast	946	our finding(s)	324	better than	140
the second ~	872	refer to	309	the required ~	126
for example	857	the latter	308	necessary for	122
prior to	823	regardless of	300	each other	119
contribute to	776	respond to	295	decrease in	118
the data	749	our data	292	for use	117
depend on	726	so that	292	post hoc	115
appear to	709	the underlying ~	292	sensitivity to	113
rather than	694	older than	286	less likely	112
present in	691	as follows	283	the peripheral ~	112
seem to	649	together with	282	serve as	111
these results	642	attribute to	278	so far	111
greater than	634	the relative ~	277	long term	110
our result(s)	582	except for	259	owing to	110
the last ~	566	follow up	252	in total	104
higher than	565	the middle ~	223	specific to	91
part of	550	tend to	222	assuming that	78
consist of	540	as to	216	subject to	74
the finding(s)	534	the corresponding ~	215	this research	68
participate in	494	even though	214	the assumed ~	67
more likely	492	in part	210	limitation(s) to	61
focus on/upon	476	at risk	209	the ideal ~	61

the overall ~	471	benefit from	209
account for	456	In case	207

(Be) + past participle + preposition (83 items)

(be) + associated with	7587	(be) + detected by	285
(be) + compared with	3565	(be) + limited to	258
(be) + found in	3279	(be) + admitted to	257
(be) + related to	2985	(be) + stained with	256
(be) + compared to	2406	(be) + isolated from	224
(be) + treated with	2141	(be) + presented with	219
(be) + observed in	1505	(be) + accompanied by	210
(be) + defined as	1350	(be) + identified as	204
(be) + used as	1348	(be) + placed in	190
(be) + involved in	1300	(be) + known as	189
(be) + followed by	1175	(be) + identified by	176
(be) + included in	1149	(be) + influenced by	175
(be) + performed in	1040	(be) + produced by	173
(be) + obtained from	944	(be) + infected with	169
(be) + reported in	810	(be) + detected in	162
(be) + caused by	803	(be) + extracted from	156
(be) + published by	803	(be) + obtained by	155
(be) + determined by	676	(be) + supported by	136
(be) + characterized by	645	(be) + defined by	134
(be) + expressed as	552	(be) + considered as	132
(be) + known to	535	(be) + used by	129
(be) + derived from	443	(be) + correlated with	123
(be) + used for	406	(be) + regarded as	119
(be) + explained by	391	(be) + supplemented with	119
(be) + achieved by	386	(be) + performed with	115
(be) + described in	382	(be) + treated for	114
(be) + expressed in	370	(be) + assessed by	112
(be) + presented in	364	(be) + listed as	112
(be) + classified as	357	(be) + required in	97
(be) + excluded from	344	(be) + added to	95
(be) + combined with	336	(be) + performed by	90
(be) + described by	333	(be) + summarized in	84
(be) + incubated with	331	(be) + performed on	82
(be) + subjected to	329	(be) + applied to	73
(be) + exposed to	314	(be) + analyzed by	71
(be) + presented as	313	(be) + required by	68
(be) + achieved in	295	(be) + discussed in	61
(be) + used in	295	(be) + evaluated for	61
(be) + identified in	294	(be) + seen as	60

(be) + shown in	290	(be) + classified into	59
(be) + divided into	289	(be) + approved by	58
(be) + measured by	286		
Three-word phrases (322 items)			
an increase in	3686	the association of	123
as well as	1990	the findings of	123
the presence of	1799	in agreement with	121
the use of	1688	the structure of	121
in order to	1618	for the study	120
the effect(s) of	1491	in women with	120
in this study	1459	the activation of	119
the number of	1273	the intake of	119
the majority of	1135	the site of	119
the present study	1117	the threshold of	118
the development of	1049	in case of	117
be similar to	1009	a lack of	116
be consistent with	937	be free from	116
the result(s) of	920	we assume that	113
a reduction in	879	a dose of	112
a range of	845	a kind of	112
the time of	801	the application of	112
the risk(s) of	795	the regulation of	112
it demonstrated that	791	in the future	110
in our study	684	the introduction of	109
the treatment of	675	in this group	106
the statistical analysis	639	in comparison to	105
the level(s) of	626	the most frequent ~	105
conflict(s) of interest	609	in some cases	103
in addition to	606	not differ significantly	103
the absence of	603	the probability that	103
the most common ~	583	the length of	102
the expression of	574	the concentration of	100
the incidence of	573	the possibility that	100
a total of	568	in line with	99
the role of	563	take into account	99
in combination with	559	the variance of	98
in terms of	539	the definition of	97
a number of	507	the induction of	97
as a result	506	the mean age	97
the fact that	493	the setting of	96
the diagnosis of	468	the surface of	96
the end of	459	the potential for	94

a variety of	436	the start of	94
be performed using	435	in most cases	93
the need for	424	as previously described	92
risk factor(s) for	422	on the right	92
the rate of	407	we believe that	92
the lack of	403	in human milk	91
with respect to	393	in view of	90
the age of	391	the value of	90
in response to	386	a function of	89
the basis of	380	patients with cancer	89
the relationship between	378	the concept of	89
the control group	374	a minimum of	88
the importance of	369	give rise to	88
the prevalence of	365	in each group	88
the reason(s) for	365	in this regard	88
the degree of	343	the effectiveness of	88
in the literature	330	the need to	88
the extent of	317	the substance of	88
in contrast to	314	the likelihood of	87
with regard to	314	the total number	87
in the study	312	to ensure that	87
the impact(s) of	310	standard of care	86
the probability of	310	all patients with	85
as shown in	309	for this study	85
the frequency of	308	the availability of	85
the aim of	301	in comparison with	84
the amount of	295	the mechanism of	84
the previous studies	295	the nature of	84
the management of	293	risk of death	83
the onset of	289	the existence of	83
be carried out	286	the hypothesis that	83
the method of	284	the intervention group	83
we found that	284	the depth of	82
the type of	279	the difference between	82
the current study	277	the loss of	82
a history of	264	a consequence of	81
the severity of	262	a period of	81
patients treated with	256	in our case	80
in relation to	250	the outcome of	79
the course of	250	the sensitivity of	79
the efficacy of	250	a study of	78
a decrease in	246	as a whole	77
the most important	242	in other words	77

the percentage of	240	the appearance of	77
in accordance with	239	the dose of	77
the ability to	238	the efficiency of	77
the case of	236	the architecture of	76
the duration of	234	the progression of	76
in the liver	226	the rejection in	76
the addition of	216	the characteristic(s) of	72
the possibility of	215	the rejection of	72
a series of	213	the risk for	72
the detection of	212	in more detail	71
the purpose of	212	the benefit(s) of	71
the quality of	211	the objective of	71
an average of	210	the ratio of	71
the department of	210	whether or not	71
the mean of	208	after the operation	70
as compared to	207	all sorts of	70
be different from	207	in recent years	70
when compared with	206	the decrease in	70
a diagnosis of	202	an example of	69
the occurrence of	200	as an example	69
be comparable to	197	as described by	69
a combination of	196	be measured using	69
the combination of	196	every # weeks	69
the difference(s) in	195	in conjunction with	69
the two groups	195	in this population	69
to our knowledge	195	the idea that	69
a patient with	189	different types of	67
the proportion of	188	in regard to	67
as part of	187	in spite of	67
the association between	186	it seems that	67
to determine whether	183	the creation of	67
the influence of	180	the measurement of	67
be eligible for	178	the power of	67
the pathogenesis of	177	on the left	66
the patients with	175	the etiology of	66
the reason why	174	the performance of	66
aged # years	172	the subject of	66
the accuracy of	167	for treatment of	65
the formation of	167	of the following	65
in the left	166	the problem(s) of	65
in all cases	165	as measured by	64
in both groups	164	the prevention of	64
in this case	163	a concentration of	63

in the past	161	as opposed to	63
in these patients	161	the most commonly-used ~	63
the study of	161	the sum of	63
the context of	160	the/a sense that	63
be analyzed using	159	so as to	62
the distribution of	158	the area of	62
the implementation of	155	the center of	62
the university of	154	the experience of	62
when compared to	151	the timing of	62
as compared with	150	by virtue of	61
take part in	148	in association with	61
the evaluation of	148	the dynamics of	61
in all patients	146	the group of	61
in children with	146	the weight of	61
the increase in	146	this suggests that	61
the assessment of	145	a set of	60
the position of	145	first of all	60
be independent of	144	in conformity with	60
the change(s) in	143	in lieu of	60
the identification of	143	patients aged #	60
a case of	142	a measure of	59
the size of	139	the depression of	59
the administration of	138	the discontinuation of	59
the production of	138	the idea of	59
the ability of	137	the notion of	59
the activity of	134	the reduction in	59
the cause of	134	the rest of	59
be sensitive to	133	the shape of	59
the magnitude of	133	the way that	59
the process of	132	be dependent on	58
in clinical practice	130	not differ between	58
analysis of variance	129	the expiration of	58
the analysis of	129	the history of	58
the operation of	129	the meaning of	58
by means of	126	the question of	58
the beginning of	126	the support of	58
a part of	124	to some extent	58

Four-word phrases (159 items)

be used to V	4150	be performed to V	102
be the same as	2412	in the number of	100
from ~ to ~	1938	a small proportion of	98
between ~ and ~	1833	for the diagnosis of	97

as a result of	1132	the purpose is/was to	97
# years of age	696	in the pathogenesis of	95
at the time of	657	for the development of	94
it is/was suggested that	602	for the presence of	93
in the present study	584	in the face of	92
not only ~ but ~ also ~	565	in the field of	91
in the treatment of	532	a large number of	88
between the two ~	484	a wide variety of	87
on the other hand	437	for the assessment of	87
in the case(s) of	414	from the department of	87
in the presence of	394	in a variety of	87
be considered to V	343	in patients treated with	86
on the basis of	342	The findings suggest that	86
be needed to V	329	the total number of	86
in the absence of	326	it is/was assumed that	84
the standard deviation(s) of	321	from the point(s) of	83
be assumed to V	318	have no effect on	82
be necessary to V	312	below the age of	79
at the end of	300	it is/was likely to	79
the/these results suggest that	293	play a role in	79
be able to V	291	a large proportion of	78
to the extent that	287	it is/was difficult that	78
this study is/was to	275	in the intervention group	77
it is/was possible to	272	at a concentration of	76
in the study of	267	it has shown that	76
be found to V	266	it is/was difficult to	76
it is important that	265	be asked to V	76
be likely to V	258	for the study of	75
in the context of	252	the differential diagnosis of	75
an increased risk of	237	with the exception of	75
in the management of	235	from the perspective of	74
for the treatment of	234	the number of patients	74
as described previously in	218	it is clear that	73
one of the most	218	the degree to which	73
it is important to	211	as a function of	72
It is/was found that	206	children aged # years	72
~ and ~ respectively	200	at a time when	71
it is/was possible that	190	patients aged # years	71
at room temperature of	189	in a previous study	70
in the setting of	189	the average number of	69
it is/was noted that	189	within the scope of	69
at the age of	179	with the development of	68
by the end of	178	be referred to as	68

play an important role	178	for the detection of	67
in the control group	173	over the course of	67
a high level of	169	patients with heart failure	67
during the study period	169	a significant increase in	66
for the purpose of	167	a total number of	66
in the development of	166	in the fat body	66
be significantly different from	165	in the light of	66
by the use of	155	in the order of	66
in a recent study	152	in the present case	66
be significantly associated with	151	table # shows that	66
the/these results indicate that	134	This research/study supports that	66
be thought to V	132	within the limitations of	66
in the diagnosis of	129	be required to V	66
an increased risk for	127	a small number of	65
at the same time	125	as a consequence of	65
a high degree of	123	from the viewpoint of	65
the way(s) in which	123	a wide range of	64
# months of age	122	for the first time	64
it has demonstrated that	121	in the form of	64
on the part of	121	the majority of patients	64
the data show that	119	in the majority of	63
at the level of	118	length of hospital stay	63
in the process of	118	a mean age of	62
it has suggested that	118	in an attempt to	62
the aim is/was to	114	informed consent was obtained	62
each of the three	113	during the first trimester	61
in the current study	113	an order of magnitude	59
with the use of	113	in the course of	59
be carried out using	111	it is/was likely that	59
at the start of	109	with a history of	59
the extent to which	109	as a matter of	58
at the beginning of	108	in the regulation of	58
be not significantly different	105		

Five-word phrases (44 items)

there was/were no significant difference(s)	1055
be shown in figure #	983
the aim/purpose of the/this study/research	930
~ studies have shown that	927
range from ~ to ~	859
the analysis/analyses was/were performed using	415
be shown in table #	399
it has been found that	345

be summarized in table #	316
It is worth V-ing that	214
it has been assumed that	211
the presence/absence or absence/presence of	207
~ studies have demonstrated that	174
it can be seen that	169
the results of this/the study	166
as shown in table #	162
there was no difference in	161
it has been reported that	151
due to the fact that	147
there was no evidence of	145
it can be observed that	133
informed consent was obtained from	132
it has been shown that	132
there were significant differences between	123
it may be difficult to	111
as can be seen in	95
there was no effect on	91
it is less likely to	90
it has been suggested that	89
the present study was to	87
in the differential diagnosis of	78
there was no relationship between	77
~ cells were treated with	76
during the first trimester of	73
the study of the liver	73
~ study was conducted on	72
it should be noted that	69
standard error of the mean	69
be listed in table #	66
the midline of the face	65
for disease control and prevention	64
as far as ~ be concerned (is/was/are/were)	59
in such a way that	59
at # weeks of gestation	58
Six-word formulas (3 items)	
there was/were no statistically significant difference(s)	309
there was a significant difference between	297
there was a significant increase in	120

Comparing Students' and Teachers' Opinions on the Integration of Receptive Skills in their Academic Reading Comprehension Lessons

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ABSTRACT

At the School of Philosophy and Letters, Universidad of Buenos Aires, our research team has been analyzing the influence of the inclusion of aural comprehension practice in the anticipation step of the reading lessons. Our work revealed that reading and listening in academic settings not only share similar characteristics but they could be integrated in an instruction program since they complement each other to foster comprehension. The main goal of this exploratory study was to analyze whether there are different opinions among the students as regards the benefits of the inclusion of a bimodal strategy and how teachers' attitudes influence on them. A quantitative and qualitative approach was used to examine the data provided by the implementation of two questionnaires. The comparison of the gathered information showed there were different attitudes among the teachers towards the application of a bimodal strategy and these differences influenced on students' opinions.

