# Can EFL texbooks help to promote processing efficiency in reading comprehension?

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#### Abstract

Aiming at investigating whether and how the reading activities proposed in the textbook Way to Go! (2013) promote processing efficiency, the theoretical constructs proposed in the work of Gagné, C. Yekovich and F. Yekovich (1993) and of Daneman and Carpenter (1980) were used as a basis for the present study. Results show that the analyzed textbook aids the reader in anticipating vocabulary difficulties, therefore, suggesting that the activities seem to foster the sub-processes of decoding and lexical access. Inferential comprehension is promoted through the integration of information in activities that engage the reader in establishing a relationship between prior knowledge of the reading topic and of concepts involved and textual information. However, guidance on the use of strategies and on comprehension monitoring are not exploited separately in the analyzed units.

Keywords: Cognition. Processing efficiency. Reading processes. Teaching reading.

## Introduction

There is broad agreement among researchers that reading comprehension is influenced by various and equally important aspects. Within the literature that focuses on reading in a second (L2)/foreign (FL) language, 1 two of these aspects include the impact of the reader's working memory capacity and L2 proficiency on comprehension. In this paper, we depart from the assumption that carefully planned reading materials in an L2, textbooks included, can

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aid in promoting consolidation of information in long term memory (LTM),2 contributing to students' acquisition of knowledge. Therefore, bearing in mind the idea of processing efficiency, proposed by Daneman and Carpenter (1980), which claims that readers who are more proficient in the component reading processes free working memory resources, thus presenting a larger working memory capacity and possibly having more cognitive resources available during this study, of an exploratory nature, aims at analyzing a high school textbook, used in Brazilian schools, to understand if and how the reading activities included in the textbook foster processing efficiency in reading comprehension.

In order to achieve this objective, the following research questions guided this study: a) To what extent do the pre-reading activities proposed help to promote declarative and procedural knowledge, according to Gagné, C. Yekovich, and F. Yekovich's (1993) framework?; b) Can the activities proposed during pre-reading support the reader in making processing more efficient (DANEMAN; CARPENTER, 1980) during the reading task? If so, how?; c) Do the reading comprehension activities proposed foment both literal and inferential comprehension? How is that achieved?

# Review of literature

In order to contextualize the discussion proposed hereby, there is a need to conceptualize reading comprehension,

its relation to working memory and the implications of research for the teaching and practice of reading in L2. In the last subsection of this review, the framework developed by Gagné, C. Yekovich and F. Yekovich (1993) that supports the analyses proposed in this paper is presented.

# Reading comprehension

Although we are aware that reading also involves the social context where the reader is inserted, this piece of research lies in the realms of language and cognition, more specifically, it tries to trace a relationship between reading tasks in EFL textbooks and cognition in reading. Being a phenomenon that can only be investigated indirectly, as highlighted by Pearson (2009), the cognitive process of text comprehension has inspired inquiry within the research community and explaining it is quite a difficult task. Snow defines reading comprehension "as the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (2002, p. 11).

A vast amount of research, making use of different approaches and methods, has tried to explain this phenomenon, which is, as Smith (2004) highlights, as complex as trying to explain how humans acquire and use language in general. Even though literature portraying various aspects of the process of reading comprehension shows no consensus in explaining its complexity, some considerations can be pondered. Kintsch and

van Dijk (1978) describe comprehension in both oral and written language as multiple, overlapping processes. In their comprehension model, the authors propose several complex processes that work in parallel and interact without much effort of the system. However, as they observe, capacity limitations are seen to affect storage of information in memory as well as response production.

Therefore, it can be concluded that, in order to ensure comprehension, the reader must engage in several distinct processes, which are related not only to the ability to perform the sub-processes of decoding, literal comprehension, inferential comprehension and comprehension monitoring (GAGNÉ; C. YEKOVICH; F. YEKOVICH, 1993), and to connect background knowledge to information in the text for constructing a coherent mental representation of its content (KINTSCH; VAN DIJK, 1978), but also to other intrinsic aspects, which may vary from individual to individual (SNOW, 2002). In this paper, we will try to show a relationship between reading tasks proposed in EFL textbooks and one such intrinsic aspect mentioned above, namely, working memory capacity, described below.

