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Cognitive corpus linguistics and pedagogy: From rationale to applications

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Abstract

This article deals with applied cognitive corpus linguistics, that is, the combined use of cognitive linguistics and corpus linguistics for pedagogical purposes. It describes the main features of each framework in terms of teaching applications and underlines their complementarity. Through several illustrations, it shows how applied cognitive corpus linguistics combines the benefits of corpus data (authenticity, quantification, diversification of genres, access to learner production, etc.) with those of cognitive principles (linguistic motivation, enhanced salience, realignment of form and meaning, etc.) in ways that are expected to foster the development of the learner's language system.

Keywords: cognitive linguistics, corpus linguistics, language teaching, foreign language learner

1. Introduction

Cognitive linguistics is a framework that seeks to "make one's account of human language accord with what is generally known about the mind and the brain" (Lakoff, 1990: 40). It brings together several theories, including Cognitive Grammar, (several models of) Construction Grammar (CxG) and conceptual metaphor theory, which differ from one another but also share some important tenets, most notably the idea that all language units are meaningful and convey a certain conceptualization. *Corpus linguistics* is a framework that relies on the use of corpora, i.e. databases of naturally occurring language. It is "an empirical approach to studying language, which uses observations of attested data in order to make generalizations about lexis, grammar, and semantics" (Stubbs, 2004: 107). *Cognitive corpus linguistics* is the combination of the principles and methods of cognitive and corpus linguistics (see Lewandowska-Tomaszczyk & Dziwirek, 2009). It may be said to have arisen simultaneously from "an increasing awareness [within cognitive linguistics] that the study of linguistic phenomena

needs to be grounded in usage" (Arppe et al., 2010: 1) and the recognition, among corpus linguists, that corpus studies, in addition to methodological rigour, also require theoretical sophistication. Cognitive linguistics and corpus linguistics have been shown to be compatible through their shared basic assumptions and complementary through their divergences (cf. Schönefeld, 1999; Meunier, 2008).

This article deals with what could be termed *applied cognitive corpus linguistics*, where 'applied' refers to pedagogical applications in the L2 (here, foreign) language classroom. In particular, it focuses on the most direct applications, that is, those activities that teachers can propose to their students. While it considers different types of corpora (native corpora, bilingual corpora, learner corpora) and various cognitive assumptions (usage-based approach, salience, construal, reconstruction, etc.), the aim is not to be exhaustive in the description of the possible applications of cognitive corpus linguistics, but merely to outline the rationale and provide some illustrations, in the hope that this will encourage researchers and practitioners to develop their own ideas.

Sections 2 and 3 of this article present a brief overview of the links of cognitive linguistics and corpus linguistics, respectively, with pedagogy. More detailed accounts can be found in, e.g., Boers and Lindstromberg (2006) or Tyler and Huang (2018) for cognitive linguistics and Meunier (2002) or Chambers (2019) for corpus linguistics. Section 4 deals with the actual combination of cognitive and corpus linguistics. It first takes the perspective of cognitive linguistics and considers the benefits and limitations of using corpora in cognitively inspired pedagogy (Section 4.1). It then takes the opposite perspective and reviews the main advantages and disadvantages of applying cognitive principles to corpus-based pedagogy (Section 4.2). Section 4.3 summarizes the ways in which corpus linguistics and cognitive linguistics complement each other for pedagogical purposes, while Section 4.4 provides illustrations of their combination. Section 5 concludes the article.

2. Cognitive linguistics and pedagogy

As a theoretical framework, cognitive linguistics is meant to explain all the aspects of language use. However, through its basic tenets, it is inextricably linked to the process of language acquisition. Thus, Littlemore and Juchem-Grundmann (2010: 1) highlight three assumptions that are shared by all cognitive linguistic theories: "language is not an autonomous cognitive faculty; knowledge of language emerges from language use; language is a product of physical interaction with the world". Each of these assumptions says something about how language is acquired (through general cognitive processes, through language use and through physical

interaction with the world). While it is first and foremost child language acquisition that is implicitly referred to, the tenets of cognitive linguistics also have implications for second language acquisition, and hence for language teaching. For example, if language knowledge emerges from language use, it is necessary to expose learners to the L2 as much as possible, inside but also outside the classroom.

Numerous publications have been devoted to the pedagogical applications of cognitive linguistics (e.g. Pütz et al., 2001; Boers & Lindstromberg, 2008a; De Knop & De Rycker, 2008; De Knop et al., 2010; De Knop & Gilquin, 2016; Boas, 2022). They underline one of the most useful cognitive principles for teaching, namely the assumption that language (all forms of it) makes sense, by exploiting concepts such as motivation (how seemingly arbitrary language items can be shown to be motivated), categorization (how linguistic categories are organized around a prototype and form a network of meanings) or schematization (how concrete language instances can be related to abstract schemas). These studies tend to centre around a few pet subjects including prepositions, phrasal verbs, idioms and metaphors. Most of them take the form of small-scale and short-term experiments in which a group of students is taught certain language items through a cognitively inspired pedagogy, while a control group is taught the same language items by means of traditional teaching methods.

Because most studies in applied cognitive linguistics are experimental in nature, deal with a small set of language items and fail to investigate long-term learning effects, they cannot directly translate into an across-the-board method to teach a language on the basis of cognitive linguistic principles. As Boers and Lindstromberg (2006: 338) point out, "[c]oncerted efforts now need to be made to integrate the various research insights and pedagogical proposals on a larger scale, in authentic language teaching settings, and in coherent curricula". A few publications have already paved the way for a more fully-fledged approach, if only for specific aspects of language. Thus, Rudzka-Ostyn (2003) offers a "textbook for guided self-learning" (p. v) focusing on phrasal verbs and compounds and aiming to demonstrate the motivation behind the combination of a given particle and certain verbs, nouns or adjectives. The textbook is organized around different particles and includes examples and diagrams to explain the different senses of a particle, as well as numerous exercises and tests. Lindstromberg and Boers (2008) propose a resource to teach chunks of language. The book includes many activities meant to help learners notice and remember chunks, as well as some photocopiable handouts. It relies on methods such as linguistic motivation, repetition, visualization or mime.

3. Corpus linguistics and pedagogy

Pedagogy was not a driving force behind the origin and the initial development of corpus linguistics (Leech, 1997: 1). Yet, because most researchers in corpus linguistics were also university teachers, corpora soon started to be exploited for pedagogical purposes. According to McEnery and Wilson (1997: 12), Peter Roe used corpora for teaching at Aston University as early as 1969. The advent of learner corpus research, which relies on the analysis of corpora representing learner language, gave a new impetus to the link between corpus linguistics and pedagogy, as the potential contribution of learner corpus research to teaching was emphasized from the very beginning (see Granger, 1993). Over the last few decades, many studies have shown how native/expert and learner corpora can help improve teaching (e.g. Wichmann et al., 1997; Granger et al., 2000; Sinclair, 2004; Aijmer, 2009; Campoy et al., 2010; Götz & Mukherjee, 2019).

The benefits of corpora for teaching are many, but they can mostly be subsumed under the general advantage that they reflect authentic language use. Reference corpora of native/expert language can serve to provide better descriptions of naturally-occurring language (in different registers and genres) and thus inform any of the resources used for teaching – textbooks, grammar books, dictionaries, software, etc. They can also help teachers decide what to focus on and not to focus on (depending on what is frequent in the reference corpora, for instance). Learner corpora too can provide useful information to guide the design of the curriculum, for example by pointing to aspects of language that are often misused, underused or overused among (a given population of) learners or by establishing lists of language items that learners at a certain proficiency level should be familiar with. Students themselves can be given access to (native/expert or learner) corpus data and carry out their own analyses in order to come up with generalizations about language, a form of pedagogy known as 'data-driven learning' (see Gilquin & Granger, 2022).

