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Development of Locative Expressions by Turkish Deaf and Hearing Children: Are There Modality Effects?

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1. Introduction

Sign languages are natural languages that operate in the visual-spatial modality. The modality of sign languages enables their users to map spatial relations (e.g. topological relations between entities such as "pen on table") between objects in the real world onto signing space in an analogue way. In contrast, the auditory-vocal modality of spoken languages does not afford their users such analogue mappings to linguistically encode these relations. Instead, spoken languages usually use categorical lexemes such as adpositions and locative case markers to describe the spatial relationship between a Ground object (the reference entity in the periphery of attention) and a Figure object (the entity that attracts the focal attention). The modality difference between sign and spoken languages raises interesting questions about the development of locative expressions in Deaf[1] children who are acquiring a sign language and hearing children who are acquiring a spoken language. The main purpose of the current study is to investigate the possible effects of modality on the development of locative expressions in Turkish Sign Language (Türk İşaret Dili - TİD) and Turkish. In this way, we contribute to our general understanding of the effects of modality on spatial language development.

Spoken languages show large amount of variation in the expression of the spatial relationship between a Figure and a Ground both in the underlying conceptualizations of the spatial distinctions and the forms with which they are encoded, ranging from small inventories of closed-class forms to large inventories of open-class forms (Evans & Levinson, 2009). For example, in order to describe "an apple in a box", English employs a preposition (*in*) (see example 1) that precedes Ground (box). Turkish, on the other hand, offers its speakers two ways of describing a spatial scene; Turkish speakers can use a postpositional locative case marker *(-de / da*) suffixed to the Ground, through

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[1] Following the conventions mostly used in sign language literature, we use Deaf with an uppercase (D) to refer to the members of the Deaf community.

which they indicate that there is a spatial relation between Ground and Figure (box and apple), but without specifying the exact nature of the spatial relation (containment in this example) between the objects (see example (2)). However, Turkish has also more specific spatial lexemes that can be used together with the locative case marker. These linguistic forms are more specific than the locative case marker and specify the type of spatial relationship between the entities, as presented in example (3). In this example, by using "içinde", the speaker specifies that there is a containment type of spatial relationship between Ground and Figure. Furthermore, in Turkish, the syntactic order of Figure and Ground is flexible. This flexibility either does not exist or can be a quite marked option in many languages such as English.

(1) English:
The apple is in the box.

(2) Turkish:
Kutu+da elma var.
Box+loc apple there is.
"There is an apple in the box"

(3) Kutu+nun iç+i+nde elma var.
Box+poss inside+gen+loc apple there is.
"There is an apple in the box"

The studies about spoken languages have shown that spatial language develops between 2 and 6 years of age in children who are acquiring English (E.Clark, 1973; Tomasello, 1987; Johnston & Slobin, 1979; Sowden & Blades, 1996), German (Grimm, 1975), Hebrew (Dromi, 1979), Afrikaans (Vorster, 1984, as cited in Tomasello, 1987), Italian, Serbo-Croatian, and Turkish (Johnston & Slobin, 1979). While some of these studies had data from spontaneous speech of children (Grimm, 1975; Dromi, 1979; Vorster, 1984; Tomasello, 1987), some others from elicitation tasks (E. Clark, 1973; Johnston & Slobin, 1979).

When compared to the number of studies conducted on spoken languages in this domain, there are relatively few similar studies on sign languages. As mentioned at the beginning of the introduction, due to the visual-spatial modality, sign languages can use the physical space around the signer to associate referents with locations and to indicate the relationship between them for spatial expressions. In order to linguistically express these relationships, sign languages mostly utilize classifier predicates. In these predicates, a classifier expressed by the handshape represents salient, physical features of the referents which are usually previously introduced by a lexical noun sign. The position and the movement of the hands in signing space encode information about the location and motion of the referents (e.g. Supalla, 1982; Emmorey, 2002; Zwitserlood, 2003). It has also been observed that in many sign languages,

signers introduce the Ground before the Figure in locative expressions (Emmorey, 2002; Perniss, 2007). This is shown in examples (4) and (5) from TİD below. Example (4) shows a signer using the lexical sign for PAPER, followed by the lexical sign for PEN. In the final picture, the classifier handshapes represent the paper and the pen in a support configuration. The modality of sign languages also enables signers to represent Figure and Ground in a classifier predicate simultaneously.