# Reading and working memory

One of the many sources of individual differences that may affect reading comprehension is working memory (WM). Several attempts to describe as well as define this construct have been made

in the literature. Baddeley and Hitch's (1974) model, for instance, considered by many authors as a turning point in the area, understands working memory as a multicomponent system, formed by a phonological loop, a visuospatial sketch pad and a central executive, all working together so as to both activate and manipulate information during processing.<sup>3</sup> Almost 30 years later, Baddeley (2002 as cited in YUAN et al., 2006) adds a fourth component to the former model, the episodic buffer "viewed as an interface which assembles information from WM and LTM" (YUAN et al., 2006, p. 85).

Cowan (1999) goes hand in hand with Baddeley and Hitch (1974) when it comes to considering both storage and processing as WM functions. The author, however, proposes an embedded model for WM in which controlled attention plays the major control function instead of a central executive. Aiming at a unified theoretical consensus on a WM definition, Miyake and Shah (1999) propose a global agreement on the nature of working memory, one which states that WM encompasses "those mechanisms or processes that are involved in the control, regulation and active maintenance of task-relevant information in the service of complex cognition, including novel, as well as familiar, skilled tasks" (1999, p. 450).

Taking the above into account, in reading comprehension there are several processes in which the reader must engage in (e.g. syntactic, semantic and pragmatic processes; connecting information from previous with that of subsequent sentences; disambiguating, among others), and information can decay or be displaced due to the working memory limited capacity (TOMITCH, 2003; MIYAKE; SHAH, 1999; LORCH JR.; KLUSEWITZ; LORCH, 1995; JUST; CARPENTER, 1992). According to Daneman and Carpenter, "decay occurs if the activation of information subsides to a threshold level with time. Displacement occurs if additional structures are encoded, activated, or constructed until the capacity is exceeded" (1980, p. 450-451).

It can be understood, hence, that heavy processing decreases the amount of information to be stored. Daneman and Carpenter (1980) propose that one possible explanation to individual differences in reading comprehension can be the trade-off between processing and storage, which varies across readers. Considering reading in a foreign language context, this process can be even harder. The L2 learner's not fully developed knowledge yet in relation to vocabulary, syntax and grammar, coupled with insufficient background knowledge concerning specific cultural aspects that texts in the L2 might contain, work as a burden to working memory and may hinder comprehension. Having the aforementioned discussion in mind, the following section briefly reviews some important studies in the area of reading in a foreign language and working memory capacity.

# Teaching Reading Comprehension in a Foreign Language and Working Memory

In general terms, we can say that the great amount of research on reading in the first language has contributed to some understanding of the process in L2; however, because of the specificities reading in L2 entails (some of them already signaled above), many aspects still warrant investigation.

In what concerns reading instruction in L2, communicative teaching approaches, mainly in the late 1970's, beginning of the 80's, helped to change the gaze of this skill as a central component of L2 teaching (CARLO; SYLVESTER, 1996). Before that, reading was given secondary roles as in the Audiolingual or the Grammar-Translation teaching methodologies. In terms of the theoretical reading models being proposed, they were restricted to the mother tongue (L1), although their applications were soon extrapolated to the L2 classroom.

Further research in the area of L2 drew on the idea that reading could not be described or researched as a global construct without considering differences in the reader's background knowledge, language proficiency, schemata, strategies, interests and socio-historical realities. Instead of considering the reading process as either bottom-up or top-down, and of seeing meaning either in the text or in the reader, proficient reading began to be conceptualized as meaning construction, where bottom-up

and top-down processes interact, as proposed by Rumelhart for example:

[...] all these knowledge sources [e.g. graphemic, phonemic, syntactic, semantic, etc.] apply simultaneously and [...] our perceptions are the product of the simultaneous interactions among all of them. [...] ...all of the various sources of knowledge, both sensory and nonsensory, come together at one place [at the pattern synthesizer], and the reading process is the product of the simultaneous joint application of all the knowledge sources (2013, p. 732).

Although the author was describing L1 reading, this is very enlightening in what concerns reading in an L2 since a deficient level of processing, for example, insufficient linguistic knowledge can be overcome with relevant prior knowledge on the topic. That is, a low language proficiency reader may use context and prior knowledge to help him/her make sense of the text (STANOVICH, 1980).

Based on what has been exposed so far, we can state that, although WM plays an important role in the processing of language in general and more specifically in reading, language proficiency can also affect one's performance in the processing of written discourse. Each level of interaction between the reader and the text (decoding, literal comprehension, inferential comprehension and comprehension monitoring as proposed by Gagné, C. Yekovich and F. Yekovich), places a different demand on the reader's WM capacity and on his/ her cognitive effort to accomplish each step. Empirical evidence from recent studies such as Claro's (2010), which

investigated the effect of illustrations on comprehension of basic level students of English as an L2, indicate that pre-reading activities with the aid of illustrations contribute to text understanding, with better results in main idea recall. Moreover, Bailer (2011), in a study about the relationship of WM capacity and the ability of a reader to attend to form and meaning while reading, found that as WM is at play in both processes, they compete for attention allocation.