Despite the considerable potential of corpora for teaching, it must be recognized that their incursion into the classroom has been relatively limited so far (e.g. Cheng, 2010). The general reference tools (especially dictionaries and pedagogical grammars) are increasingly corpus-based, but the closer we get to the day-to-day classroom activities, the less published material there is. Corpus-based textbooks do exist (e.g. McCarthy et al., 2004-2006), but the contribution of corpora to these textbooks tends to be rather modest. As for data-driven learning, the paucity of ready-made worksheets or teaching plans has often been deplored (Gilquin & Granger, 2022), although more are starting to become available on the Internet. More philosophical reasons may also have prevented corpora from being widely used in the

classroom, including the preference, among many educational actors and even students, for more traditional teaching approaches, and possibly their (unfounded) fear that the corpus may end up supplanting the teacher as a repository of knowledge (see Hunston, 2002: 171; Boulton, 2009: 99).

4. Applied cognitive corpus linguistics

4.1. Using corpora in cognitively inspired pedagogy

4.1.1. The empirical turn in cognitive linguistics

Cognitive linguistics has often been criticized for its use of artificial data and invented examples (Littlemore, 2009: 11). Over the last fifteen years or so, however, things have started to change, with cognitive linguistics gradually taking an empirical turn. As can be expected from a theoretical framework that seeks to approach mental representations, one of the empirical methods that cognitive linguistics has relied on is psycholinguistic experimentation, which has made it possible to probe into the way linguistic information is categorized and organized in the mind, for example, and which in some cases has questioned assumptions made on the basis of introspection (cf. Sandra & Rice, 1995). Corpora, as another source of empirical evidence in cognitive linguistics, have provided a different – but complementary – perspective on language, for instance by revealing what language items are the most frequent in usage or how they cluster together in texts. When trying to account for mental processes (including learning processes), corpora are arguably a less direct source of evidence than psycholinguistic experiments. When it comes to teaching applications, on the other hand, corpora offer undeniable advantages over experimental data or, indeed, invented data, many of which also align with fundamental principles of cognitive linguistics. In what follows, I describe what I see as the three main advantages of using corpora in cognitively inspired pedagogy.

4.1.2. Advantages of corpora for applied cognitive linguistics

The first advantage of corpora is that they expose students to **authentic language**. This ties in with the usage-based approach in cognitive linguistics and the recommendation to "invest in the analysis of real language use" (Geeraerts, 2006: 17). Yet, as we saw above, this recommendation has not always been adhered to in cognitive linguistics, and cognitive applications have tended to follow the same trend. Pedagogical experiments mostly rely on invented stimuli and the few cognitively inspired teaching methods (like Rudzka-Ostyn (2003) and Lindstromberg & Boers (2008), mentioned in Section 2) do not have language authenticity as a guiding principle. By representing authentic language, corpora expose learners to the type

of language that they are likely to encounter in real-life interactions and that should therefore be most useful to them. As a special type of corpus, the learner corpus provides instances of authentic learner production, showing what learners tend to get right as well as what they tend to get wrong, with the latter pointing to possible areas for focus in teaching. Learner corpora that consist of data produced by learners at different stages in the learning process show how language knowledge develops and what can typically be expected of learners at certain proficiency levels, which can help set realistic goals for teaching and reasonable targets for language testing and assessment. Since corpora are supposed to be representative of a language or language variety, they can be used with confidence that they reflect what most speakers/writers in that context would say or write. All this leads Tyler and Ortega (2018: 19) to note about usage-inspired L2 instruction that "corpus linguistics must be a key point of consultation in deciding the targets of instruction, the pedagogical contents of those targets, and the evaluation of whether the learning objectives have been met successfully".

Another advantage is that language in corpora is **contextualized**, enabling students to see how different language items fit together within a sentence, paragraph or text. This contrasts with the data generally used in applied cognitive linguistics, for which context may be very limited and inauthentic. The larger authentic context to which corpora give access should help learners come to the realization that, as acknowledged in both corpus linguistics and cognitive linguistics, language items tend to cluster together to form larger units, for example collocations such as *make a wish* or constructions which, in the CxG sense, correspond to form-meaning pairings and can cover the whole spectrum of word chunks from idioms to fully abstract combinations such as the ditransitive structure [Subj V Obj_1 Obj_2]. Since it is generally assumed that such multiword units are stored holistically in the mind and facilitate language production, bringing this phenomenon to students' attention is expected to be beneficial to them. In addition, the range of existing corpora often makes it possible to present language in different contexts, including various registers and genres, from the most general to the most specialized. For students, this means that they can familiarize themselves with different text types, in particular those that they might need for their current activities (e.g. emails) or future jobs (e.g. business English), and be made aware of stylistic differences, an issue that is often problematic for language learners (see, e.g., Gilquin & Paquot, 2008). While it has recently been recognized in cognitive linguistics that contextual information might be stored together with the linguistic forms (see Nikiforidou & Fischer, 2015), this is not an aspect that has been predominant on the cognitive scene so far. Corpus linguistics therefore has an important contribution to make in this respect.

A third major advantage of corpora is that they give access to **quantitative information** about language. This is particularly relevant for learners, given their tendency to overuse or underuse certain language items, as can be discovered in learner corpora. Being shown that *perhaps* is more frequent than *maybe* in a corpus of academic writing, for example, and that the opposite is true of a learner corpus, might encourage learners to favour the more frequent option in their academic texts. This is very precious information since "quantitative distributions matter and are part of the grammar" (Bybee, 2010: 122). In fact, frequency has been claimed to be one of the major factors affecting cognition (see Ellis, 2012). If a language item is encountered frequently, this will arguably have an impact on cognitive representations (Bybee, 2008: 218). In CxG, for example, it is assumed that constructions are stored in the mind if they are sufficiently frequent in language (Goldberg, 2006: 5). Corpora are the only resource that can provide direct information about frequency in language use, and their role in cognitive linguistics is therefore crucial. From a pedagogical point of view, although frequency is not everything and, as Leech (2011) puts it, 'more frequent' does not necessarily equate to 'more important to learn', exposing learners to reference corpora that reflect authentic quantitative distributions or to corpus-based materials that give information about frequencies can help them form cognitive representations that are closer to those of mature users of the language.

4.1.3. Limitations

Despite their pedagogical benefits, corpora show a number of limitations. First, the information they provide is so diverse and detailed that it can be overwhelming for students. For less advanced learners, many of the examples taken from corpora may be too complex. This underlines the crucial role of teachers in corpus-based pedagogy, as they need to accompany students in their corpus explorations, especially in the early stages. Also, while numerous off-the-shelf corpora are readily available for teachers and/or students to use, certain languages are underrepresented in corpus linguistics and hence among corpora on the market. Besides, access to computer-based technologies is still quite limited in certain countries, which does not completely rule out corpus-based activities but restricts them to a 'soft' version relying on printed handouts. Finally, it must be recognized that corpus-based teaching activities tend to be time-consuming and that the more implicit and inductive approach that is typically associated with data-driven learning does not suit every student's learning style. While the results of corpus-based teaching experiments are overall encouraging (Boulton & Cobb, 2017),

corpora are no pedagogical cure-all, and they should be used in combination with other sources of information and other teaching methods.

