Is Time Going to Stand? Hebrew and English Speakers' Conceptions of Time

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Abstract

This study examines conceptualization of future intention cross-linguistically. While prior research established the psychological reality of "time as motion" conceptual metaphor for speakers of English, the universality (and the implied embodied nature) of this metaphor is not obvious. Results of this study show that English and Hebrew speakers conceptualize future intention differently following the different spatiotemporal metaphors in their languages.

Introduction

How do people conceptualize time? We usually conceive of time as a continuum that goes from the past through the present to the future. But this conception is too vague. What specifically do we know about time? We know that it is unidirectional and progresses at a constant rate (it is unlikely to be transported from "now" to 1850, and improbable to wind up in 2010 in less than 4 years from now). Tied to this knowledge is a basic property of time - it is quantifiable and thus measurable - that much is clear from our use of clocks and calendars. It is also clear that not all aspects of time are apparent from our immediate experience - do we conceive of time as moving from top to bottom, right to left or front to back; does it run, flow, stand or crawl? Empirical evidence suggests that the abstract domain of time is likely to be shaped by metaphoric mappings from the more concrete and sensory domain of space (Boroditsky, 2000).

In English (as in many other languages) there exists a framework of conceptualizing the relational structure of time in terms of motion in space. As part of the Conceptual Metaphor Theory (CMT), it is noted that there are two different time perspectives – the ego-moving and the time-moving (Lakoff & Johnson, 1980). In the ego-moving perspective, the 'ego', or the observer, progresses toward the future on a stationary time line, as in the phrase "I'm going to miss the deadline". In this metaphor, a deadline (point in time) is conceptualized in terms of a *fixed point in space,* which the speaker *will* miss. Conversely, in the time-moving perspective, the observer is stationary, while the time moves. An example of the latter perspective is a phrase such as "time is flying by." In this metaphor, the speaker remains stationary, while time passes by him as a *flying object*.

An assertion made in recent versions of the CMT with respect to "time as motion" is that it is an example of a primary metaphor (Grady, 1997). There are certain criteria a metaphor needs to satisfy to be considered primary. Primary (as opposed to compound/complex) metaphors have a relatively high degree of experiential grounding and are based on one-to-one mappings (i.e., linguistic labels from only one experiential domain are used to conceptualize an abstract domain). The most important criterion for a primary metaphor is its universal nature for all humans at a conceptual level, rather than level of metaphoric expression. This criterion, in the context of "time as motion," is partially based on the assumption that time, although not a directly experiential domain, is nonetheless a quantifiable and measurable one and thus supposedly objective. Objective domains should therefore be conceptualized identically across languages. However, the universality of the "time as motion" metaphor is questionable, because different languages talk about time differently. Specifically, there is a difference in the ways in which the English and Hebrew languages talk about future intention. What are the effects of such linguistic differences on the respective speakers' conceptions of time? If spatiotemporal metaphors are indicators of underlying conceptualization, then different metaphors for the same phenomenon might indicate a difference in conceptualization.

Gentner, Imai and Boroditsky (2002) have shown evidence for the psychological reality of time conceptualization following the two different systems that the English language provides us with (time and ego-moving). Empirical evidence for the effect of cross-linguistic difference on temporal thinking comes from a study on English and Mandarin speakers. The two languages talk about the relational structure of time differently. English predominantly describes time as a horizontal linear continuum ("Chanukah is already *behind*, but Christmas is still *ahead* of us"), while Mandarin also describes time as a vertical linear continuum ("Chanukah is already *up/above*, but Christmas is still *down/below*"). In a series of studies, native speakers of English and native speakers of Mandarin (Mandarin/English bilinguals) tended to think about time according to the metaphors used in their respective languages (Boroditsky, 2001). The purpose of the present study is to further explore the influence that languages exert on their speakers' conceptions of time. More specifically, it is hypothesized that the different ways in which Hebrew and English languages express future intention affect the respective speakers' conceptualization of future intention.

Future Intention in English

The English construct *going to* is used to denote future intention, as in the following phrases - a) She is *going to* give birth; b) He is *going to* make a mistake; c) I am *going to* pass this test. *Going to* in such context expresses future intention, not a physical act of motion. G*oing to* in the temporal sense is a product of grammaticalization, during which this construct was imported from the domain of space (motion along a continuum) to the domain of time (future intention) and became a "time as motion" spatiotemporal metaphor (Traugott, 1978). Additionally, the construct *will* is used in English to denote future intention, as in the phrase "She *will* give birth."