For the purpose of the present study, and following the processing efficiency hypothesis by Daneman and Carpenter (1980), therefore, we consider that for reading comprehension to occur with fewer computational demands on working memory, some steps need to be taken with less effort (e.g. decoding, lexical accessing, parsing, inferencing, and integrating), since less effort on some or all stages would lead to a speed advantage and less information decay during processing due to time, which may enable a larger storage capacity for the byproducts of comprehension.

Bearing in mind that classroom practice can promote this consolidation of information in LTM and contribute to the students' acquisition of knowledge through carefully planned reading lessons, this study seeks to analyze reading activities presented in the EFL textbook *Way to go!* (2013), used in Brazilian schools, under the framework proposed by Gagné, C. Yekovich and F. Yekovich (1993), discussed below.

# The reading comprehension model by Gagné, C. Yekovich and F. Yekovich

According to Gagné, C. Yekovich and F. Yekovich, "successful reading comprehension relies on three elements of expertise - conceptual understanding, automated basic skills and strategies" (1993, p. 269). They explain that while conceptual understanding considers background knowledge, automated basic skills include processes such as word decoding as well as literal and inferential comprehension. Still, strategies refer to the reading approach taken by the reader depending on the given goal. Therefore, in this model, conceptual understanding involves the 'what', that is, our background or declarative knowledge in relation to the content or topic being discussed in the text, as well as our knowledge of smaller units such as that in relation to letters, phonemes, morphemes and words. Automated basic skills and strategies, on the other hand, constitute our procedural knowledge, that is, our knowledge of 'how' to do things, including that concerning the execution of the subprocesses of reading comprehension, as well as our strategic knowledge in relation to monitoring our comprehension, as described below.

Considering the aspects aforementioned, Gagné, C. Yekovich and F. Yekovich point that "reading processes can be broken down into four subgroups: decoding, literal comprehension, inferential comprehension and comprehension mo-

nitoring" (1993, p. 269), all part of our procedural knowledge. As explained by the authors, decoding involves "cracking the code" (1993, p. 269), that is, matching the printed word to its meaning and recoding to its sounds. Decoding is considered the lowest level within the component processes necessary to achieve comprehension (TOMITCH, 2009) and involves retrieving the meaning of individual words. According to Gagné, C. Yekovich and F. Yekovich, literal comprehension, on the other hand, has the function of "deriving literal meaning from print" (1993, p. 270) through the processes of lexical access (retrieving the specific word meaning in context from LTM) and parsing (organizing meaning of individual words within the sentence level). Inferential comprehension (a high-level process, according to Tomitch (2009) among others), in turn, involves the processes of integration (connecting the ideas of two or more propositions), summarization (building a mental outline of the gist of the passage being read) and elaboration (combining the new mental representations being constructed during reading with relevant prior knowledge the reader has in LTM). Based on the framework of Gagné, C. Yekovich and F. Yekovich (1993), we can say that, when we read, we provide inferences in order to integrate information between clauses, to connect previous and subsequent sentences in the text, and even to connect information across paragraphs. As we move on, we

also make inferences to summarize the incoming information across sentences. reducing it to a gist that contains the major points in the text. Elaborative inferences are also provided so that the information from the text being read can be connected to related information on the topic the reader has already stored in memory. Finally, comprehension monitoring aims to "assure that the reader is meeting her goals effectively and efficiently" (GAGNÉ: C. YEKOVICH: F. YEKOVICH, 1993, p. 279). This is done through goal setting (setting a reading goal before actual reading starts), strategy selection (selecting a strategy or a group of strategies appropriate to the goal), goal checking (making sure the goal is being met as reading proceeds) and remediation (trying to activate information that was lost due to breaks in comprehension).

## Method

In order to pursue the main objective of this exploratory study, which is to analyze a high school textbook to understand if and how the reading activities included in it help to promote processing efficiency in reading comprehension, the method described below was employed.

#### The textbook

Way to Go! comprises a series of three textbooks, along with other options which were recommended by the PNLD 2015 to be adopted in the period from 2015 through 2017 by Brazilian High Schools. The textbook series was developed by Tavares and Franco (2013) and the following table summarizes the main aspects covered in each volume:

Table 1

Sections	Subsections
8 thematic units	Warming up – Reading - Vocabulary study Language in use - Listening and speaking Writing - Looking ahead
1 Tips into practice	
4 review sections	One review section after every two units
2 language projects	

Source: the authors.