4.2. Using cognitive principles in corpus-based pedagogy

4.2.1. The theoretical contribution to corpus linguistics

Not everyone agrees on the status of corpus linguistics as either a methodology or a branch of linguistics with its own theoretical assumptions (cf. Taylor, 2008). However, even those who opt for the latter position generally acknowledge that corpus linguistics is "theory light" (Thompson & Hunston, 2006: 2), in the sense that the corpus analysis tends to outweigh the theoretical considerations. For this reason, combining corpus linguistics with a theoretical framework is not only possible, but also likely to be fruitful. Various theories have been shown to be compatible with corpus linguistics, including functional linguistics, Head-driven Phrase Structure Grammar and some psycholinguistic theories (cf. Barlow 2011: 14). A combination that has been particularly popular over the last few years is that of corpus linguistics with cognitive linguistics (see, e.g., Gries & Stefanowitsch, 2006; Lewandowska-Tomaszczyk & Dziwirek, 2009; De Knop & Meunier, 2015a; Yoon & Gries, 2016). The two frameworks share several tenets, including the importance of usage and meaning. They are also complementary with each other, in ways that can be beneficial for language teaching. In particular, corpus linguistics ensures an empirical approach and provides the basis for descriptive adequacy, while cognitive linguistics offers "explanatory power and psychological plausibility" (Gilquin, 2010: 16). In what follows, I describe what I see as the three main advantages of using cognitive principles in corpus-based pedagogy.

4.2.2. Advantages of cognitive principles for applied corpus linguistics

A major advantage of cognitive linguistics is that, through the concept of **categorization**, it makes it possible to organize information in a way that should make sense to learners. Polysemous items, for example, are not just presented as a list of different senses, but as a network of related senses, with a central one (often called 'prototype') from which the others are derived by means of links such as specialization, metaphor or metonymy (see, e.g., Tyler & Evans, 2011 on the preposition *over*). Such links point to the "non-arbitrary nature of language" (Boers & Lindstromberg, 2008b: 1) and create linguistic motivation, which facilitates the learning of the language items under examination (Csábi, 2008), but can also provide learners with strategies to guess the meaning of new uses (Tyler & Huang, 2018: 6). Bringing order into the "apparent chaos and unsystematicity of 'real' language" (Tognini-

Bonelli, 2001: 180) is also one of the aims of corpus linguistics, which often relies on the categorization of language instances as a basis for analysis. The principles of categorization in corpus linguistics, however, tend to be more formal (frequency lists, lists of recurrent lexical bundles, formal patterns emerging from alphabetically sorted concordances, etc.) and arguably less meaningful for learners than the semantic principles applied in cognitive linguistics.

Another advantage of cognitive linguistics has to do with **conceptualization** (see Croft & Cruse, 2004: 3), which means that there are different 'construals', that is, different ways of conceptualizing one and the same event and hence of encoding it through language. Corpus linguistics, having variation as one of its central concerns (Szmrecsanyi, 2017), can reveal the existence of different linguistic alternatives and highlight the many variables that seem to influence their choice. The findings, however, may not be directly applicable to teaching. Thus, the dative alternation (e.g. *She gave the book to me* vs *She gave me the book*) has been shown to be influenced by variables such as the animacy, the definiteness and the length of the noun phrases (cf. Gries, 2003). Yet, students could hardly be expected to remember what combinations of factors are more likely to lead to the use of which construction. A more cognitive account relying on conceptualization may be more helpful to them, for example Langacker's (1987: 39) explanation that in the prepositional construction the use of the preposition *to* emphasizes the path taken by the object to the goal, whereas the ditransitive construction emphasizes the final state in which the goal possesses the object, as indicated by the juxtaposition of the two elements. Making learners aware of this type of variation is useful for their understanding of the target language, to realize that there is not necessarily a single way of saying something. But it is also particularly important for highlighting the possible differences between the target language and the learner's native language. This can be illustrated with an example based on Talmy's (1985) distinction between verb-framed and satellite-framed languages. A French speaker will thus have to learn that, unlike French, which typically expresses path of motion through the verb and manner of motion through an adjunct (e.g. *Elle est sortie en courant*, lit. 'She went out by running'), English usually expresses manner of motion through the verb and path of motion through a 'satellite' (e.g. *She ran out*). Both languages describe the same reality, but with different construals. Again, corpora can show this in authentic data (bilingual corpora), but cognitive linguistics is probably better equipped to provide a meaningful explanation and help learners "'revisit' some of their often deeply entrenched conceptualizations" (De Knop & Meunier, 2015b: 9).

A third advantage worth underlining is related to the cognitive claim that "language is not an autonomous cognitive faculty" (Croft & Cruse, 2004: 1) but relies on **general abilities**

used for non-linguistic tasks as well (e.g. reasoning, visual perception or motor activity). This means that learning a language may involve the use and development of other cognitive skills, including those that data-driven learning is said to contribute to (see O'Sullivan, 2007: 277), for instance noticing, hypothesizing, interpreting, critical thinking and, most notably, what Kennedy and Miceli (2010: 31) call "pattern-hunting", which in cognitive linguistics is more often referred to as "pattern-finding" (Tomasello, 2003: 28). This also means that non-linguistic cognitive properties can be relied on to improve language learning. Visual or aural salience can thus help learners notice – and remember – certain language elements. Alliteration, for example, has been said to facilitate memorization, which should help with the learning of idioms such as *bite the bullet* (Boers & Lindstromberg, 2005). Language input (including authentic data like those found in corpora) can also be manipulated so as to enhance the salience of the target item (cf. Collins et al., 2009), e.g. through stress, pauses or articulation in speech, and boldface, underlining or colours in writing. As a way of teaching chunks of language, for instance, Lindstromberg and Boers (2008: 20-21) suggest reading out a text loudly and emphatically, with long pauses between chunks, so that learners can notice the chunks more easily. Focusing on writing, Boers et al. (2017) demonstrate that the typographic enhancement of multiword expressions, in the form of underlining in a text, helps learners remember these expressions better. The non-autonomous nature of language can also be related to the cognitive concept of embodiment, which claims that "people's subjective, felt experiences of their bodies in action provide part of the fundamental grounding for language and thought" (Gibbs, 2006: 9). The fact that language and thought are connected to the body and to physical experiences has as a consequence that many aspects of language can be described in more concrete terms and – importantly for pedagogical purposes – can be illustrated by means of visual representations such as pictures/diagrams and animations. Such representations are frequently found in the cognitive literature and they are particularly common in applied cognitive linguistics (e.g. Wong et al., 2018; Arnett & Suñer, 2019). Being more semantically oriented, they can advantageously combine with the frequency-based representations found in corpus linguistics (frequency graphs, word clouds, etc.). In Lapaire (2006), a cognitively inspired method based on movement is used to teach English grammar. Linguistic phenomena such as past vs future, countable vs uncountable, superlatives or modals are represented by means of

gestures called 'KineGrams'.[1] Such an approach (literally) puts into action the cognitive idea that language learning exploits the same mechanisms as motor activity.

4.2.3. Limitations

Despite the many advantages of cognitive linguistics for teaching, it comes with some limitations. A major limitation is that not all language items or phenomena are easily amenable to linguistic motivation and/or visual representation. Lindstromberg and Boers (2008), in their cognitively inspired book on chunks of language, have selected chunks with a high degree of 'memorability', i.e. those that can easily be motivated linguistically (p. 12). A consequence of this limitation is that some of the cognitive explanations found in the literature may "come across to learners as far-fetched" (Boers & Lindstromberg, 2006: 320). For example, in Condon and Kelly's (2002) teaching experiment, which involved highlighting the linguistic motivation for phrasal verbs, learner gain was limited to phrasal verbs whose motivation was very clear and which could be illustrated by means of drawings, which suggests that the explanations for the other phrasal verbs were not very helpful to learners. Finally, it must be acknowledged that cognitively inspired teaching methods have not always been tested, nor are they necessarily more efficient than traditional teaching methods, as appears from Arnett and Suñer's (2019: 367ff.) literature review.

4.3. Complementarity between corpus linguistics and cognitive linguistics

The respective strengths and limitations of corpus linguistics and cognitive linguistics for pedagogy described above already point to the complementarity between the two approaches. This section provides a brief summary of the main ways in which they complement each other. It must be emphasized that this summary relies on what is typically done within each framework, rather than what practices are possible or not.