Future Intention in Hebrew

The *going to* construct translated literally is used in the temporal sense in Hebrew as well (*holekh* when the subject is male, *holekhet* when the subject is female). As in English, *holekh/holekhet* is used to express physical motion, like in the phrase "Hu holekh la-bank/ He is going to the bank," as well as future intention, like in the phrase "Hu holekh laasot taut/ He is going to make a mistake." What makes Hebrew interesting for the purposes of the present study is that the Hebrew verb *omed* (when the subject is male*, omedet* when the subject is female) is also used to talk about future intention. *Omed/omedet* literally means *stand(s)* in English. So in Hebrew, the phrase "He omedet ba-knisa la-bank/ She stands in the entrance to the bank," and the phrase "He omedet laasot taut/ She is going to make a mistake" share the same verb, *to stand*. It is likely that *stand* in Hebrew, in the temporal sense of future intention, is also a product of grammaticalization, during which the spatial construct stand was imported into the domain of time. (English also uses *stand(s)* to talk about future events, but this use is limited in scope to matters of accidental gain/loss, such as "she *stands* to lose her fortune over this shady deal" or "he *stands* to inherit a large sum of money.") *Will* does not exist in Hebrew at all. Verbs can be conjugated to reflect future tense/intention.

Does Language Shape Conceptualization of Future Intention?

As already mentioned with respect to "time as motion" metaphor, English uses both time-moving and ego-moving perspectives. However, even though both perspectives exist in Hebrew, neither seems to apply to the spatiotemporal metaphor of a future intention expressed by the verb *stand(s)* (a semantic equivalent of the English temporal *going to*). The stationary nature of this construct is in direct contrast to the "time as motion" metaphor, because in a Hebrew phrase such as "Ani omedet laasot taut" (literally: I *stand* to make a mistake; metaphorically: I'm *going to* make a mistake), there is no sense of 'me', the agent, advancing toward the moment in which a mistake is going to be made, nor is there a sense that the moment of the mistake is advancing toward 'me'.

If metaphors involving ego-moving perspective are processed by activating motion spatial thinking (which is to be expected because in the ego-moving perspective, time is stationary and people move through it), then people should be better at processing such metaphors if they have been primed with pictures of people in motion than if they have been primed with pictures of people without motion. If time-moving perspective metaphors are processed by activating stationary spatial thinking (which is to be expected because in the time-moving perspective, people are stationary and the time moves), then people should be better at processing such metaphors if they have just seen a stationary prime than if they have just seen a motion prime. However, if spatiotemporal metaphors are indicators of underlying conceptualization, then different metaphors for the same phenomenon might indicate a difference in conceptualization. Therefore, it is expected that after seeing motion primes, English speakers will be better at processing ego-moving targets than time-moving targets (because "I'm going to" is used for both physical motion and future intention). Conversely, it is expected that Hebrew speakers will be better at processing ego-moving targets than time-moving targets after seeing stationary primes (because "I stand" in Hebrew is used for both physical upright position and for future intention).

Additionally, if motion spatiotemporal metaphors are processed by activating motion spatial thinking, then people should be better at processing such a metaphor if they have just seen a motion spatial prime than if they have just seen a stationary spatial prime. Therefore, it is expected that English and Hebrew speakers will be better at responding to the spatiotemporal *going to* targets after being primed with a motion scenario than after being primed with a stationary scenario. Also, since in English both *going to* and *will* are used for future intention, while in Hebrew *going to* used (albeit less frequently), but *will* does not exist at all, Hebrew speakers should be better at processing *going* to targets than *will* targets, while English speakers should do equally well on *will* and *going to* targets.

Experiment

Participants

Participants were 29 native English speakers (recruited from San Francisco State University Psychology classes) and 25 native Hebrew speakers (recruited by snowball sampling from the San Francisco Bay Area). All participants were fluent in English (self reported). Native English participants received course credit; native Hebrew participants received payment for their participation. Native English participants ranged in age from 19 to 43 years (M = 25 years, SD = 5.5 years). Native Hebrew participants ranged in age from 21 to 40 years (M = 30, SD = 5 years). Native Hebrew participants ranged in age of acquisition of English from 2 to 11 years (M = 7.1 years, SD = 3.7 years).

