

Perspective taking strategies in Turkish Sign Language and Croatian Sign Language

Engin Arik
Purdue University

Marina Milković
University of Zagreb

1 Introduction

Space is one of the basic domains of human language and cognition (Miller & Johnson-Laird 1976, Levinson 2003). Every language has its own lexicalized and/or grammaticalized forms for representing a spatial relation. Some languages use adpositions; others use case-markers or positionals in referring to spatial relations (Grinevald 2006). For example, English employs prepositions whereas Turkish uses the locative case-marker. Sign languages provide interesting cases since spatial relations are conveyed by using the three dimensional signing space. However, to date it has not been shown how sign languages differ from each other in their spatial language. This paper provides evidence for this difference in one of the linguistic domains of space, i.e. perspective, in two sign languages: Turkish Sign Language (TID) and Croatian Sign Language (HZJ).

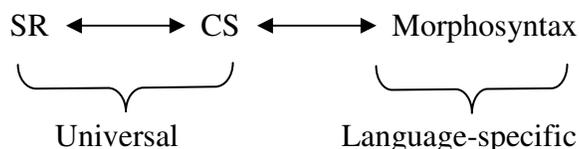
This paper is organized in the following way. In Section 2, we will give theoretical background for the study of spatial language. In Section 3, we present our study, main claims in the literature, and the methodology used in this study. Section 4 outlines our first experiment and the results obtained from this experiment, and Section 5 provides the second experiment and findings. Section 6 concludes the paper.

2 Theoretical background

According to Jackendoff (1990), humans conceptualize the spatial relations of objects in a conceptual representation (Conceptual Structure, CS) by combining all aspects of spatial structure. This is, arguably, represented in the brain. This conceptualization process is subject to our perceptual capacity (spatial

representations, SR) and all aspects of language structure, i.e. lexicon and grammar (language representations, LR). Although CS is universal, languages differ from one another in morphosyntax because of the interface between syntax, CS, and the lexical concepts (Jackendoff 1996:7).

Figure 1. Jackendovian interfaces.



In talking about space we identify entities, i.e. Figure and Ground, and their asymmetrical relation with respect to each other (Talmy 2000) with regard to relations such as size, containment, support, orientation, order, direction, distance, motion, or a combination of these in the entities located in a space (Svorou 1994:8). There is a tendency to identify larger, immobile, culturally significant, and familiar objects as Ground objects (Svorou 1994:9-12). Additionally, there are extra-geometric effects of functional relations, location or functional control relations, object association, animacy, and context (Coventry & Garrod 2005).

In addition to reference objects and their relations in space, we also take a perspective in describing a spatial arrangement (Levelt 1996). There are three perspectives defined to date. Two of them are egocentric and one of them is allocentric. One of the egocentric perspectives is narrator perspective, in which the speaker takes his/her own perspective and describes the spatial relations accordingly. The other one is addressee perspective, in which the speaker describes the spatial relations according to the addressee's viewpoint. The third type of perspective is neutral perspective, which is allocentric, defined as the perspective which is a combination of the other two but with no explicit reference to narrator or addressee viewpoint. For example, in English in 'the car is on your left' the addressee perspective is taken whereas in 'the car is on my right' the narrator perspective is taken. However, in 'the car is in front the building' there is no reference to either narrator's or addressee's viewpoint; therefore, a neutral perspective is employed.

Not all languages convey spatial relations, i.e. Figure, Ground, and Perspective, in the same way. According to Pederson et al. (1998) and Levinson & Wilkins (2006) languages differ from each other in their preferences in establishing spatial relations, or reference frames. Tzeltal speakers, for example, take a neutral perspective, an absolute reference frame in Pederson et al. (1998), whereas Turkish speakers use both egocentric and allocentric perspectives (Arik 2003).

3 Present study

Perspective taking is one way to investigate how languages represent spatial relations. In this paper we investigate perspective taking strategies in Turkish Sign Language (TID) and Croatian Sign Language (HZJ).

There is a growing interest in the spatial grammar of sign languages. However, there are also competing hypotheses regarding how spatial information is encoded in signing space. In the literature the spatial linguistic forms of sign languages such as American Sign Language (ASL) are claimed to have gradient rather than categoric properties (Emmorey 2002, Emmorey & Herzig 2003). On the basis of this view, according to Talmy (2006), for example, signed spatial representations are largely iconic, have more structural elements, more categories, and more elements per category when compared to spoken spatial representations. Liddell (2000, 2003) argues further that gestural and linguistic information in signed spatial information are fused together.