Keywords: Teachers' beliefs- oral input- reading comprehension - academic texts

INTRODUCTION

At the School of Philosophy and Letters, the Universidad of Buenos Aires, our research team has been analyzing the influence of the inclusion of aural comprehension in the anticipation process of the reading lessons. The most striking finding of previous research work on this topic is that reading comprehension can be facilitated, fostered and enhanced by adding a gradual and systematic program in listening comprehension for students with a low threshold level of English. Results reveal that aural input reinforces strategic reading, helps students do away with linear reading, increases their motivation, makes them concentrate on meaning, and allows them to transfer strategies from one receptive skill to the other.

Our most important research findings in previous research were that reading and listening in academic settings not only shared characteristics and could be integrated in an instruction program but also that both skills complemented each other to foster comprehension. As regards the similarities between these two skills we can mention: 1) the importance of background information in both listening and reading comprehension experiences; 2) the transactional nature of the relationship between text and receptor; 3) the relevance of paratext to predict and limit the scope of comprehension; 4) the recognition of text markers, such as connectors, enumerators, articulators and key concepts that organize the discourse and guide the receptors during the process of reading and listening. As regards differences, the process of reading allows the reader more freedom, text stability, and time to manipulate a text. On the other hand, when transacting with an oral text the listener faces many difficulties: a) the oral text organization is unknown even for the lecturer, b) the listener cannot go back in order to check misunderstandings, c) the receptor's concentration is shorter in time and therefore sections of the lecture content may be missed, d) the lecturer's pace cannot be controlled.

In their metacognitive reflections, many of our students remark that the inclusion of aural comprehension in the pre-reading stage facilitates their reading comprehension. However, they are not always aware of this relationship and of the reasons why both macroskills complement each other. Neither do they consider that strategies are transferred from one skill to the other. The teacher's role is of utmost importance to help them become conscious of the interrelation between these two abilities. However, dissimilar opinions on bimodality arise depending on the group of students. These different results made us wonder whether teachers' beliefs or classroom management has an impact on students' learning experience.

Therefore, the main goal of this exploratory study was to find out what students in general think of the bimodality instruction and secondly to distinguish if their opinions could be related to teachers' attitude or beliefs towards the implementation of bimodality in the lessons.

State of the art

We consider reading as a transactional/ interactive process between the reader, the text and the writer (Spath Hirschmann: 2000). Several variables affect this process: reader', writer's and text variables (Alderson: 2000). Grabe and Stoller (2002) enumerate several dilemmas for L2 reading development and one of them is the integration of language skills. In academic settings, reading and listening combine naturally when students listen to lectures related to topics they already know or they are interested in and they take notes during the presentation.

Literature on the relationship between reading and listening provide evidence that listening to the language helps acquire greater sense of the rhythm, which in turn might help learners detect meaningful sense groups, rather than adopting a word-for-word strategy (Insrillo & Adem: 2012). Studies investigating the effectiveness of reading while listening for comprehension have found that a reading while listening approach produces significant gains in reading comprehension for older readers (Ericson: 2004). Our bimodality research team also confirmed that the phonological input of the written text enhanced comprehension of academic texts in low proficiency L2 learners (Delmas *et al*, 2000). Due to these results, a bimodality sequence was developed to be applied in the pre- reading stage of the elementary (Level 1) reading comprehension courses.

For these elementary courses, the reading comprehension activities in the anticipate section are complemented with aural input and developed in gradual and systematic stages. The initial stage of the sequence, *reading while listening* is characterized by the simultaneous reading and listening of the text during the anticipation stage and before the silent propositional text reading. Students follow the written version while they receive the aural input. The reading aloud is propositionally paused according to semantic and suprasegmental markers. In this stage, students get familiar with the phonology of the language, identify meaningful chunks and become aware of certain L2 stress patterns that make them recognize for example key words in noun phrases. They also recognize phonological transparent words.

During the second stage of the sequence, *selective listening*, students are exposed to the listening of certain parts of the text without the aid of the written version and with the purpose of anticipating the text content through the aural input. The sections are selected considering their relevance in the presentation of information in the text. Considering the low threshold L2 level, students are provided with a list of key words/phrases taken from the text, mixed among distractors (words that are phonologically similar to the target words or semantically possible to be present in the text) which they have to recognize while listening. Once these words are identified, students are required to infer a possible relationship between them so as to recreate the text meaning (specific text hypothesis). This hypothesis is finally confirmed or rejected through the propositional or detailed reading of the original written text. Thus, the purpose of reading the original text becomes to self check students' listening comprehension, to verify concepts, and to identify parts not understood through the aural version. This stage reinforces (with the help of the teacher) the importance of key words and transparencies and the idea that comprehension in both skills is not the direct result of understanding every single word present in a written/ aural text. Students start to transfer strategies from one skill to the other. The use of skipping, text scanning for key words and transparencies becomes clearer for our students through the reading aloud of selected sections.

Finally, in the last stage of the sequence - *strategic listening*- the students receive the aural input of key parts of the original written text, but now without the aid of the key words or phrases provided for ticking. They listen to a reduced version of the written text and take down notes in their mother tongue. Then, they interconnect the key concepts or key phrases detected to produce a specific hypothesis of the text. This hypothesis is then confirmed or

rejected through the detailed or propositional silent reading of the original text. Students read the text with the purpose of identifying how much they have understood and to discover parts not mentioned in the aural version. The reading of the text becomes easier and faster as students can easily recognize the parts read aloud, and they do not stop to check individual words but to check or reconfirm text meaning.

The articulation of the receptive skills mentioned above requires a detailed lesson planning, the identification of the parts to be read to the students, the teachers' awareness of the possible difficulties, a clear and posed propositional reading aloud of the text, and the teachers' effort to help students become aware of the similarities and differences of both skills to help them transfer strategies. It demands the teachers' appropriate attitude towards listening as our didactic sequence does not include the traditional exercises that the skill requires in a typical L2 language lesson. Teachers usually tend to evaluate listening rather than teaching listening. This sequence also moves away from the idea that reading is an individual silent process.

As is often the case with every educational innovation, some teachers are convinced of the need to change and others are not. In our context we notice that some teachers enthusiastically follow this procedure but unfortunately we see others who are doubtful of the gains that the aural input can provide to the reading comprehension skill. This last teachers' belief may result in a not systematic or carefully planned implementation. This attitude can be expected if we consider that *"one of the many facets that teachers bring to the teaching - learning process is a view of what education is all about, and this belief, whether implicit or explicit, will influence their actions in the classroom"* (Burden and Williams :1997, 48-9). This means that teachers' beliefs about how a second language is learned, and how that language should be taught, are central to the way in which teachers behave in the language classroom and these beliefs do not exclude the teaching of the receptive skills.

METHODOLOGY

Subjects and context

Eight hundred and two students who attended the Elementary Reading Comprehension course in seven different terms participated in this project. In the Facultad de Filosofía y Letras of Buenos Aires University, the students who attend the regular courses have a basic knowledge of the English language and they form heterogenous groups because they may be beginning their studies or about to finish them. Therefore, they may have differences as regards their reading experience of academic texts both in their mother tongue and in English. Very often, they have to read articles or chapters from books in English as part of the bibliography in the subjects they are attending. Eight teachers are in charge of the Elementary Level groups and all of them participated in the project.

In the regular English courses, students read authentic academic texts and they are helped to develop strategies which will allow them to become independent readers after a three - term course. In the elementary level, students read texts mainly descriptive, narrative, and contrastive. They read short paragraphs at the beginning of the course and 150-line-long by the end of the term. Students read about twenty two texts in fourteen lessons in each term and they have to read a text on their own at the end of the term.

Instruments

As our main goal was to compare students' and teachers opinions on the integration of the receptive skills in the reading comprehension course, two questionnaires were developed, one for the students and the other for the teachers in charge of the courses where bimodality instruction was implemented. The teachers' questionnaire comprised the same items presented to the students.

A) CURSO DE LECTOCOMPRESION						
1. ¿Qué opinión le merece el curso de lectocomprensión?						
	1	2	3	4	5	
2. ¿Qué opinión le merecen los ejercicios de prelectura o anticipación de textos?						
	1	2	3	4	5	
3. ¿Cómo considera que logró los objetivos trazados?						
	1	2	3	4	5	
4. ¿Cuántos textos trabajó en el curso? Indique la cantidad aproximada						
5. ¿Le parece ese número suficiente? Tache lo que no corresponda. SI – NO						
6. ¿Cómo se han cubierto sus expectativas?						
	1	2	3	4	5	
B) BIMODALIDAD (ESCUCHA Y LECTURA)						
1. ¿Qué opinión le merece el uso de la instrucción bimodal (escucha/lectura)?						
	1	2	3	4	5	
2. ¿Con qué frecuencia ha trabajado la bimodalidad en el curso? Marque lo que corresponda.						
Todas las clases – la mayoría de las clases - algunas clases – pocas clases – ninguna clase.						
3. ¿Qué opinión tiene sobre la gradación de los ejercicios de escucha?						
	1	2	3	4	5	
4. ¿Cuántos textos trabajó con bimodalidad? Indique la cantidad aproximada.....						
5. ¿Le parece ese número suficiente? SI – NO						
6. ¿Cómo evalúa su progreso en cuanto a la escucha?						
		1	2	3	4	5
7. ¿Cree que es importante trabajar la comprensión auditiva? Marque lo que corresponda. SI – NO						
8. ¿En qué medida lo ha ayudado la escucha en la lectura y comprensión del texto?						
	1	2	3	4	5	

Table 1: Students' questionnaire

As table 1 shows , a Likert scale of 5 categories was used for most of the items in which number one stands for the lowest score and number five for the highest. Category one stands for "bad", 2 for "fair", three for "good" 4 for "very good" and 5 for "excellent". Some of the items include general questions on the course and others specific questions related to the bimodality instruction.

A) CURSO DE LECTOCOMPRESION	
1. ¿Qué opinión le merece el curso de lectocomprensión tal como se dicta en nuestra facultad?	1 2 3 4 5
2. ¿Qué opinión le merecen los ejercicios de prelectura o anticipación de textos presentes en el cuadernillo?	1 2 3 4 5
3. ¿Cómo considera que el alumno logra los objetivos trazados desde su experiencia en los cursos?	1 2 3 4 5
4. ¿Cuántos textos generalmente trabaja en su nivel? Indique la cantidad aproximada	
5. ¿Le parece ese número suficiente? Tache lo que no corresponda. SI – NO	
6. ¿Cómo son cubiertas sus expectativas en cuanto al rendimiento de los alumnos en sus cursos?	1 2 3 4 5
B) BIMODALIDAD	
1. ¿Qué opinión le merece el uso de la instrucción bimodal en el nivel inicial?	1 2 3 4 5
2. ¿Con qué frecuencia aplica la instrucción bimodal en el curso? Marque lo que corresponda. Todas las clases – la mayoría de las clases - algunas clases – pocas clases – ninguna clase.	
3. ¿Qué opinión tiene sobre la gradación de la bimodalidad (tres pasos)?	1 2 3 4 5
4. ¿Cuántos textos trabaja con bimodalidad según su planificación? Indique la cantidad aproximada	
5. ¿Le parece ese número suficiente? SI – NO	
6. ¿Cómo evalúa el progreso de los alumnos en cuanto a la escucha?	1 2 3 4 5
7. ¿Cree que es importante trabajar la comprensión auditiva? Marque lo que corresponda. SI – NO Justifique su elección:	
8. ¿En qué medida considera que la escucha facilita la lectura /comprensión del texto?	1 2 3 4 5
Especifique:.....	

