AUTHOR	Asma Dhifallah
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Ego-centered Motion Metaphors of Time across Methods: A Comparative Analysis of Introspective, Corpus-Based, and Psycholinguistic Studies

Asma Dhifallah
Email: asdhif@utu.fi

Abstract

This paper benefits two audiences: researchers studying time metaphors and those employing introspective, corpus-based, and psycholinguistic methods. It is well-suited for methodology courses and for scholars exploring how these approaches intersect. Using a case study on Ego-centered Motion Metaphors of Time (EMTs), the paper examines the methodological and ontological challenges of shifting between these paradigms. It outlines the often-implicit tenets of introspective frameworks, defines linguistic illustrations, and distinguishes among encountered, prompted, and intuited examples. It also presents an analysis of commonly cited EMTs and shows how introspective definitions converge on similar prototypical illustrations. It then compares corpus retrieval strategies across eight studies. The findings show how introspective definitions are confronted with corpus data, particularly when translating introspective input into search prompts, and how data cleansing fosters new classifications. Finally, the paper identifies the limitations of corpus-based methods and highlights the types of questions that are better addressed through psycholinguistic data.

Key words: methodological transitions, introspective methods, corpus-based methods, psycholinguistic methods, cognitive linguistics, temporal metaphors, comparative analysis, linguistic illustrations

1. Introduction

This paper examines the use of three types of methods: introspective, psycholinguistic, and corpus-based. The premise of the paper is that by examining the development of literature on a specific cognitive linguistic phenomenon – Ego-centered Motion metaphors of Time (EMTs, henceforth) – one can draw generalizable conclusions about the complementarity of the different methods and the challenges involved in transitioning from one method to another.

Evidently, the topic in focus in this paper, i.e. the comparison of methods and data types for the study of a particular phenomenon, is a long-standing subject of debate and is likely to remain so indefinitely. This paper contributes to the scholarship by using a case study approach focused on EMTs, presenting an in-depth comparison of the three different kinds of methods and emphasizing the transitions between them. It also addresses the tenets of introspective methods, which are not always discussed, and highlights the role of linguists' intuition across methods.

EMTs are metaphors that map the passage of time onto the frame of spatial motion, using an ego-centered perspective. EMTs can be further subdivided into 1) Moving Ego metaphors where Ego, the experiencer of metaphorical temporal motion, fulfills the function of the Mover; e.g. *We are approaching summer* and 2) Moving Time metaphors where the temporal entity (TE, henceforth) is the metaphorical Mover, e.g. *Summer is approaching*. This division goes as far back as Clark's (1973) seminal work which defines EMTs in the context of a systematic comparison of TIME and SPACE. From that point on, EMTs have been defined multiple times and studied for a variety of reasons.

The EMT literature exhibits two main properties: First, it is abundant, offering a wealth of material for analysis and second, it is made up of a combination of older foundational works and newer research that incorporates a variety of methodologies, including psycholinguistic as well as corpus methods. This diversity provides a rich background for conducting comprehensive investigations, which, in turn, validate the choice of EMTs for a case study of Cognitive Linguistic phenomena. Broadly speaking, the EMT literature can be categorized into three distinct groups, primarily divided by the purpose of the research and its outcomes:

The first category examines the metaphorical composition of EMTs guided by questions on the interplay of the Figure and Ground, the mapping relationships between the frames of SPACE-MOTION and TIME, the experiential grounds of the metaphor as well as different conceptualizations of time (Kranjec, 2006; Núñez & Sweetser, 2006; Bennardo et al., 2010; Tenbrink, 2011; Moore, 2011; Evans, 2013; Moore, 2014; Huumo, 2017; Moore, 2016; Moore, 2020). In addressing these questions, these studies identify different temporal frames of reference (t-FoRs) building on the notion of spatial frames of reference (cf. Levinson, 2003; Talmy, 2000). T-FoRs provide a generic model structure of EMTs based on the human conception of spatial reference and are also the basis for further EMT classifications. A review of the most prominent t-FoRs is available in Bender & Beller (2014). Overall, studies within this category are foundational, predominantly based on a qualitative methodology drawing upon constructed examples or examples collected from natural contexts of use. The resulting models are therefore introspective, and they serve to provide an operational definition of the metaphor.

The second category is concerned with identifying the psychological and cognitive realities related to metaphor selection. Investigations of this type are mainly concerned

with the psychological grounds of EMTs, addressing questions on how spatial experience can influence the selection and understanding of metaphorical motion construals and identifying the factors that determine the selection of metaphor type, i.e. Moving Ego vs. Moving Time. Studies within this category employ a broader array of empirical methods including psychological tests and, to a lesser extent, corpus work. The data used is mostly grounded in scenarios that reflect the experiences of native informants and involves understanding the process of choosing between Moving Time (MT) and Moving Ego (ME). Among other findings, this body of literature confirms a strong association between spatial motion and metaphor selection. For instance, a person in motion is found to be more likely to select a Moving Ego metaphor over Moving Time, and the opposite is also true (cf. Boroditsky, 2000; Gentner et al., 2002; Ramscar et al., 2009). Other studies associate metaphor selection with power (Duffy & Feist, 2017) and affective valence, i.e. whether an event is perceived as positive or negative (McGlone & Pfiester, 2009; Piata & Soriano, 2022, *inter alia*).

Lastly, the third category includes inquiries into the typological and grammatical compositions of EMTs together with cross-linguistic explorations of them (see, for example, Feist & Duffy, 2020; Alcaraz Carrión & Valenzuela, 2021; Valenzuela & Castillo, 2022; Dhifallah, 2024). These studies use corpus-based methods and employ corpus data, primarily via quantitative analyses, to investigate various usage aspects of the phenomenon. Questions in this body of literature include, for instance, the usage criteria of verbs of motion, prepositions, etc. (cf. Section 3.2 for a review of the different corpus-driven accounts).

Three specific questions are addressed in the present inquiry. They are as follows:

1. What are the impacts of the different methods on the development of the definition of EMTs as a Cognitive Linguistic phenomenon?
2. What are the results of the transitions from one method to another?
3. How and when do the three methods, i.e. introspective, corpus-based, and psycholinguistic, provide converging evidence?

Two notes are needed here: First, the paper adheres to methodological pluralism; in other words, it does not claim the superiority of one method over another. Rather, it employs a descriptive approach in its assessment and presents a nuanced discussion of the strengths and weaknesses of each method, as applicable to EMTs. Second, although parts of the discussion center on the specific case of EMTs, the definitions and implications are broadly applicable to most metaphors and other Cognitive Linguistic phenomena.

The paper is structured as follows: First, it begins with a discussion of the tenets of introspective frameworks and a frequency analysis of a sample of the most used examples within the introspective literature (Section 2). It then moves on to an examination of corpus-driven methods and a systematic review of the corpus retrieval strategies used in corpus-based studies of EMTs (Section 3). Next, it presents an analysis of psycholinguistic methods, identifying older and more recent psycholinguistic studies within the literature on EMTs (Section 4). Finally, it concludes with a reflection section that discusses the implications of the analysis and suggests considerations for future research (Section 5)[1].

[1] Recognizing that it is difficult to evaluate each model without involving a maze of terminologies, each of the subsections will introduce precise definitions of relevant terms. These include intuited data vs. usage-based, off-line data vs. native-speaker on-line data, intuiting vs. interpreting, corpus-based vs. corpus-illustrated paradigms, etc.

The three methods are evaluated based on their data foundations, including the selection procedures, the type of data used, the type of logic employed to connect the data with EMTs, the impact of each method on the definition and representation of the metaphor, and areas of convergence or divergence stemming from these implications. These criteria are discussed in detail as each method is analyzed in Sections 2 through 4 and form the basis for the discussion in Section 5.