According to the Teacher's Manual, the textbook Way to Go! adopts the Bakhtinian' dialogic perspective of language in which "the meaning of the word is determined by its context" (2013, p. 179, our translation). Therefore, one of the main goals the textbook collection has is related to developing different reading strategies in the students in order to promote proficient, critical and autonomous readers. Considering reading ability, more specifically, according to the teacher's manual descriptions, the textbook holds a "social-interactional conception of reading, according to which the meanings are constructed based on the interaction of the author and the reader, both inserted in a specific social-historical moment" (2013, p. 184, our translation). Moreover, in order to form a critical reader, one who is able to realize that "reading does not aim at mere decoding and assimilation of the text only" (2013, p. 184, our translation), the textbook claims to make use of authentic texts (sometimes adapted) together with pre-reading, during reading and post-reading activities in which various reading strategies are explored and taught.

The teacher's manual describes the reading section as the chance for the students to: 1) prepare to read the main text of the unit through the *Before Reading* activities. The aim of this section is to activate previous knowledge of the topic and/or genre to be explored. Furthermore, the authors explain that the students

should raise hypotheses about what the text will be about and then have as their reading goal to verify if the hypotheses were indeed confirmed; 2) work on comprehension of the text by doing the *Reading for General Comprehension* and *Reading for Detailed Comprehension* activities; and 3) reflect critically about the text by engaging in the *Reading for Critical Thinking* activities.

Considering that during the last year of high school in Brazil, students' focus is mainly directed to preparing to the University Entrance Exam (vestibular), this study will focus on the analysis of the textbook used in the third year. More specifically, units 1 and 8 were chosen as they represent the beginning and the end of the school year. A more detailed description of each unit will be given in the results and discussion section. For the purpose of analyzing the support given to the teacher and student in approaching the reading sections, our analysis will focus on the teachers' edition since it also contains guidelines to educators on how to conduct the activities in the classroom, besides including the actual student's book. Besides, we deemed important to consider two other sections of the textbook: Tips into Practice (a general guide to the student) and warming up (an attempt to activate previous knowledge). Tips into Practice is a section presented in the beginning of the textbook, composed of 19 questions, all taken from various university entrance exams around the country. For each question, several tips for reading comprehension and question answering are offered in Portuguese. The *Warming Up* section, located at the beginning of each unit, refers to one or two questions related to the theme in order to activate students' previous knowledge about a topic.

## Results and discussion

In order to answer the first two research questions of this paper, a) To what extent do the pre-reading activities proposed help to promote declarative and procedural knowledge, according to Gagné, C. Yekovich and F. Yekovich (1993) framework?; b) Can the activities proposed during pre-reading support the reader in making processing more efficient (DANEMAN; CARPENTER, 1980) during the reading task? If so, how?; the sections Warming Up, Before Reading, and Tips into Practice of Units 1 and 8 are analyzed and discussed below.

# Units 1 and 8 - warming up

The first activity in Warming Up in Unit 1 asks students about their family background calling attention to the Brazilian ethnic diversity. There is also a picture of a black male with the Brazilian flag painted over his face and the question "Do you have a mixed family? Where do your family members come from?". The guidelines offered to the teacher propose a discussion about ethnic diversity by encouraging the

students to look at the unit's title and the picture prior to answering the two questions. Additionally, a cartoon about diversity is presented to be interpreted and the authors stimulate a discussion on diversity and university. Unit 8 *Warming Up* section proposes a discussion on the issue of *falling in love*, stimulating a reflection on personal experiences. As a follow up, a quiz on general knowledge about love relationships customs around the world is proposed.

By looking at the Warming Up section of both units of the textbook hereby discussed, we can state that both declarative and procedural knowledge are promoted by the activities. Declarative knowledge is addressed by drawing attention to the words, ideas, activating schemata to help readers use prior knowledge in order to integrate with text information. Even though the Warming Up sections do not support the reading sections only, they help anticipate the topic by instigating a discussion and preparing for the main issue the text is going to bring up and also raising the theme of the whole unit. They lead to prior knowledge activation and draw on the reader's previous experience to prepare for the reading that is going to come next. In relation to feeding procedural knowledge, it is very probable that during the discussions the relevant vocabulary that will appear in the text will also pop up, thus raising the possibility that it will be available during reading for the execution of the subprocess of lexical access. This whole preparation for reading may have a positive effect in promoting an interactive process and meaning construction during the process of reading. Although we are aware of the fact the final results concerning the execution of the tasks proposed depends, ultimately, on the teacher and the students, they have the potential to help processing efficiency in reading comprehension.