Table 2: Teachers' questionnaire

Procedure

The questionnaire was administered to eight hundred and two students at the end of their Level 1 reading comprehension course. The questionnaire was distributed at the end of 7

semesters to gather a wider sample and to determine if there was a recurrent tendency of opinions within each particular group. Students were asked to complete the questionnaire anonymously and teachers explained that the information would be used to enrich the design of future courses.

The eight teachers who were in charge of the elementary (level 1) reading comprehension courses were asked to fill in their corresponding questionnaire. They were asked to be as honest as possible because their responses would be used to evaluate the bimodality procedure.

Results and data analysis

A quantitative and qualitative approach was used to analyze the data. Each response was tallied and percentages were estimated for each item. Once the information was gathered and tallied, the results from each course were confronted to identify the similarities or differences between the student's opinions with that of their corresponding teacher in charge of each course. The tables below show the results obtained from all the students who completed the questionnaire without distinction of the course they were enrolled in.

Questions	Students	Students' opinion		Teachers	Teachers' opinions	
		Quantity	%		Quantity	%
Reading course	802	619	77	8	7	87.5
Pre-reading	802	599	75	8	7	87.5
Goals	802	612	76	8	8	100
Expectations	802	552	69	8	7	87.5

Table 3: Students' and teachers' positive opinions about the reading comprehension course (options 4 and 5)

An examination of the above table shows that both students and teachers have a high opinion of the reading comprehension course and of the pre-reading tasks students have to complete. We can observe differences in their opinions about goal achievement and expectation fulfillment because teachers are more satisfied than students. A possible explanation for this difference may be that students at this level expect to improve their English in these courses because they think they will be taught English grammar instead of the use of reading strategies to become independent readers.

Questions	Students	Students' opinion	
		Quantity	%
Reading course	802	39	5
Pre-reading	802	46	6
Goals	802	29	4
Expectations	802	45	6

Table 4: Students' negative opinions about the reading comprehension course (options 1 and 2)

In this area, the percentages of students' negative opinions are very low (below 10 % in all the items) considering the values 1 (bad), 2 (Fair). Students and teachers agree that the number of texts they have worked with is adequate to the goals of the course.

Questions	Students	Students' opinion	
		Quantity	%
Bimodal instruction	802	521	65
Gradation	802	472	59
Progress	802	377	47
Listening and reading	802	401	50

Table 5: Students' positive opinions about the bimodal instruction (options 4 and 5)

As regards the use of bimodal instruction in the pre-reading stage, the percentages of students' positive opinions are lower than in the reading comprehension area in which they are always above 70%. We can observe that the lowest values appear in the answer to the question about students' progress in listening (47%) and in the importance of the interrelation between the two skills, listening and reading (50%).

Questions	Students	Students' opinion	
		Quantity	%
Bimodal instruction	802	48	9
Gradation	802	82	10
Progress	802	162	20
Listening and reading	802	187	24

Table 6: Students' negative opinions about the bimodal instruction (options 1 and 2)

From the observation of the above table, we can see that the percentages of negative opinions are also low considering the students who selected the options 1 (Bad) and 2 (Fair).

We expected these results because the listening tasks are not organized following a traditional lesson. Contrary to what the Cognitive Load Theory claims, we consider that the development of listening skills in the pre-reading stage helps students advance reading hypotheses and recognize meaningful units. This dual input enhances the establishment of relationships among phonology, morphology, and meaning. The objective of the elementary level is not to develop listening comprehension but reading comprehension articulated with listening in the pre-reading stage. For all these reasons, we are really satisfied with the results because 47% of the students state that they consider they have progressed in the development of their listening comprehension which was not a central aim in the course. In addition, 50% of the students consider that listening helps them advance reading hypotheses. A possible explanation for this percentage is that teachers do not emphasize this relationship as they should or that students are still in the process of understanding this interconnection.

Questions	Students	Students' opinion		Teachers	Teachers' opinions	
		Quantity	%		Quantity	%
Bimodal instruction	802	521	65	8	6	75
Gradation	802	472	59	8	8	100
Progress	802	377	47	8	5	62.5
Listening/reading	802	401	50	8	6	75

Table 7: comparison of teachers' and students' positive opinion on bimodality

There are more differences between teachers' and students' opinions in the bimodality section of the questionnaire. Teachers' opinions tend to be more positive than students'.

Frequency	Students' opinions		Teachers' opinions	
	Quantity	%	Quantity	%
Every lesson	26	3	5	62.5
Most lessons	326	41	3	38
Some lessons	379	47	0	0
Very few lessons	70	9	0	0
Never	0	0	0	0
No answer	1	0.12	0	0

Table 8: Implementation frequency of the bimodal instruction

As regards the implementation frequency of the bimodal instruction, 47% of the students considered teachers used bimodal instruction some lessons whereas no teacher agreed with this opinion. A high percentage of teachers (62.5%) considered they used this type of instruction every lesson. Three possible explanations can be given:

- 1- Students are not aware that the first part of the sequence of bimodal instruction "reading while listening" is used the first four lessons. During this period, students listen to the teacher's reading of the text while they read it silently.
- 2- There may be a difference between teacher's opinions and their practice.
- 3- The results may be due to both explanations.

Opinions	Students' opinions		Teachers' opinions	
	Quantity	%	Quantity	%
Positive (Yes)	593	73.94%	6	75%
Negative (No)	208	25.94%	1	12.5%
No answer	1	0.12%	1	12.5%
	802		8	

Table 9: Importance of listening in the reading comprehension lesson.

Most teachers in this study consider it important to work with listening comprehension in the pre-reading stage. There is one who does not answer and the other answers negatively. If we compare the answers of the groups of students whose teacher apparently does not believe the interrelation between reading and listening is important, we see that only the 52% of the students consider bimodal instruction is important. This percentage is the lowest of all the groups.

If we compare students' positive opinions about the reading course and bimodal instruction in general, we see that the percentages in favor of the reading course (77%) are higher than in favor of bimodal instruction (65%). A possible interpretation is that the interrelation between listening and reading is not emphasized and both skills are treated separately.

Conclusions

The data analysis showed satisfactory results for both the reading comprehension aspect and the bimodal instruction. Although the percentages for the bimodal instruction are lower, 47%

of the students consider they have improved their listening skills which is not a central goal of the course. Besides, 50% of the students state that listening has helped them improve their reading comprehension.

We would also like to mention that it is really important to become aware of the fact that a marked discrepancy between teachers' beliefs and teachers' real classroom actions can have implications on learners who may perceive confused messages. These messages could interfere with their learning process. Becoming a reflective practitioner, that is, someone who can learn from past experiences promotes professional development. Our beliefs about teaching have multiple origins such as past experiences as learners, our training experience and also our experience as teachers.

All these factors tend to be resistant to change. But being resistant to change does not necessarily mean that our beliefs are for life unchangeable. Further research should go deeper into the analysis of the consequences of teachers' beliefs and attitudes on students' academic reading comprehension. We consider we can obtain more significant results if the group of teachers discuss and reflect on the results of the questionnaire and become reflective practitioners; if the questionnaires are improved when the students' answers are justified, and if the teaching material is adapted according to the analysis of the justifications which can be supported by theoretical principles.

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L1 Influence on L2 Academic Written and Oral Production

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ABSTRACT

Despite the general assumption that L1 should not have a major influence on the linguistic production of proficient academically competent L2 learners, experience has often shown that their oral and written academic production is vulnerable to linguistic and conceptual transfer. This study aims to explore the processes involved in L1 transfer as they are manifested in academic discourse, and to discuss their connection to learner and context related factors, as proposed by Selinker and Lakshmanan's *multiple effect principle* (1993). For this purpose, 40 samples of trainee EFL teachers' and translators' oral and written production were examined. The passages in these texts, which were marked by linguistic and conceptual transfer, were explained as the result of processes of direct calque or overextension of analogy. Finally, the profile of the authors of these texts, and a description of relevant contextual features were compared to Selinker and Lakshmanan's model.

Keywords: cross-linguistic influence; positive and negative transfer; conceptual transfer; multiple effect principle; academic register

1. INTRODUCTION

The nature and extent of L1 upon the processes underlying L2 written and oral production have been an issue of concern and controversy for decades. On the one hand, ESL teachers view L1 influence as a facilitating factor in the acquisition of L2 in general, and of the academic register in particular (positive transfer). However, they are also wary of its capacity to generate grammar errors and a kind of discourse which diverges from native speakers' norms and conventions (negative transfer). It is generally assumed that L1 transfer, specifically the one that negatively affects accurate and fluent communication, should not have a major impact on the linguistic production of proficient L2 learners who have had considerable practice in academic skills, yet experience often proves this assumption wrong. Thus, based on the premise that oral and written academic production of proficient L2 learners is vulnerable to mother tongue influence, which results in both linguistic and conceptual transfer, this study aims to explore the following issues:

- a) The nature of and processes involved L1 transfer as they are manifested in written and oral academic discourse, and
- b) The hypothesis that the occurrence and nature of such influence may be linked to certain learner and context related factors, as proposed by Selinker and Lakshmanan's *multiple effect principle* (1993).

For this purpose, forty samples of the oral and written production of trainee EFL teachers and translators were examined. To explain the incidence of linguistic and conceptual transfer in these texts, those passages which were marked by L1 influence were then categorized as being the result of processes of either direct calque or overextension of analogy. Finally, the profile of these trainee teachers and translators, and a description of the context in which these texts were produced were compared to Selinker and Lakshmanan's model.

This study intends to offer a comprehensive insight into cross-linguistic phenomena and the ways in which these affect academic communication. I believe that an awareness and knowledge of the factors intervening in academic discourse production can be exploited by teacher and translator educators to maximize their teaching strategies and, consequently, their students' performance.

2. OVERVIEW OF THE RESEARCH AND DISCUSSION ON L1 TRANSFER

2.1. The concept and scope of transfer

The extent and nature of cross-linguistic influence upon L2 learning competence and performance have L2 been the object of research and discussion for decades, and a phenomenon whose complexity has derived in multiple theoretical perspectives (Murphy, 2003). In the 50's Weinreich introduced the term *interference*, to designate a "bilingual's deviation from linguistic norms as a consequence of an unequal familiarity with mother tongue and the second language" (1953, p.1), a definition which was restricted to the negative aspects of mother tongue influence. Odlin (1989) preferred the more comprehensive term *transfer*, which encompassed various manifestations of L1 influence: facilitation (positive transfer), errors (negative transfer), differences in frequency of occurrence, substitution and avoidance of linguistic items, linguistic calques, among others. Sharwood Smith and Kellerman (1986, p.1), expanded the scope of this concept even further, defining *cross-linguistic influence* as "those processes that lead to the incorporation of elements from a language to another", which includes a variety of language contact related phenomena such as L2 to L1 transfer, language loss, avoidance and the so called "last language effect" (L2 to L3 transfer). Kellerman (1995), on the other hand, argues that languages differ not only in form but also in the way in which they express and organize ideas, and suggests that L2 learners often ignore these differences and consciously or unconsciously transfer such conceptual organization from their mother tongue to the second language. In other words, cross-linguistic influence is manifested not only in linguistic transfer (transfer of linguistic structure, which may result in linguistic errors), but also in conceptual transfer (transfer of conceptual organization, whose consequence is lack of naturalness in spoken and written discourse). In L2 communication, both linguistic and conceptual transfers are materialized through two processes: direct calque, i.e., the literal translation from L1 to L2, and overextension of analogy, i.e., "incorrect usage of a linguistic item in the L2 because of the assumption that its function is identical to that of an item in the L1" (Lott, 1983, p.256).

2.2. Variables intervening in transfer processes

Cross-linguistic influence is described as a complex phenomenon involving the intervention and interaction of various factors. Based on this assumption, Selinker y Lakshmanan (1993) have introduced the *multiple effect principle*, or MEP, which maintains that the convergence of some learner, context or language related factors or variables increases the incidence of linguistic and/or conceptual transfer, as explained in the following sections.

2.2.1. Proficiency

It is generally assumed that L1 transfer is a frequent occurrence in early stages of L2 acquisition (e.g., Odlin, 1989; Poullisse & Bongaerts, 1994) and a learning strategy to compensate gaps in L2 knowledge with knowledge of L1 (Fuller, 1999; Ringbom, 1986). Poullisse and Bongaerts suggest that the correlation between a low level of competence in L2 and L1 transfer, particularly the negative kind, may be accounted by the fact that L1 morphemes tend to remain active in early stages of L2 acquisition due to their frequency, and, consequently, often occur in L2 learners' production. However, Odlin claims that other manifestations of transfer, such as the use of cognates, are more likely to occur in learners with higher levels of proficiency. Likewise, Jarvis (2000) asserts that conceptual transfer as well as competence usually increases as learners require more and more sophisticated resources to express their mother tongue perspective.

2.2.2. Amount of target language exposure and use

This variable, often interacting significantly with age and proficiency, is operationalized according to the time of exposure to the language in the speech community or to formal instruction in that language (Murphy, 2003). Odlin (1989) affirms that the amount of exposure is directly proportional to both positive and negative transfer. Jarvis (2000), nevertheless, minimizes the impact of the interacting variables exposure and age, and asserts that transfer is more dependent on the characteristics of the linguistic activity (e.g., written or spoken mode, formality degree, audience, topic, etc.)