The analysis presented in Section 2 uses four papers focused on the analysis of linguistic illustrations in introspective studies. The four-paper sample includes 70 illustrations which I examine to highlight the most salient properties of EMTs used in introspective analyses. The four papers are: Kranjec (2006), Núñez and Sweetser (2006), Moore (2011), and Huumo (2017). Next, the analysis in Section 3 includes an updated review of the retrieval processes of EMT metaphors in eight different studies: Reali & Lleras (2017), Feist & Duffy (2020), Valenzuela & Alcaraz Carrión (2020), Waliński (2020), Alcaraz Carrión & Valenzuela (2021), Piata & Soriano (2022), Dhifallah (2024), and Teeri & Huumo (2024). Finally, Section 4 presents a review of psycholinguistic methods. This includes a summary of classical psycholinguistic studies such as Gentner et al. (2002), Ramscar et al. (2009), Bender et al. (2012), Feist & Duffy (2015), Stocker & Hartmann (2019), and Li (2020). It also discusses computational psycholinguistic models that integrate corpus-based data with psycholinguistic data using computerized tools to compare the two. Relevant studies include Divjak et al. (2016), Divjak et al. (2021), and Romain et al. (2022).

2. Introspective methods

By introspective methods here, I refer to theoretical representations that range from foundational definitions to more functional classifications of a given phenomenon based

on a limited number of illustrative examples. When engaging with introspective representations of a phenomenon, readers are usually exposed to a handful of carefully selected examples which instantiate a particular phenomenon. As put forth in the introduction section, early descriptions of EMTs have essentially been developed based on examples constructed by authors or selected from natural contexts of use, and interestingly, the whole field of Conceptual Metaphor Theory emerged from intuited examples in the seminal work of Lakoff & Johnson (1980). In this paper, I adopted a similar approach by defining Moving Ego and Moving Time metaphors through two examples: *We are approaching summer* and *Summer is approaching* in the introduction. These examples help frame the readers' understanding of the metaphor types effectively.

Importantly, introspective analyses are informed by precise logic grounded in specific conceptual principles. This section aims at unraveling these principles by addressing two questions: First, what are the tenets of introspective methodology and how can they be defined? Second, in what sense are introspective representations of a phenomenon problematic?

2.1. The tenets of the introspective method

Introspective studies rely primarily on two actions: intuiting and interpreting. To start with, intuiting can be defined as the "practice of introspectively accessing one's linguistic experience in order to create sentences and assign grammaticality judgments to them" (Stefanowitsch, 2020, p. 8). In the case of EMTs, intuiting plays an important role, namely in identifying prototypical examples of EMTs as well as in defining non-examples to showcase the limits of the metaphor. Interpreting, on the other hand, is "the practice of assigning an interpretation (in semantic and pragmatic terms) to an utterance" (Stefanowitsch, 2020, p. 8). Naturally, linguists interpret both intuited and naturally

occurring illustrations in order to identify a phenomenon and showcase the interplay of its constituent components.

Regarding their data foundation, introspective frameworks are based either on "intuited" (Stefanowitsch, 2020, pp.7-15) or carefully selected examples from real usage contexts. These are distinct types of data: intuited data is based on the intuition of the linguist, while selected data is authentic and usage-based. Both types are typically used for their illustrative function, which, in turn, gives rise to the following question: What counts as linguistic data, and what is an example or an illustration[2] from both cognitive and methodological perspectives?

This latter question may seem simplistic as we intuitively 'know' what an example or an illustration is. What I am interested in, however, is identifying a precise definition of illustrations in cognitive linguistic research and then understanding their methodological import. This, in turn, helps define the limitations of introspective frameworks.

Two potential definitions appear fitting for understanding the type of evidence illustrations provide and their impact on how we conceive of a given phenomenon, concept, or linguistic form. They are as follows:

Firstly, an illustration represents the parts of the language system which are implicated in a specific phenomenon. In other words, an illustration emerges from the interplay of various variables influencing the expression of a particular linguistic form. For instance, tense and aspect serve as grammatical components of an EMT, while the Figure and Ground of motion function as metaphorical components. An example of an EMT, such as *Summer is coming* (tense: present, aspect: progressive, Figure: summer, Ground:

[2] Examples and illustrations are used interchangeably in the context of this paper.

(implicit) Ego), brings together a combination of these systems and demonstrates that they can occur together. By analyzing this particular example, we can comment on the more abstract combination of the present progressive with the Figure entity: *Summer*, and the Ground: Ego. Thus, each example of an EMT is at the intersection of the broader systems at play – including tense, aspect, Figure, and Ground – and allows access to them.

The second, and more elaborate, definition of a linguistic illustration is rooted in Cognitive Grammar. More specifically, I am referring to Langacker's (2008) distinction between instance and type conceptions. Type conception refers to the mental representation of a general category or class, such as *car*, while instance conception refers to the mental representation of a specific instance of that type. For example, this might be a particular car someone owns, which shares certain properties with the abstract concept of *car* but is specified with characteristics like color, shape, brand, etc.

"[T]he mental operation serving to transform a type conception into an instance conception" (Langacker, 2008, p. 267) is instantiation. All possible instances of a given type belong to a domain of instantiation. In the present example, the domain of instantiation includes all possible instances of the type *car*, with all possible variations in properties.

There are a few central points to consider here: First, an instance is profiled and defined within a "particular location in the domain of instantiation" (Langacker, 2008, p. 268), so it functions as an access point to the type. A type, on the other hand, is abstracted and backgrounds the conception of the profiled instance. Particularly, illustrations can be seen as specific examples (instances) of a broader cognitive linguistic phenomenon (type). This, in turn, explains why illustrations are a significant defining tool, in that although they occupy a limited location within the domain of instantiation, they substantiate a

schematic type conception. Evidently, in using illustrations, the interest of a linguist is not the specific example per se but rather the type it instantiates.

If we integrate the idea of a domain of instantiation with the paradigm of radial categories that identifies a prototypical center and peripheral members for a given category (cf. Janda, 2018), we can identify different types of illustrations/instances depending on their location within the domain of instantiation: prototypical and peripheral. A prototypical illustration instantiates a centralized identification of a type, presenting an idealized conception of that type. Conversely, a peripheral illustration is less effective in instantiating the type because it fails to evoke its central properties. This, in turn, explains why some illustrations are usually over-selected at the expense of other possible examples, which are equally available in the natural context of use. In the case of EMT literature, *Christmas is coming* is one of the most recurring examples used to present Moving Time metaphors (Moore, 2004; Núñez & Sweetser, 2006; Ramscar et al., 2009; Evans, 2013; Moore, 2016; Huumo, 2017). As will be explained in the next section, this particular example identifies the central properties of EMTs: It is a Moving Time with a prototypical example of a time in a Western – and to an extent global – culture. The same example also uses the verb *come*, which is one of the most cited verbs in the literature on EMTs (cf. Section 2.2 for the analysis of the most used examples in the literature).

In addition to prototypical illustrations, the literature on EMTs also often employs non-examples that help identify the limits of the model representations. This, in turn, helps delineate the limits of the described phenomenon by identifying structural constraints and by outlining the limits of the domain of instantiation. An example of a non-example is *?I am approaching Christmas* (Huumo, 2017, p.11). What makes this an odd example is the personal experiencer of metaphorical motion (note the use of the pronoun *I*) towards a

calendric and typically collective time, *Christmas*. A more canonical example is *We are approaching Christmas.* Using the plural first-person pronoun *We* in this second example better reflects the collective nature of the event. Using *I,* on the other hand, creates a sense of exclusivity and implies that only the speaker is approaching *Christmas*, which does not fit with the common understanding of the event being shared.

In sum, two key takeaways are attested here 1) although introspective methods are intuitive, they are not random. They in fact imply specific cognitive-based logic rooted in the phenomenon of instantiation 2) illustrations, whether intuited or selected from real context of use are a powerful defining tool: prototypical examples define the central properties of a studied phenomenon, while non-examples help delineate its limitations. These notes are particularly useful for a novice researcher who is exploring the scholarship on a specific phenomenon and is interested in investigating it further. For this purpose, I emphasize the need for two types of understanding: an understanding of the phenomenon itself and an understanding of the limitations of introspective descriptions of that phenomenon.

