SPACE, TIME, AND ICONICITY IN TURKISH SIGN LANGUAGE (TID)

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Abstract. Much evidence points to the conclusion that temporal concepts are drawn primarily from the conceptualization of space. Sign languages provide a particularly suitable area for observing such a relationship since they employ a three-dimensional signing space as a major building block for articulation. This paper addresses spatial and temporal language in Turkish Sign Language (TID), which has a full-fledged grammar and a natural language used by the deaf community in Turkey. It investigates descriptions of static and dynamic spatial situations and expressions of time. Results showed mismatches between the axial information in the stimuli and the use of left-right and front-back axes in the signing space. Furthermore, results also showed that the temporal language did not always correlate with the deictic use of the front-back axis. Thus, these findings suggest that temporal language may only partially be derived from spatial language.

1. Introduction

It has been argued that temporal relations by means of adverbials and / or tense are drawn primarily from the conceptualization of space. That is, people talk about time by using spatial expressions, which also suggest that locative relations are more basic and provide structural templates (Evans 2003, Boroditsky 2003, Lyons 1977, inter alia). Sign languages offer clear cases to observe that spatial relations are encoded in signing space (e.g. Emmorey 1996, 2002, Engberg-Pedersen 1993), but little is known about how temporal relations are conveyed. In this paper, I test the hypothesis whether, following Haspelmath (1997), time is derived from space, especially spatial relations on the front-back axis. I show that data from Turkish Sign Language (TID) partially support this hypothesis. TID, which is officially recognized by the 2005 Disability Act passed by the Turkish Grand National

Assembly, has a full-fledged grammar and a natural language used by the deaf community in Turkey.

Space is one of the basic tenets of human language and cognition (Miller and Johnson-Laird 1976). It is often assumed that spatial representations are universal. However, languages differ from each other in their linguistic representations of spatial relations of entities (for dynamic situations such as motion events see Bohnemeyer et al. 2007; for static situations see Pederson et al. 1998). For example, English uses adpositions, Turkish uses case markers, and Mayan languages use positionals (see Grinevald 2006 for an overview). Although languages differ from each other in their morphological encodings of spatial relations, natural language users use similar strategies across languages, such as Figure-Ground assignment, perspective taking, and reference frames across languages. A natural language user identifies one entity as Figure with respect to a referent object, and another as Ground (Talmy 1983:232), which is often a larger, immobile, culturally significant, and familiar object (Svorou 1994:8–12). In addition, a natural language user chooses a reference frame: egocentric or allocentric (e.g. O'Keefe and Nadel 1978, Klatzky 1998, Burgess 2006). An egocentric reference frame can be realized in two ways: (1) a viewer perspective in which speakers take their own perspective and describe the spatial relations accordingly and (2) an addressee perspective in which speakers describe the spatial relations according to the addressee's viewpoint. An allocentric reference frame can also be realized in two ways: (1) an environment-based perspective in which speakers describe the spatial relations according to fixed-bearings such as geocardinal directions and (2) a neutral perspective in which speakers describe the spatial relations according to intrinsic features of the objects.

Time is also one of the basic tenets of human language and cognition (Miller and Johnson-Laird 1976). Across languages, spatial lexemes such as adpositions and/or adverbials are also used in temporal expressions (e.g. Haspelmath 1997). Yet, (1) languages also encode temporal relations in their tense systems and (2) the use of adverbials can correlate with tense markings. For example, 'last week I will go to London' is unacceptable since last week and non-past marking on the auxiliary do not 'agree'. Typologically, grammatical markings of temporality are quite complicated. For example, Dahl (1985) argues that there are about forty-five different tense systems, which often overlap aspect and mood. It is also assumed that situations are located along a timeline which is supposed to be a straight line, hence one-dimensional, so that, according to Comrie (1985), tense is a 'grammaticalized expression of location in time'. Nonetheless, morphological markings of tense are not always obligatory. Some languages mark tense in their morphology while others such as Mandarin do not.

Since entities in spatial relations are concrete and events in temporal relations are abstract, it is often stated that time is derived from space (see Clark 1973, Lyons 1977). The fact that (some) spatial lexemes are also used in temporal expressions across languages also supports this view. However, the lexical items referring to space and time do not overlap exclusively. For example, according to

Haspelmath (1997), in English, prototypical 'near' may not be used in temporal events, nor is prototypical 'soon' used in spatial relations. The ways to convey spatial and temporal relations can also differ. For example, temporal relations can be carried by special morphological markers such as tense and aspect while those markers are not used in conveying spatial relations (for a review see Tenbrink 2007: 12-37). Nonetheless, these items are often neglected in discussions.