Design

The experiment consisted of a set of 128 primes, 16 targets and 16 target fillers. Participants answered spatial prime true/false questions followed by target true/false questions about time. Primes were spatial pictures accompanied by a sentence description. Half of the primes

were motion and the other half were stationary scenarios. True motion primes depicted people in motion (running, biking, or jumping), accompanied by a sentence accurately describing the particular type of motion in the picture (e.g., "She is jumping" for a woman depicted jumping). True static primes depicted people without motion (sitting or laying), accompanied by a sentence accurately describing the picture (e.g., "He is sitting" for a man depicted sitting). False primes were constructed by mislabeling the pictures (i.e. a picture of a sitting person, sentence reads: "He is laying"), but keeping the nature of the entire page consistent (either motion or stationary). False statements were created to prevent the participants from figuring out the structure of the experiment (all experimental trials were true). Targets were temporal statements. Half of them were *going to* spatiotemporal statements (e.g., ''The year 2050 is going to precede the year 2060"), and the other half were temporal *will* statements (e.g., ''The year 2050 will precede the year 2060"). Additionally, half of both motion and stationary targets were ego-centered statements (e.g., "I'm *going to/will* be 50 years old before I'm 60 years old"), and the other half were time-centered statements (e.g., "The year 2050 is *going to/will* precede the year 2060"). Target filler statements were all false and were constructed by reversing the order in each of the target statements (e.g., "The year 2060 will/is going to precede the year 2050"; "I'm going to be/I will be 60 years old before I'm 50 years old"). Four different experimental sequences were created to guard against order effects. Each participant completed a set of 2 practice trials followed by 64 experimental trials. Each experimental trial consisted of two spatial prime questions (both motion or both static) followed by one temporal target question. The two primes and the target in experimental trials were true. Each target question appeared twice, once after motion primes and once after stationary primes. The experiment was carried out on an Apple laptop using a reaction time program designed with MacLaboratory Reaction Time program. Experimental materials were in English for both English and Hebrew participants.

Procedure

All participants were tested individually in English with English instructions. Questions (primes and targets) were presented on a computer screen. For each question, participants had to respond by pressing one of two keys on a keyboard ("D" for false, "L" for true). Accuracy of responses, as well as response times were recorded by the computer.

Results

Percentage of correct responses and response times were analyzed. However, only the analysis of percentage of correct responses revealed significant differences between the two language groups. Response times followed the same patterns, but the differences were not statistically significant on the critical predictions. Data of participants who a) were Hebrew/English bilinguals from age 5 or below; b) did not know what the word "precede" means; or c) had above 50% of incorrect responses overall, were omitted from the analyses, leaving 23 native English speakers and 16 native Hebrew speakers. Only responses to true target time questions were analyzed. Responses to targets that followed an incorrect response to a prime were considered incorrect. Responses were analyzed with repeated-measures ANOVA, with language (Hebrew, English) as between-subjects factor, and prime type, target type as within-subjects factors. As predicted, Hebrew and English speakers patterned differently in their responses to the same primes and targets. After seeing motions primes, English speakers were more accurate at processing ego-moving targets, such as "I'm going to be 60 years old before I'm 70 years old," than at processing time-moving targets, such as "The year 2060 is going to precede the year 2070." Hebrew speakers' responses followed the opposite pattern, albeit without statistical significance. After seeing stationary primes, Hebrew speakers were more accurate at processing ego-moving targets than time-moving targets.

Native English speakers were more accurate in answering ego-moving targets (99.45%) than time-moving targets (94.57%) after seeing motion primes, F (1, 22) = 4.632, $p < .05$. Hebrew speakers' responses show the opposite trend but without significance, perhaps due to the smaller sample size and therefore less power in the analysis. Hebrew speakers were more accurate in answering ego-moving targets (99.99%) than time-moving targets (94.52%) after seeing stationary primes, F (1, 15) = 3.462, p=.083 (non-significance is likely due to higher attrition of Hebrew-speaking participants and hence less power in the analysis). The predicted difference in the interaction of prime type and ego/time-moving target between the two language groups was confirmed as a three-way interaction in a 2(target) X 2(prime) X 2(language) ANOVA, F (1, 37) = 7.942, $p < .01$.