To address the second point, the following section will present an evaluation of introspective descriptions in the case of EMTs.

2.2. Evaluation of introspective studies in EMT literature

In essence, illustrations can establish a framework of thinking by highlighting the most prototypical profile of a type. This is especially the case with prototypical examples, or exemplars. However, identifying a linguistic model based only on prototypical illustrations raises skepticism regarding the applicability of introspective accounts against a wide range of corpus data, especially noting the repetitiveness of intuited examples.

To elaborate, introspective frameworks are limited in terms of quantitative and qualitative scopes of representation (cf. Stefanowitsch, 2020). That is to say, this limitation transfers from the number of illustrations and the selection criteria of examples to the properties of the studied phenomenon. This is especially the case when the selection of examples is governed by the introspective framework itself in a top-down approach. It results from this that, in general, an introspected representation usually overlooks the less salient cases, and so it is likely to neglect some, if not many, of the aspects of the linguistic phenomenon under examination.

In the case of EMTs, intuited data have provided an introspected representation of the metaphor which relies for the most part on English in addition to a limited number of other languages like Aymara, Japanese, Finnish, and Wolof (cf. Kranjec, 2006; Núñez et al., 2006; Zinken, 2010; Tenbrink, 2011; Moore, 2014; Moore, 2016; Teeri & Huumo, 2024). This prototypical description does not just lack linguistic variability but is also constrained in other ways.

To test the viability of the last observations, this section will examine a small sample[3] of examples collected from several papers on EMTs. The selected papers consist of works that define and describe model frameworks for the representation of EMTs, namely, Kranjec (2006), Núñez and Sweetser (2006), Moore (2011), and Huumo (2017). The compiled data acts as a reference sample used to evaluate the (limited) diversity of illustrations used in literature. Overall, 70 EMT examples were found in the four papers

[3] This sample was initially utilized in Dhifallah (2024) to identify the most frequently used verbs in the EMT literature and to develop search queries for the corpus-based design of that study. In the current paper, the sample is employed to discern the salient properties of EMTs and to reflect on introspective frameworks.

just mentioned, and they were annotated for the purpose of determining how they frame an individual's understanding of EMTs.

The analysis reveals several notable observations: Firstly, repetition is prevalent, with *Christmas is coming* and *Christmas is approaching* being the most frequently encountered examples. The examples are also limited in terms of grammatical and metaphorical components like tense and aspect, pronouns, type of Temporal Entity (TE) e.g. *summer, Christmas, etc*., and type of motion verb. In terms of tense, the present progressive tense emerges as dominant as it is used in 44 examples, followed by the simple present, the simple past, and the present perfect. The analysis also shows a frequent use of the pronoun *we* which in turn usually indicates a collective experience and suggests shared experiences of metaphorical temporal passage. Not just in the examples used, but more broadly speaking, the entity 'Ego' in EMTs is generally defined as a collective experiencer (cf. Kranjec, 2006; Núñez & Sweetser, 2006; Moore, 2011; Tenbrink, 2011; Evans, 2013; Moore, 2014; Moore, 2016; Huumo, 2017; Moore, 2020, among others). In terms of the TE type, *Christmas* is overwhelmingly the most referenced, which, in turn poses questions on the constrained variability of the types of TEs used in theoretical representations. Lastly, concerning the motion verbs used, *approach* predominates (N=36), followed by *come*, *go*, *arrive* and *pass* (in descending order).

There is another interesting observation related to the limits of theoretical literature reviewed and which does not stem from the analysis of the sample examples itself but is rather a general observation. This concerns the fact that Moving Ego and Moving Time are often treated in theoretical frameworks as Figure-Ground reversals and typically receive equal weight and entrenchment. That is to say, intuited data does not tell us anything about the usage frequency of each type, which can be studied using corpus data,

nor about the selection criteria of each metaphor, which needs empirical work that addresses the native informant.

This way, introspective analyses pose an ontological challenge by providing an idealized, prototype-like, and limited definition of a phenomenon. It is, therefore, crucial to recognize that the phenomena described by these models are likely to exhibit greater variability than the models suggest. Most importantly, researchers should approach introspective analyses with the awareness that they might not capture all aspects of the phenomenon under investigation and anticipate the potential for more complex and varied usage manifestations.

In a comparison of different methods – introspective, corpus-based, and experimental – Tummers et al. (2005) suggest an iterative process for hypothesis development across these methods. The process is as follows:

> [a]n initial hypothesis, which may be derived introspectively, is confronted with the corpus data; interpreting the results leads to a more refined hypothesis and more questions, which may then be subjected to further experimental testing or a new confrontation with the corpus data—and so on
>
> (Tummers et al., 2005, p.233)

The same logic can be applied to any Cognitive Linguistics (CL) phenomenon in general, and to the case of EMTs in particular: First, the metaphor is identified introspectively using a small number of examples, marking an exploratory phase, and then, these introspective accounts are confronted with empirical data, including corpus data. I particularly emphasize the term “confrontation” here because it captures the essence of the shift in methods. The purpose of the following section is to look further into this

confrontation and examine its challenges in depth. Specifically, in evaluating corpus models, two questions are at play: How does the corpus-driven literature reflect a representation of EMTs that extends over the properties of *Christmas is approaching/ Christmas is coming*? And to what extent are corpus-driven studies on EMTs representative of the metaphor?

3. Corpus-driven methods

Prior to exploring the application of corpus linguistics to the study of EMTs, several definitions will be presented to clarify the terminology used in this section.

Primarily, a corpus is an ensemble of off-line data or "naturally occurring uses" of a linguistic form (cf. Feist & Duffy, 2020, p. 450). A sample of usage data can be compiled from an electronic corpus tool or a collection of original written texts (Deignan, 2008). By corpus linguistics, I refer to an approach that entails the use of corpus data, be it anecdotal or for the purposes of statistical modeling (Tummers et al., 2005). In general, corpus-driven studies of metaphors take advantage of the available corpora to make usage-based examinations and can be either corpus-illustrated or corpus-based.

Corpus-illustrated research uses corpus data to support introspective observations of a more qualitative, descriptive nature, hence the illustrative or anecdotal nature of this approach (Tummers et al., 2005, p. 234). This approach is comparable to the idealized illustration-based approach; the only difference here is that the illustrations are taken from a corpus as opposed to being intuited or selected from on-line spoken data.

Corpus-based research, on the other hand, includes statistical analysis preceded by the identification or operationalization of research questions in such a way that fits the quantified paradigm of the study. To be explicit, corpus-based research centers on "the

empirical evidence and the tendencies found in actual language use [and which] constitute the core of the analysis and define the resulting model, rather than just being used to support theoretical assumptions about the language system given in advance" (Tummers et al., 2005, p.235).

Corpus data, whether used in qualitative or quantitative research, usually focus on studying the language system rather than the psycholinguistic aspects of language production and processing (Tummers et al., 2005). That is to say, because corpus data is off-line, it typically enables access to the language system at the expense of the production processes of particular instances of use.

The shift in metaphor studies from idealized to corpus-driven accounts is evident throughout the metaphor literature and further corroborated in Semino (2017), as follows:

> The linguistic evidence provided in early work within CMT [Conceptual Metaphor Theory] … consisted of decontextualized examples invented or remembered by the authors themselves. In contrast, over the last few decades, research on conceptual metaphors has increasingly made use of authentic data, including by studying patterns of metaphor use in a variety of electronic corpora.
>
> (Semino, 2017, p. 464)

For EMTs, most corpus-driven literature is quantitative; it includes numerous EMT examples and aligns with the corpus-based paradigm. For this reason, the present and following subsection focus on corpus-based methods.