(4) TİD signer describing "a pen on a paper" by using classifier predicates (CL)

LH: $CL(paper)_{loc}$

RH: PAPER PEN $CL(pen)_{loc}$

The use of classifier predicates for spatial expression is a common strategy to express spatial relationships across sign languages. However, it is not the only one. Arık and Wilbur (2008) argue that sign languages can sometimes use 'relational lexemes'[2] to describe spatial configurations. Such forms are also found in TİD and they are more categorical than classifier predicates although they still depict the spatial relationship visually. In the example (5) below, a Turkish Deaf person uses a relational lexeme to depict a containment type of spatial relation between a cat and a boat. However, specific relational lexemes do not seem to be preferred strategies, at least in American Sign Language (ASL) and in TİD (Emmorey, 2002; Özyürek, Zwitserlood, and Perniss, 2010).

(5) TİD signer describing "a cat in a boat" by using a relational lexeme

LH: BOAT CAT IN

RH: BOAT CAT IN

[2] These forms are also called "lexicalized locatives" in Emmorey and Casey, (1995); Emmorey, (2002) and "relationals" in Arık (2009).

The studies on the development of spatial language in Deaf children suggest that mastery in certain aspects of locative expressions is not achieved at least until the age of 5 or over and may last even until the age of 13 (Supalla, 1982; Schick, 1990; Engberg-Pedersen, 2003; Tang, Sze, and Lam, 2007; Morgan, Herman, Barriere, and Woll, 2008).

Some studies show that Deaf children have difficulty in choosing adult-like classifier handshapes. For example, Kantor (1980) studied the production of classifier handshapes by native Deaf children (aged 3-11 years) acquiring ASL. The results of her study suggest that these were not completely mastered until the children were nine years old. The children in her data chose motorically simple handshapes when presented with complex semantic and syntactic decisions. Similarly, in his seminal work on the acquisition of verbs of motion and location in ASL, Supalla (1982) presented three native Deaf children (aged between 3;6 and 5;11) with 120 animated films in which a Figure changes its location with respect to a Ground. Although the children produced a "correct" classifier handshape for the moving Figure most of the time, Supalla stated that children sometimes used a "general classifier" instead of a specific, adult-like one. In another study (Schick, 1990) with 24 native Deaf children aged between 4;5 and 9;0, classifier predicates were elicited through a set of communicative games in which participants and the experimenter took turns in producing appropriate classifier predicates describing pictures with various spatial relations such as "two clocks are on a shelf" or "a monkey sits between two trees". In her analysis, she teased apart the effects of handshape use and the use of spatial morphemes on the development of locative expression and found significant differences among age groups in using location morphemes, but not for handshape morphemes. She suggests that the use of syntactic space as in the description of a spatial scene is the key to characterizing and assessing ASL acquisition. However, with this mix data in which the spatial descriptions come from both motion and location events, one cannot be sure to what extent these results hold for only location or only motion events.

Second, simultaneous expression of a Ground and a Figure object has been suggested to be another area of challenge for Deaf children. Supalla (1982) observed a slow increase in using a classifier for the Ground object through development. A similar result was also found by Engberg-Pedersen (2003) who studied the descriptions of “FALL” events in a picture story called *Frog, Where are you?* (Mayer, 1982). 16 Deaf children (6;6-9;3 years of age) acquiring Danish Sign Language and four Deaf adults were requested to retell the events in the story. Her results showed that children mostly used a two-handed lexical sign FALL to describe such events although they omitted the non-dominant hand representing Ground in this sign until the age of 9;3. Adults in her study, on the other hand, mostly used classifier predicates for both Figure and Ground objects, rather than using the lexical sign "FALL". Slobin, Hoiting, Kuntze, Lindert, Weinberg, Pyers, Anthony, Biederman, and Thumann (2003) analyzed the narrations of personal stories and of a picture story book *Good dog Carl*