#### Unit 1 – before reading

The text in Unit 1 is entitled Brazil's new era of racial policy and the Before Reading section begins with a matching exercise, with words and definitions that anticipate the debate proposed by the text. The guidelines for the teacher advise him/her to activate the students' prior knowledge about the topic of the text that will be discussed since this practice "favors hypothesis formation about what will be read and its comprehension" (2013, p. 17, our translation). Therefore, the activity brings a brief definition of false friends and the suggestion to consider context to resolve the conflict of meanings related to cognate words and false friends. This activity can be seen as fomenting the subprocesses of decoding and lexical access, since the instructions to the task include a command for learners to try to relate the words and their definitions to the broader concept of ethnic diversity (i.e. 'Complete the diagram below with words from the box and find out the associations with ethnic diversity').

The second activity in the Before Reading section is divided into two subsections: a) suggests that the reader looks at the title and source of the text in order to compare it to the diagram of definitions previously presented, stimulating students to guess which words might be in the text; and b) elicits expectations on the topic to be addressed by the text. These two steps can be viewed as tackling the subprocesses of decoding and lexical access (by working with individual words and their definitions) and also of the component process inferential comprehension as proposed by Gagné, C. Yekovich and F. Yekovich (1993), by anticipating some critical stance to be considered during reading, and thus fomenting inferences related to the subprocess of elaboration, In this activity, the teacher's guidelines also reinforce this subprocess as they suggest the teacher asks students what relation they expect between the text and the words previously mentioned in activity 1 in order to "enlarge the scope of letter a" (2013, p. 17, our translation) in the activity, activating prior knowledge and relevant schemata to be used during reading, drawing on conceptual knowledge by stimulating expectations from the reader.

## Unit 8 – before reading

Activity 1 in the section *Before Reading* of Unit 8 brings five different questions about various themes (cooking, biology, neuroscience) and requires the

reader to match these questions to a list of five specialists (chef, biologist, neuroscientist) who could answer them. This activity stimulates the reader to elaborate on assumptions presented in the text and encourages her/him to make inferences using prior knowledge and making analogies (GAGNÉ; C. YEKOVICH; F. YEKOVICH, 1993), possibly fostering the level of inferential comprehension. There is also a tip note calling attention to the different meanings that some words (e.g. 'professor' and 'teacher') have in English and Portuguese, possibly contributing to literal comprehension, more specifically to lexical access.

Drawing on both declarative and procedural knowledge, activity 2 asks the reader to look at the title, the illustration and the source of the text and, based on these features, proposes reflections on the source, the purpose of the publication and the legitimacy of the author on the issues raised around the topic. These initial preparations raise the reader's awareness in relation to taking a critical stance towards the text by reflecting on aspects such as what type of text is presented, who wrote it and who sponsored it. In our view, these reflections are elaborations that could also contribute to inference generation during reading, if explicit guidance were given to students on how to connect this activated prior knowledge with the text to be read, which was not done. Unfortunately, no explicit instruction is given to the student or to the teacher regarding how the text

should be approached, which could also contribute to the level of comprehension monitoring. Activity 3 suggests a few words to be checked against the readers' expectations regarding the discussion as well as a preview of the vocabulary that will be used in the text, contributing to the activation of declarative knowledge.

Procedural knowledge is tackled with exercises that anticipate decoding and literal comprehension as a way to discuss concepts and meanings before reading starts. When the authors propose a look at some words before reading, they consider low-level processes by tackling decoding and lexical access and conforming with Daneman and Carpenter's (1980) view that by diminishing the computational demands on working memory as less effort on decoding, lexical access and parsing are required, there will probably be a speed advantage and less decay of information in working memory due to time, which may result in a larger storage capacity and possibly more efficient processing.

Regarding the component comprehension monitoring as mentioned before, although some of the before reading activities in the two units under analysis bring some awareness in relation to the type of text being read and the source, they do not directly emphasize comprehension monitoring, since they do not include specific instructions related to goal setting, strategy selection, goal checking, and remediation, as a means for developing a well-planned

and smooth reading such as what is proposed in the introductory section of the textbook, called *Tips into Practice*, described below.