Several hypotheses have been developed to understand the space-time relationship. For example, since time is understood one-dimensionally, whereas space is three-dimensional, one could argue that the spatial lexical items used in referring to one-dimensional spatial relations are also used in temporal relations. Moreover, in the real world, space and time are interrelated; therefore, languages lexicalize spatial terms into temporal terms (e.g. Bybee et al. 1994). One could also argue that space is basic whereas time is a metaphorical extension of space (Lakoff and Johnson 1980). That hypothesis was developed recently in the following way: There are two 'perspectives' used in temporal relations. One is the moving-time perspective in which time is understood as moving, as in 'approaching', 'coming', etc. The other one is the moving-ego perspective in which time is understood as static and the ego moves as in 'going to' (Radden 2003, Gentner 2001, Traugott 1978, Clark 1973). There is also increasing empirical evidence for these 'perspectives' alongside the front-back axis to be used in the spatial and temporal domains of language. For example, when participants are primed with one of the strategies in spatial tasks, this strategy has an effect on the participants' judgments in referring to temporal events (Casasanto and Boroditsky 2008, Núñez et al. 2006, Núñez and Sweetser 2006, Torralbo et al. 2006, Matlock et al. 2005, Gentner et al. 2002, Gentner 2001, McGlone and Harding 1998, Gentner and Imai 1992).

The reported studies above are done on spoken languages which use the auditory modality. But do these findings account for the spatial and temporal expressions in the other modalities? In this paper, I aim to answer this question by studying a sign language, Turkish Sign Language (TID), which uses the visual-gestural modality.

2. Current study

Signers use the space in front of them and their body in articulation. Importantly, they represent space by using their signing space (e.g. Emmorey 2002). Previous observations suggest that temporal expressions are also made systematically by using the signing space (for American Sign Language see Friedman (1975), Cogen (1977)). Engberg-Pedersen (1993) and Emmorey (2002) claim that there are five timelines in Danish and American Sign Languages: deictic, anaphoric, sequence, mixed timelines, and the calendar plane. For them, the sequence timeline lies from left to right whereas the deictic and mixed timelines are front-back. The anaphoric timeline is horizontal and diagonal while the calendar plane is both left-right and vertical in the signing space. In the current study, I focus on the deictic timeline which is front-back in relation to mainly

lexical items in relation to temporal expressions. I leave the use, if there is any, of the sequence timeline, from left to right, to future research.

On the basis of the current literature I develop the following hypotheses: (i) Temporal language is derived, especially, from the spatial front-back axis, which directly maps the situations in the real space and (ii) Some lexemes used in spatial relations are also used in temporal language.

3. Spatial relations in TID

In this section I focus on the use of the left-right and front-back axes in TID signing space in describing spatial relations since these axes, especially the front-back axis, arguably, provide the spatial base for time. Based on findings from experimental data on static and dynamic spatial situations, I show that the spatial language of a visuo-spatial language, such as TID, is more complex than often assumed. For example, in TID descriptions, two objects located on a lateral axis can be represented either on the left-right axis or the front-back axis in the signing space. The findings reported here suggest that the spatial front-back axis may not be the only template for temporal relations.

In order to understand the linguistic encodings of space by focusing on the use of axes in signing space I designed a set of experiments. These experiments were conducted in several signed and spoken languages and the results were published elsewhere (Arik, 2009, 2010a, 2010b, 2011, to appear). In the static experiment, spatial information is controlled as much as possible. TID signers (n = 12; 3 females, 9 males; all native Deaf signers) are asked to give spatial descriptions of objects in different arrangements in a total of twelve static situations. In each situation, the objects are located on different axes (lateral and sagittal), and have several con-figurations (face each other, face different directions, and face the same direction).

Figure 1 shows object location arrangements: on the lateral (left-right) axis such as (b) and (d); on the sagittal (front-back) axis such as (a) and (c). In addition, there were several arrangements of object orientations. Thus, in (a) objects face each other; in (b) and (c) objects face the same directions; in (d) objects face different directions.

In the dynamic space experiment, spatial information is also manipulated. TID signers (n = 8; 4 females, 4 males; all native Deaf signers) describe a total of thirty-three motion events in which objects are in different arrangements. In each event, similar to the static experiment, the objects are located on either the lateral or sagittal axis, and the animate objects such as dolls have configurations: facing each other, facing different directions, and facing the same direction.

Figure 2 shows one of the testing items in the dynamic experiment. In this stimulus, there are two dolls (male and female) located on the sagittal axis and facing each other. The illusion of motion is made by the motion picture technique of sequencing more than six shots of the event in iMovie and saving them as a movie file. The situation is created as if the male doll was moving towards the female doll.