We saw earlier that the main feature (and advantage) of corpora is that they give access to authentic language. They thus make it possible to replace (or at least supplement) the type of naturalistic language input from which one can acquire (rather than learn) a language. They can also illustrate various genres, both written and spoken. The data typically used in cognitive linguistics are not (fully) authentic, but this can have the advantage of presenting learners with simple sentences or texts that show exactly what the teacher wants them to show. Holme (2009:

[1] See the example of the distinction between *all*, *each* and *every* on https://www.youtube.com/watch?v=-arO-D1H-sE (accessed on 4 September, 2021).

41), for example, suggests introducing a new lexical item in an iambic sentence and asking students to tap out the stress with their hands, while Lindstromberg and Boers (2008: 127, 136) propose a modified version of *Little Red Riding Hood* in which several body idioms have been inserted.

Corpora are useful resources to illustrate practically any kind of language item or phenomenon, ranging from individual words and idiomatic expressions to syntactic structures and genres, through aspects such as morphology or punctuation. This makes corpus linguistics a very flexible teaching method in this respect. Cognitive linguistics, on the other hand, is most useful for the teaching of language items or phenomena that can be linguistically motivated and/or visually represented, such as concrete uses of words or structures, metaphors, metonymies and idioms. For these, cognitive explanations may be more efficient – and certainly more rapid – than corpus exposure, as they are likely to evoke a lasting mental image.

While both corpus linguistics and cognitive linguistics can help categorize data for pedagogical purposes, they tend to do so on the basis of different criteria. For corpus linguistics, this is mainly formal criteria, including frequency (e.g. word lists in decreasing order of frequency), alphabetical sorting (e.g. left or right sorting of concordances) and formal similarity (e.g. lexical bundles or patterns). Cognitive linguistics, on the other hand, relies more on semantic criteria, most notably through networks in which the various senses or uses of a language item are related to each other via different types of links (metaphoric, metonymic, etc.) and through groupings of items per theme or domain (e.g. conceptual metaphors such as TIME IS MONEY or ARGUMENT IS WAR in Lakoff & Johnson, 1980). It should also be pointed out that corpus linguistics usually extracts categories from the data whereas cognitive linguistics tends to posit them beforehand (Teubert, 2008), which points to more inductive vs deductive approaches.

The complementarity between the principles of corpus linguistics and those of cognitive linguistics not only means that different linguistic phenomena can be taught through different methods in each of the two frameworks, but also that they may each be more appropriate for students with specific learning styles. Talking about data-driven learning, Boulton and Cobb (2017: 386) suggest that it "works pretty well in almost any context where it has been extensively tried". Yet, the typically inductive and student-led approach of corpus-based pedagogy arguably favours students with a more inductive and autonomous learning style. Boulton (2010: 110) additionally demonstrates that students who benefit the most from corpus consultation are of the active and sequential type (active students learn by

experimenting; sequential students work step by step).[2] Cognitively inspired pedagogy, on the other hand, is more likely to work with deductive students. It has also been shown to benefit so-called 'high imagers' (with an imaging style) more than 'low imagers' (with a verbalizing style) (Boers et al., 2006).

4.4. Illustrations

4.4.1. Corpus-informed or cognition-informed approach

The combined uses of corpus linguistics and cognitive linguistics for pedagogical purposes found in the literature often tend to be more representative of one of the two frameworks, with some elements borrowed from the other one. Taking the cognitive linguistic perspective, we can give the example of Lindstromberg (2010), a revised version of a guide to English prepositions based on cognitive principles, in which corpus examples (most of them taken from the Web) have been substituted for the original invented examples. The perspective, however, is still essentially cognitive, with its focus on networks of meanings, construals and visualization, as well as its largely intuition-based approach, as appears from this extract:

> [I]f you say *I flew <u>across</u> Canada*, you are almost certainly thinking of your route as a line on an ocean-to-ocean map. If you say, *I flew <u>over</u> Canada*, your imagined viewpoint is almost certainly that of you, high up in a plane, with Canada passing by far below you. Much the same can be said of Example (44) as well.
>
> (44) In all, about 5000 people made it **across** *The Wall* in its 28 years. [Example taken from the World Wide Web]
>
> One might think that *make it <u>over</u>* would be more natural given that the Berlin wall was a few meters high. But if, in our mind's eye, we zoom a kilometer up in the air so that we see the wall as a thread-like line between two sizeable geographical areas, then *ACROSS* becomes the more natural choice.
>
> (Lindstromberg, 2010: 125)

An example of corpus-based pedagogy with some cognitive elements is Gilquin (2021), which involves data-driven learning with concordances of constructions (i.e. phrasal patterns) rather than of single words (as is usually the case in corpus linguistics). The constructions are among those often discussed in the cognitive literature, including the MAKE causative construction and

[2] Visual students appear to enjoy corpus consultation but are not particularly good at it (Boulton, 2010: 108).

the *into* causative construction. French-speaking learners of English are asked to go through concordance lines illustrating each construction and to carry out tasks in relation to these concordance lines (e.g. determine the nature of the subject in the MAKE causative construction or underline the verb in the *into* causative construction). The study relies on some of the theoretical underpinnings of cognitive linguistics, in particular the usage-based model (see Section 4.4.2). It shows that the learners have a better representation of the construction after the concordance-based activities and seem to have generalized from the concrete instances, since they are able to produce examples of the constructions with verbs not included in the concordances (12% of the sentences produced for the *into* causative construction) and a majority of them can identify the right semantic description for each construction.

Although such works arguably represent a step in the right direction, it might be said that they do not take full advantage of the combined potential of corpus linguistics and cognitive linguistics for teaching, being simply 'corpus-informed' or 'cognition-informed'. The pedagogical sequences described in the next sections and their variations seek to better integrate the two frameworks and to maximize their respective benefits for teaching. Section 4.4.2 adopts a corpus-driven approach, taking corpora as a starting point, whereas Section 4.4.3 adopts a cognition-driven approach, taking cognitive categories as a starting point. Both sections also include some theoretical and methodological considerations that are relevant to the pedagogical sequences at hand.

4.4.2. Corpus-driven approach

In this illustration of the possible symbiosis of corpus linguistics and cognitive linguistics for pedagogical purposes, the starting point is a corpus, and more precisely a concordance showing different uses of a target item. Despite the fact that it is therefore corpus-driven, it should be emphasized that the approach described here is well anchored in cognitive linguistics, most notably through the nature of cognitive linguistics as a usage-based model. While 'usage-based' can be understood as referring to a methodology that relies on the analysis of authentic language (see Section 4.1.2), originally it actually refers to the way in which language is acquired and processed (Taylor, 2006: 573-574). Usage-based models claim that "language structure emerges from language use" (Tomasello, 2003: 5). In other words, our knowledge of language is said to gradually develop on the basis of language as it is used by people around us ('usage events'). Words and sequences of words get entrenched after they have been encountered several times, and abstract schemas (such as the ditransitive construction mentioned in Sections 4.1.2 and 4.2.2) are built thanks to the many concrete instances that are

found in the language input we receive. The consequence of this principle is that language acquisition requires exposure to a great deal of language, so as to increase the depth of language knowledge (i.e. how strongly language items are entrenched in one's mental inventory) as well as its width (i.e. how many language items are part of this mental inventory).

In first language acquisition, language input is usually not a problem, as children typically grow in an environment (home, nursery, etc.) that uses their native language (L1) as the main language of communication. In foreign language learning, on the other hand, the main language of communication in the learner's environment is normally not the target language, whose use tends to be restricted to the language classroom. Foreign language learners' chances to get exposed to L2 items repeatedly are therefore reduced. In addition, the input in the language classroom is often not ideal, as it may include inauthentic textbook materials (texts, exercises, recordings, etc.) but also language production by other learners. The emergence of language structure among L2 learners is thus likely to be slow and potentially biased.