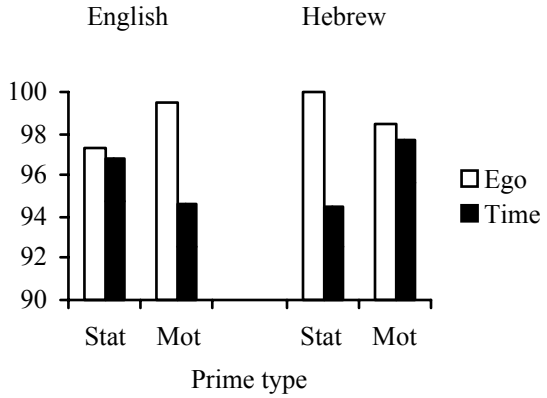

Figure 1: Percentage of correct responses to ego and time-moving targets following motion and stationary primes is plotted for English and Hebrew speakers.

Additionally, Hebrew and English speakers' responses revealed opposite patterns for the *will* and *going to* targets. Hebrew speakers were more accurate to process *going to*

targets (98.45%) than to process *will* targets (95.92%), while English speakers were more accurate to process *will* targets (98.1%) than to process *going to* targets (96.87%). This pattern is probably due to the fact that in Hebrew going to is used (albeit less frequently than in English), but will does not exist at all (verbs are conjugated to reflect future intention/tense). English speakers' response patterns are likely because will targets were shorter and therefore potentially easier to process. This pattern was confirmed in a two-way interaction by a 2(target) X 2(language) ANOVA, F (1, 37) = 5.152, p < .05.

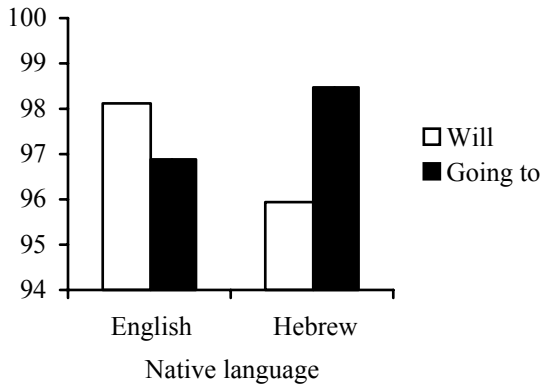

Figure 2: Percentage of correct responses to will and going to targets plotted for English and Hebrew speakers.

Contrary to the prediction, English and Hebrew speakers were not better at processing the going to targets after being primed with motion scenario than after being primed with stationary scenario, F (1, 37) = .665, p = .42.

Conclusions

The results of this study suggest that conceptualization of future intention is not universal, but is based on the particular metaphors used in one's native language. English speakers were more accurate at processing ego-moving targets than time-moving targets after seeing motion primes. Conversely, Hebrew speakers were more accurate at processing ego-moving targets than time-moving targets after seeing stationary primes, even though both groups were tested in English. Although the construct *going to* is occasionally used in Hebrew, as well as a number of other metaphors suggestive of "time as motion" conceptual mappings, it appears that the habitual use of a "time as no-motion" spatiotemporal metaphor is pervasive enough to encourage thinking about agentive (based on the ego perspective) future intention in stationary terms. Additionally the lack of the construct *will* for future intention in Hebrew appears to lead to Hebrew speakers' reduced accuracy of processing of *will* sentences compared to *going to* sentences.

However, there is a puzzling result - while spatial primes seemed to activate long-term metaphoric temporal thinking), they did not work for immediate processing of temporal metaphors (i.e., participants were not better overall at processing *going to* targets after seeing motion primes). A possible explanation is that while the primes did invoke motion thinking, none of them involved actual physical walking (motion primes depicted people running, jumping and biking) and therefore there was a differentiation between the types of motion depicted and the actual walking that is involved in *going*. Future research should examine the hypotheses of this study with more pronounced primes (e.g., video clips for motion primes, static pictures for stationary primes) to explore the precise conditions under which motion spatial thinking is used for temporal thinking. Overall, the findings of this study suggest that "Time as Motion" conceptual metaphor is not universal. Rather, the findings lend support to Whorf's Principle of Linguistic Relativity - people tend to conceptualize a particular aspect of the domain of time according to the languages they speak.

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