(a)   (b)

(c)   (d)
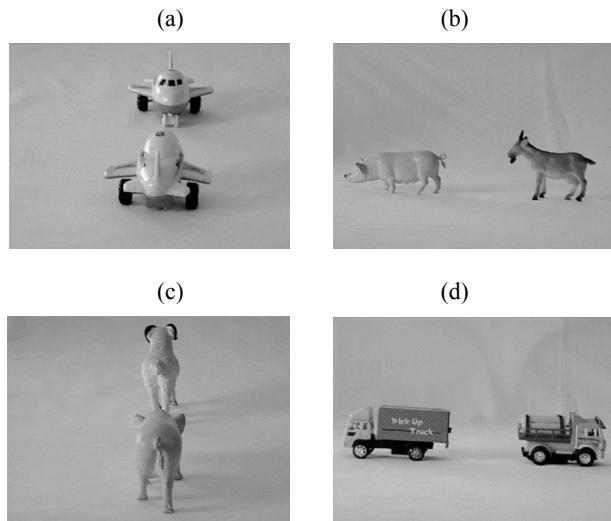
Figure 1. Testing item samples from the static space experiment.

Figure 2. Three still frames from one of the dynamic experiment testing item.

The descriptions are coded on the basis of matching criteria. Consider Figure 1d in which two trucks are located on the lateral axis and facing different directions. When the participant describes this picture by using the left-right axis in their signing space (Axis = x, Reference frame = Egocentric), the description is coded as 'match'; otherwise it is coded as 'mismatch' (e.g., Axis = y, Reference frame = Allocentric). As a result, I found mismatches between the input information and the description in 32% of the data from the static space experiment and 26% of the data from the dynamic space experiment. Crucially, the mismatches did not statistically correlate with either locational or orientational information. In addition, perspective was not marked linguistically.

Content analysis of the data shows that, in TID, there is essentially more than one way to represent a static spatial configuration of the objects. Let me give a detailed description of TID spatial language. Consider the picture in Figure 3. In the data, two rather different descriptions appear. In one, the TID signer in example (1) uses the left-right axis of her signing space and orients the animals toward her left. Her use of axes matches the axial information from the picture. In

the other, the TID signer in example (2) uses the front-back axis of her signing space and orients the animals toward the distal region. Her use of axes does not match the axial information in the stimulus. Nevertheless, both descriptions are acceptable according to the judgments of the participants and informants, unmarked in terms of perspective, and functionally equivalent to each other in TID; therefore, there were no performance errors.[1]

Figure 3. The static experiment testing item for the data in (1) and (2).

(1)

RH: PIG   GOAT   CL1_____ move to left
LH: CL1_____ move to left
'The pig and the goat are located on the lateral axis and face left.'

(2)

RH: PIG   GOAT   CL1_____ move to distal
LH: CL1_____ move to distal
'The goat and the pig are located on the sagittal axis and face the distal region'

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1 Transcription conventions: SMALL CAPITAL LETTERS=sign glosses given in English, RH=right hand, LH=left hand, #=fingerspelling, CL=verbs of location, motion, and orientation, ____=continuous sign, static=stationary/not moving, move to … =in motion.

In TID there is also more than one way to represent a dynamic spatial configuration of the objects. Consider the stimulus in Figure 4. In the data, there are two ways of describing that stimulus. Still frames below only give the targeted part of the description for the sake of simplicity. The TID signer in example (3) uses the front-back axis (y) of his signing space whereas the TID signer in example (4) uses the left-right axis (x) of his signing space. While (3) matches the motion information with respect to the axes in the stimulus, (4) does not. Note that, as for the static data, both are acceptable according to the judgments of the participants and informants, unmarked in terms of perspective, and functionally equivalent to each other in TID.

Figure 4. The dynamic testing item in which two dolls are located on a sagittal axis, face different directions, and the female doll moves toward the proximal region. The data are shown in (3) and (4).

(3)

RH: CL1_____ move to proximal
LH: CL1_____static_____
'(The girl and the boy) are located on the sagittal axis and the girl goes away from him'

(4)

RH: CL1_____move to right
LH: CL1_____static
'(The girl and the boy) are located on the lateral axis and the girl goes away from him'

This section has shown how the axes are used in TID spatial language. The findings from the experiments on the static and dynamic event descriptions show that the left-right and the front-back axes do not exactly map the situations in the real space. Hence, the signing space itself is more complex than has been claimed before. I argue that the spatial geometry is not identical in perception/conceptualization and in the spatial language. But can the spatial use of the front-back axis in TID be a source for the temporal language? In the next section, I provide language-internal data to show how and when temporal language and spatial language are related linguistically.

4. Temporal relations in TID

In order to test the second hypothesis I elicited data from the TID signers. The data came from 14 native signers who are deaf and active in their deaf community. The entire corpus consisted of 40+ hours of digitized and transcribed utterances, grammaticality and acceptability judgments, storytelling, and life stories. In the following, I give examples for the deictic use of space in TID temporal language, mainly lexical items. TID uses the deictic front-back axis in referring to several temporal expressions. Some of these are lexical items.