1	Stephen had a **way** of getting what he wanted from people.
2	The UK tried yet again to negotiate a **way** round the EC rules.
3	To put it another **way**, it does not alter the basis of liability.
4	The best **way** to impress politicians is to mobilize public opinion.
5	They may operate purely by **way** of informal agreement.
6	The cool and rainy spring gave **way** to warm summer days.
7	He had almost given **way** to panic.
8	Enthusiasm, he wrote, gives **way** to frustration.
9	The boys were half **way** through supper.
10	She eventually << found her **way** to the social services department >>.
11	My mother was << pushing her **way** towards me >>.
12	She must have << wormed her **way** into Topaz's confidence >>.
13	Helped by his coach, he << fights his **way** to the top >>.
14	He << fumbled his **way** into the chair provided for visitors >>.
15	He << groped his **way** through the still open doorway to the bed >>.
16	For nearly two hours he << worked his **way** through his agenda >>.
17	The cortege was due to << make its **way** to Holy Trinity Parish Church >>.
18	You've got a long **way** to go.
19	There's no **way** that we can ever hope to get along better.
20	There is no **way** that that fellow could get this other party to change.
21	There was no **way** they could do that.
22	The point is, they'll report it one **way** or the other.
23	There may be more than one **way** of carrying out a task.
24	The only **way** forward seemed to be down.
25	The only **way** to control fear is to confront it.
26	'There must be some other **way** of identifying him.'
27	Charles looked the other **way**.
28	He found me, not the other **way** around.
29	It was supposed to work the other **way** round.
30	We're on our **way** to England.
31	A possible **way** round this problem has been suggested by Sen.
32	Merton put forward five possible **ways** of adapting to this gap.
33	I think they'll feel the same **way** about Jarrod.
34	He thinks the same **way** as I do about our work.
35	We can suggest **ways** of rescheduling the payments over a longer period.
36	In that **way** we will raise standards of service.
37	Well [pause] that story came all the **way** from Africa.
38	It was his fault she had to go all the **way** back to the house.
39	And er, by the **way**, pensions, pensions are er, are taxed!
40	'C'est la vie. By the **way**, have you ever seen the musical Les Misérables?'
41	'My name's Katrina by the **way**.' 'Dorothy,' I said.
42	The Community is now on the **way** to solving these problems.
43	We passed a pleasant seaside resort on the **way** to the harbour.
44	It paved the **way** for expanded West German trade.
45	They resented the **way** in which the Chancellor interfered.
46	The Russians had << battered their **way** into the city >> in 1945.
47	Clients joining in this **way** should indicate so in the appropriate box.
48	Plans are under **way** to build a home for him.
49	A search is under **way** for the two-man crew of a light aircraft
50	<< Make your **way** through the ballroom >> so everyone can see you.

Figure 1. Concordance of the noun WAY based on the BNC

Corpora can be an excellent source of "condensed exposure" (Gabrielatos, 2005: 10), which learners can directly benefit from through data-driven learning. Instead of having to listen to hundreds of hours of conversation or read thousands of pages to encounter a language item multiple times, a learner can examine a concordance of this language item, which will show all the occurrences of the language item in context automatically extracted from a corpus, with several instances of some of the most common patterns. Figure 1 shows a sample of the concordance of the noun WAY in the *British National Corpus* (BNC; BNC Consortium, 2007), illustrating several of its uses. Encountering these various uses in the type of input that foreign language learners typically receive would undoubtedly take much longer than going through the concordance.

The concordance of WAY can be presented to learners in several formats, depending on how much experience they have with corpora. Beginners in data-driven learning can be given a handout with Figure 1, which corresponds to the concordance lines sorted alphabetically to the left of WAY, as well as another handout in which the (same) concordance lines are sorted alphabetically to the right of WAY. Relying on cognitive principles, the salience of certain features can be enhanced through typographic manipulation: boldface highlights the use of the target item; the KWIC (key word in context) view, with all the occurrences of the language item one under the other, and the alphabetical sorting facilitate the identification of recurrent patterns; the boxes emphasize some of these patterns, while the angle brackets point to instances of the so-called *way*-construction (Goldberg, 1996). Learners with some experience in data-driven learning could be given the concordance with no or little typographic enhancement and be asked to add some features themselves (e.g. circling patterns or underlining instances of the *way*-construction), thus resorting to non-linguistic skills (noticing, pattern-finding, motor activity), in accordance with the non-autonomous nature of language posited in cognitive linguistics. Finally, learners who are used to data-driven learning could be given direct access to the actual corpus and be encouraged to explore it with a concordancer and possibly discover other patterns and uses than those represented in Figure 1, a type of exploration that would further develop some of the learners' cognitive skills that are useful to language learning (cf. Section 4.2.2). Certain concordancers actually use colours to highlight collocates or parts-of-speech, which could be helpful for learners who have access to the corpus.

The examination of the alphabetically sorted concordance of WAY can reveal formal patterns, which are made up of identical words found one under the other and which correspond either to phraseological combinations (e.g. *GIVE way to* [6, 7, 8], *BE under way* [48, 49]) or to

syntactic structures (e.g. *way to* + infinitive [4, 25], *way of* + *-ing* [1, 23, 26]).[3] Some of the instances of the *way*-construction also follow each other in the concordance [10-17] and the others can be retrieved by identifying [verb + possessive determiner + *way*] sequences [46, 50]. In addition, the contextual information found in corpora can make learners aware of certain stylistic issues. The three occurrences of *by the way* [39, 40, 41], for example, present features of spoken language (filled pauses and repetitions in [39], quotation marks in [40, 41]), which offers insights about the register in which the phrase is more likely to be found. Similarly, learners could be shown (or asked to find out) that the phrase *to put it another way* [3] preferentially occurs in academic prose.[4] Learners' attention can also be drawn to the variation of the phrase *the other way (a)round* [28, 29]. This observation could lead to a comparison of the frequency of both variants in a corpus of British English and one of American English, as a way of making learners aware of possible differences between varieties of English.[5]

The more semantically oriented approach of cognitive linguistics, and in particular the concepts of linguistic motivation and embodiment, can help make learners understand some of the uses illustrated in the concordance, starting from the meanings that they are likely to be familiar with. Learners can thus be shown how several senses of WAY derive from its basic, spatial meaning of 'road, path'. They can for example compare *The only way forward seemed to be down* [24] with *The only way to control fear is to confront it* [25]. While the former refers to a concrete path going in a certain direction ('down'), the latter evokes an imagined path/method that can lead to a certain destination/objective, namely 'to control fear'. The same sort of metaphoric link exists between *We passed a pleasant seaside resort on the way to the harbour* [43], which refers to a very concrete road, and *The Community is now on the way to solving these problems* [42], which describes an abstract path whose destination ('solving these problems') is about to be reached. This strong link with the spatial use of the preposition *to*, incidentally, can be mentioned to explain to learners why in [42] *to* needs to be followed by an *-ing* form (to be compared with *to* + infinitive in [4, 25]). The instances of the *way*-construction can also be organized from the most basic and concrete ones (*The cortege was due to make its*

[3] The figures between square brackets correspond to the concordance lines in Figure 1. If the concordance was sorted to the right, the occurrences of *way to* would be found one under the other, as would the occurrences of *way of*.

[4] The phrase has an average relative frequency of 2.09 occurrences per million words (pmw) in the academic component of the BNC, as against 0.8 in the whole BNC.