# Tips into practice

A general section in the first page of the series entitled *Tips into Practice* stimulates the reader to think about reading strategies and suggests some steps to be followed in specific testing situations, such as Enem<sup>4</sup> and *vestibular*. The suggestions include asking learners to: i) define an objective before reading by looking at the questions proposed in the test; ii) look at titles, headings, and first sentence or first paragraph; iii) look at key words, cognates, word component parts; iv) ignore unknown words; v) use previous knowledge and context to resolve ambiguity.

Regarding the component process that is being fomented, namely comprehension monitoring, (GAGNÉ; C. YEKOVICH; F. YEKOVICH, 1993), the activities proposed by the authors in the Tips into Practice section can be seen as a guide to the reader in terms of strategy use. It gives steps on how to set goals, select strategies, and to check goals, all in order to perform well in a test. Comprehension monitoring raises students' awareness in relation to the task at hand and helps them with planning the reading situation beforehand, selecting strategies that are appropriate to the task to be performed and checking their effectiveness while reading. Therefore, it is expected that the activities proposed in the *Tips into Practice* section can help students to create a framework for reading that will enable the flow of processing to proceed more smoothly and to free working memory from extraneous burden, possibly preventing trade-offs between processing and storage of information during reading.

Considering the first research question of this paper, we can state that both the Warming Up and the Before Reading sections have activities that promote declarative (or conceptual) knowledge by giving the reader support in terms of word knowledge, awareness on cognate and false friends, by tackling key concepts before reading, brainstorming on the topic, contextualizing, and eliciting concepts/ideas from the reader. When considering the reader's prior knowledge, the activities help to build content schemata to be used in information integration. This declarative knowledge will be possibly available during reading for feeding the components of decoding and literal comprehension, part of procedural knowledge, as discussed below.

Regarding procedural knowledge, the subprocesses of decoding and literal comprehension are supported by preparation exercises focusing on vocabulary knowledge and context use for adequate decoding and literal comprehension, as well as by using prediction and anticipating evaluations regarding author, title, source and information. However, in relation to the component comprehension moni-

toring in the two units under analysis, except for the general tips given in the Tips into Practice section, instructions on how to use strategies to enhance comprehension in every situation are not given. There are only some hints on looking at titles or sources, but the reader is not reminded of the objectives of these procedures and how they could make the process of reading easier. Each text and each reading comprehension task may require different strategies and the classroom should instantiate these various challenges. By focusing on titles only, the activities undervalue the importance of setting goals, selecting strategies, checking and remediating, which vary from situation to situation.

Regarding the second research question, it can be concluded that in the pre--reading activities, there is a great deal of exercises to cope with potential difficulties posed by language and previous knowledge. Declarative knowledge is called upon when the activities stimulate discussions, drawing on prior knowledge, building up schemata as a warm-up for the complexity of a text in L2 and as an encouragement for tackling unknown issues and vocabulary (TOMITCH, 2009), focusing on low-level processes to free processing and leave more resources for storage of the byproducts of comprehension (DANEMAN; CARPENTER, 1980). Procedural knowledge, through activities that foster decoding and literal comprehension, also supports the reader and prepares her/him for unknown

words and concepts before approaching the text. By doing that, the activities consider low-level processes as demanding tasks that could overload the working memory capacity if not tackled prior to reading. Less effort on decoding and literal comprehension leads to a speed advantage and less decay of information in WM, conforming with Daneman and Carpenter's (1980) view.

Aiming at answering the third research question "Do the reading comprehension activities proposed foment both literal and inferential comprehension? How is that done?", the Reading for General Comprehension, the Reading for Detailed Comprehension and the Reading for Critical Thinking sections were analyzed and the results are presented and discussed below.

# Unit 1 - reading for general comprehension

The Reading for General Comprehension section is composed of two questions that refer to the text presented in the previous page. In order to understand the main purpose of the text, the reader is expected to make inferences and create a mental outline that organizes the text into its main ideas. As posed by Gagné, C. Yekovich and F. Yekovich, "the function of summarization is to produce in the reader's declarative memory an overall or macro structure that expresses the main ideas of a passage" (1993, p. 275). Moreover, following the question, three options are presented from which

the student is expected to select only one. By offering the reader some possibilities to choose from, the activity may facilitate students' cognitive processes since they already have options to focus their attention on. This step, in its turn, may reinforce processing efficiency in reading comprehension. Moreover, the teacher's guidelines recommend that the teacher should encourage students to focus on key-words, words similar to Portuguese and familiar vocabulary to answer the question. By doing so, the teacher would be fomenting students' vocabulary knowledge and possibly enabling lexical access, which in turn may facilitate the comprehension process.