2.2.3. Language mode

Grosjean (2001, p.2) defines language mode as “the state of activation of the bilinguals’ languages and language processing mechanisms at a given point in time”, which functions as a variable in a range from monolingual to bilingual mode. Bilinguals’ mother tongue, then, is fully activated and controls its own and other languages’ linguistic processes, while their L2 may vary its degree of activation from low to nearly total activation. In communicative situations which demand a monolingual mode, that is, exclusive use of L1, L2 remains in a low level of activation. However, when the speaker is in a bilingual mode, in activities which require the intervention of both languages, such as translation, interpreting, or the production of discourse in which sources in L1 are referred to in L2, both languages are in an equal degree of activation. In this case, there is an increase of likelihood of transfer related phenomena like code-switching or lexical borrowing. For this reason, Grosjean claims that language mode has an impact on transfer, especially on lexical transfer.

2.2.4. Linguistic awareness

Linguistic awareness, i.e., knowledge *about* the language, which is not an essential condition for knowledge of the language, plays a fundamental role in L2 acquisition and use, and, as a transfer related variable, is likely to be linked to the learner’s educational background (Murphy, 2003). Kellerman, (1983, 1986, 1995) and Odlin (1989) agree in that the capacity to analyze L1 and L2 features constitutes the bases for the processes of psychotypology, congruence, and structural variable which foster linguistic transfer.

2.2.5. Age

In general, studies on this subject suggest that children are less likely to transfer from their mother tongue than adults (Murphy, 2003). Selinker y Lakshmanan (1993) believe that, in the case of young children, L2 acquisition is based on universal grammar and the incorporation of target language structures, just as L1 acquisition is. Therefore, L1 does not have a significant influence on this process. Odlin (1989), on the other hand, claims that, although the influence of L1 phonology is less evident in young learners, learners from 4 to 10 are often marked by “syntactic conservatism”, i.e., a tendency to recurrently use the syntactic pattern of the mother tongue. Adults, in contrast, usually exhibit a greater flexibility in their syntactic choices, which challenges the general belief that young children are better language learners than adults.

2.2.6. Educational background

Odlin (1989) argues that educational background and literacy foster positive transfer, as learners with high levels of achievement in their L1 linguistic skills, including reading, writing and richness of vocabulary, can exploit these for L2 acquisition. However, Odlin points to the fact that such facilitating effect may be a consequence of “transfer of training” (transfer of linguistic strategies of the L1) as much as of an L1 transfer process.

2.2.7. Contextual factors

The findings of the research in this field suggest that L1 transfer, particularly lexical transfer, is more acceptable with a bilingual audience (Grosjean, 2001, Odlin, 1989). Deliberate code-switching is a common occurrence among bilinguals, and, as pointed by Dewaele (1998, 2001) and Grosjean (2001), L2 speakers tend to resort to L1 transfer in communications with interlocutors who have the same L1 – L2 profile.

Literature usually operationalizes the variable context in relation to formality level and type of linguistic task. Dewaele and Grosjean argue that the more formal the context is, the greater the demand of attention and control over the linguistic production, which generally constrains L1 transfer. Kellerman (1995), on the other hand, states that transfer is dependent upon linguistic activity type, and cites a study by Poulisse (1990), which demonstrates that the amount of transfer is likely to be greater in an interview than in a story-telling task. Kellerman

attributes this to the fact that there is a greater demand for attention in an interview, and, consequently, a lower amount of attention available to monitor formal linguistic aspects. A narration, however, being a less demanding genre in structural and lexical respects, permits speakers to focus on their linguistic production and offer a more accurate performance.

3. THE IMPACT OF L1 ON THE ACADEMIC PRODUCTION BY TRAINEE TEACHERS AND TRANSLATORS

Following the abundant amount of research and academic literature on the issue, which has been reviewed in the previous section, I assume that L1 has a major effect upon the academically contextualized oral and written production in English of trainee teachers and translators whose native language is Spanish. Thus, this study is aimed to specifically answer the following questions:

- a) How is L1 manifested in the academic oral and written production of trainee teachers and translators?
- b) Can such L1 influence be explained by Selinker y Lakshmanan's multiple effect principle?

In order to explore a), the following corpus of texts was selected:

- 25 papers written by trainee translators and teachers, which included 10 research papers (5000-7000 words) and 15 expositive/argumentative papers (1000-1500 words). Out of these 25 texts, 10 were authored by trainee translators and 15 by trainee teachers.
- 15 five- fifteen minute oral presentations, 5 by trainee translators and 10 by trainee teachers.

Both the papers and the oral presentations constitute standard requirements of academic subjects in the last year of teacher and translator training college, and they involved topics related to theoretical and applied linguistics, translation theory, and language acquisition and teaching. The oral presentations were taped for subsequent analysis.

The oral and written texts were examined, and those passages which reflected influence of the authors' mother tongue, Spanish, were identified. These passages were then categorized as manifestations of linguistic or conceptual transfer, and as the result of processes of direct calque or overextension of analogy, and lists of instances of discourse reflecting L1 influence were elaborated.

In the case of the written texts, the occurrence of linguistic and conceptual transfer, and of processes of direct calque and overextension of analogy per page (1 page=400 words) was displayed in tables so as to contrast the subjects' performance in sections of their papers which require the expression of their own ideas (introduction, analysis, discussion, conclusion) to those whose elaboration involves the utilization of bibliographical sources (literature review). In the case of the oral texts, the proportion of linguistic and conceptual transfer was considered. In both cases, the occurrence of the different types of transfer in the production of trainee translators and that of trainee teachers was contrasted.

In order to answer our second research question, the students whose texts were involved in this study were required to respond to a questionnaire which was oriented to collect information related to those features Selinker and Lakshmanan claim to have an impact on language transfer: proficiency, amount of target language exposure and use, language mode, linguistic awareness, age, and educational background. On the basis of this data a description of the profile of the trainee translators and teachers was elaborated and subsequently considered in a discussion of the multiple effect principle.

The influence of the subjects' mother tongue, Spanish, was found to be recurrent and manifested in a variety of forms in both spoken and written production. The occurrence of linguistic and conceptual transfer via processes of direct calque and overextension of analogy is summarized in table 1 and table 2:

Table 1: Linguistic and conceptual transfer in written texts by trainee teachers and translators

LINGUISTIC TRANSFER			
DIRECT CALQUE		OVEREXTENSION OF ANALYSIS	
Description	Examples	Description	Examples
<p>Word-for-word translation of syntactic, idiomatic or collocation patterns</p>	<p>Translators prepare themselves in an academic way. ... despite of their mother tongue or kind of training they receive. Another kind of discourse is the foreigner talk. Although it is a fast and practical means of communication, it does not mean you do not have to be polite.</p>	<p>Inadequate linguistic item</p>	<p>... the most relevant bibliography.</p>
<p>Dangling participle</p>	<p>Moving to Scotland, the Scottish English dialect has many variations like English in England</p>	<p>False cognate</p>	<p>The translator is expected to conserve the foreign identity of the source text. Why should the question of translation be given more prominence in the scientific field? ... what specialized authors have already expressed. I present a summary and a synthesis of the arguments. This is a word of French origin, and is supposed to be the language used by criminal in France.</p>
<p>Disruption of SVO canonical order</p>	<p>...translators have shared with European readers local literature. ...can picture more clearly the new concepts. It should be regarded other perspectives. East Midland dialect belongs to the east part of</p>	<p>Overextension of analogy in collocation patterns</p>	<p>Errors are considered to be very logical These constraints are well defined by Gottlieb ... that may have an influence in second</p>

	England, and has been propagated through literature the use of specific dialect words and grammar.		language acquisition.
		Lack of precision in the use of specific terminology	...between the person who creates the comic effect and the receptor.
		Present simple, instead of present perfect, implying perfect aspect, consequence of the assumption that the present simple equals <i>presente del indicativo</i> in perfect and imperfect function	It is also proved that students coming from marginal and disfavored contexts tend to quit their studies. For a very long time different authors see those errors not only as deviations of the rules but also as...
		Plural suffix in pre-modifying nouns/adjectives	Pit Corder proposes a five-steps process simplification of the linguistics forms

CONCEPTUAL TRANSFER

DIRECT CALQUE

OVEREXTENSION OF ANALYSIS

Description	Examples	Description	Examples
Post-modifying prepositional phrase instead of premodifying nouns/adjectives	The culture of the place... Selinker (1992) proposed the theory of Interlanguage. The result of interference of previous knowledge of their mother tongue. Early Modern English was the successor of it.	Abuse of vague/generalizing nouns (specific terms are preferred in English academic writing)	The person is able to develop speaking skills
Redundant, Spanish like composing	The confusion created challenged the students to get the right answers	Comma splice (clause coordination without coordinating	It was seen that the different skills are developed independently from each other, the

	... interviews made to subjects... In the translation done by the trainee translator... The need they have to study English...	conjunction. Adverbial clause subordination is a more natural choice in most cases)	weakness or the strength depends on each S. Another is called Systematic errors, they are made by learners that already know the system A strong influence in the way errors were seen was Behaviouristic, errors were undoubtedly due to first language interference
"Heavier" semantic load on nouns/adjectives rather than on verbs/adverbs	Students' participation in general, in all the lessons, was active . (I.e., instead of "actively participated")	Passive voice in verbs normally used in active voice	Professionals in translation can be specialized...
Present simple rather than present continuous to refer to changing situations	The mental grammar is replaced all the time.	Past simple rather than present perfect in actions with operative consequences in the present time.	They received from 18 to 24 hours of instruction a week.
Inclusion of audience, overt rapport with reader, which, while quite frequent in Spanish, is rare in written academic English	In the previous paragraphs we have seen some developed ideas and details regarding Interlanguage. Before defining and giving some examples of language discrimination, let us focus a bit more on the potential social variations that can take place in our language.	Coordinating conjunction (and, or) at the beginning of the sentence, which is a more frequent feature of written Spanish than of academic English	And around the beginning of the World War I, no one spoke the language
Direct calque of syntactic/collocation pattern in Spanish, which results in marked or rare structure in English	In this vague category lies an important conditioning factor. Apparently, from the concept of classical language, there is a language form which derives, and it is called "lingua	Abuse of expletive pronoun (it) impersonal construction which is equaled to impersonal sentences with "se" in Spanish	It was seen that...

	<p>franca”. ...the different cultures that might be present within these communities ... these include gestures that appear in a culture.</p>		
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Table 2: Linguistic and conceptual transfer in oral texts by trainee teachers and translators

LINGUISTIC TRANSFER			
DIRECT CALQUE		OVEREXTENSION OF ANALYSIS	
Description	Examples	Description	Examples
<p>Word-for-word translation of syntactic, idiomatic or collocation patterns</p>	<p>Then we have case study... In some cases it doesn't care if... It is not the same to give a description English differentiated from German because of... English modified a lot in lexicon In nowadays... This area is much related to... It becomes more used... The middle English was called like that... There are differences like the quality and quantity, the fluency, and... We don't have much idea about it As regards non-nativist theories, we can find behaviorism</p>	<p>Overextension of analogy in idiomatic or collocation patterns</p>	<p>When we make a case study... It is considered like (as) correct It has different conjugations from (for) the verb ... is achieved in the same way than... They incorporate the wrong rule and don't realize. They...</p>
<p>Disruption of SVO canonical order</p>	<p>It happens the same with English...</p>	<p>Inadequate linguistic item</p>	<p>I put this as a conclusion The people, the</p>

	In Spanish happened more or less the same.		class or the person we are investigating...
Present tense + would in conditional sentence	If we go from one place to another, we would see...	False cognate	It was called like that because of the different (various) dialects that were spoken... Ug is presented (introduced) by Chomsky
Inversion in an indirect question	I want to begin by saying what is mainly a case study.		
Ellipsis of the noun in the noun phrase	The pre-operational, the concrete operational and the formal operational.		
CONCEPTUAL TRANSFER			
DIRECT CALQUE		OVER-EXTENSION OF ANALYSIS	
Description	Examples	Description	Examples
Direct calque of syntactic/collocation/idiomatic pattern in Spanish, which results in marked or rare structure in English	The advantages of case study are six. The main uses of single case research... We can find phonological characteristics, for example... This area has many variations of dialect. It became more shortened, more practical. Piaget's contribution about phases of development. A very common error is when students get the wrong past tense of verbs. The interlanguage is under construction constantly.	Present simple, instead of present perfect, implying perfect aspect, consequence of the assumption that the present simple equals presente del indicativo in perfect and imperfect function	If we did not complete the abstract so far...

