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What trajectors reveal about TIME metaphors

Analysis of English and Swedish*

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This paper is an analysis of trajectors (i.e. located entities) in language about fixed durations of TIME. More specifically, trajectors in instances including the English prepositions *in* or *on*, or their Swedish equivalents *i* or *på*, are analyzed. On the structure of the inverse Moving Observer/Moving Time metaphors (Lakoff & Johnson 1999) instances such as these should be construed relative to a Moving Observer, and trajectors people that move relative to fixed durations of TIME (as reflected in e.g. *when we come to launching the 4th edition in early 1990*). My analysis, however, suggests that our understanding of TIME through SPACE is more nuanced than suggested by these metaphors. In this specific context, trajectors are not typically people in motion, but rather events or processes located in, or on, unit of time landmarks. My study emphasizes the need to test the systematicity of the mappings proposed by Conceptual Metaphor Theory.

Keywords: Conceptual Metaphor Theory, TIME, SPACE, MOTION, trajectors

1. Introduction

“When The Phantom moves, time stands still” is an old jungle saying from the American adventure comic strip *The Phantom* by Lee Falk. It is one of several old sayings illustrating the speed with which the mythical hero moves (e.g. “Phantom quick like lightning” and “Phantom moves faster than eyes can see”). The emphasis on speed of motion in this particular saying is related to a metaphorical connection between TIME¹ and MOTION THROUGH SPACE. The metaphorical idea is that TIME is perpetually moving, but that the Phantom is so incredibly fast that when compared to his moves even TIME seems to be standing still.

The connection between the domain of SPACE and the essentially metaphoric domain of TIME has been extensively studied. Numerous studies suggest that the TIME IS SPACE

metaphor is pervasive in a broad range of languages all over the world (see e.g. Lakoff & Johnson 1999, Evans 2004, Núñez & Sweetser 2006, Radden 2003, Filipović & Jaszczolt 2012a, 2012b). Accordingly, a wealth of experimental evidence has shown that the domains of SPACE and TIME are linked (see e.g. Boroditsky & Ramscar 2002, Casasanto & Boroditsky 2008, Núñez & Sweetser 2006). In particular, the connection between TIME and MOTION THROUGH SPACE has been investigated (e.g. Núñez & Sweetser 2006, Núñez et al. 2009, Matlock et al. 2011).

Lakoff & Johnson (1999) propose an entire system of spatiotemporal metaphors that coherently structures our understanding of TIME through SPACE. On the most basic metaphor in the system, the Time Orientation metaphor, the present is at our present location, the past behind us, and the future ahead of us (Lakoff & Johnson 1999: 140). Based on this metaphor, the inverse Moving Observer and Moving Time metaphors structure TIME in such a way that we do not have to be mythical heroes to make TIME stand still. Either we move relative to TIME, or TIME moves relative to us. When we move, TIME is standing still, and when TIME moves, we are standing still (Lakoff & Johnson 1999: 148-149, cf. Clark 1973). These “minimally differing variants [or] duals” (Lakoff and Johnson 1999: 149) elegantly explain uses of seemingly contradictory metaphorical expressions (e.g. *Christmas is coming* and *We’re coming up on Christmas*). Accordingly, cognitive research into spatiotemporal mappings typically builds on this contrast (cf. Núñez & Sweetser 2006).

But does the Moving Observer/Moving Time dual explain the patterns of all metaphorical expressions dealing with TIME? Do all metaphorical instances that refer to time as a located entity also refer to an Observer, and if so, does the Observer always move? Lakoff and Johnson (1999: 146) do indeed provide several linguistic expressions structured by the Moving Observer metaphor (e.g. *We’re coming up on Christmas* and *We passed the deadline*), but the examples are not based on empirical data and may not be representative of language reflecting mappings between fixed durations of TIME and bounded portions of SPACE. Moreover, not all the expressions given appear to be structured relative to a Moving Observer. For instance, neither Example (1) nor (2) below includes reference to a Moving Observer, but rather to a conference that moves relative to TIME.

(1) Let’s spread the conference *over* two weeks.

(2) The conference *runs from* the first *to* the tenth of the month.

(Lakoff & Johnson 1999: 146)

Considering that even some of the instances given to prove a theoretical point appear not to be structured by these specific metaphors, there may likely be other exceptions as well. So far, however, cognitive research into spatiotemporal mappings has tended to focus on how the Moving Observer/Moving Time metaphors structure our understanding of TIME through SPACE rather than looking into if these metaphors necessarily structure every aspect of this relationship. Given that searches for specific patterns might potentially miss other patterns that are equally important, the extent to which language about TIME is explicable in terms of these metaphors needs to be tested. One way of avoiding this type of linguistic “cherry picking” is to focus on a specific type of context construing TIME by means of SPACE investigating *all* the patterns reflecting a given aspect of this context.