In general, corpus methods facilitate the exploration of variability within linguistic phenomena in two ways: first, by including more examples across a wider range of contexts within the domain of instantiation (cf. Section 2.1), and second, by examining

the same phenomenon across different languages, thus adding a cross-linguistic perspective. Such a nuanced understanding contributes significantly to the description of linguistic phenomena, particularly in investigations concerning the universal aspects of the human conceptual system. Corpus-based scholarship on EMTs addresses questions about the typological distribution of ME and MT metaphors (Feist & Duffy, 2020; Valenzuela & Alcaraz Carrión, 2020), the selection criteria of ME and MT metaphors (Duffy et al., 2014; Duffy & Feist, 2017; Piata & Soriano, 2022), the ontological nature of time (Waliński, 2020), as well as the deictic properties of EMTs (Dhifallah, 2024).

3.1. Contributions of corpus-based research on EMTs

Researchers rely on corpus data for various reasons. In fact, there are many ways in which a corpus-based methodology can advance theory: by highlighting new aspects of the studied phenomenon or by examining the phenomenon in other languages, thereby identifying typological distinctions. The transition to corpus data effectively tests whether introspective frameworks, typically based on English data, hold up against extensive data in English and in other languages.

Notably, when theoretical literature is insufficient for a particular language, researchers face a gap in top-down evidence. In such cases, corpus data bridges the gap by offering tangible evidence of how language is used in real contexts. This can complement or even compensate for areas where current scholarship lacks a theoretical basis. However, it is important to note that the application of English-based models to non-English corpus data is a transition that requires careful consideration on the part of the researcher.

In the case of EMTs, several studies have been conducted to contrast English with other languages like Turkish (Kumcu, 2022), Spanish (Reali & Lleras, 2017; Feist & Duffy,

2020; Valenzuela & Alcaraz Carrión, 2020), and Arabic (Hamdi, 2008; Dhifallah, 2024). Questions investigated in these studies concern the frequency of Moving Ego and Moving Time metaphors, the types of motion verbs used in metaphor expressions, as well as the grammatical and typological patterns included in the EMT expressions in general.

To evaluate corpus-based models and their impact on defining a CL phenomenon, it is essential to consider the phases involved in carrying a corpus-based study. The following section will focus specifically on the processes of data retrieval from corpora and data cleansing.

3.2. Review of the methods and processes for retrieving data from corpora in the study of EMTs

A researcher engaged in corpus-based research typically goes through the process of corpus retrieval. This process involves specifying and selecting certain aspects of the phenomenon to be examined as the subject of the study. Particularly, in the case of metaphor studies, the significance of this step is evident on two fronts: ontologically, in terms of the definition and formal representation of the metaphor, and methodologically, in relation to the study's design and the description of its findings.

Generally speaking, retrieval procedures can be defined as strategies or techniques employed in order to identify a specific construction in a corpus of language use. Importantly, corpus searches are based on form; that is, search terms must be specific linguistic expressions, not meanings or concepts intended by the researcher. As a result, corpus-based research on EMTs and other metaphors is always contingent on previous studies and intuitions regarding the initial selection of search terms (e.g., motion verbs, time expressions). Both precision and recall depend on the search terms, both their

number and their nature, that the investigator consciously or unconsciously chooses to retrieve data from the corpus. When selecting a retrieval strategy, linguists typically begin with the existing definition of the phenomenon under-examination and tailor it to ensure the practicality of the search. This process marks the first point of 'confrontation' of the theoretical introspective framework with language data via a data-driven paradigm. Metaphor retrieval processes have been a subject of interest for some time now (cf. Stefanowitsch, 2006 for a review). Most importantly, in order for a sample to be representative of language use "a corpus has to cover a large variety of language situations instead of being restricted to one or a few – generally highly controlled – language situations." (Tummers et al., 2005, p. 232).

Retrieval is subject to two variables: precision, or the act of identifying a specific form without including other non-related forms, and recall, or the act of identifying all instances of the target form present in a corpus (Stefanowitsch, 2020, p. 111). The approach that a researcher chooses impacts these two variables usually prioritizing one over the other (cf. Sardinha, 2012 for a quantitative assessment of the different retrieval methods in corpus-based research on metaphors).

The point of discussion here is the methodological implications of retrieval procedures, especially on the definition of the studied phenomenon. To address this, several corpus-based studies on EMTs will be analyzed as example cases, mainly by spanning over their retrieval processes and presenting ontological inferences on the definition of EMTs each time. The purpose of the analysis is to use evidence from the EMT scholarship in order to substantiate and illustrate the following claim: The methods used to retrieve data from linguistic corpora play a crucial role in accessing EMTs and, more generally, CL phenomena. In other words, the way researchers gather and select data from language

databases not only influences their ability to study and understand the phenomenon; it also impacts the scope of generalizability of the findings and the replication of results.

Unlike metaphors which are identified by the use of a word in a figurative sense, the metaphoricity of EMTs originates from a unique dynamic. An EMT is foundationally based on shared properties of space and time as domains of conception (cf. Galton, 2011 for a comparison of space and time) and is the outcome of the mapping of the source frame SPACE-MOTION to the target frame TIME (Moore, 2014, 2016). In the famous example *Christmas is coming*, the metaphoric nature of the expression arises from the combination of the verb *come* which evokes a metaphorical motion construal and the TE *Christmas*, hence the conception of temporal passage using metaphorical spatial motion. Subsequently, the retrieval of EMT metaphors necessitates a paradigm that suits this composition.

In what follows, a mini review of the retrieval processes of EMT metaphors in eight different studies (namely, Reali & Lleras, 2017; Feist & Duffy, 2020; Valenzuela & Alcaraz Carrión, 2020; Waliński, 2020; Alcaraz Carrión & Valenzuela, 2021; Piata & Soriano, 2022; Dhifallah, 2024; Teeri & Huumo, 2024) will show how the retrieval strategies shape a different conception of EMTs each time and target different instances of the same metaphor.

To start with, Reali & Lleras (2017) looked at the Spanish equivalent of the expression *move forward* in Moving Ego and Moving Time metaphors. The studied sample is made up of all sentences using the particle *forward* and a verb of motion, primarily *mover* ('to move') and *adelantar* ('to advance' or 'overtake'). (see Reali & Lleras, 2017, pp. 176 – 178). In the context of this study, an EMT is defined as an expression that uses a specified motion expression, namely *move forward* in English and its counterpart in Spanish with

a TE. EMTs here are identified using manual cleansing, and the corpus returns are classified into three categories "(i) ego-moving, (ii) time-/object-moving, and (iii) ambiguous (if the information provided was not sufficient to decide between an ego-moving and object-/ time-moving interpretation)" (Reali & Lleras, 2017, p. 176, *punctuation follows the original source*).

What is particularly interesting in Reali & Lleras (2017) is the category "ambiguous." Although this portion of the data was not analyzed in detail in their study, it is plausible that at least part of it involves EMTs. However, including these instances in the EMT dataset would likely require a revision of the definition of EMTs. Conversely, some of the ambiguous data probably consist of non-EMT cases that are similar but not identical to EMTs. Even as unstudied material, this sample of "ambiguous" data could still be valuable, as it may help delineate the limits of the definition of EMTs and identify potential new types of metaphors, including alternative temporal or pseudo-temporal variations.

Feist and Duffy (2020) also delve into the properties of motion verb usage within EMTs in English and Spanish. To determine the different usage patterns, they searched lemmatized versions of a set of predetermined motion verbs in English and Spanish corpora. The verbs were mainly selected from Cifuentes Férez's (2008) taxonomy of English and Spanish motion verbs which comprises of 360 English verbs and 256 Spanish verbs. The authors selected the the ten most frequent path verbs and the ten most frequent manner verbs in each language from the taxonomy for the study. The data for this study were retrieved from the "Brigham Young University–British National Corpus (BYU-BNC; Davies,2004-) and the Corpus del Español (Davies, 2002-)" (Feist & Duffy, 2020,

p. 450). According to the authors, both corpora are composed of at least 100 million words which makes them large corpora.