	<p>All the time the learners are restructuring the rules. One of them is the idea of mental grammar.</p>		
<p>Post-modifying prepositional phrase instead of premodifying nouns/adjectives</p>	<p>Psychological problems of the students. the dialect of cockney. A wrong item of vocabulary or grammar.</p>	<p>Overextension of the semantic/pragmatic range of the pattern would+verb to make assertions less definite (as in "sería"/"podría ser").</p>	<p>Another example would be when students... Positive evidence would be... Competence would be...</p>
<p>1st person plural pronoun to minimize the impact of 1st person singular pronoun, a discourse strategy which is frequent in Spanish, but rare in written academic English</p>	<p>Then, we can say that the interlanguage system is also dynamic. From the inside, we see that... By analyzing the errors that they have, we can understand...</p>		
<p>Redundant, Spanish like composing</p>	<p>The level of education that we have... The motivation we have in the Project...</p>		
<p>Conjunction joining pre-modifying adjectives</p>	<p>It's a kind of dynamic and intermediate system.</p>		
<p>"Heavier" semantic load on nouns/adjectives rather than on verbs/adverbs</p>	<p>The causes of fossilization can be internal or external.</p>		

As observed in the tables above many linguistic features which suggest L1 transfer through processes of direct calque and overextension of analogy, such as word-for-word translation of syntactic, idiomatic or collocation patterns, disruption of SVO canonical order, inadequate linguistic items, false cognates, and overextension of analogy in collocation patterns, are recurrent in both oral and written expression. Manifestations of conceptual transfer are also found in recurrent features of both oral and written discourse, for example, direct calque of syntactic/collocation pattern in Spanish, which results in marked or rare structure in English, post-modifying prepositional phrases instead of premodifying nouns/adjectives, redundant, Spanish like composing, "heavier" semantic load on nouns/adjectives rather than on verbs/adverbs, Spanish-like usage of plural 1st person patterns, and past simple rather than present perfect in actions with operative consequences in the present time. However, other conceptual transfer related features, such as comma splice, Spanish-like patterns in the use passive/active voice, and the use of coordinating conjunctions at the beginning of the

sentence, are circumscribed to the written mode, while other such as Spanish-like patterns of the modal *would*, and conjunction-linked pre-modifying adjectives are restricted to oral expression.

Pronunciation features, which can be speculated to be a manifestation of transfer from Spanish, were not included in the lists, for this study focuses on those aspects of language competence which are characteristic of academic, rather than general L2 expression. However, it is worth mentioning that the subjects' mother tongue was found to be manifested in pronunciation features such as lack of aspiration, no difference between /b/ and /v/, and persistence of Spanish-like pronunciation of individual words (e.g., Paradigm = */paradigm/) and word stress patterns (e.g., Selinker = */se'linker).

The analysis of the written texts indicated that the incidence of linguistic and conceptual occurrence varies in those sections which require the production of content by the student (introduction/ analysis/ discussion/ conclusion), and those which involve reformulation of content from bibliographical sources (literature review), as shown in table 3. The analysis of the papers by the trainee translators yielded an average of 0.0065 instances of linguistic transfer per page in sections involving elaboration of content, and an average of 0.0085 in the literature review section. The significantly higher figure in the latter may be accounted by the fact that trainee translators utilize up to 40% of bibliographical sources in Spanish. The incidence of conceptual transfer, in contrast, is almost equal to that of linguistic transfer in the introduction/ analysis/ discussion/ conclusion sections. Likewise, the volume of conceptual transfer in the literature review section virtually equals that in the introduction/ analysis/ discussion/ conclusion sections. In the papers written by the trainee teachers, the incidence of both linguistic and conceptual transfer in the introduction/ analysis/ discussion/ conclusion sections is lower than in the papers by trainee translators (average of 0.0045 and 0.0047 respectively compared to 0.0065 and 0.0064). The incidence of both kinds of transfer in the trainee teachers' literature reviews is higher (average of .0052 and 0.0066 respectively) than in the introduction/ analysis/ discussion/ conclusion sections. Still, except in the case of conceptual transfer in literature reviews, trainee translators seem to lapse significantly more frequently in L1 transfer than trainee teachers. This finding is hardly surprising, considering that translators have a greater awareness of and exposure to academic discourse in their L1, as well as being frequently involved in activities requiring a bilingual mode. Teacher training and practice, on the other hand, is more restricted to L2.

Table 3: Incidence of linguistic and conceptual transfer in papers by trainee translators and teachers

	PAPERS BY TRAINEE TRANSLATORS (T=10)		PAPERS BY TRAINEE TEACHERS (T=15)	
	Linguistic transfer sample count per page (1page=400 words)	Conceptual transfer sample count per page (1page=400 words)	Linguistic transfer sample count per page (1page=400 words)	Conceptual transfer sample count per page (1page=400 words)
Introduction/ analysis/ discussion/ conclusion	0 – 0.022 samples per page Average: 0.0065	0 – 0.017 samples per page Average: 0.0064	0 – 0.017 samples per page Average: 0.0045	0 – 0.022 samples per page Average: 0.0047
Literature review	0 – 0.015 samples per page Average: 0.0085	0 – 0.012 samples per page Average: 0.0063	0 – 0.012 samples per page Average: 0.0052	0 – 0.015 samples per page Average: 0.0066

The analysis of the oral presentations showed that linguistic and conceptual transfer is as frequent in spoken discourse as it is in written discourse. However, in those passages which suggest L1 influence, linguistic transfer is significantly more frequent than conceptual transfer in the oral texts produced by both trainee translators and teachers, even though the percentages in the case of the latter are slightly more balanced (see table 4).

Table 4: Proportion of the incidence of linguistic and conceptual transfer in oral texts by trainee teachers and translators

	Average percentage of linguistic transfer	Average percentage of conceptual transfer
Texts by trainee translators (T=5)	73 %	27 %
Texts by trainee teachers (T=10)	66 %	34%

As the tables above indicate, while the incidence of linguistic and conceptual transfer is fairly proportional in the written academic discourse of trainee teachers and translators, in oral academic discourse, the incidence of linguistic transfer is significantly higher than that of conceptual transfer.

The evidence introduced above supports the claim that L1 influences the academic production of trainee teachers and translators. The point is, why does this happen? When constructing complex texts which demand high levels of linguistic, rhetorical and pragmatic sophistication and specialization, L2 learners need to resort to every resource available to them, and in order to reach their communicative goals, they apply various learning and communicative strategies. Some of such strategies consist in the exploitation of L1 competence. It is possible, then, to view the occurrence of linguistic and conceptual transfer through processes of direct calque and overextension of analogy as the result of the application of discourse construction strategies. Thus, the recurrence of L1 related patterns such as, false cognates, dangling participles, or word-for-word translation of syntactic or collocation structure might be explained as possible learning strategies, that is, learners' attempts to fill gaps in L2 knowledge with available L1 knowledge. It is also possible that practices such as the use of L1 patterns in tense, aspect, voice, or modal verbs may be connected to pragmatic strategies, in other words, they might reflect an effort to communicate a certain attitude, or create a certain perlocutionary effect or implicature by exploiting conversational maxims (e.g.: modal verb *would* to mitigate the force of a claim). On the other hand, the disruption of SVO canonical order, the occurrence of post-modifying prepositional phrases instead of premodifying nouns/adjectives, conjunctions joining premodifying adjectives or at the beginning of the sentence, the placement of the "heavier" semantic load on nouns/adjectives rather than on verbs/adverbs, and the abuse of expletive pronoun (it) impersonal construction might indicate an intention to place certain pieces of information in focused parts of the sentence that is, they might constitute discourse strategies.

However, resorting to L1 competence is one of the various available alternatives for solving discourse production difficulties. This study aims to discuss whether it is sensible to claim that proficient language learners like those whose textual production has been analyzed tend to transfer the linguistic and conceptual idiosyncrasy of their L1 in their L2 performance. Over the last decades, researchers have offered numerous explanations for the occurrence and nature of L1 transfer in L2 communication. Selinker and Lakshmanan's (1993) model, *the multiple effect principle*, links L1 transfer to features of the speakers and those of the context. Thus, according to this model, the co-occurrence and interaction of factors such as high levels of proficiency, amount of target language exposure and use, education and linguistic awareness, frequent involvement in activities requiring a bilingual mode, high degree of formality, a bilingual audience and complexity of form and content are likely to increase the occurrence of certain types of linguistic and conceptual transfer. The following discussion tries

to establish the possibility to explain L1 transfer in the oral and written texts analyzed above applying this model.

Proficiency: As mentioned above, research has linked high levels of proficiency to positive transfer (Odlin, 1989) and conceptual transfer (Jarvis, 2000). Students involved in this study have reached a level of competence between C1 and C2 (according to the Council of Europe's Standards), and have been learning English between 5 and 25 year (an average of 11 years), and 38 % of these students have been learning this language for more than 10 years.

Amount of target language exposure and use: Studies on this topic have indicated that positive and negative transfer seems to increase with high levels of L2 exposure and use. The authors of the texts examined in this study attend an average 24 hours a week of English lessons, and 8 hours in Spanish, and spend a weekly average of 13 hours doing homework in English, and 5 hours in Spanish.

Language mode: L1 transfer related phenomena like code-switching or lexical borrowing tend to occur more frequently in the discourse of L2 learners who are constantly in a bilingual mode (Grosjean 2001). Trainee translators are involved in bilingual mode activities such as translation and oral interpretation, which may account for the fact that linguistic and conceptual transfer is a more frequent occurrence in their texts than in those by trainee teachers (see table 3). Also, for the documentation of their papers the trainee translators have cited up to a 40% of bibliographical sources in Spanish, whereas trainee teachers have cited exclusively sources in English. Therefore, it could be inferred that the latter have experienced lesser influence from their L1 during the elaboration of their papers.

Linguistic awareness: Linguistic awareness facilitates those psycholinguistic processes on which language transfer is based (Kellerman, 1983, 1986, 1995; Odlin, 1989). The students whose discourse samples were included in this study have attended academic subjects such as English and Spanish Grammar, Phonology, Comparative Grammar, Linguistics, Discourse Analysis, among others, which develop various aspects of explicit knowledge of L1 and L2.

Age: Although there is a great deal of controversy in this respect, researchers such as Selinker and Lakshmanan (1993) claim that L1 influence is more significant in adult learners than in children. All the participants in this study are adult learners between 21 and 34 years old.

Education background: Those learners like all the subjects involved in this study, who have reached high levels of education and literacy can exploit their L1 skills in the acquisition and use of other languages and are, therefore, more likely to experience L1 transfer, especially the positive kind (Odlin 1989).

Contextual factors: L1 transfer is more frequent in contexts which involve a bilingual audience (Grosjean, 2001; Odlin, 1989), high level of formality, and complex content and form which demand a great deal of attention to various aspects of discourse production (Kellerman, 1995). Trainee teachers and translators in general perceive the teacher who evaluates their written and oral work as their real audience. This was confirmed in a survey I conducted during a previous study, in which more than 50% of the students asserted that their academic production is targeted to one single audience: the teacher. In Argentina, most teacher and translator trainers have the same mother tongue and cultural background as their students, in other words, they constitute a bilingual audience. The oral and written texts selected for this study are research papers or discursive essays on subjects such as linguistics, translation theory or education, which demand a considerably high level of formality and specialization. Producing this type of text requires knowledge of specific textual formats and structures, as well as the use of discourse involving complex syntax and specific disciplinary terminology. In addition, the production of these texts demands a high degree of attention to cope simultaneously with various tasks: generating and developing complex ideas and expressing them in linguistically, rhetorically, stylistically, strategically and culturally adequate forms in a non-native language.

4. CONCLUSION

It is evident that L1 influence is a significant feature of the spoken and written academic discourse by proficient adult L2 learners. Such influence derives, in some cases, linguistic inaccuracy, and in others, in linguistically acceptable yet atypical and foreign-sounding expression. Linguistic and conceptual transfer is manifested through processes of direct calque and overextension of analogy, and is a common occurrence in the oral and written academic production of both trainee teachers and translators. The evidence observed in this study suggests, however, that linguistic and conceptual transfer tends to be slightly more frequent in the written production of trainee translators than in that of trainee teachers, a finding which can be accounted by the fact that the former are more actively involved in L1 and bilingual activities than the latter. In the oral production of both trainee translators and teachers, linguistic transfer is significantly more frequent than conceptual transfer. But in general, L2 speakers tend to make more errors (not only transfer errors) in spoken than in written discourse because in the latter they are able to consciously revise and polish their production. It is possible that linguistic and conceptual transfer in these subjects might be motivated by the need to exploit a variety of learning and communicative strategies for the production of linguistically and pragmatically highly demanding discourse types. The recurrence of L1 related structure in academic texts, then, could be the effect of the application of learning, pragmatic, and discourse strategies.

The recent research and discussion on the topic of cross-linguistic influence, like that by Selinker and Lakshmanan, links its occurrence to certain learner and context related features. This model claims that L1 linguistic and conceptual transfer is more likely or frequent with the interaction of factors such as high levels of language proficiency, awareness, education and achievement in literacy skills, and L2 exposure and use, formality and specialization, a relatively older age, a bilingual audiences and involvement in bilingual activities. Such description coincides to a great extent with the profile of the trainee teachers and translators who participated in this study.