To empirically study one specific aspect of spatiotemporal language in a specific type of spatiotemporal context, I made an analysis of the “trajectors” (i.e. located entities) (see Langacker 2002: 6) in English *in* and *on* sentences that refer to fixed durations of TIME. More specifically, I analyzed trajectors located *in* or *on* unit of TIME “landmarks” (i.e. the final position of a moving or located entity, see Langacker 2002: 6). The study is based on a random set of data from the British National Corpus (the BNC). Although metaphorical language structured by spatio-temporal mappings has gained a lot of attention, there is still much to learn about this type of temporal context. Mappings treating TIME AS A PLACE have received much less attention than mappings related to motion, and fixed durations of TIME have simply been assumed to be bounded regions on a path defined in relation to a Moving Observer (Lakoff & Johnson 1999: 153).

Moreover, to empirically test whether Lakoff and Johnson’s (1999) claims are reflected in the patterns of a closely related language, trajectors in the Swedish equivalents, *i* and *på* instances, were analyzed, taken from the Swedish Language Bank corpus Parole². Although Conceptual Metaphor theory has indeed been applied to a multitude of studies of a broad range of languages all over the world (see e.g. Radden 2003, Núñez & Sweetser 2006), and close to universal as well as culture specific patterns have indeed been found (cf. Kövecses 2005), we do not yet know to what extent patterns observed in one language recur in another one. Typically, the theoretical claims that go back to patterns observed in English, are simply expected to be reflected in languages in general, and in closely related languages spoken in closely related cultures in particular.

The main aim of my study is thus to find out to what extent language about fixed durations of TIME is explicable in terms of the Moving Observer/Moving Time contrast and to what extent complementary explanations are needed. Moreover, a secondary aim is to find out to what extent the patterns found in English are also evident from an analysis of Swedish data. On the system of spatiotemporal metaphors outlined by Lakoff and Johnson, the *in* and *on* instances in my data should be construed via the Moving Observer metaphor, and Swedish *i* and *på* likely construed in a similar way. On their view, “a fixed duration of time is a bounded region on a path along which an observer moves” (Lakoff & Johnson 1999: 153). These bounded regions may be conceptualized as containers (Lakoff & Johnson 1999: 153), or as point locations along a line (Lakoff & Johnson 1999: 158). Events that last shorter than a given duration of TIME occur *in* (Swedish *i*) TIME, and events viewed as instantaneous, or single unextended entities occur *at* TIME locations. Lakoff and Johnson do not discuss *on*, but given its reference to fixed durations of TIME, *on* (Swedish *på*), should be construed in a similar way.

As argued above, however, this is not necessarily the case. Despite the many studies on metaphorical language structured by spatio-temporal mappings, there appears to be more to learn about our understanding of fixed durations of TIME through bounded portions of SPACE.

2. Multiple interacting constraints on our understanding of TIME through SPACE

The idea that our metaphorical understanding of TIME through SPACE is more nuanced than suggested by the Moving Observer/Moving Time dual has previously been suggested by Núñez and Sweetser (2006), Evans (2004) and Wallington (2012). As is relevant for the present study, Núñez and Sweetser (2006: 406) argue that spatial language for TIME is not always dynamic, and motion not always involved. Instances such as *There’s no time to do my homework because the class meetings are too close together* simply treat times as locations (Núñez & Sweetser 2006: 406). Moreover, our construal of TIME by means of MOTION THROUGH SPACE does not always include an Observer (“Ego” in their terminology), but may be about events that move in relation to one another. In the example *December follows November*, two different months are construed as moving entities, and one of them (*November*) as “a moving reference point” (Núñez & Sweetser 2006: 406). No Observer, however, is present. Based on shortcomings of explanations in terms of the Moving Observer/Moving Time contrast, and on a previous distinction between Ego-based metaphors (including the Moving Observer and

Moving Time subcases) and Time-based metaphors (Núñez 1999, Moore 2000), Núñez & Sweetser (2006) argue for a clear distinction between Ego- and Time-Reference-Point-models. This contrast is considered more basic than that between the Moving Observer and Moving Time metaphors, and distinguishes the question of what is moving (Ego or time), from that of what the landmark of that motion is (Ego or time).

Similar to the *conferences* that move relative to TIME in Examples (1) and (2) above, Núñez & Sweetser's examples (2006) show that there are aspects of spatiotemporal language that are not explicable in terms of the Moving Observer/Moving Time contrast. Their primary concern, however, is an empirical study of Ayamara gestural data, and not a detailed investigation of the patterns of spatiotemporal language. They too provide examples that prove their point, but do not look into to what extent their instances are representative of how languages construe TIME through SPACE. Similarly Evans' (2004) linguistic examples suggest that other factors might be involved, but are not based on empirical data. As reflected in instances such as *in Auschwitz, one day – everyday – was like 10 years, and it only took ten or fifteen seconds for us to hit, but it certainly felt like ten or fifteen minutes* (Evans 2004: 19), TIME may be perceived as passing more slowly, or more quickly, than usual. For the duration of TIME to be cast this way, so Evans (2004: 19) maintains, there has to be a normative experience against which that durational experience can be judged. TIME is not just “an objectively real entity inhering in the world ‘out there’” (Evans 2004: 8), but “a phenomenologically real”, and internally-derived experience” (Evans 2004: 8).