Importantly, one notable aspect of Duffy and Feist's (2020) study is that it combines evidence from introspective frameworks with evidence from corpus-based research. In fact, the authors compiled a sample of 284 examples of EMTs used in 42 publications to test the proportional frequencies of MT and ME metaphors in the literature and to compare the use of pronouns. Notably, they observed "a high proportion of second- and third-person predications for which the entity in motion was not time" in their corpus data, which they note is "in contrast with example sentences in the literature" (p. 454). In line with the observations made in Section 2.2, this finding highlights the limitations of examples used in introspective studies when compared to larger usage samples, despite the fact that examples in the literature come from different sources and would therefore be expected to show more variability.

Another noteworthy aspect of the same study is that it gives a precise definition of TEMPORAL MOTION. Unlike most other studies that focus on predetermined sets of TEs, Feist & Duffy (2020) is based on the search of predetermined verbs without defining a set of TEs. In other words, they define a sample of verbs to search for and select EMTs based on their interpretation of the concept of time. The retrieved sample is then classified into two categories: TEMPORAL MOTION vs. *other*. TEMPORAL MOTION is defined by the following criterion: "the entity in motion …[is] time or an event (i.e., something that unfolds in time)" (Feist & Duffy, 2020, p. 452). In contrast, non-temporal motion classified as *other*, on the other hand, is signaled when "the entity in motion was a person or a non-human, non-event" (Feist & Duffy, 2020, p. 452). In so doing, Feist & Duffy's (2020) study stands out as one of the first works to explore the ontology of time within

its retrieval processes and to make explicit its classification criteria. These criteria focus on determining whether motion is temporal based on the entity in motion (time, event, person, or non-human entity), the relationship of the motion event to time (as a source, goal, or via point), and how motion through time is framed by verbs. Temporal motion is further categorized by its connection to event order, persistence, and the use of future tense constructions like *going to* in English or *ir a* in Spanish. This framework allows for the identification of motion that unfolds through or is influenced by time (ibid, pp. 452 – 454). To further clarify this classification, the authors lay out examples of included instances (see pp. 452 – 454), which, in turn, enhances the study's contribution to understanding how temporal concepts are represented in language and increases its replicability. Particularly, the motion event is considered temporal when time or an event is the moving entity. Temporal motion is also inferred, if the entity in motion is a person or non-human agent, from whether a time or a state are used as source, goal, or medium. Other cues include verbs indicating event sequence, transitive motion verbs with temporal objects, and institutions as movers across time.

Another interesting retrieval technique to sample time metaphors, including EMTs, is found in the study by Valenzuela and Alcaraz Carrión (2020). The study starts by defining five "taxonomies of time," which specify a new classification of motion metaphors of time. They are as follows: Deictic with Directional Language (DDL), including expressions such as "ahead," "back then," "in front of," "back in that/those" (Valenzuela & Alcaraz Carrión, 2020, Supplementary Materials); Deictic with non-Directional Language (DnDL), with terms like "near future," "distant future," "distant past," "far in the future"; Sequential, represented by expressions such as "previously," "sequentially" ; Demarcative, with phrases like "from start to finish," "from beginning to end," "from

start to end" ; and Quantity, including "for the entire," "for the whole," "during the entire" (Valenzuela & Alcaraz Carrión, 2020, Supplementary Materials). These categories were empirically tested using two corpus tools: Sketch Engine and CQPWeb, with data drawn from large-scale web-based corpora (EnTenTen, EsTenTen2018) and subtitle-based television corpora (NewsScape) in both English and Spanish.

The five categories are further arranged along a cline of spatial explicitness, with DDL expressions encoding the most explicit spatial and directional information, and Sequential expressions the least. To evaluate cross-linguistic equivalence, the authors analyzed 1,650 English-to-Spanish translations using the Glosbe parallel corpus. In this phase of the analysis, the same five-category classification was applied, and the two most frequent expressions from each group were examined. The findings show that English temporal expressions more frequently encode path and manner, while Spanish tends to omit this information.

Another search strategy comes from Waliński (2020), who uses proximity searches. This approach integrates "*searching for source domain vocabulary* with *searching for sentences containing lexical items from the target domain*" (Waliński, 2020, p. 169, formatting follows the source). Specifically, prior to conducting the corpus search, eight motion verbs and nine TEs were selected[4]. They were "*catch, chase, hurry, press, prompt, pursue, race,* and *urge*" and "*time… deadline, hour, interval, period, season, span, spell*, and *term*" (Waliński, 2020, p. 169). In this study, the metaphor is defined as an expression that uses a combination of a specific TE with a motion verb. The resulting sample is notably more precise and restricted due to the closed-ended retrieval technique. While the

[4] The source does not provide detailed criteria for selecting these verbs, except to note that they should be related to the activity of pursuit.

selection of verbs and temporal nouns is explicitly acknowledged to be non-exhaustive, it is justified as "reasonably adequate" for the purpose of testing the narrow conceptual contrast between Time as a PURSUER vs. OBJECT OF PURSUIT and to particularly show "inconsistencies in temporal metaphors", as the title of the paper suggests. The goal, therefore, is not representativity in terms of broader temporal metaphor use, but a focused empirical comparison of two metaphorical variants classified as Figure-Ground reversals.

A similar strategy of pre-selecting a motion verb and specific TEs to target motion time metaphors is used in Alcaraz Carrión & Valenzuela (2021). The paper targets Moving Time metaphors that use the verbs *come* and *go* and aims at examining the co-speech gestures used with the metaphor. The corpus used in their study is "the NewsScape library," described as "a multimodal television corpus part of the Red Hen lab" (Alcaraz Carrión & Valenzuela, 2021, p. 5). Moving Time metaphors are retrieved using a combination of one of a set of pre-defined TEs in subject position and the verb of motion. The TEs, referred to in the study as Temporal Units, are "*minute(s), hour(s), day(s), week(s), month(s), year(s)* and *centurie(s)"* (Alcaraz Carrión & Valenzuela, 2021, p. 6). The authors do not specify the reason for selecting such a restricted sample. However, it is reasonable to assume that this choice was made because the [TU + motion verb] search yielded a large number of hits (N = 30,695), and the study focuses on analyzing a substantial number of co-speech gestures (N > 320). As a result, the data set consists of a large, targeted sample of precise EMTs, to allow for a multi-layered analysis.

Piata & Soriano (2022) employed a different retrieval process. Their study aims at identifying EMTs that use the verb *approach* and evaluating affective valence on the choice of the Mover: either Ego or time. The retrieval process in this case uses collocation analysis in Sketch Engine and selects TEs from the collocation returns of the verb

approach by "identifying the lexical collocates of *approach* related to events (e.g., *birthday, Christmas, election*)" (p. 11). This search technique is evidently limited in its choice of motion verbs, which potentially skews conclusions about emotional valence to those specific to EMTs using the verb *approach* and, in turn, restricts the generalizability of the findings to other verbs. However, the open-ended selection of TEs enhances the diversity of EMTs identified with this verb.

A more recent retrieval technique which studies EMTs in Arabic and English comes from Dhifallah (2024). Considering the typological differences of the two languages, the study involves several steps in the querying process to identify search tokens in the form of conjugated verbs.

First, it begins with a literature review of works by Huumo (2017), Kranjec (2006), Moore (2011), and Núñez & Sweetser (2006), all of which are based on introspective analysis, and compiles a sample of time metaphors. This sample helps identify the most referenced motion verbs together with the most used person and temporal agreements. The English search tokens are determined from this sample.