However tempting it is to explain L1 influence as related to the above mentioned factors, I believe that it is sensible to bear in mind that Selinker and Lakshmanan's model is limited to factors of a linguistic and social nature. Linguistic and conceptual transfer may well be related to many other factors, such as personality, learning styles, or even the attitude of the native culture towards the incorporation of foreign linguistic and communicative features.

A deeper and more comprehensive understanding of the process underlying the production of academic texts by L2 speakers may lead translator and teacher educators to challenge their current views of L2 academic competence, which they apply in the evaluation of their students' performance. This might mean that the view of L2 academic competence based on native speaker standards could be replaced by that which takes into account the social, cultural and academic identity of a bilingual speaker.

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APPENDIX

QUESTIONNAIRE

Por favor, complete la siguiente información:

Edad:

Carrera: PROFESORADO TRADUCTORADO

Nº de años que hace que estudia inglés:

Nº aproximado de horas de cursado de materias en inglés semanales:

Nº aproximado de horas de cursado de materias en castellano semanales:

Nº aproximado de horas semanales dedicadas a realizar tareas en inglés:

Nº aproximado de horas semanales dedicadas a realizar tareas en castellano:

Materias cursadas y aprobadas (especificar nivel, por ejemplo, GRAMÁTICA I, II; FONÉTICA I, II, etc.):

MATERIA	SÍ	NO
GRAMÁTICA INGLESA	(ej: I, II)	(ej: III)
GRAMÁTICA ESPAÑOLA		
FONÉTICA INGLESA		
ESTUDIOS COMPARATIVOS DEL INGLÉS Y EL CASTELLANO (o materia similar, ej, estructuras comparadas)		
CIENCIAS DEL LENGUAJE (o similar, ej, lingüística, análisis del discurso)		

Modality-based Teaching at Corporate Level

Dana Poklepovic, PhD

DPL Corporate Language Dynamics

ABSTRACT

Market globalization has definitely placed English as the language of business. Companies are aware that an English-speaking workforce is an asset that enables them to remain competitive and updated. In view of this, companies are willing to invest in English courses. However, these courses need to be effective and efficient. One way to attain effectiveness and efficiency in learning is by analyzing how business people use their sensory channels or modalities to work and to learn. This research seeks to explore the preferred learning styles of corporate learners in a *Business English* course and to examine the effectiveness of modality based teaching

Keywords: Business English – sensory channels –modalities- learning styles – modality based teaching – effectiveness – efficiency

INTRODUCTION

The Need for Research

Market globalization has definitely placed English as the language of international business. A direct consequence of this world trend has been the rapid development experienced by Business English (BE) which has become one of the major branches of English for Specific Purposes (ESP) (Duddley-Evans & St. John, 2003). In effect, the demand for both general BE courses and specialized business skills workshops has grown steadily over the last 20 years. While BE shares with the other varieties of ESP the presence of a specific language corpus that has to be acquired, BE sustains that the acquisition of that specific language corpus has to be accompanied by the ability to communicate effectively (Ellis & Johnson, 1994), a sine qua non of success in business transactions. Moreover, the teaching process needs to be in the hands of specialized professionals who understand the profile and needs of business learners and companies.

On the one hand, business executives are highly demanding students (Ellis & Johnson, 1994). They know that the mere knowledge of specialized vocabulary is insufficient to develop and maintain successful business relationships. As learners, they ask for the language content and skills that enable them to do business in English. Briefly, what they need are effective training solutions. On the other hand, companies are aware of the reality that surrounds them: they need a workforce capable of communicating in English. To this end, they hire BE teachers to train their staff. Since companies consider language courses as an investment in time, money and effort, they expect the teacher to provide efficient training solutions, i.e. attain teaching goals in the time and manner agreed upon.

It follows then that, in the current scenario, there is a need to explore a teaching approach that may help trainers meet the needs of business learners. This study seeks to offer Business English teachers a full understanding of the sensory learning styles of corporate students so that they may provide a more professional and effective teaching service. How can English teachers meet corporate learners' needs? If teachers observe the way their corporate learners receive and process information through their sensory channels, they can substantially improve the effectiveness and efficiency of their classes and reach all the students in one, single, effort.

Literature Review

It is generally accepted that human beings differ in their way of viewing the world and

processing learning. Each learner shows distinct and consistent preferences to perceive, organize and retain information. The way in which an individual characteristically acquires, retains and retrieves information is usually defined as a learning style. Oxford (2003) argues that the approach that a learner adopts to acquire a new language or any other subject shapes the direction of learning. Students, in the same class and with the same teacher and syllabus, show different rates of progress and levels of independence. According to Keefe (1991), each person is born with certain preferences toward a particular style on the basis of their psychological and physiological characteristics. While these preferences are kept during their lifetime, they are substantially shaped by factors such as cultural inheritance, educational background, life experience and professional practice. Consequently, learning styles cannot be considered a static feature of our students. On the contrary, their learning preferences evolve together with their personal and professional growth. Therefore, it is important not to use learning preferences as a tool to classify learners into closed categories. They should be used to maximize the students' learning potential.

If educators are to successfully address the needs of individuals, they must relate their teaching style to their students' learning style. When the learning preferences of students are matched with appropriate techniques or strategies in teaching and learning, motivation, performance and achievement are enhanced (Kinsella, 1996; Reid, 1995). Business English implies -in general terms- the development of creative thought, decision-making skills and problem solving techniques. These are priorities that, in the face of serious mismatches between the learning style of students and the teaching style of the instructor, can lead to a breakdown in the teacher-student relationship.

Learning styles have been extensively discussed in educational psychology literature (Dun, 1972; Reiff, 1992; Oxford, 1990) and thoroughly studied from several perspectives. This article examines the use of sensory learning styles –or modalities - in Business English courses.

Sensory Learning Styles: Visual, Auditory and Kinesthetic (VAK)

This category or dimension explains how some students prefer to use a sensory channel to receive, store and give information. Students are said to be visual when they prefer to learn by seeing information or reading it in texts, images or charts. They can remember exactly where they have read or seen the information. They are aware of the body language of people and tend to be very good at visual arts. Some of them also have a very rich imagination. Auditory people prefer to listen to the information and to what they have to do; they "*say it to learn*". They have strong communication skills and often have musical talents. Kinesthetic students prefer to learn by doing something, they are hands-on learners who learn better when there is movement involved. Some of them may be labeled as hyperactive as children; most of them are good at sports and also great performers. They enjoy group and role play activities. It may take longer for kinesthetic students to learn a topic, but once they have learnt it they seldom forget this information. This is because their 'muscle memory' lasts longer; it is like learning to ride a bicycle.

There exists a body of empirical contributions about the use of sensory learning styles to teach and to learn from medical doctors, educators and psychologists with the prestige and recognition of Rita Dun (1979); Walter Barbe and Raymond Swassing (1979); who have acknowledged the importance of sensory learning styles at school level.

English as Second Language (ESL) teachers in U.S. schools have also conducted research studies into the learning styles of students in order to improve the English classroom environment. Laura Rossi-Le (1995) found that, among her adult immigrant community college students, the older students and those with an advanced English level showed a preference for visual learning. A second scholar, Rita Dunn (1990), reported that her Caucasian and Asian students had a higher preference for mobility in learning and that they remembered less well orally and visually.

A further significant finding was reported by Joy Reid (1998): when ESL students whose stay in the United States is prolonged, they adapt their sensory learning styles to the educational

culture in which they are studying. Specifically, she found that students became less kinesthetic and more auditory. Reid also reported that ESL students from specific major fields often preferred specific learning styles: engineering students favoring kinesthetic learning, and students in the hard sciences preferring visual learning. Finally, in their study of learning styles, Felder and Henriques (1995) reported that although most college students have a stated preference for visual input, their actual performance when learning through the auditory mode was equally positive.

Joy Reid (1998) concludes that sensory styles are active channels for learning a language and stated that:

Effective teaching requires teacher's awareness of students' individual differences and teachers' willingness to vary their teaching styles to match with most students'. A multi-sensory approach to classroom teaching is the rational solution. The more able and willing the teachers are to observe their students and to integrate appropriate material presentation and class assignments that match their students' learning styles, the more easily and efficiently their students will learn (p.84).

Review of the Brain Workings

According to neuroscience, human beings absorb almost all learning through one or more of our sensory channels. Therefore, it can be stated that the sensory channels put learning in motion. Sensory channels, also called modalities, are considered "the keys to learning" (Barbe, 1979:1). The first stage in the learning process is called sensation, i.e. the individual receives a stimulus from the environment. Then, in the second stage, called perception, that input reaches the brain and is assigned meaning. The act of sensory perception takes place in networks that are responsible for identifying and recognizing patterns of shape, light, sound, taste, smell and touch and movement. Recognition is achieved in a matter of seconds, and from then on, the third stage follows interpreting and passing data into short and long-term memory.

Although all human brains share the same basic networks, it must be acknowledged that not all brains are equal; they show differences and they work differently. Stronck (1980) claims that several types of cells present in some brains are not present in others. If a modality is only understood as a physiological characteristic of a person, it is bound to be described as a feature chiefly determined by hereditary factors. This is only one of the reasons why people tend to view the world differently and approach learning differently (Schwartz, Davidson & Maer, 1975). However, human beings interact with peers since birth. From these experiences, we create our preferences. This second perspective adds an affective component to the use of modalities. But above all, there are behavioral factors (Barbe, 1979). It has been demonstrated that the environment is the greatest modifier of human behavior and that a repetitive activity influences the way students learn. More specifically, the sensory channels used to work correlate with the sensory channels used to learn. Therefore, a modality is also a feature that can be developed.

The Adult Learner and the Use of Modalities

As stated before, scholars and researchers (Dun & Dun (1979); Oxford (1990), Barbe (1979), Joy Reid (1998)) have studied the use of sensory modalities to learn in children and adults. They all agree that through the process of growth, children's modalities tend to integrate with cognitive strategies in order to transfer information from one modality to the other or others. Consequently, the adult learner learns with a pattern formed by: a dominant modality, a secondary modality, a dormant modality or mixed modalities. (Cazau, 2000; Dun and Dun, 1970; Barbe, 1979). A *dominant modality* is the channel through which an individual processes information most efficiently and effectively at a given point in time. A *secondary modality* is a complement to the dominant modality -instead of interfering with it, a secondary modality enhances it. For example, a student with a dominant kinesthetic modality and a secondary visual modality is not at a disadvantage when a lesson is presented in either of

these modes. The *dormant modality* is the least used of the three categories. However, evidence (Barbe, 1979) shows that if adequately motivated, adult learners can perfectly use their dormant modalities. *Mixed modalities* occur when no single modality is clearly dominant. Barbe sustains that the proportion of individuals with mixed modalities is larger among adults than among children and attributes this to the cognitive maturity of adults. People with mixed modalities have an easier time in the classroom since they are able to process information using two or three modalities with equal efficiency.

THE RESEARCH

Research Objectives

The goal of this research project is to study the use of sensory learning styles or modalities by corporate learners who worked for the following areas of companies: Marketing & Sales, Accounting & Finance, and Operations & Technology.

The research questions were:

- 1 Is there a preferred sensory learning pattern which identifies each of the areas under analysis?
- 2 How far can a modality-based teaching style work on Business English courses?

Population

The number of subjects in this fieldwork was 160 business executives that worked in the Marketing & Sales, Accounting & Finance and Operations & Technology areas of companies, based in Buenos Aires. They took in-company, BE lessons twice a week. Eighty percent had group lessons while the rest had one-to-one tuition. The groups were composed of no more than six students. They belonged to:

- Diverse economic Sectors: banking and finance, security services, telecommunications and media, insurance brokerage, manufacturing, foreign trade and retail. Students held managerial, technical or assistant positions.
- Diverse Gender and Age: 82 men and 78 women within the range of 23 to 58 years of age.
- Diverse Language Proficiency Levels: 45% of participants were at the beginner and elementary stage, and 55% at the low-intermediate and upper-intermediate stage.

Research Instruments

A VAK questionnaire was used to answer the first question (Appendix A: "The VAK Questionnaire"). This is a quantitative tool of 12 items adapted from Neil Fleming's VAK Questionnaire (2001) to assess the business organization context.

The evidence gathered was cross checked for triangulation purposes with classroom observation (Appendix B: "Observation Form"). This is a qualitative tool. While the questionnaire provides information about the size of the phenomenon under study, classroom observation reinforces those findings by offering a description of the specific features of the said phenomenon.

Administering the VAK Questionnaire

The course teacher administered the questionnaire and asked students to complete it in one session. Respondents answered questions about their preferences when studying, memorizing, reading and communicating. The questionnaire had a multiple-choice scheme (A, B, C) which systematically corresponded to one of the three modalities. The information gathered was entered in an excel database, processed for statistical analysis, sorted out and recorded.

Conducting Class Observations

During class observations, the "participant observer" field technique was implemented. The items under observation were: evidence of use of sensory channels when paying attention to teacher presentation (input phase) and when interacting in class with the teacher and with peers (output phase). The information gathered was recorded on the observation form and registered in the Findings Section as anecdotal reports.