Wallington's (2012) analyses of *Christmas*, *Easter* and *holidays* instances retrieved from internet searches support the view that mappings between TIME and SPACE are indirect rather than direct. His study shows that language about TIME is directly influenced by the degree to which an observer “can understand or mentally manipulate” (Wallington 2012: 85) “events, reified as physical objects [and] located in different positions in space” (Wallington 2012: 84). That being the case, factors such as “the role of degree of information, information concerning (un)certainly, and information about the mental/emotional state of Ego” (Wallington 2012: 95) largely influence the construals. Contrary to the structure of the *Time Orientation* metaphor, future events that speakers find unpleasant (Wallington 2012: 93), or do not have full knowledge of (Wallington 2012: 88-89), may approach the Ego from a position behind the Ego (e.g. *Due to the fact that Christmas is coming up behind us [...]*, and *the heart attack or stroke that is always lurking over our shoulder* (Wallington 2012: 93). Moreover, future events such as Christmas, Easter, and holidays are much more often *around the corner*

than *ahead*. These instances “all seem to involve a (potential) future event that Ego is aware of but doesn’t know much about, hasn’t made many plans for, or doesn’t have certain knowledge of” (Wallington 2012: 94). Wallington (2012) thus provides authentic data supporting the view that our understanding of TIME through SPACE is quite complex. Studies such as this one, however, need to be complemented by corpus linguistic investigations into how languages construe other aspects of TIME by means of SPACE.

Although scholars such as Lakoff and Johnson (1999), Núñez and Sweetser (2006), Evans (2004) and Wallington (2012) do not completely agree about how our understanding of SPACE structures that of TIME, the conclusions drawn from their studies are not necessarily conflicting. Our metaphorical understanding of TIME through SPACE might well be influenced by multiple factors (cf. Gibbs 2011a, 2012b) at several levels of abstraction (cf. Johansson Falck, 2010, 2012a, 2012b, 2013), and these might interact with one another in dynamic ways (Gibbs 2011a, 2011b). On the ‘dynamic view of metaphor’ proposed by Gibbs (2011a, 2011b), “language, brain, body and environment form nested dynamical systems inextricably interconnected with one another” (Gibbs 2011b: 582), and “people’s ongoing metaphoric experiences [might be] simultaneously shaped by multiple, interacting constraints” (Gibbs 2011b: 582-583). Accordingly, Johansson Falck’s (2010, 2012a, 2012b, and 2013) and Johansson Falck and Gibbs’ (2012) research into metaphorical language including the terms *path*, *road*, or *way* suggests that metaphorical instances of these terms are structured by experiences at several levels of abstraction, that is, by conventional mappings at the levels of primary and conceptual metaphor (e.g. ACTION IS MOTION, PURPOSES ARE DESTINATIONS, LOVE/LIFE/A PURPOSEFUL ACTIVITY IS A JOURNEY etc.), by mappings at a more specific level of organization involving people’s embodied experiences of the specific artefacts that these terms refer to in their literal senses (i.e. the fact that paths are uneven, and roads smooth) (Johansson Falck, 2010, 2012a, 2013, Johansson Falck & Gibbs, 2012), and by language-specific ways of encoding our experiences of the world around us (Johansson Falck 2012b). Given the many factors that might influence metaphorical understanding of the world through embodied experience, it seems possible that our understanding of TIME through SPACE is equally constrained by several interacting factors. Not only mappings at the level of conventional conceptual metaphor might be involved, but also mappings at a more specific level of abstraction involving our individual, and often quite complex, experiences of activities, events and processes in relation to the locations in TIME that they are associated with.

As would be in line with a growing body of corpus-based studies indicating that some of the patterns involving conceptual metaphors are more varied than previously suggested (Deignan 1999, 2005, Stefanowitsch & Gries 2006, Johansson Falck 2010, 2012a, 2012b, 2013, Johansson Falck & Gibbs 2012), the English *in* and *on* instances, and the Swedish *i* and *på* instances in my data may thus go back to more than one way of thinking about TIME in terms of SPACE. Specifically, they might be construed via the *Moving Observer* metaphor on certain conditions, and construed relative to other types of trajectors on others. Moreover, given that Lakoff and Johnson's claims are primarily based on linguistic patterns observed in English, there may be similarities and differences between the languages that have not yet been observed. Although conceptual mappings are generally assumed to be reflected in many different languages all over the world, there is still a dearth of corpus-based studies analyzing cross-linguistic variation in a systematic way (cf. Stefanowitsch 2006a: 9).

Some recent corpus-based studies indicating that metaphorical patterns are more varied than previously suggested are discussed in Section 3 below, while the method and material used for analyzing the *in* and *on*, and *i* and *på* instances are discussed in Section 4.