To examine the Arabic EMTs, a different strategy is used, primarily to overcome the challenge of the lack of literature on Arabic EMTs. The definition of the selected verbs in Arabic is determined by using a corpus-based frequency dictionary of Arabic that lists the 5000 most used words in Arabic (Buckwalter & Parkinson, 2010), which provides the Arabic equivalents for each selected verb in English. In line with Feist and Duffy (2020), Dhifallah (2024) also defines TEMPORAL MOTION by specifying that a TE must represent time itself. The analysis thus excludes cases where the subject is not purely temporal, such as places or events, as in *The shopping centre has arrived*, sensory experiences, such as *November's cold has arrived*, people or entities, as in *The baby is coming*, states or

statuses, such as *Rock star status*, and media or generational references, as in *The new season of Game of Thrones is coming* (cf. Dhifallah, 2024, p. 119). In contrast, the analysis defines three distinct types of TEs: Calendric TEs refer to specific times like units (*years, months, days*), landmarks (e.g., *New Year's Eve*), and defined dates (e.g., *2023, the day of the meeting*). Anchored Events involve planned or cyclical events tied to the calendar, such as meetings or elections, which can be anticipated or sudden. Non-anchored Events include unbounded times (e.g., *the future* or *past*) and hypothetical or imaginary events (e.g., *disasters* or *good times*), not tied to the calendar at the time of speech.

Finally, the most recent search technique to be reviewed is the one by Teeri & Huumo (2024), which explores Moving Time and Moving Ego metaphors in Finnish, specifically using the verb phrase *tulla vastaan*, which roughly translates as 'to come from the opposite direction.' The retrieval process begins with a lemmatized search of the verb, followed by the identification of time metaphors based on specific criteria for TEs. The study posits three types of temporal expressions: a point in time, referring to specific moments such as *Monday*; a period of time, denoting an extended duration like *summer*; and a situation, referring to an event, such as *getting married*, that may occur at a point in time. Furthermore, the study classifies points and periods of time as primary TEs, while situations are categorized as secondary TEs.

The retrieval processes employed by Dhifallah (2024), Feist & Duffy (2020), Reali & Lleras (2017), Teeri & Huumo (2024), and Valenzuela & Alcaraz Carrión (2020) depend on corpus cleansing to identify EMTs. This process highlights a point of 'confrontation' between introspection-based models and corpus paradigms. In general, the act of processing a corpus to select a given linguistic element or pattern forces the linguist to

choose a definition of that type and to redefine it each time they decide whether to include or exclude a corpus hit using a bottom-up approach. This process is an act of mapping instances onto a type (cf. Section 2.1). In effect, the definition provided by introspective frameworks is tested in the process of corpus cleansing and is extended over a larger variety of illustrations which cover several aspects of the metaphor. Each time an illustration is included, it meets the criteria of the type to some extent, while each exclusion of a corpus hit indicates a failure to meet the same criteria. In a way, the operational definition of the phenomenon resulting from introspective methods is adjusted to incorporate more examples or further sharpened by the identification of non-examples. Despite its difficulty, this process of corpus retrieval and data cleansing is eventually what allows more exposure of the domain of instantiation of a CL phenomenon.

This mini review pinpoints distinct ways of retrieving EMTs and different conceptions of them by different researchers showing that each retrieval method is a way of defining an EMT. These definitions range from specific, noting that an EMT is a result of a combination of a predetermined set of motion verbs with a predetermined set of TEs, to schematic, noting that an EMT is made up of a defined set of motion verbs with an undefined set of a TEs. Feist & Duffy's (2020) method, for instance, stands out for its high recall because it employs lemmatized searches of a substantial number of verbs in both English and Spanish (N= 20 for each language). In contrast, Alcaraz Carrión & Valenzuela (2021), Waliński (2020), and Piata & Soriano (2022) use more precise but less expansive methods, resulting in lower recall.

Each sample poses its unique challenges and opportunities. However, what can be explored using a controlled, closed-ended, EMT sample differs from what can be studied

with an open-ended sample. An intriguing experiment would be to transfer certain questions from one study to the sample of another and assess whether the findings derived from narrower and more precise samples remain valid when applied to broader and more expansive samples, and vice versa.

Another interesting observation from this review concerns the validity of using samples of illustrations from introspective frameworks to develop more precise search tokens by identifying predefined sets of verbs of motion, TEs, etc. (cf. Feist & Duffy, 2020; Dhifallah, 2024). Specifically, a significant question arises here: Do examples from introspective frameworks provide reliable evidence of the usage properties of the studied phenomena, such as the most canonical verbs and prepositions?

A tentative answer is that intuitively selected examples highlight the prototypical uses of metaphors based on linguists' intuitive insights. Using these examples to guide a larger corpus sample can help expand and refine existing descriptions in the literature. Thus, the data set retrieved from a corpus can be understood in two ways: a strong interpretation suggests it is a representative sample of the phenomenon as a whole, and a weak(er) interpretation posits that it is merely a more elaborate representation of the existing introspective scholarship on the specified phenomenon. In both cases, the corpus sample ensures higher recall and has the potential to advance scholarship, albeit with varying levels of representation.

Overall, the questions regarding representativeness, retrieval processes, sample structure and model accuracy are an anticipated byproduct of corpus methodology. Probably, the most important point to emphasize here for future research is the importance of clear and detailed descriptions of the corpus procedures, which, in turn, aid in evaluating any corpus-based model. Another point to highlight is the importance of building open-access

data infrastructures and sharing different collected data with the researcher community. These ideas are not groundbreaking; however, putting retrieval procedures of EMTs side-by-side further validates their importance.

3.3. Corpus Linguistics and Large Language Models

The popularity of corpus linguistics is in part due to the accessibility of electronic corpora. This method has evolved as a result of technological advancements and may be on the brink of significant change, especially with the emergence of Large Language Models (LLMs). At this point, I intend to briefly point out a potential challenge and an opportunity within corpus research.

To start with, the challenge concerns the impact of using LLMs on web-based corpora, especially the ones constructed through web scrapers. The fundamental premise of corpus linguistics is that corpus data comprises authentic usage examples produced by (native) speakers of the language. For this reason, it is imperative to exercise caution regarding the human status of electronic corpora, especially in the case of online corpus tools in English, considering its global status as a lingua franca. Without proper identification protocols, there is a high likelihood of an English corpus incorporating data generated by LLMs.

Alternatively, LLMs offer a promising solution for minimizing retrieval and annotation efforts by automating or semi-automating corpus procedures and testing intercoder reliability rates. LLMs can be trained to interpret and empirically test the definitions of linguistic forms and annotation categories using specified – preferably real usage – examples. LLMs can then be employed as evaluators to assess annotation consistency. Notably, reference is made to the work of Torrent et al. (2023) which lays the groundwork

for integrating Artificial Intelligence into linguistic methodologies by evaluating the ability of chatbot-based LLMs to construct semantic frames. However, according to the most recent publication by Curry, Baker, and Brookes (2024), which tests the use of ChatGPT in corpus linguistics, the model's usefulness is shown to be limited in many aspects. As such, the use of LLMs in corpus-linguistic applications currently remains subject to further evidence. Importantly, implementing such practices requires careful consideration. First, it is important to pay thorough attention to ethical and copyright issues, which remain complex and unresolved. Second, rigorous testing is necessary to verify the feasibility of integrating LLMs within experimental designs.

Notably, if LLMs are to be employed in the future, a separate method needs to be developed with a clear description of its steps and procedures, similar to how corpus-based methodologies evolved with the availability of corpora. To establish such procedures for corpus cleansing and annotation, the process could begin with a clear outline of the linguistic phenomenon to be studied, including definitions, properties, and examples. This would lay a solid ontological foundation. Next, a testing phase would assess the LLM's understanding of the target phenomenon through iterative prompt design. This phase might also involve creating a human-annotated 'training set' to serve as a benchmark for further training. Finally, thorough documentation of procedures in the write-up phase – along with the publication of prompts – would ensure the study's replicability.