Instrument Used to Determine the Effect of Multi-Sensory Activities

The instrument chosen to determine the effect of a modality-based teaching (MBT) style was a Pilot Test. This instrument allows the researcher to measure the performance of a small-scale population and anticipate the behavior patterns to be found in the larger system.

Administering the Pilot Test

The pilot test consisted in presenting the class with a lesson topic in the three modalities. In this way, the input chosen would reach all learning preferences. During the presentation phase, the teacher had to take notice of students' level of receptiveness and of comprehension. This first phase was cross checked by a second phase. As shown in Table 1, tasks were of a multi sensory nature. The pilot test extended over a four month term.

Table 1: Suggested sensory-based activities for pilot test

Visual	Auditory	Kinesthetic
Reading slides, boards	Listening comprehension	Reading and drawing
Working with pictures	Working with songs	Role playing
Looking for written information	Repeating after a model	Miming
Completing missing information	Dialogue making/ improvisation	Listing/ ordering data
Imagining and reading	Telephoning	Working on stories/ acting out
Video viewing (sound on/off and sound off)	Discussions/ Interviews	Playing Games

RESULTS

Findings

Based on the evidence gathered, we conclude that:

- There exists a distinctive preferred sensory learning pattern in each of the areas under study. This means that a learning pattern is influenced and shaped by exposure to specific work dynamics.
- The use of multi-sensory activities in teaching Business English, at corporate level, can help students to achieve learning goals more effectively, and companies to have a higher return on their investment in Business English courses.

Preferred Sensory Learning Patterns

Marketing and Sales

Learners who work at the marketing and sales areas report a case of mixed modality: they can learn with almost the same degree of effectiveness if input is presented in any of the three modalities. Expressed in percentages, their modality learning pattern is the following:

V	A	K
40%	30%	30%

When these students were given visual activities under the pilot test, their average score was 9. When using the visual modality, members of the M&S area adopt a global approach to learning; i.e. they learn by observing the visual signal before them and by looking for comprehensive, cognitive relationships in it. They feel comfortable with charts and pictures and actually understand language structures better if input relates to a chart or diagram. At work, they have to read material about market performance and interpret data in graphs and then produce a written or oral report. In class, they prefer to produce language with free-form exercises. One of their tasks is to develop new products. To do this, they use their visual imagination. In class they enjoy tasks where they use their creativity, e.g. mind maps, invent a story or end it out of an image, watch a video without sound, write blogs, work with tweets, flashcards, write an interview.

Based on the findings from the questionnaire and class observation, they prefer oral to written practice, for example activities with plenty of thinking and communicating. Auditory activities rank high with them (average score 8). M&S jobs are highly exposed to interaction at seminars, meetings, video conferences, conventions and the like. This shows the use of the auditory channel and it is not surprising that they perform extremely well in communicative tasks, role play, and simulations as well as in listening tasks. As learners, they are talkative and easy-going. They value group interaction and take conversational risks.

A further finding in this line is that kinesthetic tasks go very well with them (average score 8). They demand to be given activities that keep them active, such as cases studies and projects. In coincidence with Bridges (2000), findings show that the members of these areas are extroverted learners. This is because their reality is outside their offices, among customers and competitors. Their weakness seems to be accuracy and mastery of form.

Finance & Accounting

Learners from the Accounting & Finance area have a clearly visual dominant modality, an auditory secondary channel and a dormant kinesthetic channel. Expressed in percentages, their sensory learning pattern is the following:

V	A	K
60%	30%	10%

They scored an average 9 in visual tasks. A&F staff has to read and write regulations and reports basically about how money has been saved or spent. This reflects the use of the visual modality. But, unlike the M&S they do not need to apply imagination, rather they have to use analytical skills to make investment decisions and comply with fiscal guidelines. To organize these data they resort to tables, lists, columns and matrices. According to the results from pilot tests and class observation, they feel comfortable with written input of any kind: reading articles, doing writing skills exercises, working with graphs. Yet, they excelled in controlled activities, such as cloze texts, puzzles, drills and reading comprehension tasks. Members of this area are, in general, organized students who like to have step by step explanation. In Bridges's (2000, p: 53) own words "The finance and accounting people do things logically and follow time-tested ways". Moreover, their tasks tend to be quite predictable. For example, some of them have to send reports every end of the month, or wait for the closing of the fiscal year to prepare certain documents. As highly visual people do, they usually have a notebook and highlight new words with different colors.

In aural activities, these learners scored an average of 7, which was satisfactory. However, in all the activities they seemed to need the support of a visual aid, either by reading or writing information. This attitude is closely linked to their work habits since the percentage of visual

tasks they carry out largely exceeds any kind of requirement from the auditory and kinesthetic channels. Their weakest side seems to be fluency. They need to process ideas before speaking and are not prone to take conversational risks, which is a feature of visual people. Moreover, except for senior managers, junior staff is not highly exposed to negotiations.

The average score recorded in the kinesthetic modality was 5. The students from the Finance and Accounting area rely so much on their visual strength that when presented with a hands-on activity, they lack confidence in their doing it well or satisfactorily. Often, they do not show interest in tasks that require them to role play a situation. Certainly, this modality needs to be reinforced in class.

Operations & Technology

The average scores reported by members of these areas were: 8 for visual activities, 4 for auditory and 7 for kinesthetic tasks. We conclude that the dominant modality of these learners is the visual channel, their secondary is the kinesthetic and their dormant is the auditory one. Expressed in percentages, their sensory learning pattern is:

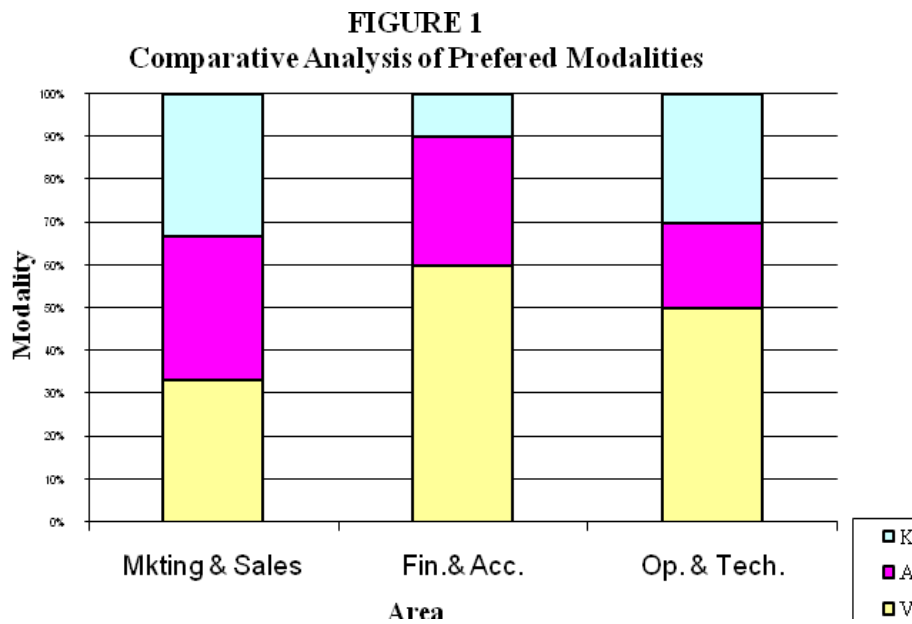
V	A	K
50%	10%	40%

Both the F&A staff and the O&T staff tend to learn best by having the visual signal in front of them. But the O&T students report a marked tendency to reading tasks. In effect, to carry out their jobs well, they need to read a significant amount of technical texts, such as software manuals and production specifications - i.e. they read to perform a task. The content of the texts they read is usually made up of procedures to be followed and instructions to be observed. As learners, they do very well in the typical reading activities where they receive clear instructions about what they are expected to do (e.g. multiple-choice, True/False and matching exercises). They do not seem to be comfortable with open-ended tasks that require an independent elaboration on their part. At work, they are also responsible for designing processes and do this by using graphic organizers, such as flow charts. In class, these diagrams have proved to be very useful for these learners to practice passive voice, sequencing and listing. O&T staff members are realistic people that act in cautious and logical way; their responsibilities involve observing each step of the task; otherwise machinery may break down or employees may not understand how a system works and this might cause delays to the business. Their habit is reflected in class because they tend to have a sequential approach to learning, they need step by step explanations.

Most jobs in the production area involve moving around industrial plants or performing hands on activities, like putting assembly pieces together in the case of manufacturing companies, or gathering information to solve a technical problem. This shows the use of the kinesthetic channel. In class, learners from these areas tend to make drawings to check understanding or draw schemes to follow the stages of the task. The most outstanding feature of this area is, according to Bridges (2000), their sense of hierarchy and compliance with rules and standards. They like to learn rules and try actively to apply them. This is why they enjoy board games and case studies where they use information from a reading and use it to write a report or to discuss a topic, find a solution to a problem or give a recommendation. They gesticulate and use their hands to talk, and fidget in class. This also reflects the use of the kinesthetic channel.

The least used or developed channel is the auditory modality. As already mentioned, except for senior managers, who participate in international meeting, these students are not highly exposed to oral interaction in English. Consequently, this modality should be developed in class.

Figure 1 depicts an overall comparative perspective of corporate learners' sensory preferences.



Additionally, the existence of a modality pattern implies that business learners have strengths and weaknesses (see Table 2) in their learning process.

Table 2
Modality Preference vs. Students' Strengths and Weaknesses

	Strengths	Weaknesses
Marketing & Sales	The ability to speak and be understood.	Low standards in correctness.
Finance & Accounting	The ability to read and write. Analytical approach. Interest in correctness.	Low speaking standards.
Operations & Technology	The ability to read and gather specific data or complete a task.	Low listening and speaking standards.

The Effectiveness of a Multi-Sensory Style of Teaching at Corporate Level

According to the evidence gathered, we conclude that corporate students learn more quickly and more effectively if input is presented in their preferred sensory modality. The overall average score reported in the pilot test was of 73/ 100 (Table 3 describes averages per unit). This means that over 70% percent of the class understood the teaching point and was able to produce it either verbally or in writing.

Table 3
Average scores per Functional Unit (/100)

	V	A	K
Marketing & Sales	90	80	80
Finance & Accounting	90	70	60
Operations & Technology	80	40	70

DISCUSSION

Modality-based Teaching at Corporate Level

Modality-based teaching (MBT) style at corporate level centers its eye on the different learning modalities of students and uses such channels as the means to help them reach their needs and expectations.

When teachers decide to implement MBT, the first step is to become aware of their own preferred learning and teaching style. The second step is diagnosing individual learning styles and profiling group preferences. MBT is basically about striking a balance between the strengths and weaknesses of students. Under multi-sensory teaching, the teacher always knows for whom a given activity will represent a strength and for whom, a weakness. If the group is made up of students with similar modality patterns, the decision as to the proportion and frequency of use of each modality may be homogeneously made. If the group is made up of different learning patterns, the teacher has to balance the modalities to use in the input and output phase to prevent difficulties and frustration. When the aim of the activity is to reinforce a weak or dormant modality, the same attitude must be followed.

When working with course books, teachers may add variety by changing the order of activities, the pace and/or interaction pattern to suit learners' preferences. If the activities are focused only on one or two channels, the teacher may bring extra material specially tailored to offset the difference. At corporate level, students like to work with authentic materials. In these cases, the trainer may decide to implement a "Sensory + approach" to reach all students. This approach involves presenting a teaching point in two modalities. Furthermore, corporate tuition involves teaching business skills. For this kind of courses and workshops, trainers should think of full lesson plans with sensory variety.

At this stage, it should be noted that MBT style is flexible because it works well with any teaching methodology. For example, through auditory activities, it seeks to improve learners' communicative competence and through kinesthetic activities it fosters task-based learning. Moreover, it is comprehensive because it helps learners to go beyond their style and start using styles which are secondary or dormant in them. An English class that offers varied sensory associations can no less than enrich and enliven the learning process. The wider the range of learning opportunities is, the more dynamic the class will be.

Finally, corporate learners like to be given feedback about their progress and to understand their mistakes. Therefore the teacher may approach these classroom management issues from a sensory preference perspective (Table 4).

Table 4
Classroom Management Issues under MBT

	V	A	K
Feedback	A chart that shows progress or has data in percentages	Group discussion	A checklist to tick in items or questions such as 'How do you feel when doing...?'
Error correction	Mistakes written with different colors; writing the wrong form in a column and the correct version in another column.	Hearing the students' understanding should be checked with a question or an example.	Students expect the teacher to produce in writing or verbally the correct version
Class layout	Chairs in a half a circle, whiteboard and computer	Chairs close together near the audio equipment	SS expect the teacher to move around and have open space in the center of the room

Tips to Meet the Challenges of Learning Modalities

Marketing & Sales

While Marketing and Sales learners' strength is their fluency and communicative competence, their weakness rests on the mastery of form, they need to reinforce and systematize grammar rules and language structures if they want to attain higher levels of proficiency. Therefore, the challenge with this kind of learners is to have them practice controlled language in a communicative context. Teachers may resort to problem solving and role playing where they can use their habitual ways of working (e.g. having an interview with a business celebrity or job interviews to practice question making), reading activities where understanding is the passage to elaboration (e.g. preparing a presentation or giving a speech to practice the use of connectors), board games (where they have to do something with the language they are learning to get forward and reach the 'finish line') Since they have a mixed modality pattern, they are not limited to one-path activities – a visual element added to an aural or kinesthetic language activity is often welcome.