3. Corpus-based approaches to metaphor

As is coherent with a more general trend in cognitive linguistics (see Janda 2013) and with linguistics in general, an increasing number of cognitive metaphor scholars have turned to corpus linguistic methods to empirically test the theoretical claims in the field. Notably, the broadness of the data uncovered by these studies has paved the way for new theoretical insights. Deignan (2005), for instance, reports on a number of studies that are generally consistent with Conceptual Metaphor Theory, but also includes patterns that are not easily explained by the theory. Examples would be certain restrictions on the linguistic mappings, (e.g. *blossom* is restricted to talk about relationships, careers and businesses, and *flower* to talk about creative projects, Deignan 2005: 174-183), the relative absence of ambiguity between literal and metaphorical senses in naturally occurring language (Deignan 2005: 217), and patterns showing that syntagmatic relations are more significant for metaphorical meanings than for literal ones (Deignan 2005: 193-213, 219). Similarly, Stefanowitsch and Gries's (2006) edited volume uncovers patterns that have led to new insights. For instance, Semino's (2006) chapter on speech-act activity in written British English narratives emphasizes the need to reanalyze the

way in which some mappings are best defined. Specifically, she shows that the ARGUMENT IS WAR metaphor (Lakoff & Johnson 1980) is better defined as ANTAGONISTIC COMMUNICATION IS PHYSICAL CONFLICT, and that Reddy's (1993) CONDUIT metaphor is better defined in terms of a set of primary metaphors (cf. Grady 1998). Her study shows that these two "text-book cases of communication metaphors" (Stefanowitsch 2006a: 7) are not as pervasive as suggested by Reddy (1993). They represent less than 50 per cent of all the communication metaphors in her study. Some of the more recent advances in the field include Demmen et al's (2015) computer-assisted study of the use of violence metaphors, Johansson Falck's (2010, 2012a, 2012b, 2013) and Johansson Falck & Gibbs' (2012) combined corpus-based analyses and psycholinguistic surveys. The latter show that metaphorical language is also structured by conceptual mappings that involve people's embodied experiences of specific source domain concepts (Section 2).

4. General method and material

Given that conceptual metaphors "are not linked to particular linguistic forms" (Stefanowitsch 2006a: 2), retrieving the relevant data for corpus linguistic investigations into conceptual metaphors is notably hard (Stefanowitsch 2006a: 1-2). Accordingly, a number of strategies have been proposed to deal with the problem of retrieving relevant linguistic data. These include manual searching and searching for source domain vocabulary, target domain vocabulary, sentences containing lexical items from both the source domain and the target domain, and for metaphor based on 'markers of metaphor' (e.g. metaphorically/figuratively speaking, or "so-to-speak" uses) (Stefanowitsch 2006a: 2-5). Moreover, conceptual metaphors may be searched by means of extraction from a corpus annotated for semantic fields/domains, or for conceptual mappings (Stefanowitsch 2006a: 5-7). Yet other ways of finding metaphor candidates involve reading a portion of a corpus, looking for metaphor clusters within metaphor windows of a given size, searching through keywords, computing the difference in meaning between neighboring words, and using the online tool *Metaphor Candidate Identifier*, which matches words and patterns drawn from hand-coded training data (see Sardinha 2012: 21-50). In the present study, I chose to focus on one specific aspect of spatiotemporal language in one specific type of spatiotemporal context, and then analyzed all the patterns found in this context.

More specifically, my focus was on TIME IS A PLACE instances (i.e. instances construing fixed durations of TIME by means of bounded portions of SPACE) including the English prepositions *in* and *on* in the first part of the study, and their Swedish equivalents *i* and *på* in a second part. For the English part, I retrieved 1,000 random *in* and *on* occurrences from the BNC (XML Edition) together with a context consisting of 1-2 lines of text. For the Swedish part, I retrieved 1,000 random *i* and *på* instances from the Swedish corpus Parole together with 1 line of text. The BNC and Parole are not directly comparable. The BNC is a 100 million word corpus made up of 90% written texts and 10% spoken texts collected from a wide range of sources (e.g. newspapers, periodicals, journals, academic books, popular fiction, letters, memoranda, and unscripted informal conversations) and released in 2007. Parole is a 19-19.4 million word corpus from written sources such as novels, newspapers, journals, and texts from the internet, completed in 1997. Each corpus, however, can be used to investigate how a written, present-day, version of a language construe TIME in terms of bounded portions of SPACE.

As a second step, the 1000 instances from each corpus were divided into those that are used in reference to temporal concepts, and those that are used in reference to other concepts. Instances were considered TIME IS A PLACE instances if the preposition was followed by a unit of time landmark (e.g. English, *in January 1990*, *in that year*, *in a flash*, *on a night in early winter*, *on that occasion*, *on a daily basis* etc.; Swedish, *i början av maj* “at the beginning of May” lit. “in the beginning of May”, *på morgonen* “in the morning” lit. “on the morning” and *på en kort tid* “within a short period of time” lit. “on a short time”). Instances that did not belong to this group were either used in reference to spatial concepts, non-temporal abstract concepts, or with verbs. Some of the instances that were used with verbs were particles. Taken together, 266 TIME IS A PLACE instances were found in my English data; (134 *on* instances and 132 *in* instances), and 160 in my Swedish data (58 *på* instances and 102 *i* instances).

Next, the usage patterns of the temporal instances of these specific prepositions in each of the two languages were analyzed. My main aim was to find out to what extent TIME IS A PLACE instances in each of the two languages are structured in line with the Moving Observer metaphor (cf. Lakoff & Johnson 1999, Clark 1973) and/or in line with other mappings. This aim has been broken down in two research questions:

- i. What are the trajectors in the *in*, *on*, *i* and *på* instances?
- ii. If there are several types of trajectors, how frequent is each type?