from preschool age Deaf children (about age 5) and school-age children (9-12 years) learning ASL. They, too, suggest that both preschool and school-aged Deaf children have difficulty in expressing both Ground and Figure in a classifier predicate. Similarly, Tang et. al. (2007) analyzed the narrations of six comic strip stories of 14 Deaf children (6-13 years of age) learning Hong Kong Sign language (HKSL) and two Deaf adults. Their results show that encoding Ground emerges at a later stage of development while participants always expressed Figure in their descriptions. In yet another study, Morgan et. al. (2008) followed a native Deaf boy acquiring British Sign Language between the ages of 1;10 and 3;0 and observed that his spontaneous data included very few explicit descriptions for a Ground.

Summarizing, several studies show difficulties in choosing adult-like classifier handshapes and simultaneous expression of Figure and Ground in spatial descriptions, affecting the development of locative expressions in children acquiring a sign language.

However, the results of these studies are equivocal for a number of reasons. First of all, most of these studies compare patterns observed in children to assumed adult patterns, i.e. they lack data from Deaf adults on the same tasks (Supalla, 1982; Schick, 1990; Slobin, et. al., 2003; Morgan, 2008). Moreover, in most of the studies, data were collected from both Deaf children with hearing parents (non-native) and Deaf children with Deaf parents (native) (Engberg-Pedersen, 2003; Tang et al., 2007). Some studies also have data from hearing children with Deaf parents (bimodal bilingual) (Morgan et al., 2008). Moreover, many of these studies do not have data from age-matched hearing children who are performing on the same tasks as Deaf children. Such cross-modal comparisons are crucial for understanding what is modality specific and what is modality independent in learning locative expressions. Additionally, these studies mostly present data from well-studied Western languages and lack data from less studied and typologically different languages in which spatial relations are expressed through various linguistic forms including ones from closed-class and open-class. Finally, these studies collected data through materials that depict motion events and did not particularly focus on locative expressions of static topological spatial relationships (Supalla, 1982; Schick, 1990; Engberg-Pedersen, 2003; Slobin et. al., 2003; Tang et. al., 2007). In other words, it is not clear to what extent the general findings of these studies can also hold for the descriptions for static location of the entities.

2. Present Study

In this study, we examined the development of locative expressions by native Deaf children learning TİD and children learning Turkish by comparing their expressions to Deaf and hearing adult patterns. We chose Turkish because it is typologically different from many extensively studied European languages, especially in terms of linguistic encoding of locative expression as explained in the previous section. TİD was chosen because it is historically unrelated to many

well-studied sign languages (e.g. ASL). Focusing on these two languages, we investigated whether and to what extent the language modality affects the development of locative expressions. If the visual resemblance between spatial relations in the real world and their linguistic representations in sign languages facilitates the development of locative expressions for Deaf children, then we expect that they will develop these expressions earlier than hearing children. If, on the other hand, the challenges of selection or articulation of target classifier handshapes and simultaneous expression of classifier predicates in sign languages have a hindering effect for Deaf children in the acquisition of locative expressions, it can be assumed that these expressions will appear later in Deaf children than in hearing children. Another possibility is that the modality may not have an effect on the development of locative expressions, and Deaf and hearing children will reach adult-patterns of their languages at similar ages.