(5)

before   yesterday   behind

(6)

now   today   here

(7)

after   tomorrow   there

For example, BEFORE, YESTERDAY, and BEHIND are articulated in back as shown in (5); NOW, TODAY, and HERE in the proximal front as shown in (6); whereas, AFTER, TOMORROW, and THERE are articulated in the distal front in the signing space as shown in (7).

Moreover, when some of these signs are used to modify time expressions, there is again a correlation with the 'deictic' front-back axis in the signing space. For example, BEFORE in TWO DAY BEFORE 'two days ago', TWO WEEK BEFORE 'two weeks ago', FOUR MONTHS BEFORE 'four months ago', and THREE YEAR BEFORE 'three years ago' is always a backward sign whereas AFTER in TWO DAY AFTER 'two days later', TWO WEEK AFTER 'two weeks later', FOUR MONTH AFTER 'four months later', and THREE YEARS AFTER 'three years later' is always forward in the signing space. (8) shows how TID signers sign 'two weeks ago' and (9) shows how TID signers sign 'two months later'.

(8)

TWO   WEEK   BEFORE
'two weeks ago'

(9)

two   month   after
'two months later'

On the basis of the above data, one could argue that there are temporal expressions in TID lexicalized with respect to the signers' body; therefore, temporality might be conceptualized 'deictically'. However, time expressions do not consist of the above examples only. Crucially, the other domains of TID temporal language do not use the 'deictic' front-back axis. For example, the names of hours, days, months, seasons, and years are not correlated with respect to space. (10) presents three examples: Monday, Tuesday, and Wednesday. Notice that there is no correlation among the articulations of these signs with respect to the front-back axis in the signing space. (11) presents three examples: January, February, and March. Again, the articulations of these signs have nothing to do with the front-back axis.

(10)

monday   tuesday   wednesday

(11)

january   february   march

So far, I have presented the data with regard to time expressions and temporal adverbials. How a natural language expresses clause-level temporality is also, unquestionably, related to temporal language. Thus, I have also analysed the tense domain of TID temporals with respect to spatial axes. What I found is that there is no overt tense marker in TID morphology. It appears that TID does not use lexical items or manual morphological markers to mark tense. It also appears that there was no systematic use of nonmanual markers such as head nod, eyebrow raising, body lean and so on, to mark tense. Yet, future research is needed to analyse whether there are some restrictions on the use of nonmanual markers in relation to tense. For example, I SCHOOL GO can refers to an event that happened before the articulation or will happen after the articulation. (12) presents how TID signers sign 'I went to school' while (13) presents how they sign 'I will go to school'. Notice that there is no morphological difference, i.e. manual and / or nonmanual marking, between the two expressions. When a temporal adverbial such as 'yesterday' in past tense or 'tomorrow' in future tense is in use, there is no

morphological marking for the tense. Nor is the use of signing space correlated with the 'deictic' front-back. (14) and (15) present the data.

(12)

i school go
'I went to school'

(13)

i school go
'I will go to school'

(14)

yesterday school go
'I went to school yesterday'

(15)

i tomorrow school go
 'I will go to school tomorrow'

The data above have shown that in TID in some domains of temporal language, e.g. lexical items such as 'before', 'yesterday', and 'behind', the surface correlations between the spatial and temporal language can be found in the front-back axis of the signing space. But, in the other domains of TID temporal language, e.g. the names of time concepts such as 'January', 'Monday', and tense marking, there are no correlations with respect to spatial language and the signing space. Hence, these findings partially support the hypothesis at the lexical level but not at the domain level.

Taken together, the experimental findings and elicitations partially support the hypothesis that time is an extension of space such that the front-back axis of space also encodes temporal relations when one takes the domains entirely. The use of axes in TID, which uses space grammatically, in the spatial domain is complex and may not be a primitive for another domain such as time. Yet, some of the lexical items are used deictically and provide a correlation between space and time.

5. Conclusion

Is the (spatial) front-back axis the only source for the temporal language? Some studies on spoken languages suggest so. In this paper, I questioned that claim and tested the hypothesis in a visual gestural language, TID. Experimental data and language-internal evidence from TID suggest that temporal and spatial language may not be derived from each other but they share some properties at the lexical level with respect to deixis. This is not surprising since crosslinguistic studies indicate that some, but not all, spatial lexemes can be used in the temporal language. There is also evidence that brain-damaged subjects process the prepositions used in both the spatial and temporal domains of English differently. For example, the assessments of the use of English prepositions in the spatial and temporal domain indicate that the knowledge may be intact in one domain but not the other (Kemmerer 2005). The linguistic encodings of space and time also differ from each other in their structure. For example, typologically, locational information is mostly encoded in NPs and not in predicates, with the exception of the so-called positionals, e.g. standing and sitting (Newman 2002). However, temporal information can be encoded both in NPs and in predicates.

Acknowledgments

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