It may be argued that corpus linguistic data will never reveal exactly how people think about TIME in terms of SPACE, and indeed corpus theoretical approaches do not generally claim to explain the mental processes behind language (see Mahlberg 2005: 79-80). This type of analysis, however, at the very least, provides information on whether fixed durations of TIME are linguistically construed relative to a Moving Observer, or relative to other types of trajectors as well. If fixed durations of TIME are mentally construed relative to a Moving Observer then this should be reflected in language too. However, if fixed durations of TIME are mentally construed relative to other concepts, it should be evident from language what these concepts are. Both the quality and the frequency of the concepts referred to in each language can be analyzed by means of corpus-based research. Moreover, the presence or absence of lexical items codifying motion (e.g. motion verbs and prepositions of path) in the data may be seen as indicators of whether trajectors are conceived of as being in motion, or as being stationary. In this way corpus data may be used to test certain theoretical assumptions concerning language and thought (cf. Mahlberg 2005: 80).

5. Trajector types in temporal *in*, *on*, *i* and *på* instances

Taken together six types of trajectors (in italics in Examples (3) to (13) below; emphasis mine) were identified in the English and Swedish TIME IS A PLACE instances. Four of these types are represented in both the English and the Swedish instances, and two of the types in either the English, or the Swedish data.

- i. *Moving Observer* trajector. A first type, found in both the English and the Swedish instances, is a Moving Observer that moves relative to TIME. In example (3) below, for example, an observer referred to by *we* moves relative to the time when the 4th edition was launched:

(1) When *we* came to launching the 4th edition in early 1990.

- ii. *Moving Event* trajector. A second type of trajector, also found in both languages, is an overall event (in this paper, used in the broad sense of the word encompassing all sorts of events, activities, processes, etc.) that moves relative to TIME. This type of trajector is

exemplified in example (4) where [*t*]he *first inkling that something was amiss* moves relative to *Wednesday*.

(2) *The first inkling that something was amiss* came on *Wednesday*.

- iii. *Observer Moves Time* trajector. A third type of trajector is an Observer that moves one unit of TIME relative to another unit of TIME. This is seen in example (5) where *vi* “we” move *en vecka* “a week” toward another unit of TIME. This type of trajector was only found in the Swedish instances.

(3) Men vi tar *en vecka* i taget så får vi se. (“we will take a week at a time” lit. “we take one week in the grip”).

- iv. *Moving Time* trajector. A fourth type of trajector moves together with TIME rather than relative to TIME. For instance, in example (6) below, the *governemen[t’s] fac[ing] an unprecedented challenge to its authority* is located *in the weeks that followed* and thus moves together with this specific unit of TIME landmark. This type of trajector was only found in the English part of my study.

(4) [...] but in the weeks that followed *the government faced an unprecedented challenge to its authority* [...]

- v. *Event I* trajector. A fifth type of trajector is an overall event that involves motion, but not relative to TIME. In example 7, the event of *go[ing] to bed* includes travel through physical space (someone is going somewhere), but not relative to TIME, and in 8 *Tito’s troops entered Carinthia* involves motion on the part of a troop into a geographical area, but not motion relative to TIME.

(5) On an average weekday, *what time do you go to bed?*

(6) *Tito’s troops entered Carinthia* on 6 May and on 8 May.

Instances of this type are found in the Swedish data too. In Example (9), a lady enters a physical space, but not a temporal one.

(7) *in kom i detsamma en dam* (“at that moment a lady entered” lit. “in came in the same a lady”).

vi. *Event 2* trajector. Finally, a sixth type of trajector, found in both languages, is completely void of terms codifying motion. As in examples (10) to (13), these simply take place in, or on TIME, without any reference to motion whatsoever.

(8) *In recent years micro-economic interpretations of fertility transition have been dominant.*

(9) *The excitement of free cash was certainly not worth it on that occasion [...]*

(10) *reforms that have revolutionized BP's management style in the last two years [...]*

(11) *The ninth National Assembly was elected on July 19.*

The many types of trajectors found in my data show that fixed durations of TIME are not merely construed relative to a Moving Observer. Trajectors may be anything from people who move relative to TIME to events doing so.

5. Distributions of trajector types

Next, I compared the distribution of the six trajector types, the distribution of moving trajector types as opposed to stationary ones, and events versus non-events in each of the four groups of prepositions. Given the frequency differences between the *in*, *on*, *i* and *på* instances in my data, which is partly due to the functions that these specific prepositions serve in other contexts than the temporal ones (i.e. in talk about spatial relations, or about other types of abstract contexts than temporal ones), proportions rather than raw figures were compared. Moreover, this stage included a statistical analysis of the 95% confidence interval (CI) for the true proportion of each

trajector type. The Wilson score interval was used when the proportion was 0% or 100% and the Normal approximation interval for all other proportions. The interpretation of this CI is that if the procedure of sampling sentences and computing a 95% CI would be repeated, the 95% CI would cover the true proportion in 95% of the repetitions. We cannot know, however, if each particular CI (within brackets in my analysis below) includes the true proportion. Moreover, we cannot know if similar proportions would be found in a study of British English *in* and *on*, or Swedish *i* and *på* instances in general. Given the high degree of conventionality of the constructions involved, however, major qualitative differences between the corpus data, which primarily consists of written texts, and British English/Swedish in general seem unlikely.