[5] *The other way round* has a frequency of 3.07 pmw in the BNC and 0.24 pmw in the *Corpus of Contemporary American English* (COCA; Davies, 2008-), whereas *the other way around* has a frequency of 0.76 pmw in the BNC and 3.19 pmw in COCA.

way to Holy Trinity Parish Church [17], *Make your way through the ballroom* [50]) to the most abstract ones (*She must have wormed her way into Topaz's confidence* [12], *he worked his way through his agenda* [16]), using the former to explain the latter. Finally, diagrams can be relied on to visually represent certain abstract uses of WAY in an attempt to facilitate their retention, for example *The boys were half way through supper* [9], where WAY takes on a temporal dimension and *half way* indicates the middle of the period referred to ('supper'), as represented in Figure 2. The phrase *a way round this problem* ([31]; see also [2]) can be represented by means of Figure 3, which shows how a problem can be avoided by circumventing it. As for the idiom 'to pave the way for' [44], it could easily be visualized by means of someone constructing a pavement that leads to a target.

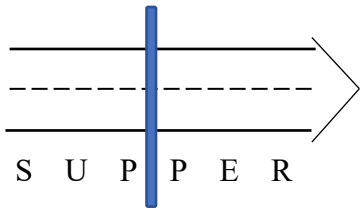

Figure 2. Visual representation of *half way through supper*

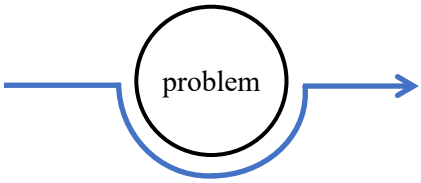

Figure 3. Visual representation of *a way round this problem*

This kind of approach is applicable to different types of corpora, which can be chosen according to their relevance for the learners: native corpus if they aim to achieve native-like proficiency, corpus of language used as a lingua franca if their focus is on communicative intelligibility, corpus of academic writing and speech if they are learning the language for academic purposes, etc. Concordances from reference corpora can also be combined with learner corpus data, which can show what learners are likely to get right/wrong and to underuse/overuse. A possible pedagogical sequence around the pair of prepositions *in* and *into*, for example, which often appear to be problematic for learners (Gilquin & Granger, 2011), could start with the examination of concordances of *in* and *into* from a reference corpus. Formal patterns could be identified from the alphabetically sorted concordances, such as *interested in*, *result in* or *divide into*. Whenever possible, cognitively inspired explanations could be provided

to help learners understand the different conceptualizations implied by the two prepositions, as illustrated by Lindstromberg's (2010: 32) statement that *in* "keeps the focus on the result (enclosure) and off the movement that led up to enclosure" whereas *into* is more dynamic and highlights the movement that precedes enclosure. Students could then be presented with an error detection exercise like that in Table 1, which includes (standard and non-standard) instances of *in* and *into* taken from the *International Corpus of Learner English* (ICLE; Granger et al., 2020). Relying on what they have learned from the reference corpus about the two prepositions, they should be able to correct the sentences when necessary. Thanks to the examples of chunks found in the reference corpus, they should know how to improve sentences [1] (*divide into*), [7] (*result in*) and [9] (*involve oneself in*). As for the semantic explanations provided about the two prepositions, they should help the students distinguish between sentences [4] and [10], which both include the noun *society* but involve different construals: while in [4] movement is emphasized through the verb *thrown*, which leads to the use of *into*, in [10] the verb *be* is more compatible with the focus on enclosure expressed by *in*. The same reasoning can be applied to sentences [3] and [5], which both include the noun *country* but differ in conceptualization.

#	**Examples from learner corpus**	**Correction (if necessary)**
1	Our world has been divided **in** rich and poor, north and south, white and coloured, etc .	divided **into** rich and poor
2	This appears to be as good a reason as any to explain the increasing religious interest **in** our changing society.	Ok
3	They are living **in** a new country with new rules, which they must respect.	Ok
4	In Japan, people are thrown **in** a society that places too much emphasis on educational background.	thrown **into** a society
5	The number of immigrants being allowed **into** the country has been reduced.	Ok
6	In big cities most apartments do not allow pets, and some people smuggle their pets **in** their homes.	smuggle their pets **into** their homes
7	And this might result **into** some lack of self-confidence.	result **in** some lack of self-confidence
8	But even in the case of a statement as simple as this we run **into** difficulties.	Ok
9	They gained the right to vote, to give their opinion, and to involve themselves **into** the working life.	involve themselves **in** the working life
10	The woman was the angel of the house, totally devoted to her husband, they were **into** a paternal society where women were not taken into account.	were **in** a society

Table 1. Error detection exercise around the prepositions *in* and *into* based on ICLE

While any off-the-shelf learner corpus could provide useful information to learners, one type of learner corpus that is particularly relevant for teaching purposes is the so-called local learner corpus (Seidlhofer, 2002), which contains data produced by the learners with whom the corpus is meant to be pedagogically exploited. Typically, a local learner corpus includes data produced

by a small group of learners from the class or school in which it is used. However, it may be exclusively made up of data produced by a single learner, who would then be the beneficiary of its pedagogical exploitation. While not necessarily easy to compile in large sizes, such corpora make it possible to take Leech's (1997) ideal of a learner-centred approach to extremes and offer learners materials that are tailor-made to their own individual needs. From a cognitive point of view, this type of approach acknowledges the variation that is bound to exist between individuals (cf. Dąbrowska, 2012). If one's mental representations of language are the result of one's various encounters with language through life (which is what usage-based models claim), then it is almost certain that these representations will differ between individuals. As for language acquisition, it "can only be seen as a highly individualized process in which no two learners share the same developmental paths or ultimate outcomes" (Wulff, 2021: 307). Consequently, having access to a corpus of one's own L2 production, ideally in combination with a reference corpus, makes it possible to discover what schemas one seems to have already entrenched or not, and what form-meaning pairings may have to be deconstructed and reconstructed (see also Section 4.4.3).

As a final note, it should be pointed out that a corpus-driven approach in applied cognitive corpus linguistics need not necessarily start from a concordance. Figure 4, for example, shows how the results of a distinctive collexeme analysis (Gries & Stefanowitsch, 2004) of the non-finite verb slot in periphrastic causative constructions carried out on a sample of the BNC (see Gilquin, 2006) can help produce a word cloud with the most distinctive verbs in the [X MAKE Y V_{inf}] construction. As is typical of word clouds, the bigger the font of the word is, the more common it is. Here, different colours have been used to point to different classes of verbs: blue for descriptive verbs (e.g. *appear*, *seem*), purple for verbs of mental processes (e.g. *think*, *wonder*), yellow for physiological processes (e.g. *feel*, *sneeze*) and fuchsia for verbs of (involuntary) movement (*jump*, *cringe*); the remaining verbs in the cloud do not represent any specific class of verbs. The different font sizes and colours should make the most common verbs and their semantic categories more salient and thus help learners remember them. Some of the verbs can be used as a basis for further elaboration, after asking learners to check some of their occurrences in context. Learners could observe that *look* is indeed a descriptive verb in most of its occurrences, since it tends to be used as a synonym of *seem* (e.g. *How do they make it look so huge inside?*) rather than in the sense of 'seeing something with one's eyes'. They could also notice that *meet* mostly appears in the idiom *make (both) ends meet*, whose metaphoric meaning could be explained to them, possibly on the basis of a picture.

To make students more active, they could be provided with a colourless word cloud and be required to group the verbs into classes with the help of concordance lines.