3. Method

3.1. Materials and Procedure

In order to study the effect of the language modality on the development of locative expressions, data were elicited through picture description tasks in which participants were asked to describe pictures where a Figure object was situated in relation to a Ground object (e.g. pen on paper, cat in boat) in three types of configurations: IN (10 pictures), ON (7 pictures), and UNDER (6 pictures). Two different types of picture description tasks were used in the study[3]. In the first task, there were 16 contrastive sets of pictures that were shown one by one on a computer screen. In each set, the pictures to be described was indicated by a red frame. The signer / speaker described these pictures to an addressee who was supposed to find the same picture in an array of four pictures in front of her. The second task was a free description task with seven line drawings. Again, the signer / speaker described the picture to the addressee. In this task, the addressee was to set up the described scene by using small toy figures. During this task, there was a screen between the two parties and after the addressee completed the set-up, she showed it to the interlocutor who then decided whether the scene matched to the picture. If it did not match, the signer / speaker again described the same picture until the scene was similar to the picture. For the analysis described in this paper, we did not count the repeated responses. In both tasks, the addressee was a confederate.

3.2. Participants

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[3] The pictures for the first task were originally developed by Jennie Pyers and the drawings in the second task by Karen Emmorey. We would like to thank them for sharing their materials with us.

The participants of the study include 14 Deaf and 14 hearing people. There are seven native Deaf children with a mean age of 7;9 (range: 7;2-9;10) and seven native Deaf adults using TİD. All but one of the Deaf children attend primary schools (all employing oral education) for the Deaf. All the Deaf children acquire TİD from their Deaf parents. The second group includes seven Turkish hearing children with a mean age of 8;2 (range; 7;8-8;7) and seven hearing adults. The children in this group also attend a primary school. All of the participants in this study reside in Istanbul, Turkey.

3.3. Coding and analysis

A total of 599 spatial descriptions by all participants were transcribed / annotated. The data were, then, analyzed for: a) the frequency of the expression of spatial relations between a Ground and a Figure object, b) the order of introduction of Ground and Figure, and c) the strategies used to encode the spatial relationship between Ground and Figure. Additionally, since locative relations can be expressed with simultaneous constructions in TİD, we also analyzed the presence or absence of such constructions for the Deaf group.

4. Results

4.1. The expression of spatial relations between Ground and Figure

The picture descriptions of children and adults were compared with respect to the areas mentioned in the previous section to see if children at these ages become adult-like in their spatial language. First, we investigated the frequency of the expression of a spatial relation between Figure and Ground by both Deaf and hearing participants in the study. Thus, those descriptions were selected in which a spatial relation between a Ground and a Figure object was indeed described by the participants, such as “a cat in a boat” rather than just a mention of Ground and/or Figure without indicating the spatial relationship, such as "there is a cat and there is a boat". 93.3% of all spatial descriptions by Turkish Deaf adults and 85.7% by Turkish Deaf children included the target spatial relation between Ground and Figure. The difference between Deaf adults and Deaf children was not statistically significant ($t(12) = 1.032$, $p > .05$) In the hearing group, adults expressed the spatial relation out of 97% of all spatial descriptions and children out of 92% and the difference between these two groups was not significant, either ($t(12) = .266$, $p > .05$). These results are also presented in Figure 1.