The trajector types in the English instances (along with their raw figures and percentages) are presented in the left-hand columns in Table 1, and the trajectors in the Swedish instances in the right-hand columns. As in Section 3 above, the trajector types that involve motion relative to TIME are presented first, (i.e. the Moving Observer, the Moving Event, and the Observer Moves Time, i.-iii.) followed by the types that involve motion together with TIME (i.e. the Moving Time trajectors in row iv.), and then those that do not involve motion relative to TIME (i.e. the Event 1 and Event 2 trajectors, rows v.-vi.).

Instances that include terms that do not encode motion in their contemporary senses, but might still be connected with motion through their etymology (e.g. the Swedish noun *gång* “time” which is etymologically related to *walk/walking*; Allén 2009: 1112) were categorized as moving entities, but marked with *. The English infinitive marker *to*, however, which is etymologically related to the preposition *to*, but in modern English merely a highly entrenched sign or prefix of the infinitive (Barnhart 1988: 1146), was not considered to codify motion. Eight *to* infinitives were found in English *in* instances, and 17 *to* infinitives in *on* instances.

Table 1. Frequency of trajectors in 426 *in*, *on*, *i* and *på* TIME IS A PLACE instances.

	<i>in</i>	<i>on</i>	<i>I</i>	<i>på</i>	Row totals
i. <i>Moving Observer</i>	2		2		4
ii. <i>Moving Event</i>	7 (2*)	1	9 (3*)	1*	18
iii. <i>Observer Moves Time</i>			12 (8*)		12
iv. <i>Moving Time</i>	1				1
v. <i>Event 1</i>	21	34	14	12	81
vi. <i>Event 2</i>	101	99	65	45	310
Column totals	132	134	102	58	426

* The gray numbers within brackets show the number of instances in a given category (e.g. 2 out of 7 *in* instances) that are not explicitly connected with motion through their contemporary uses, but might be so through the etymology of one of the words included in the sentence.

Beginning with the English data, statistical analysis of the 134 *on* instances and the 132 *in* instances reveals that moving trajectors (type i-iv) are much less frequent than stationary ones (type v-vi). 0.7% (0.0-2.2) of *on* trajectors, and 7.6% (3.1-12.1) of *i* trajectors are indeed moving. Overall, trajectors tend to be events (types ii, v and vi). 100% (97.2-100.0) of *on* trajectors, and 97.7% (95.1-100.0) of *in* trajectors are events. Further analysis of event trajectors shows that 99.3% (97.8-100.0) of *on* events, and 94.6% (90.7-98.5) of *in* events are stationary.

Contrary to what would be expected given the structure of the inverse Moving Observer/Moving Time metaphors, Moving Observer trajectors (type i), are extremely infrequent in this specific type of temporal context. Both the *in* and *on* instances in my data are indeed used in reference to fixed durations of TIME. Yet none of the *on* trajectors (0.0% (0.0-2.8)), and 1.5% (0.0-3.6) of *in* trajectors are Moving Observer trajectors. Instead all moving *on* trajectors (100.0% (20.7-100.0)), and 70.0% (41.6-98.4) of moving *in* trajectors are events.

Similar results are evident from a statistic analysis of the Swedish *på* and *i* instances. Here too moving trajectors (type i-iv) are less frequent than stationary ones (type v-vi). 1.7% (0.0-5.1) of *på* trajectors and 22.5% of *i* trajectors (14.4-30.7) are construed as moving entities. Moreover, in the Swedish data too, trajectors tend to be events. 100.0% (95.8-100.0) of *på* trajectors are events, as are 86.3% (79.6-93.0) of *i* trajectors. In turn, analysis of event trajectors shows that 98.3% (94.9-100.0) of *på* events, and 89.8% (83.4-96.1) of *i* events are stationary.

Again, Moving Observer trajectors (type i) are infrequent, and the trajectors that move are events rather than people. None of the *på* trajectors (0.0% (0.0-6.2)), and 2.0% (0.00-4.7) of *i* trajectors are Moving Observer trajectors. Similar to the patterns in the English data, all the moving trajectors (100.0% (20.7-100.0)) in the *på* instances are events. Moving trajectors in the *i* instances however, are more often Observer Moves Time trajectors (type iii). 52.2% (31.8-72.6) of moving trajectors *i* instances belong in this group. Moving Events (39.1% (19.2-59.1)) of *i* instances, make up the second largest moving trajector group in this data.