Figure 4. Word cloud of the distinctive collexemes in the verb slot of the [X MAKE Y V_{inf}] causative construction (based on results from Gilquin, 2006)

4.4.3. Cognition-driven approach

Instead of taking corpus data as a starting point, the symbiosis of corpus linguistics and cognitive linguistics for pedagogical purposes can start from categories that are established on the basis of cognitive principles, for example networks of meaning organized around a prototype or conceptual metaphors. Figure 5 is based on a representation of the network of the highly-frequent and highly-polysemous verb TAKE found in Norvig and Lakoff (1987).[6] It shows how a basic sense, that of 'grabbing',[7] gives rise to the sense of 'moving to somebody' (through semantic role differentiation), which itself gives rise to the sense of 'moving to a destination' (through profile shift). The sense of 'moving to somebody' is also related to that of 'doing something' (through metaphor), which itself is related to the sense of 'being affected' (through profile shift). These links provide linguistic motivation for the different senses, thus making them more transparent, which should help learners remember them.

[6] Only the main senses in the network have been reproduced.

[7] Gilquin (2008) has shown that this sense is not the one that first comes to the mind of native speakers who are asked to produce a sentence with TAKE (the 'move to destination' sense is). However, the 'grab' sense is still arguably 'basic' in that all the other senses are semantically derived from it and can be explained in relation to it.

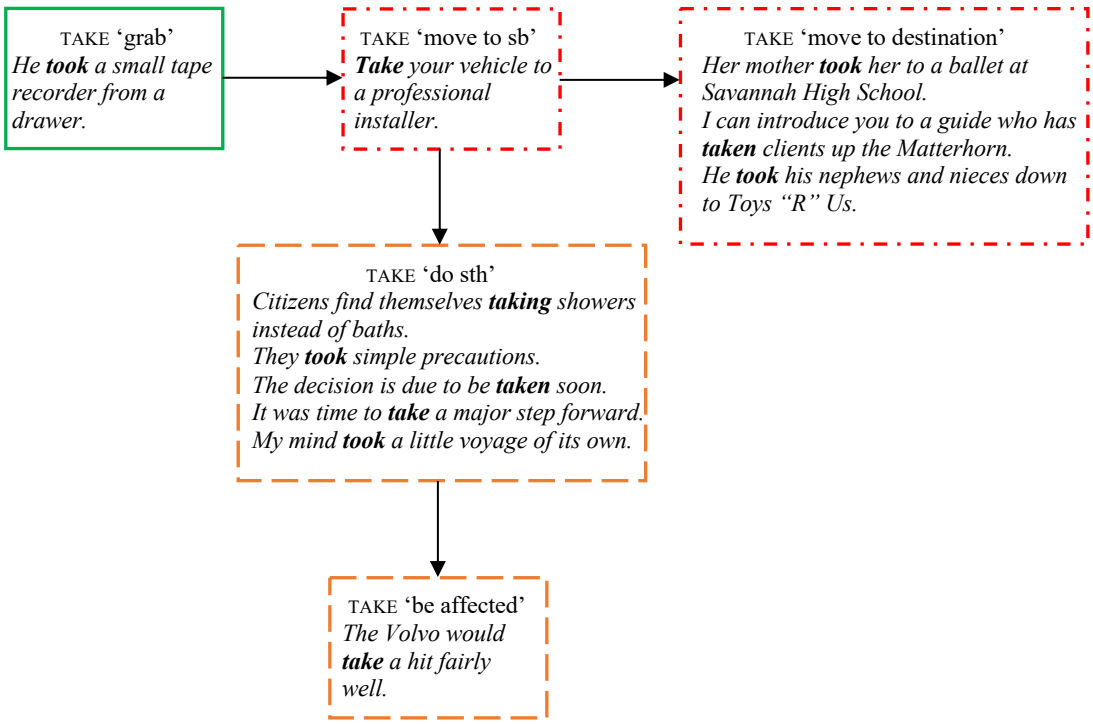

Figure 5: Corpus-enriched schematic representation of the network of TAKE (based on the structure in Norvig & Lakoff, 1987: 205)

Originally, Norvig and Lakoff's (1987) network was established by means of intuition. Here, it has been enriched with information derived from corpora (see Gilquin, 2008). All the senses are illustrated by means of authentic examples taken from the *Frown* (Hundt et al., 1999) and *Switchboard* (Godfrey et al., 1992) corpora, and the size of the boxes gives an approximation of the corpus frequency of the different senses, with 'move to destination' and 'do something' being the most common senses of TAKE. Such a network can be used as a basis for further work on a reference corpus of English. In this illustration, the schematic representation of the network has been used in conjunction with bilingual corpora representing English and the learners' mother tongue (assumed to be French). The colours of the boxes indicate whether the sense is conventionalized or not for the most direct equivalent of TAKE in French, namely PRENDRE. Green means that PRENDRE is the normal equivalent for this sense; orange means that some occurrences, but not all, can be translated by PRENDRE; red means that this sense is normally not expressed by PRENDRE ('move to somebody' and 'move to a destination' are normally translated by verbs such as EMMENER, AMENER, APPORTER or EMPORTER in French). The figure can be used to present to learners an overview of the polysemy of TAKE and how it compares to French PRENDRE.

While the L1 has often been stigmatized in the language classroom, from a cognitive point of view its role is in fact crucial. This is because, unlike children acquiring their first language, students who learn a foreign language do not start with a blank sheet. Their mental inventory already contains a large number of language tokens, schemas and conceptual categories from their L1, and possibly from other L2s acquired earlier. For this reason, second language acquisition "involves processes of construction and *re*construction" (Ellis, 2013: 366; emphasis original). Construction is necessary when the language item to be learned has no correspondence in the learner's native language (e.g. phrasal verbs for learners of English who have a Romance language as their L1). Reconstruction is involved when the form-meaning pairings of the L1 do not fully correspond to those of the L2 (cf. false friends or the example of the motion construction in English and French described in Section 4.2.2). In order to help learners construct, deconstruct and reconstruct whatever they need to, it is important to be aware of the similarities and differences between their L1 and the target language. This has led Littlemore (2009: 6) to claim that "one of the main contributions that cognitive linguistics can make to theories of language learning and teaching is in the area of contrastive analysis". Corpus linguistics can provide the necessary tools for this, since corpora have often been used to carry out contrastive analyses (cf. Johansson, 2007) and to relate the results of such analyses to learner language and possible traces of transfer from the L1 (cf. Granger, 1996). One type of corpus can be especially useful when comparing languages for pedagogical purposes, namely parallel corpora, which contain texts in one language and their translation into another one, and whose navigation "reveals precisely the information that the learner needs to acquire in order to establish mental links between L1 and L2 schemas and create new L2 schemas when there is no reciprocity between the two languages" (Laviosa, 2002: 110).

Parallel corpora have been used to prepare the fill-in-the-blank exercise in Table 2. The exercise uses original sentences in English from the PLECI (*Poitiers-Louvain Échange de Corpus Informatisés*) parallel corpus[8] and their translations into French from which the equivalent of TAKE has been removed (the expected answers as found in the corpus are given between square brackets, followed by their literal translations (infinitive form) in English). It focuses on the 'do something' sense of TAKE (delexical sense), a frequent sense in the corpus and one which can sometimes, but not always, be translated by PRENDRE (FAIRE is a common alternative, cf. [2, 4, 6] in Table 2). Corpora can be particularly helpful to teach such uses in which the verb has little meaning of its own and whose choice may be less easily motivated by

[8] See https://uclouvain.be/en/research-institutes/ilc/cecl/pleci.html (accessed on 4 September, 2021).

means of cognitive principles. By looking for appropriate translations of TAKE into their L1, learners should become aware of the similarities and differences between English and French, and should gradually build a representation of the network of TAKE, reinforcing the links with French where the two languages overlap, and creating new ones where they differ.