Accounting & Finance

Accounting and Finance learners' level of accuracy is usually high and their major strength lies in the grammar area. These are students who perform extremely well in activities where they can use their analytical skills. Their problem areas are fluency in speech and the use of kinesthetic modalities. To help them develop both areas, the teacher may use a *Sensory Plus approach*. In spoken interactions, the teacher observes with whom they can pair up, give them clear guidelines and at the beginning allow them to use a visual support. As they gain confidence they may be left to work independently. In oral discussions, brainstorming and role playing, they should be allowed to use a graphic organizer as a guide. It is important to advance slowly to attain solid results in this channel. To insure the correct and lasting assimilation of lesson objectives with these learners, auditory and kinesthetic tasks should not be mixed at the early stages.

Learners from these areas need to develop the auditory modality. Since their strength lies in reading and following rules, teachers may adopt a Dual Presentation mode and prepare listening tasks with checklists, or interaction based activities where they have to complete different steps to advance and finish the task. With these learners, games are an ideal tool to learn and can be used to foster communication and listening skills. If modalities strengths are appropriately balanced, skills may be learnt integrated manner.

CONCLUSION

This study has analyzed the sensory learning styles of Business English students who work for the Marketing & Sales, Accounting & Finance and Operations & Technology areas of companies.

The findings have demonstrated that these students learn with a modality learning pattern which often correlates with the tasks that they perform at their workplace. It has further shown that if Business English teachers adopt a MBT style, they can provide an effective and efficient training service to companies and executives. By giving input through the most efficient channel for each group profile, the teacher capitalizes on individual differences and insures both the students' rate of progress and the quality of teaching. Additionally, since MBT fosters a balanced use of all modalities, it also guarantees the expansion of learners' possibilities.

Finally, this study intended to be a starting point for BE teachers and researchers as it has opened a window of opportunities for further investigation into the sensory learning styles of learners who work in other areas of companies.

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APPENDIX A: THE VAK QUESTIONNAIRE

Choose the answer that best explains your preference. Select more than one response if a single answer does not match your perception.

1. You are talking on the phone and the speaker gives you some data, what do you do?
 - A. write it down
 - B. listen carefully and memorize it
 - C. tap your pen all the time, make unintelligible drawings and in the middle of those drawings you write the data
2. You are reading a business report and find an interesting part. What do you do?
 - A. highlight it with a color marker
 - B. read it to yourself again and again
 - C. stand up, go for a cup of coffee and sit back to read it again
3. You are sent to visit the Company's Head Office in US. You have a rental car but you do not know the location. You would like the people in the office to:
 - A. draw a map on paper
 - B. tell you the directions
 - C. write down the directions (without a map)
4. In a business presentation, do you prefer a speaker who likes to
 - A. distribute handouts, readings, written material (photocopies, etc)
 - B. talk about the subject in the form of a discussion, where the audience may be involved
 - C. make a practical experiment or demonstration or if not possible because of the subject
5. You are in a meeting; which of the following expressions do you use most frequently?
 - A. *`As you can see ...`, `From my point of view...`*
 - B. *`It sounds to me ...`*
 - C. *`My impression is...I've got a hold of this issue`*
6. When you talk during a business meeting,
 - A. *You can talk fluently but sometimes you find it hard to find the exact word*
 - B. *You feel comfortable talking. You can make long descriptions and detailed explanations*
 - C. *You gesticulate a lot, move your hands. You like to get up and walk in the room.*
7. To get in touch with business people, you prefer
 - D. *A face-to-face meeting*
 - E. *A telephone conversation*
 - F. *To share an activity where you can do something else, like having lunch*
8. What do you most remember from a person after a meeting?
 - G. *The face*
 - H. *The voice*
 - I. *The general impression that the person has left on you*
9. You have received a copy of the budget. This is of interest to a co-worker. You:
 - A. *Send him copy of the budget*
 - B. *Phone him immediately and tell him about it.*
 - C. *Discuss with him what you plan to do as regards each item in the budget*
10. The Company's top management has come to Argentina. What would you do?
 - A. *Make them a presentation using graphs, slides, etc.*
 - B. *Give them a talk about the local market and the branch operation in the market*
 - C. *Organize a tour around the company's premises*
11. What makes you lose your attention when you listen to someone speaking?
 - A. *When there is movement in the room*
 - B. *When there is noise in the room*
 - C. *You get lost when explanations are too long*
12. You have to prepare a report on a presentation you attended, what do you remember?
 - A. *What you wrote, read, and saw in the graphs*
 - B. *What the speaker said, the words, expressions used, you can even remember the sound of his/her voice*
 - C. *What you saw in the presentation and the impression the speaker made on you*

APPENDIX B: CLASS OBSERVATION FORM ¹ (with key)

Learning Style	<input type="checkbox"/> Learns by watching, <input type="checkbox"/> listening, <input type="checkbox"/> Doing?
Reading	<input type="checkbox"/> Enjoys dialogues and plays. <input type="checkbox"/> Avoids lengthy description, unaware of illustrations. <input type="checkbox"/> Moves lips or sub vocalize when reading. <input type="checkbox"/> Likes to read in a loud voice.
Spelling	<input type="checkbox"/> Uses a phonic approach. <input type="checkbox"/> Other
Handwriting	<input type="checkbox"/> Tends to write lightly; say strokes when writing. <input type="checkbox"/> Struggles to keep notes clean <input type="checkbox"/> Finds writing difficult.
Memory	<input type="checkbox"/> Remembers names, forget faces. <input type="checkbox"/> Remembers by auditory repetition.
Imagery	<input type="checkbox"/> Great imagination <input type="checkbox"/> Thinks in sounds; details less important. <input type="checkbox"/> Not imaginative
Distractibility	<input type="checkbox"/> Easily distracted by sounds, movement, both?
Problem Solving	<input type="checkbox"/> Talks problems out; try solutions verbally. <input type="checkbox"/> Follows oral directions better than written ones. <input type="checkbox"/> Needs explanations of maps, diagrams, visual signals.
Response to periods of inactivity	<input type="checkbox"/> Stares, doodles <input type="checkbox"/> Hums; talks to self or to others. <input type="checkbox"/> Fidgets
Communication	<input type="checkbox"/> Enjoys listening but cannot wait to talk. <input type="checkbox"/> Descriptions are long but repetitive. <input type="checkbox"/> Can repeat back and mimic tone pitch and timbre. <input type="checkbox"/> Uses words such as <i>listen</i> , <i>hear</i> , etc. <input type="checkbox"/> Talks to themselves while working. <input type="checkbox"/> Speaks in rhythmic patterns.
General Appearance	<input type="checkbox"/> Matching clothes not so important. <input type="checkbox"/> Very concerned for personal appearance
Response to the Arts	<input type="checkbox"/> Favors music. <input type="checkbox"/> Finds less appeal in visual arts, but are ready to discuss it. <input type="checkbox"/> Dramatizing
Further Comments	<input type="checkbox"/>

¹ Care must be taken to avoid labeling a student on the basis of one or two isolated behaviors. The most reliable observations are those that are made over an extensive time period and in a variety of situations.

KEY

	Visual Learners	Auditory Learners	Kinesthetic Learners
Learning Style	By seeing the visual signal (images, letters or numbers). Better by themselves or in small groups.	Through verbal instructions from others or self. By listening and remembering what was discussed rather than seen.	Learn by doing or manipulating: personal involvement. through games, acting out and playing roles
Reading	Fast readers Like descriptions	Enjoy dialogues and plays.	Prefer action stories with a plot
Spelling	Recognize words by sight	like to read in a loud voice	Often poor spellers
Handwriting	clear, spacing and size are good.	Tend to write lightly; say strokes when writing	Messy handwriting
Memory	Remember faces, forget names; Remember by writing things down or drawing.	Remember names, forget faces. Remember by auditory repetition.	Remember best what was done, not what was seen or talked about. Remember the feeling that an event had on them.
Imagery	Vivid imagination; think in pictures.	Think in sounds; details less important.	Images that do occur are accompanied by movement.
Problem Solving	Plan in advance; organize thoughts by writing them; list problems.	Talk problems out; try solutions verbally.	Prefer to do something to solve a problem than to listen to or watch a third party.
Response to inactivity	Stares, doodles; finds something to watch.	Hum; talk to self or to others	Fidget; find reasons to move
Communication	Quiet; does not talk at length; often answer question with a short 'yes' or 'no' Become impatient when extensive listening is required; uses words such as <i>see, look</i> , etc. Forget to relay verbal messages to other people. Get lost with verbal instructions. Ask for repetition; need to have the instruction written down	Descriptions are long, repetitive. Can repeat back and mimic tone pitch and timbre. Use words such as <i>listen, hear</i> , etc. Talk to themselves while working. Speak in rhythmic patterns.	Gesture when speaking. Tend to speak slowly. Stand close when speaking or listening. Quickly lose interest in detailed verbal discourse. Use words such as <i>get, take</i> , etc. Touch people as a show of friendship. Express emotions physically.
General Appearance	Neat, meticulous, likes order.	Neat and simple	Neat but soon becomes wrinkled through activity.
Response to the Arts	Can be deeply affected by the visual arts.	Favor music.	Respond to music by physical movement. Sculpture

ARTESOL ESP E-journal - Submission guidelines

ARTESOLESP E-journal receives submissions of unpublished manuscripts on any topic related to the area of ESP. Each manuscript must include the names, affiliation, and e-mail addresses of all authors, an abstract of no more than 150 words, and a list of five to seven keywords. A brief biographical statement (maximum 100 words, in sentence format) for each author is also required, (this information will be removed when the articles are distributed for blind review.) Articles should be submitted in Microsoft Word or RTF document format. Full-length articles should be no more than **5,500 words** in length, excluding appendices.

ARTESOLESP Journal follows the guidelines of the fifth edition of the Publication Manual of the American Psychological Association published by the American Psychological Association (APA) in 2001. <http://www4.uwsp.edu/psych/mp/APA/apa4b.htm> Manuscripts submitted to *ESP Journal* must conform to APA format

Four categories of manuscripts will be received, contributions, research articles, pedagogical experiences in ESP, and reviews.

✚ Contributions

In this section, articles by prestigious ESP specialists will be published.

✚ Research Articles

This is a section devoted to the publication of research articles which will be refereed by our Academic Editorial Board.

- Articles should report original research.
- Full-length articles should be no more than 5,500 words in length, excluding appendices.
- Each submission should include an abstract of no more than 150 words, and a list of five to seven keywords. All article manuscripts submitted to *ARTESOLESP Journal* will go through a two-step review process.
- Biodata of the author (s) should be included. (No more than 70 words)

Research articles should generally include the following sections:

1- Abstract

2- Five to seven keywords.

3- The introduction includes:

- The research issue
- The underlying theoretical framework.
- A description of the methodological tradition in which the study was conducted.
- Research hypotheses or questions.

4- Method section:

- Description of participants and research context.
- A detailed description of data collection and analysis procedures.
- Description of the apparatus or materials used.
- Explanation of the procedures and the steps in the research

5- Results section:

- Presentation of graphs and tables that help to explain the results.
- For quantitative research, presentation of descriptive and inferential statistics used to analyze the data.
- For qualitative research, data should reflect prolonged engagement, observation, and triangulation.

6- Discussion section:

- An evaluation and interpretation of the results.
- Discussion of alternative explanations.
- Causal inferences should be cautiously made.
- Results of the study should not be overly interpreted or generalized.
- Linking the results obtained in the study to original hypotheses.
- Presentation of the implications and any limitations of the study.

7- Conclusion:

- Summary and general implications of the study.
- Suggestions for further research

8- References in APA format.

9- Appendices of instrument(s) used.

Pedagogical experiences in ESP

This section includes the description of organization and development of new courses using ESP. Manuscripts should report original pedagogical experiences: teaching techniques and methodologies, management of different teaching situations, testing and assessment, materials development.

Reviews

This section includes reviews of books and journals published by Universities, Teacher Training Colleges and other institutions interested in the development of ESP courses or studies.

Reviews of individual books, journals or reading instructional software should not be longer than 1,600 words. The following information should be included at the beginning of the review:

- * Author(s)
- * Title
- * Publication date
- * Publisher
- * Publisher City and Country
- * Number of pages
- * A biodata of the author (s) should be included. (No more than 70 words)

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All manuscripts submitted to *ARTESOLESP Journal* will go through a two-step review process.

➤ Internal review

The editors of the journal will first review each manuscript to see if it meets the basic requirements for articles published in the journal.

➤ External review

Submissions that meet the requirements stated above will be sent out for peer review from two to three experts in the field. This second review process takes 2–3 months. When this process is finished, the authors will receive copies of the external reviewers' comments and will be notified as to the decision (acceptance, acceptance with changes, or rejection).

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The following policies apply to all articles, reviews, and commentaries:

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