What is common in these claims is that space is represented not categorically but gradiently, therefore (1) all sign languages may use the same linguistic system. Similarly, since space is represented iconically, therefore (2) its use is gestural (or linguistic representation cannot be separated from gestures). Let us put these claims into a Jackendovian perspective. Both views implicitly argue that spatial representations are directly mapped onto morphosyntax and thus *should be the same* across sign languages. We argue against this position. We claim that the use of signing space is not a direct mapping of SRs onto the linguistic system but is part of morphosyntax and therefore language-specific. In order to support our claim, we provide evidence that sign languages differ from spoken languages, both linguistically and gesturally, and that sign languages differ from each other in talking about spatial arrangements of objects.

There is already evidence that sign languages differ from spoken languages in perspective taking strategies (Arik 2003, Arik and Nadolske 2006, Emmorey 2002). In spoken languages, such as English, speakers prefer to describe object relations from their addressee's viewpoint (Schober 1993). Our first study aims to understand which perspective, i.e. narrator, addressee, or neutral, TID and HZJ users take in their descriptions of spatial relations. If TID and HZJ signers also take an addressee perspective in spatial descriptions, then we can claim that addressee perspective is part of CS and therefore universal in the Jackendovian approach. Otherwise, it must be encoded in morphosyntax, and we must conclude that each language encodes perspective in its own morphology.

According to Schober (1993), English speakers also tend to take an addressee perspective regardless of their addressee's location. Özyürek (2000) claims that English speakers change their speech and gesture combinations more

frequently when the addressee location varies than when it remains constant. More importantly, speakers use more lateral gestures when speaker and addressee are seated at 120 degrees to each other, whereas speakers use more sagittal gestures when two addressees are present and seated at 120 degrees to the speaker. Our second study aims to understand how the use of perspective is affected by the position of an addressee in TID and HZJ. We also look at the addressees' comprehension to understand which perspective they take when retelling. If TID and HZJ signers take an addressee perspective regardless of addressee positioning, then we can provide further evidence for a universal addressee perspective which is part of CS. However, if TID and HZJ narrators' descriptions and use of signing space change when the addressee location varies, then we can claim that spatial representations in sign languages such as TID and HZJ are direct mappings of SR and therefore not part of the linguistic system as per Liddell (2003). Otherwise, spatial relations must be encoded in morphosyntax, supporting the claim that each language encodes perspective in its idiosyncratic morphology.

3.1 Methodology

Twelve native Deaf TID signers and ten native Deaf HZJ signers participated in this study. Their educational level varies. TID data were collected in Izmir, Turkey in May-June, 2006. HZJ data were collected in Zagreb, Croatia in September, 2006-January, 2007. Participants completed the informed consent process and were compensated for their time.

Figure 2. Testing item samples.



Twelve pictures consisting of several spatial arrangements of objects were shown to the signers, who were expected to describe the object relations to a native signer addressee. All descriptions were videorecorded for analysis. In Figure 2 we give testing item samples. There were object *location* arrangements: on the left-right axis such as (a) and (b); on the front-back axis such as (c) and (d). In addition, there were several arrangements of object *orientations*. Thus, for

example in (b) and (c), objects faced toward the same direction; in (a) objects are facing each other; and in (d) objects are facing different directions.

4 Study 1: Perspective

In study 1, our research question is as follows: which perspective (narrator, addressee, neutral) is taken in TID and HZJ descriptions of the testing items. In this study each participant was requested to look at the pictures very carefully and to describe the event in as detailed a way as possible to the addressee. S/he was also told that there is no right or wrong description for the event in the picture. While looking at the addressee, s/he described the event.

4.1 Results

TID and HZJ signers use linguistic forms that encode both location and orientation of objects. That is, a single linguistic item gives locational and orientational information together. This characteristic might be unique to sign languages studied so far. However, no use of ‘relational lexical items’, such as left, right, front, back, etc., that would be indicative of neutral perspective was observed in either language. Therefore, we conclude that the axial location system of signing space is the default in spatial language in sign languages and relational nouns are redundant. Furthermore, the data show that the use of space differs between the two languages, especially when objects are: 1) on a lateral axis and facing the same direction, or 2) on a sagittal axis and facing different directions. While TID signers represent both situations either on a lateral axis or a sagittal axis in the signing space, HZJ signers use a lateral axis for the first situation and a sagittal axis for the second situation.

Consider some examples from our data. In Figure 3 we provide the testing item that we used to elicit examples (1) and (2). In this picture there are two trucks on a lateral axis and facing right. TID data is given in (1) and HZJ data is given in (2).