1	It was a newspaper photograph **taken** years ago.	C'était une photo découpée dans un journal et _____ plusieurs années auparavant. [prise ('take')]
2	It was thus far a favourite walk, though not **taken** since before the rains.	C'était jusque-là une de ses promenades favorites, bien qu'il ne l'eût pas _____ depuis avant les pluies. [faite ('do')]
3	My father **took** a shower in the bathroom which had no bath.	Mon père alla _____ une douche dans la salle de bains, où il n'y avait pas de baignoire. [prendre ('take')]
4	Ralph **took** a sudden step forward.	Ralph _____ un brusque pas en avant. [fit ('do')]
5	He let life **take** its course.	Il laissa la vie _____ son cours. [suivre ('follow')]
6	Marion **took** no notice of them.	Marion n'y _____ pas attention. [fit ('do')]
7	Luther **took** a deep breath.	Luther _____ une profonde inspiration. [prit ('take')]
8	She was no longer opposed to **taking** a look at the "little haunted house".	Elle ne s'opposait plus à aller _____ un coup d'œil à la « petite maison hantée ». [jeter ('throw')]

Table 2: Fill-in-the-blank exercise with TAKE 'do sth' and its translations into French based on PLECI

Other types of networks or categories can be used as a starting point for a cognition-driven approach in applied cognitive corpus linguistics. Next to the polysemy of words, illustrated by the TAKE example above, one can introduce students to constructional polysemy, for instance by showing them how the different senses of the ditransitive construction ([X CAUSES Y to RECEIVE Z], [X ENABLES Y to RECEIVE Z], [X INTENDS to CAUSE Y to RECEIVE Z], etc.) are related to each other (see Goldberg, 1995: 38). Like the network of TAKE in Figure 5, it could be enriched with corpus information – authentic examples, information about the frequency of the different senses, most common verbs used in each sense, etc. – and then lead to some activities based on monolingual or bilingual corpus data.

One could also take as a starting point conceptual metaphors, whose existence has been revealed by cognitive linguistics, and show how they materialize in the target language and how they translate into the learner's L1. In Table 3, for instance, knowledge of the TIME IS MONEY conceptual metaphor (see Lakoff & Johnson, 1980) has made it possible to extract relevant data in English and French from the *Open source parallel corpus* (OPUS; Tiedemann,

2012). Students could be asked to examine the sentences and find out what is common to most of them, which should involve a reference to time, but also to the semantic field of money (see elements in bold). They could also compare the English sentences and their French counterparts, highlighting for example the fact that SPEND in [4] corresponds to a French verb which is not related to money (PASSER, lit. 'pass') and that the direct equivalent of COST in French, COÛTER, is not often used in relation to time, which leads to the restructuring of sentence [3], with *This has cost him valuable time* becoming *Il a perdu un temps précieux*, 'He has lost precious time'. Such activities can help learners realize that the TIME IS MONEY conceptual metaphor is shared by both languages, thus capitalizing on similarities and avoiding the possible suspicion that may be caused by the literal translation of metaphoric senses, but also that this metaphor can lead to slightly different construals in the two languages, a realization that should hopefully limit cases of negative transfer from the L1 among learners.

1	Why are you **wasting** her time?	Pourquoi vous lui faites **perdre** son temps ?
2	We will **lose** one and a half hours of **precious** meeting time.	Nous allons **perdre** une heure et demie du **précieux** temps alloué aux séances.
3	This has **cost** him **valuable** time.	Il a **perdu** un temps **précieux**.
4	He **spent** his whole life pretty far out in the country.	Il a passé toute sa vie dans une campagne perdue.
5	None of them has **spared** time or energy in their endeavour to reach an agreement on the Conference's programme of work.	Aucun d'entre eux ne s'est montré **avare** de son temps ou de son énergie dans les efforts entrepris pour que la Conférence arrive à un accord sur son programme de travail.
6	We **save** a whole day that way.	Ça nous fait **gagner** un jour entier.
7	And I took the precaution of **gaining** two days while crossing the Arabian Sea.	J'ai fait en sorte de **gagner** deux jours pendant la traversée en Golfe Arabique.
8	That's gotta be **worth** a couple hours of my time.	Ça **vaut** bien deux ou trois heures de mon temps.
9	So tonight, I would love to **donate** my time.	Donc ce soir, j'aimerais **faire don** de mon temps.
10	My father needs me, he's old, on **borrowed** time.	Mon père a besoin de moi, il est âgé, ses jours sont **comptés**.

Table 3: Parallel concordance around the TIME IS MONEY conceptual metaphor based on OPUS

5. Conclusion

In this article, it has been argued that cognitive corpus linguistics can lead to pedagogical applications that combine the benefits of corpus data (authenticity, quantification, diversification of genres, access to learner production, etc.) with those of cognitive principles meant to facilitate the learning process (through linguistic motivation, enhanced salience, realignment of form and meaning, etc.). While suggestions have been made as to how this could be implemented, the teaching activities proposed here have only scratched the surface,

as it would not have been possible to draw up a comprehensive list of all the possibilities offered by applied cognitive corpus linguistics. For example, most of the illustrations have relied on written corpus data and have dealt with lexico-grammatical accuracy. Yet, spoken corpora can also be used as a basis for cognitively inspired language teaching (see Gilquin, 2022), including for aspects related to pronunciation. Multimodal corpora, which are made up of videos, can be useful too, given the assumption that speakers' mental inventories contain multimodal constructions representing gestures or facial expressions (Hoffmann, 2021) and the claim that "the acquisition of gestural repertoires represents an enormous challenge to language learners and educators" (Gullberg, 2008: 295). In addition, while the focus in this article has been on activities that could be performed in the language classroom, cognitive corpus linguistics can also have applications in lexicography or syntactic analysis, for example. The former can be illustrated by two corpus-based projects aimed at compiling inventories of constructions (in the sense of CxG): the Swedish constructicon project (Loenheim et al., 2016), a repertoire of Swedish constructions in which special attention is devoted to constructions that are problematic for learners of Swedish, and G-FOL (Boas et al., 2016), a prototype online dictionary for English-speaking learners of German that draws users' attention to differences between English and German frames/constructions. The application to syntactic analysis can be exemplified by Herbst and Hoffmann's (2018) Constructionist Approach to Syntactic Analysis (CASA), a framework which emphasizes the meaningfulness of grammar and also its creative potential. It seeks to equip learners with the necessary tools to analyze authentic utterances and make sense of them, relying on 'construction grids' that represent the different form-meaning pairings occurring in a sentence, including those that overlap or blend with one another.

It should also be pointed out that, although cognitive corpus linguistics is a fruitful combination for pedagogy, in which each framework partly compensates for the weaknesses of the other, the resulting teaching method is still subject to certain limitations, such as the time-consuming nature of data-driven learning and the fact that cognitive principles like linguistic motivation and embodiment do not apply to all linguistic items that students need to learn. In addition, the types of activities that have been proposed here will not necessarily work in all language classrooms. Activities relying on comparisons between L1 and L2, for example, will only be feasible if most of the students in the classroom share the same native language. As for activities that involve pattern-finding, they may be more appropriate for advanced learners, since access to patterns is thought to become increasingly important at higher proficiency levels (Loenheim et al., 2016: 343). An even more important caveat is that,

although they rely on methods and principles advocated in the literature, the activities have not been tested for their efficiency. It has been claimed, and rightly so, that pedagogical applications should be preceded by large amounts of research to investigate the true nature of different aspects of language and to test the efficiency of various methods to teach them (see Littlemore (2009: 173) for cognitive linguistics and Granger (2009: 14) for corpus linguistics). One must acknowledge that neither cognitive linguists nor corpus linguists have yet exhausted the richness of language or the possibilities of pedagogical applications, let alone their large-scale implementation in education (cf. De Knop & Meunier, 2015b: 10; Dolgova & Tyler, 2019: 948, 956). This, however, should not prevent them from joining forces with a view to developing new teaching methods which might be proposed to teachers as a supplement to current methods that have already proved their worth among students. For no matter how much research is carried out in laboratories and research centres, ultimately the proof of the teaching will be in the students' learning.

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