Question number 2, "What is the author's tone toward racial policies in Brazil?" also seems to have as a purpose to "extract the essence from a passage" (GAGNÉ; C. YEKOVICH; F. YEKOVICH, 1993, p. 276) through summarization. The question is also based on options to be selected which are: "confident" and "concerned". While considering the two options, the reader is expected to not only understand the literal meaning of the information presented but, additionally, identify implicit messages within this information so as to perceive the tone used by the author and, therefore, elaborate on it and use "pre-existing declarative knowledge to add to the new ideas gleaned from the text" (GAGNÉ: C. YEKOVICH: F. YE-KOVICH, 1993, p. 278). Furthermore, the reader is instructed to "find a fragment that illustrates his [the authors'] point of view" which emphasizes this summarizing process and draws on elaborations by pointing to details and continuation. According to Gagné, C. Yekovich and F. Yekovich, inferential comprehension "gives the reader a deeper and broader understanding of the ideas" (1993, p. 275) and this seems to be the main purpose of the *Reading for General Comprehension* in unit 1.

# Unit 8 – reading for general comprehension

Differently from the first unit, unit 8 has only one question in this section: "Professor Dunbar's answer to How do you fall in Love? confirms the quote:...". The activity then brings two quotes from other authors as options for the reader to choose from in order to connect with information from the text: "when you connect with a cause, it's like falling in love" and "people fall in love for mysterious reasons". Integration and summarization processes are nurtured in this task since the student is encouraged to connect information within the text with information outside the text (in the quotes) to make sense of the main ideas brought by the reading, this way also engaging in summarization. Gagné, C. Yekovich and F. Yekovich explain that "integration occurs within complex sentences, across sentences and even across paragraphs" (1993, p. 275).

# Unit 1 – reading for detailed comprehension

As the name of the section suggests, the main focus of the two activities presented in this part of unit 1 is to guide the reader into a more detailed comprehension of the text. For this purpose, a true or false activity is introduced. Students are encouraged to read four sentences which express similar ideas (or not) to the ones found in the text and decide if these are true or false according to their understanding of the reading. In case of finding a false statement, students are required to correct it. Once again, the reader is guided at focusing his/her attention on inferential processes. In order to answer question 1, the reader not only has to be able to summarize the main ideas presented but also has to integrate information so as to decide if the phrases express the truth or not.

Question 2 in this section "find fragments that express the same ideas as in the statements below" lays emphasis on the integration process since, as posed by Gagné, C. Yekovich and F. Yekovich "an integrated representation of a text makes it easier for the reader to remember and reason about the material" (1993, p. 275). In this case, the reader ought to reflect about the information they read to find similar ideas to the ones expressed in the activity itself.

# Unit 8 - reading for detailed comprehension

Three activities form the *Reading for Detailed Comprehension* section in unit 8. The first activity is a true or false task in which students are expected to mark and correct the false utterances. For space constraints, since this type of activity has already been discussed in the same section of unit 1 above, it will not be analyzed here.

In Activity 2, students are invited to answer three comprehension questions that tackle information given in three of the six paragraphs in the text. The answers can be easily found if students base themselves on the lexical choices used in the questions such as the verbs and the complements of the sentences (e.g. question: how do we feel when we fall in love? information in the text: we feel all light--headed and emotional). Since to find the three responses students do not have to put much effort in the task in terms of having to comprehend the information they are looking for, it seems, hence, that only very basic knowledge such as decoding, lexical access and parsing are enhanced in this activity.

The third question, on the other hand, requires the reader to really comprehend a piece of information given in the text in order to successfully answer the question. The activity requires the student to choose, between two images of a "brain scan", the one that represents a person who is in love. Moreover, the student is expected to find the fragment in the text

that contains this information represented in the image. The activity, therefore, encourages the reader to both integrate information within text and between text and image and also to summarize them in order to identify the main message and link it to its representation.

# Units 1 and 8 - reading for critical thinking

Both units 1 and 8 present two discussion topics for students to talk about in small groups or individually within the Reading for Critical Thinking section. The points to be discussed require the reader to elaborate on the given information. They are expected to connect their understanding of parts of the text to previous knowledge on the topic in order to answer what is being asked. Tomitch (2009) explains that elaboration can be a very complex task with heavy cognitive load on processing, since the reader must search LTM for relevant schemata and reinstate them into working memory, all within the latter's limited capacity. Therefore, it seems positive that this section figures as the last one in the reading part of the textbook, that is, the elaborations that must be provided for critical reading are better put in a post-reading section where inferences will be drawn offline, after more basic comprehension processes have already taken place, as for example, decoding, lexical access, parsing, integration and summarization.