Figure 3. The testing item for examples (1) and (2). Two trucks are on a lateral axis and facing right.



- (1) TID: TWO CAR [CAR-SHAPE=3-D & RECTANGULAR] TWO
 $\left[\begin{array}{l} \{H1\} \text{ CAR-LOC=BACK} \rightarrow \text{FRONT} \ \& \ \text{ORI=AWAY} \\ \{H2\} \text{ CAR-LOC=FRONT} \rightarrow \text{FRONT} \ \& \ \text{ORI=AWAY}^1 \end{array} \right]$

‘Two 3-D rectangular shaped cars [=trucks] are located on the sagittal axis and oriented away from me.’

- (2) HZJ: TWO CAR TRUCK
 $\left[\begin{array}{l} \{H1\} \text{ CAR-LOC=LEFT} \ \& \ \text{ORI=RIGHT} \\ \{H2\} \text{ CAR-LOC=RIGHT} \ \& \ \text{ORI=RIGHT} \end{array} \right]$

‘Two cars, trucks, are located on the lateral axis and oriented toward right.’

To illustrate the difference we also provide still frames for the linguistic forms that refer to the location and orientation of the trucks. Figure 4a represents in part the data in (1), Figure 4b represents in part the data in (2).

Figure 4. Still frames (a) from TID data (1) and (b) from HZJ data (2).



(a)



(b)

As these data and Figure 4a,b illustrate, the TID signer uses a sagittal axis whereas the HZJ signer uses a lateral axis in describing Figure 3 in which two trucks are located on a lateral axis. The TID and HZJ descriptions also differ in referring to the orientation of trucks in Figure 3. The TID signer orients objects away from the body (but with both objects still facing the same way) whereas the HZJ signer orients both objects toward her right. It is clear that the TID signer in (1) takes a neutral perspective whereas the HZJ signer in (2) takes a narrator

¹ LOC=location, ORI=orientation, H1 and H2=hands (primary articulators).

perspective since the *orientation* in Figure 4b matches with the picture in Figure 3.

When we analyzed the overall data, we found that TID and HZJ differ from each other markedly in perspective taking. TID signers use both narrator and neutral perspectives whereas HZJ signers use narrator perspective extensively, albeit not exclusively. But neither TID nor HZJ signers take an addressee perspective in their spatial descriptions. This is different from what we find with English speakers, who predominantly take an addressee perspective in talking about space (Schober 1993). Table 1 gives percentages of perspective types in our data.

Table 1. Percentages of perspective types in TID and HZJ data.

	Narrator	Addressee	Neutral
TID	68%	0	32%
HZJ	97%	0	3%

5 Study 2: Perspective in interaction

In study 2, we have two research questions. First, how is the use of space affected by position of the addressee? Second, how do addressees recreate/retell spatial relations compared to narrators' originals? In order to investigate these issues, we created several situations in which narrator and addressee were seated in three different arrangements. In the first situation, narrator and addressee were seated side-by-side; in the second situation, narrator and addressee were seated face-to-face; and in the third situation, narrator and addressee were seated at 90 degrees to each other. In each situation the narrator was requested to look at the pictures very carefully and to describe the event in as detailed a way as possible to the addressee, who cannot see the picture. After the narrator described the picture, the addressee was requested to retell what s/he understood from the narrator's description. In this way, we also investigated addressee comprehension.

5.1 Results

As in study 1, TID narrators use both narrator and neutral perspectives whereas HZJ narrators use only narrator perspective in all three situations. As before, none of the signers took an addressee perspective. Therefore, we conclude that TID and HZJ differ from spoken languages such as English in their perspective taking strategies. We also conclude that TID and HZJ differ from each other in their preferences for perspective types.

Figure 5. The testing item for Figures 6-9. Two animals are on a sagittal axis and facing toward the viewer.



In this section we provide data from TID and HZJ. In Figure 6, the TID signers were seated face-to-face. The narrator (Figure 6a) describes the picture (Figure 5) by using a sagittal axis and away from the body. Thus, she takes a neutral perspective. The addressee (Figure 6b) retells the narrator's description (comprehension) by using a sagittal axis and away from the body. Thus, the addressee mentally rotates the scene and takes his interlocutor's viewpoint (narrator perspective).

Figure 6. Still frames (a) for TID narrator description of Figure 5 and (b) addressee retelling.