As argued above, the two corpora are not directly comparable, and the English and Swedish prepositions represent different sections of two different language systems. Accordingly, chi-square statistical analyses (Pearson's Chi-squared test for count data with Yates's continuity correction, performed with the function `chisq.test` in the programming

language *R*) reveal that there is a strong significant association between corpora (Swedish/English) with respect to moving vs. stationary trajector type ($\chi^2 = 14.2, p = 0.0002$). The null hypothesis of this test is that the distribution of moving vs. stationary trajector type in the Swedish corpora is independent of the distribution of moving vs. stationary trajector type in the English corpora. The analyses show that 15% of Swedish instances are moving trajectors compared to only 4.1% (1.7-6.5) of English instances, and with respect to event vs. not event trajector type ($\chi^2 = 13.2, p = 0.0003$). Moreover, 91.3% (86.9-95.6) of Swedish instances are events compared to 98.9% (97.6-100.0) of English instances. There is not a significant association between corpora with respect to trajectors that move relative to TIME, and other types of trajectors ($\chi^2 = 2.1, p = 0.1434$), 7.5% (3.4-11.6) of Swedish instances move relative to TIME compared to 3.8% (1.5-6.0) of English instances. The same is true with respect to stationary vs. moving events ($\chi^2 = 2.4, p = 0.1219$), 93.2% (89.1-97.2) of Swedish instances are stationary events compared to 97.0% (94.9-99.0) of English instances.

Despite the differences between the languages, the corpora, and the individual prepositions, the results suggest that our understanding of TIME through SPACE is more nuanced than suggested by the Moving Time/Moving Observer dual. TIME IS A PLACE instances may indeed be understood in relation to a Moving Observer. In this specific type of context, however, Moving Observer trajectors are the exception rather than the rule. Only 0.9% (0.02-1.9) of all trajectors in all TIME IS A PLACE instances, are Moving Observer trajectors (type i). Instead, there is a strong tendency for trajectors to be events (96.1% (94.2-97.9) of all trajectors are events) (types ii, v and vi), and these do not typically move relative to time. My analysis shows that 95.6% (93.6-97.6) of events (types v and vi) do not move relative to time. Of all trajectors in all TIME IS A PLACE instances, only 7.6% (95% CI 5.2-10.0) are, in fact, moving (types i-iv), and only 5.2% (3.1-7.3) move relative to time (types i and ii). 51.4% (34.9-68.0) of moving trajectors are events (type ii).

6. Discussion

My analysis of the trajectors in English *in* and *on* sentences, and in Swedish *i* and *på* sentences, show that our understanding of TIME through SPACE is far from fully explicable in terms of the inverse Moving Time/Moving Observer metaphors.

All the sentences in my data instantiate spatiotemporal mappings in the sense that they deal with fixed durations of TIME, construed as containers (cf. Lakoff & Johnson 1999: 153) or objects/supporting surfaces, and their relation to someone or something construed as being in or on these unit of TIME landmarks. Contrary to the structure of the inverse Moving Time/Moving Observer metaphors, however, very few (0.9% (0.02-1.9) of all instances) of these specific unit of TIME landmarks are understood relative to a Moving Observer. Instead trajectors tend to be events, activities, or processes (96.1% (94.2-97.9) of all trajectors belong to this category) located in or on the unit of TIME landmarks.

There may be several reasons for this type of focus. One explanation might be that the Moving Time/Moving Observer metaphors do not typically structure our understanding of TIME through SPACE. Numerous linguistic instances (see e.g. Lakoff & Johnson 1999, Evans 2004, and Wallington 2012), however, suggest that these two metaphors are indeed highly relevant for certain parts of our understanding of TIME through SPACE. Another explanation might be that instances that do not include reference to a Moving Observer still involve motion on our part relative to TIME. But there appears to be no linguistic evidence for this kind of mapping. Conceptual Metaphor Theory has been criticized for relying entirely on linguistic data (see Gibbs 2007). The present study, however, shows that not even linguistic data substantiate the view that fixed durations of TIME are always construed relative to a Moving Observer. The importance of this specific mapping simply cannot be proven by searching for temporal *in* or *on*, *i* or *på* instances in large electronic corpora.

A third possible explanation might be that when we talk about experiences that occur *in* TIME or *on* TIME, our focus is on that fixed duration of TIME, and not on the relationship between this particular point in TIME and yet other moments in TIME. Given that it may be hard, if not impossible, to mentally zoom in and out at the same time, our focus on that fixed duration of TIME might then mean that the bigger temporal picture that this particular point in time is a part of is temporarily irrelevant to us. Hence while mentally zooming in on one specific experience that occurs at one specific point in TIME we might not consider the proposed metaphorical path along which either we move relative to TIME, or TIME moves relative to us (Lakoff & Johnson 1999: 148-149). Doing so, we might simply focus on a given moment in TIME and temporarily forget earlier or later moments in time. Moreover, since TIME is not simply about progress but is also intimately connected with the experiences that we have in TIME, and with TIME, our mentally zooming in on a given point in TIME (e.g. Christmas) might be hard to separate from thoughts on things that we connect with that specific point in

TIME (e.g. something that happened to us, or to someone else, some other Christmas). Considering the complexity of the connection between moments in TIME and our individual experiences of these moments, fixed durations of TIME may thus be more than just bounded portions on a path along which an Observer moves. They might be part and parcel of the experiences that they are connected with. It seems possible that in cases like these, fixed durations of TIME might simply serve as temporal reference points (cf. Núñez & Sweetser 2006) in which, or on which, we locate our experiences, and that might be all that is in focus. Comparisons between this specific point in TIME, and yet others, however, might mean that the temporal path, and hence the structure of the Time Orientation metaphor (Lakoff & Johnson 1999: 148-149), becomes relevant again.