4. Psycholinguistic methods

So far, the analysis has examined cognitive corpus-based models in relation to their ontological properties and generalizability, as well as their ability to represent CL phenomena based on the case of EMTs. However, the question of whether corpus-based

data can provide cognitively valid evidence remains a subject of debate (Lakoff, 1990; Divjak, 2015). The main issue is that corpus data consists of observational usage information collected passively, rather than being elicited through experimental methods. This raises skepticism about its ability to accurately reflect the conceptual or mental representations of a phenomenon, in line with the concept of "cognitive commitment" (cf. Lakoff, 1990; Divjak, 2015). Corpus data also allow us to observe constrained or restricted grammatical patterns and map them onto corresponding conceptual representations. For example, the combination of a future tense with the verb *approach* is found to be very seldom used in English; this includes verb expressions of the type '*will approach*' and '*will be approaching'* (Dhifallah, 2024). Predictive computational models can make it possible to simulate the 'selection' based on usage features embedded in the corpus data. However, to explore this constraint further, data must be elicited from native informants, either directly or indirectly. By examining why native speakers do not use the combination of *approach* and future tense through psycholinguistic tests, we can gather converging evidence from both corpus and psycholinguistic data that this combination is constrained in language use. This type of question requires different paradigms and a synergy of data types to strengthen theoretical validity.

Psycholinguistic models in the study of EMTs are based on data derived from native speaker intuitions, often obtained through elicited selections or on-line data. In general, the goal of these models is to prompt and analyze "the psychological representation or online processes underlying language production and language comprehension" (Tummers et al., 2005, p. 231), using native speaker data. A key advantage of psycholinguistic models is their ability to validate and refine existing linguistic models by incorporating the psychological reality of native speakers through a range of

techniques. These include, for example, forced choice tasks (among interchangeable linguistic forms) and acceptability ratings (see Tummers et al., 2005 for a foundational comparison of different methods, and Divjak et al., 2016 for an evaluation of corpus-based models using computational psycholinguistic models). As psycholinguistic models center on native speaker intuitions, they can be associated with the cognitive and psychological aspects as opposed to the linguistic aspects of Cognitive Linguistics. The validity of the research design used to elicit data and the reliability of the collected data itself are important considerations in these methods. Evidently, uncontrolled variability stemming from factors such as priming effects and individualized grammatical preferences can introduce potential biases and limitations into models based on data from informants. The next sub-sections will review a selection of psycholinguistic models of EMTs (Section 4.1) and then establish the need for more advanced computational models that simulate native speaker selection (Section 4.2).

4.1. *Wednesday's meeting has been moved forward by two days*

One cannot speak about the psycholinguistic models in EMTs without addressing the most used test sentence in the EMT literature. The identification of the test sentence *Wednesday's meeting has been moved forward by two days* goes as far back as 1998 with McGlone & Harding's (1998) pioneering study which looks at the role of perspective in the comprehension of temporal language. The test sentence has since been widely utilized over the span of two decades, appearing both in introspective works (e.g. Beller et al., 2005; Bennardo et al., 2010; Tenbrink, 2011; Bender & Beller, 2014; Huumo, 2017) and in psycholinguistic studies (e.g. Gentner et al., 2002; Ramscar et al., 2009; Bender et al., 2012; Feist & Duffy, 2015; Stocker & Hartmann, 2019; Li, 2020).

The importance of the test sentence *Next Wednesday's meeting has been moved forward by two days* lies in its ambiguous reference which allows for interpretation through both metaphors: Moving Ego and Moving Time. The logic here is simple: If the sentence is processed from the perspective of Moving Ego then metaphorical motion shifts from earlier to later, and as such the new meeting would fall on *Friday*. Conversely, a Moving Time metaphor instantiates metaphorical motion of time from 'later' to 'earlier' position, and, as such, the meeting from this perspective shifts from *Wednesday* to *Monday*. The test sentence is thus at the same time ambiguous and neutral since it does not provide any cues favoring one metaphor type over the other. Consequently, it serves as an ideal test sentence for gathering authentic[5] native speaker evidence and deducing selection cues from informants.

Interestingly, the *Next Wednesday's meeting* example has also been employed in introspective frameworks, namely Bender et al. (2010) to define three t-FoRs: absolute, intrinsic, and relative. In fact, counter to other similar models that map their t-FoR classifications onto different selected or intuited examples (cf. Section 2), Bender et al. (2010) design their framework around this unique example. In their approach, they distinguish between the three t-FoR types by identifying distinct Figure and Ground positions within the same sentence. Subsequently, each type is correlated with a different position of the meeting: In the Absolute t-FoR, time is treated as an absolute linear field, so moving "forward" progresses from the past to the future. Applied to the example, this means the meeting shifts from *Wednesday* to *Friday*, considering that *Friday* represents

[5] In my view, although prompted data may not be as 'authentic' as data found in a corpus or real-life situations because they are elicited and therefore controlled in certain respects, they can still be considered 'authentic' because they come from native speakers who are unaware of linguistic classifications, and thus they reflect the informants' intuition.

a future point relative to *Wednesday*. In the Intrinsic FoR, the direction of motion is based on the Ground Entity *Wednesday*, and the meeting is positioned on *Monday*. The Relative FoR has two variants: the Reflection Variant, which moves the meeting closer to the observer's present and thus leads to *Monday*, and the Translation Variant, which moves it further away and thus leads to *Friday*.

On the one hand, using the test sentence to create a theoretical classification of EMTs enhances the validity of Bender et al.'s (2010) study by enabling comparisons between the introspective and psychological accounts that rely on the same example. On the other hand, despite its widespread use, the *Wednesday's meeting* test remains limited from a cross-linguistic perspective since it prompts responses in English only. This means that the cognitive and psychological connections presented in the literature based on this test sentence rely on English data. Formulating equivalents to elicit responses from speakers of different languages would be valuable for expanding the scope of psycholinguistic models and determining 1) whether other languages can provide a 'neutral' and 'ambiguous' equivalent to this test sentence, 2) whether speakers of these languages react to the same cues pointed out in previous studies (e.g. Gentner et al., 2002; Ramscar et al., 2009; Bender et al., 2012; Feist & Duffy, 2015; Stocker & Hartmann, 2019; Li, 2020); and 3) whether these cues – such as motion through space vs. anticipated arrival, positive vs. negative emotional valence, and high vs. low power – influence speakers' metaphorical choices in similar ways.

4.2. Beyond the *Wednesday's meeting* test

In introspective frameworks, we rely on the intuition of linguists to choose data. In corpus-based models, we rely partly on the intuition of the linguist in creating classifications, definitions, and sampling techniques to access representative data; and

partly on the accessed usage data in representing different aspects of the studied phenomenon. What is missing in both models, however, is the intuition of the native speaker and the validation of the psychological reality of these aspects, information on the selection of form(s), identification of cues, and explanations of observed constraints, or at least validation of the constraints and the explanations provided in introspective frameworks. In essence, the crux of native speaker intuition in the study of EMTs often revolves around the concept of 'selection'. This includes selection of Moving Ego and Moving Time metaphors, or of a given verb expression among other interchangeable verb expressions, as well as choices of tense and aspect.

There are still open questions in the EMT literature that need to be validated from the perspective of native speaker intuition. These include issues recently identified in (Dhifallah, 2024), such as constraints on verb tense combinations. For example, *will be coming* and *will come* are found to be used with high frequency compared to *will be approaching* and *will approach*. Besides, the study reveals restrictions on certain metaphorical expressions. Compare for instance *Summer has arrived* to *?We have arrived at summer*. So far, corpus data suggests that these combinations are constrained, as they do not appear in the search results. However, the cognitive mechanisms behind these constraints are unclear. Evidently, what is constrained in corpus usage might also be constrained in mental representations, but this remains a theoretical hypothesis that needs to be validated with psycholinguistic data.

The EMT literature also lacks studies that combine computational psycholinguistic models with corpus-based approaches, despite the fact that such integrations have been successfully carried out in some areas of Cognitive Linguistics (e.g., Divjak et al., 2016; Divjak et al., 2021; Romain et al., 2022). Such studies involve the development of two

computational models that simulate the selection of certain forms, combinations, elements, or patterns over others: one model is based on elicited native speaker judgments or experimental data, and another is based on naturally occurring usage data drawn from corpora. This gap is partly due to the fact that many research questions in EMT studies can be addressed using either method individually, making the combination of both approaches seem unnecessary. Such integrated approaches are also limited by the significant time and effort required to collect the data, as well as the higher level of technical expertise involved. This last observation raises another issue regarding the training of cognitive linguists and their method selection. The choice of method is still clearly influenced by a linguist's proficiency with quantitative tools. The more technical resources a linguist has at their disposal, the better equipped they are to truly 'select' an appropriate method.