The HZJ pairs also describe the same picture (Figure 5). In Figure 7, the HZJ signers were seated face-to-face. The narrator (Figure 7a) describes the picture (Figure 5) by using a sagittal axis and toward the body. Therefore, she takes a narrator perspective. The addressee (Figure 7b) retells the narrator's description (comprehension) by using a sagittal axis and toward the body. Thus, the addressee mentally rotates the scene and takes her interlocutor's viewpoint (narrator perspective).

Figure 7. Still frames (a) for HZJ narrator description of Figure 5 and (b) addressee retelling.

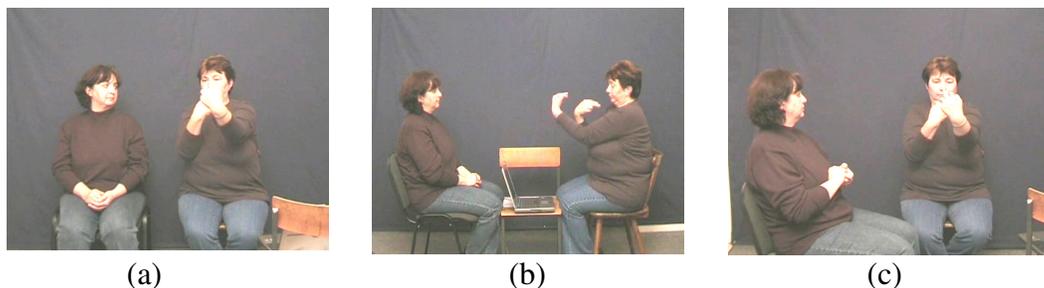


Contrary to variations in the use of gesture space (Özyürek 2000), the use of signing space in both TID and HZJ does not change according to addressee location. Rather, it remains constant in all three situations. For example, in describing the picture in Figure 5, the TID narrator (Figure 6) uses a sagittal axis and away from the body in all three addressee position situations: side-by-side (Figure 8a), face-to-face (Figure 8b), and at 90 degrees (Figure 8c). Similarly, the HZJ signer uses a sagittal axis and toward the body regardless of addressee positions (Figure 9). Therefore, we conclude that the use of signing space is both linguistic and language-specific in TID and HZJ and its properties differ remarkably from the use of gesture space.

Figure 8. Still frames for TID narrator descriptions of Figure 5 in three situations. (a) Side-by-side, (b) Face-to-face, and (c) at 90 degrees.



Figure 9. Still frames for HZJ narrator descriptions of Figure 5 in three situations. (a) Side-by-side, (b) Face-to-face, and (c) at 90 degrees.



We also analyzed addressee retellings. We found that in both TID and HZJ addressees are expected to take narrator's perspective in that they mentally rotate the object relations when addressee and narrator were seated face-to-face and at 90 degrees. However, when HZJ pairs were seated face-to-face and at 90 degrees, they were occasionally in conflict when objects faced the same direction on the lateral axis. For example, in one of these situations, the narrator used a lateral axis with objects facing right in talking about the testing item. When the addressee used a lateral axis with objects facing his right, the narrator interrupted the addressee's retelling and asked him to sign the objects facing left. They discussed this a little longer and neither one was happy with the way the addressee recreated the scene. This was not the case for TID signers. There might be three reasons for this conflict in HZJ. First, HZJ uses narrator perspective extensively, which requires a left-right distinction when the pairs of signers do not share the same viewpoint. However, the situations in which objects faced the same direction on the lateral axis may require direction encoding, too, which is a separate medium in spatial language (Landau 2003) and has a distinct conceptual primitive in CS (Jackendoff 1996). In this case, direction seems to override locational and orientational information in HZJ. In contrast, in TID, preference is given to a neutral perspective, which does not require a relative viewpoint in describing those situations. Second, it is argued that the left-right distinction is symmetric whereas the front-back distinction is asymmetric (Miller & Johnson-Laird 1976). Humans may have difficulty processing symmetric vs. asymmetric information. Thus, the conflict between HZJ pairs may not be because of the linguistic system, but instead may be located in the basic perceptual domain.

Thirdly, it is most likely the case that perspective taking strategies establish a common ground among the users of a given language. When an English speaker uses an addressee perspective to describe object locations, s/he puts appropriate lexical items in a particular order. However, in TID and HZJ, narrators describe the scenes from their own perspective, which requires a 180 degree mental rotation. Nonetheless, as the data suggest, addressees in their

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retellings do not have any difficulty in taking a narrator perspective to comprehend the description and reproduce it in the retelling. Arik (2003) claims it is shared perspective that underlies this strategy for (TID) addressees to take the same perspective as the (TID) narrators. In order to share perspective, he proposed that side-by-side interaction is the least cognitively loaded strategy, compared to, for example, face-to-face interaction.