It may indeed be argued that our mentally zooming in on a given moment in TIME may involve some type of mental motion on our part (cf. Matlock et al. 2011). This type of motion, however, appears related to imagining semantic content rather than being part of the content reflected in the linguistic data.

The results of the present study reveal features of TIME metaphors not typically seen in standard cognitive linguistic analyses. Similar to Mahlberg's (2005) analysis of the temporal nouns *time*, *times*, *year*, *years*, and *day*, and *with*, they suggests that our understanding of TIME through SPACE is more complex than previously suggested. Mahlberg's study (2005) has shown that temporal nouns have a number of textual functions that are not the same as their syntactic patterns, but closely linked to the specific contexts in which they occur. The present study emphasizes the complexity of metaphorical language about TIME by suggesting that it is influenced not by mappings at the level of conceptual metaphor, but also by more specific conceptual mappings related to our individual experiences of activities, events and processes that take place at a given point in TIME. The results then, are coherent with the dynamic view that people's metaphoric experiences are simultaneously shaped by several interacting constraints (Gibbs 2011a, 2011b), at several levels of abstraction (see Johansson Falck 2010, 2012a, 2012b, 2013; Johansson Falck & Gibbs 2012).

The close connection between the fixed durations of TIME discussed here and things that we do is indeed emphasized by the syntactic function of the phrases referring to these (i.e. by the fact that these tend to be time adverbials saying when something happens). However, cognitive research into TIME and SPACE has tended not to deal with constraints related events, processes and actions, but with ones dealing with our own motion relative to TIME. As

suggested by the results of the present study, however, there is still more to learn about this area of research. Empirical research that tests the theoretical claims is clearly needed.

Future investigations into spatiotemporal mappings could compare the results of the present study to studies of spoken discourse, or to larger studies including similar data. Moreover, they could analyze trajectors in texts about other types of fixed durations of time (e.g. those construed with *at*), or trajectors in the context of temporal motion to find out if these are always defined in relation to a stationary Observer.

More generally, there appears to be a need for empirical research that tests the extent to which naturally-occurring language really reflects previously proposed mappings. Although the application of corpus methods to cognitive linguistic metaphor studies has grown, we still do not know to what degree the proposed systematicity of frequently discussed conceptual mappings is really reflected by authentic data (cf. Deignan 2005: 217), and to what extent alternative explanations are called for. Moreover, we do not yet know what those alternative explanations might be. So far, searches for patterns related to a given source domain, or to a given target domain have uncovered many interesting patterns (see e.g. Deignan 2005; Stefanowitsch & Gries 2006). The present study shows that yet other insights are to be gained from a systematic study of all the patterns that structure a specific part of given type of metaphorical context.

In addition to raising questions for corpus-based research, the present study highlights questions for experimental research into spatiotemporal cognition. Given the patterns found in language, one might wonder if the Time Orientation metaphor (Lakoff and Johnson 1999: 140) really structures all our experiences of TIME. Is last Christmas necessarily behind us when we are mentally zooming in on that particular holiday, or could Christmas be located anywhere in abstract space (as long as Christmas is not understood in relation to some other point in TIME)? Moreover, the question whether the Moving Time/Moving Observer duals really are mutually exclusive needs to be looked into in an experimental way. As suggested by linguistic patterns seen in this study, the path along which TIME and an Observer take turns moving might not always be relevant, or it might be backgrounded when our focus is on our experiences of a given point in TIME.

7. Conclusion

The results of the present study suggest that our understanding of TIME through SPACE is more nuanced than suggested by the Moving Time/Moving Observer dual. As is coherent with its structure, my study shows that TIME IS A PLACE instances may indeed be understood in relation to a Moving Observer, and fixed durations of TIME may be construed as bounded regions on a path. However, the usage patterns of both the English and the Swedish sentences show that in this specific type of context Moving Observer trajectors are the exception rather than the rule, and bounded regions are only rarely codified in relation to a path. Instead, there is a strong tendency for trajectors in both the English and the Swedish sentences to be construed as various types of events, activities, or processes that are located in TIME by means of unit of time landmarks. These landmarks serve as temporal reference points that are intimately connected with our experiences of that specific point in TIME, but not typically with a Moving Observer. Conceptualizations that involve individual moments in TIME thus appear to be qualitatively different from those that involve several temporal units. A corpus-based analysis such as this one may thus uncover features of TIME metaphors that are not typically seen in cognitive research into TIME and SPACE. The results emphasize the need for corpus-linguistic as well as experimental research to assess the degree of systematicity involving the metaphorical mappings between conceptual domains.

Notes

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1. Following Lakoff and Johnson (1980) capitalisation is used for conceptual domains (e.g. TIME) and conceptual metaphors (e.g. TIME IS MOTION).

2. The Parole Corpus is available at <http://spraakbanken.gu.se/parole/> (last accessed December 2015).

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