After having analyzed the activities presented in the sessions Reading for General and Detailed Comprehension and Reading for Critical Thinking of units 1 and 8, it seems possible to say that these units approach mainly inferential comprehension processes. This means that teachers should be aware of the fact that, depending on the group, tasks which foment the more basic subprocesses of parsing and lexical access (literal comprehension) will have to be brought to the classroom in order to fill in this gap.

## Final considerations

Reading comprehension is the result of the construction of an adequate mental model of the text and is dependent upon the combination of two types of knowledge during processing: declarative and procedural (GAGNÉ: C. YEKOVICH: F. YEKOVICH, 1993; TOMITCH, 2009), as argued throughout this paper. This means that declarative knowledge (relevant schemata) in relation to the text has to be activated as well as the procedural knowledge necessary to feed the component processes of decoding, literal comprehension, inferential comprehension and comprehension monitoring. More declarative and procedural knowledge available to the system during processing enables both low-level (decoding and literal comprehension) and high-level processes (inferential comprehension and comprehension monitoring) to occur simultaneously, in parallel, leading to an interactive reading of the text, and also to more efficient processing. More efficient processing leads to a speed advantage and less decay due to time, which may ensure a larger storage capacity (DANEMAN; CARPENTER, 1980), freeing working memory resources.

The present piece of research aimed at analyzing the textbook Way to go! used in English classrooms in Brazil in order to verify to what extent the activities promote declarative and procedural knowledge as proposed by Gagné, C. Yekovich and F. Yekovich (1993) and possibly contribute to processing efficiency in reading comprehension. The results hereby presented allow us to state that the textbook analyzed stimulates a well balanced approach fomenting both declarative and procedural knowledge. Declarative knowledge is tackled via schema activation, preparing the reader for the topic, anticipating controversies, drawing on the reader's prior knowledge and building relevant knowledge when necessary.

As for procedural knowledge, generally speaking, both lower level and higher level processes are nurtured. At the word level, the activities predict vocabulary difficulty and focus on word meaning, both individually and in context, as well as on cognate words as a means to promote processing efficiency in reading comprehension. Both literal and inferential comprehension are tackled. Literal comprehension is supported by proposing tasks that focus on local le-

vel processes, such as checking for specific fragments of the text, and answering questions according to what is stated in the text. However, more emphasis is given to inferential comprehension by promoting integration, summarization, and elaboration through activities that propose more engagement of the reader in combining prior knowledge on topic and concepts with information from the text, in analyzing, and reflecting. Thus, if necessary, the teacher might have to provide specific tasks to foment syntactic processing, and thus give more support to parsing, as well as more work with the vocabulary presented in the texts, so that lexical access is also provided for. Although there is some attempt to develop a strategic reader in the Tips into Practice section, we understand that more emphasis should be given to promote comprehension monitoring in each reading section within the units.

We understand that this is a small-scale piece of exploratory research which may not represent what goes on in this series of textbooks as a whole, or even in the other units of the one volume under investigation. However, it was not our intention, in the first place, to be able to make generalizations which would endorse or refute any available textbook in the market. Our purpose was to provide a thorough analysis, under the scope of the objectives proposed, of the two chosen samples. As a scientific study, the objective was to throw some light in an area that has been little investigated, that

which connects materials design (EFL textbooks, in this case) with cognition in reading, and for that we think we have taken a first step and shown that there is a relationship that seems plausible and is worthy of further investigation.

Livros didáticos conseguem promover a eficiência do processamento na compreensão leitora?

#### Resumo

Objetivando investigar se as atividades de leitura propostas no livro didático Way to Go! (2013) promovem eficiência no processamento, utilizamos como bases teóricas do presente estudo os construtos propostos nas obras de Gagné, C. Yekovich and F. Yekovich (1993) e de Daneman e Carpenter (1980). Em nossa análise, verificamos que o material didático avaliado dá subsídios ao leitor para antecipação de dificuldades de vocabulário e sugerimos que essas atividades fomentam os subprocessos de decodificação e acesso lexical. A compreensão inferencial é promovida por meio da integração das informações por atividades que promovem o engajamento do leitor na relação conhecimento prévio do tópico da leitura e conceitos envolvidos com informações textuais. Porém, orientações sobre o uso de estratégias e monitoramento da compreensão não são exploradas separadamente nas unidades analisadas.

Palavras-chave: Cognição. Ensino de leitura. Processamento de leitura. Processamento eficiente.

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