Let us return to the data and look at narrators' input and addressee retellings. Table 2 summarizes perspective taking in narrator descriptions and Table 3 summarizes perspective taking in addressee retellings in both TID and HZJ.

Table 2. Narrator descriptions: Approximate percentages of perspective types.

	Side-by-side		Face-to-face		90-degrees	
	Narrator	Neutral	Narrator	Neutral	Narrator	Neutral
TID	57	43	52	48	57	43
HZJ	98	2	98	2	98	2

As shown in Table 2, narrators are consistent in their preferences for narrator and neutral perspectives in all three situations. Remember that there is no addressee perspective in either TID or HZJ spatial descriptions. Table 3 shows that addressee perspective taking varies in all three situations. On the one hand, TID addressees take narrator perspective more in face-to-face and 90 degree interactions than side-by-side positioning, in which the percentages of narrator or neutral perspective are very similar to those reported above in study 1. On the other hand, HZJ addressees take neutral perspective more in face-to-face and 90 degree interactions than side-by-side positioning, in which again the percentages of narrator or neutral perspective are very similar to those in study 1. Thus, these data suggest that side-by-side interaction is preferred over face-to-face and 90-degrees interactions in both TID and HZJ in which shared perspective is a common strategy.

Table 3. Addressee retellings: Approximate percentages of perspective types.

	Side-by-side		Face-to-face		90-degrees	
	Narrator	Neutral	Narrator	Neutral	Narrator	Neutral
TID	68	32	94	6	91	9
HZJ	99	1	74	26	87	13

6 Conclusion

In this paper we have provided evidence that, in the basic spatial domain of language, sign languages (TID and HZJ) differ from spoken languages in perspective taking strategies when talking about spatial relations of objects. We also provided evidence that TID and HZJ differ from each other in this domain. Additionally, we have shown that the use of signing space in TID and HZJ is fundamentally different from that of gesture space in English. While the use of TID and HZJ signing space remains constant, the use of English speakers' gesture space varies according to their addressees' positions.

Table 4 gives an impression of the differences across languages. TID and HZJ differ from ASL and English in that TID and HZJ users never take an addressee perspective, whereas ASL and English users do. TID differs from the others in that TID users prefer to take a neutral perspective in their spatial descriptions.

Table 4. Spatial perspectives across languages

	TID	HZJ	ASL (Emmorey 2002)	English (Schober 1993)
Narrator	+	+	+	
Addressee			+	+
Neutral	+			

What are the implications of these findings for the understanding of the spatial domain of a given language? As discussed in Section 3, Talmy (2006) argues that signed spatial representations are largely iconic, have more structural elements, more categories, and more elements per category when compared to spoken spatial representations. Liddell (2003) argues further that gestural and linguistic information in signed spatial information are fused together. In this study, however, our findings do not support these claims. On the contrary, because of the reasons discussed above, spatial representations (SR) cannot be directly mapped onto the linguistic systems in both TID and HZJ. Therefore, we conclude that the use of signing space is not motivated by iconicity or gestures. Rather, signing space is part of the Morphosyntax of sign languages, which interfaces with Conceptual Structure à la Jackendoff (1990, 1996).

However, there is a need for further studies to better understand the morphosyntax of TID and HZJ as well as other sign languages. For example, in another of our current studies, we investigate wayfinding and address descriptions

to understand how complex spatial relations are conveyed in TID and HZJ. We also study how these languages represent motion events to examine morphosyntactic differences in general and to investigate HZJ conflicts with regard to the representations of the objects facing the same direction. We believe that a deeper crosslinguistic examination of spatial descriptions will contribute to the understanding of ‘spatial grammar’, e.g. pronominalization and indexation, all of which appear to be coded morphosyntactically in signing space.

7 Acknowledgements

This study is supported in part by NSF grant (BCS-0345314) awarded to Ronnie Wilbur. We are grateful to Ronnie Wilbur, who offered comments on an earlier draft. We thank Beril Tezeller Arik for her assistance in preparing testing items. Aysel Basar assisted in TID data collection and transcription. Sabiha Orer also helped in data collection. We thank both. We are grateful to the Deaf TID and HZJ signers who participated in this study and willingly shared their insights with us. We also thank the participants of WIGL 5 (2007) for their invaluable comments.

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Purdue University
College of Liberal Arts
Linguistics
500 Oval Drive
West Lafayette, IN 47907-2038

earik@purdue.edu