5. Discussion

Arppe et al. (2010) note that "research in cognitive linguistics should be based on authentic language use, its results should be replicable, and its claims falsifiable" (p. 1). Building on this foundational principle, the purpose of this analysis has been to critically assess the progression of theories of CL phenomena by examining three different methods and their respective data types and models in the case of EMTs.

One of the most significant findings discussed in this paper is that introspective frameworks, while limited in generalizability, are crucial in the foundational stages of research on EMTs. This finding has two key implications. First, introspective frameworks are important for identifying and building theoretical representations of phenomena. Second, when moving to a more empirical, data-driven design, researchers should anticipate that confronting introspective representations with more data may result in

ontological challenges. At this point, researchers must consider either refining their working definitions or identifying more specific defining criteria.

The review of introspective accounts (cf. Kranjec, 2006; Núñez & Sweetser, 2006; Moore, 2011; Huumo, 2017) also raised the question of linguistic illustrations and their methodological implications. The analysis clearly distinguished between intuited and encountered examples and examined how instance conception relates to type conception. While Cognitive Linguistics targets how speakers represent linguistic phenomena in their minds, the descriptions and theories in CL are still influenced by the cognitive representations of the linguists themselves. In other words, the researchers' personal intuitions shape the theoretical frameworks they develop, even as they try to describe how speakers think about language.

Additionally, the analysis implicitly distinguished three different types of examples or illustrations, which are important for assessing both the examples themselves and the related accounts:

1. **Encountered Examples:** These are examples collected by linguists from natural contexts of use in a coincidental and unstructured way, and so they are the most authentic. Though intuitive, selecting examples from context is a skill that should be recognized, as linguists are surrounded by language(s) and being able to notice and select illustrative examples requires a certain level of expertise.
2. **Prompted Examples:** These are examples generated by native informants unaware of any specific linguistic classifications, and so they are considered authentic. However, since elicitation involves some control over the context, these examples are less authentic than encountered ones.

3. **Intuited Examples:** These are constructed examples generated in a top-down manner to illustrate a particular model, account, framework, or theory. As a result, they are the least authentic. For instance, examples like *Summer is coming* and *We are approaching summer* fall into this category. I used them in this paper without consulting a corpus or data source to illustrate the Moving Time and Moving Ego metaphors. Many similar examples appear in the literature; however, some theoretical papers do not clarify whether examples are constructed or selected from real-world usage unless the source of the example is clearly cited. Interestingly, these examples can be provided by either native or non-native linguists. These types of illustrations can, and sometimes should, be validated against a corpus to ensure that a given form or pattern that is intuited is actually in use.

Regardless of their type, illustrations remain a powerful defining tool due to our cognitive ability of pattern completion – the tendency to fill in gaps and form a coherent representation from partial information – which creates the illusion of a fully formed representation of the type. With this in mind, and despite their attested limitations, there are at least three valid and strong reasons for using illustrations within an introspective framework:

1. To identify a phenomenon (i.e., to demonstrate its existence).
2. To reveal new aspects of a previously described phenomenon.
3. To highlight the limitations and constraints of a phenomenon.

When used for these purposes, illustrations provide sufficient evidence. In cases 1 and 3, the primary goal is to establish the phenomenon's existence or a limited number of its constraints, which does not require extensive data. A few well-chosen, prototypical

examples suffice to start research or create momentum for further study. Additionally, in case 2, the purpose is to generate insights or hypotheses about new properties, not to provide comprehensive or generalizable data. Limited examples paired with detailed analysis are adequate for this objective.

When we construct a 'type conception' from just a few illustrations, we essentially transfer the properties of these examples onto the broader phenomenon. However, once this 'type conception' is applied in a data-driven approach, such as in corpus-based research, new data may reveal additional properties that were not captured by the original introspective definition. For these reasons, a theory that has not been tested using data-driven methods is, to some extent, weak. Testing an account against more data is crucial for validating definitions and uncovering new aspects of a phenomenon. This point is further supported by the review of the examples used in the literature on EMTs. I leave it to the reader to examine the illustrations used for another phenomenon and assess whether they too are overly repetitive and reflect a narrow range of observations.

The review of retrieval processes underscores a significant ontological benefit of corpus-based models in EMT research. These models have identified new empirical taxonomies of time, such as the classification of points in time, periods of time, and situations (Teeri & Huumo, 2024); calendric time, anchored events, and non-anchored events (Dhifallah, 2024). Additionally, some accounts have focused on defining what does not count as TEs based on observations of the corpus data (e.g., Feist & Duffy, 2020; Dhifallah, 2024).

However, the review of retrieval processes also reveals that not all quantitative corpus-based analyses are equally generalizable. Researchers should consider the discrepancies of the corpus search procedures when comparing different corpus-based studies and consider the querying limitations when determining study hypotheses. It is particularly

important to examine how sampling techniques impact the scope of the research. For example, whether the corpus is large or small, whether the studied expressions are sampled via lemmatized forms or conjugated ones, and whether the search prioritizes high recall over precision or vice versa. Ultimately, each selection carries implications for the scope of representation of the phenomenon and the generalizability of the sampled data to the broader dataset.

Another key point to consider is the significance of data infrastructures. Data retrieval procedures from corpora can be time-consuming and are subject to low reliability rates. An accessible and cross-linguistic database of EMT metaphors – or any other phenomenon, for that matter – with high recall for guaranteed diversification and with high rates of reliability would be of great value in that it would 1) reduce the amount of time spent on the retrieval phase of research and 2) ensure that most of the research questions examined on the phenomenon are tested against a uniform set of language usage observations. This is not to undermine the importance of constructing different retrieval processes if the research questions impose a different retrieval procedure based on a unique set of controlled and independent variables. However, even in these cases a shared sample could still be used as a reference.

Additionally, research questions and the way they are formulated are crucial for ensuring true convergence of evidence and for claiming complementarity between accounts. The existence of different models to explain the same linguistic phenomenon does not automatically imply they are complementary or that they offer converging evidence. Convergence of evidence occurs only when multiple models address the same research question, leading to consistent results, or when different questions are tested against comparable data samples. Without such overlapping questions and samples,

discrepancies between models may reflect different representations of the phenomenon, but not necessarily true conflict or overlap.

An example of a corpus-based account that answers the same question as the psycholinguistic studies on EMTs – specifically regarding the selection criteria of ME/MT metaphors – is the study by Piata & Soriano (2022). This study examines the selection of ME and MT metaphors by exploring the impact of the TE (whether it is positive or negative). It investigates the influence of affective valence on metaphor choice using corpus data. The findings show that positive anticipation is more likely to be expressed through Ego-moving metaphors, while negative anticipation is associated with Time-moving metaphors.

When selecting a particular method, researchers should consider the following questions, especially when reviewing the literature and identifying gaps:

1. Are there several, competing frameworks, and if so, which language(s) do they draw upon?
2. Are the definitions based on introspective frameworks, or have they been tested quantitatively on a large set of data?
3. Are the examples based on intuitive judgments, selected from real usage contexts, or prompted in some way?

If available frameworks rely primarily on introspection, it is essential to transition to a more data-driven approach to gain new insights and refine existing frameworks. Corpus methods, in particular, are crucial for overcoming the English-centered bias in theorising and addressing the lack of scholarly evidence based on languages other than English. To overcome the anticipated challenges of this transition, researchers should consider the corpus retrieval strategies employed by others studying similar phenomena and use them

as guiding models. They could also opt for available data samples, if that is an option. Another way to test introspective (and corpus-based) models is through psycholinguistic evidence. At this point, researchers can choose either quantitative or qualitative methods, depending on the time and technical expertise available. The most important consideration is to develop the theory in a way that integrates both introspective evidence and usage evidence, while also grounding it in psychological insights from native speaker intuition.

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