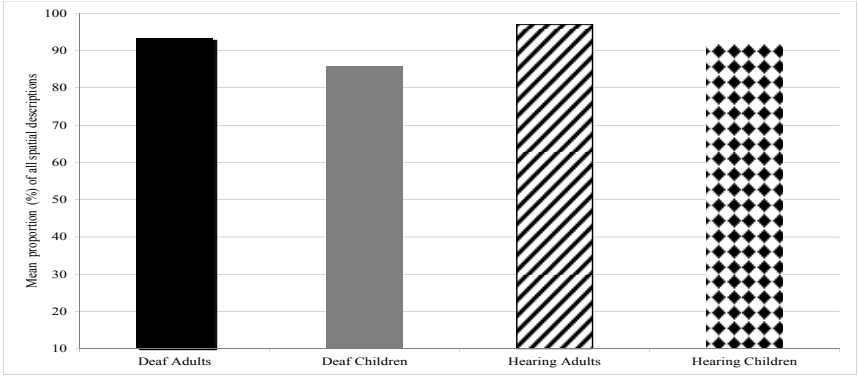

Figure 1. Descriptions in which spatial relations are expressed

4.2. Order of introduction of Ground and Figure

Second, from the set of spatial descriptions in which the location of the Figure is expressed with respect to the Ground, we calculated the mean proportion of spatial descriptions containing either "Ground before Figure" order versus "Figure before Ground" order. There was no significant difference between Deaf children and Deaf adults ($F(2, 11)= 1.97$, $p= .186$) and hearing children and hearing adults ($F(2, 11)= .430$, $p= .661$), suggesting children in both language groups are similar to adults in preferring "Ground before Figure" order.

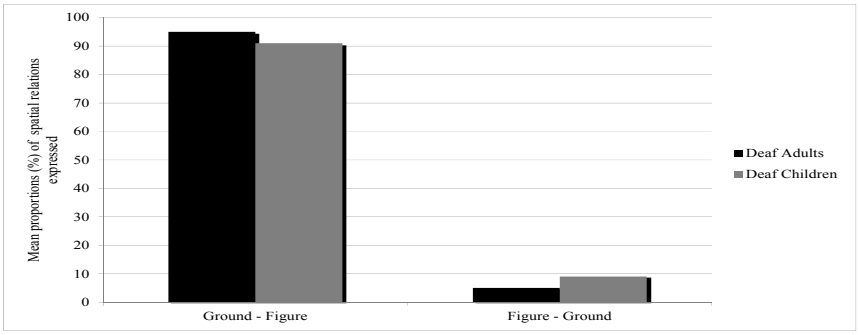

Figure 2. Spatial descriptions with different introduction orders of Ground and Figure objects as expressed by Deaf participants

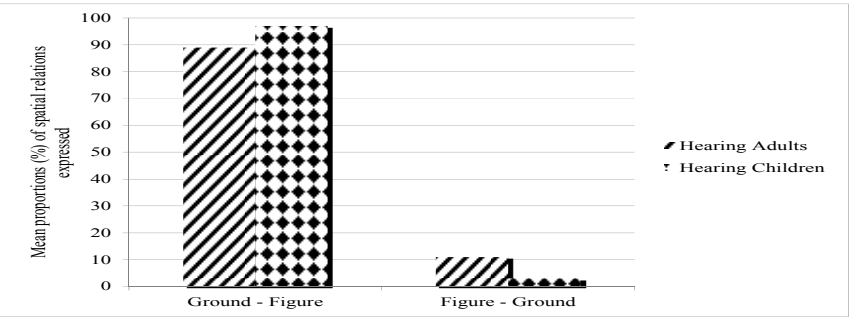

Figure 3. Spatial descriptions with different introduction orders of Ground and Figure objects as expressed by hearing participants

4.3. Strategies for encoding spatial relations between Ground and Figure

Third, the strategies employed by the participants of both languages to describe spatial relations were examined. In our data, we observed that the main strategy used by Deaf participants to encode the spatial relation between the entities was to use classifier predicates. This category includes the cases where either Figure or Ground or both are expressed by classifier predicates. Although less in frequency, the use of a relational lexeme (see example 5 in the introduction) was also observed among both Deaf children and adults. Furthermore, simultaneous constructions occurred in the descriptions, e.g. a classifier predicate expressed with one hand and a pointing sign with the other. These were merged in the "other" category.

A one-way between-groups multivariate analysis of variance was performed to investigate age difference in the strategy choice in describing spatial relations. There was a statistically significant difference between Deaf adults and children on the combined dependent variables (i.e., classifier predicates, relational lexemes, and other strategies): $F(3, 10)= 5.03$, $p=.022$; Pillai's Trace=.60; partial eta squared=.60. When the results for each strategy considered separately, the only difference was observed in the use of classifier predicates between adults and children: $F(1, 12)= 5.58$, $p= .036$, partial eta squared= .32. The mean score of adults ($M=17.42$, $SD=3.59$) was higher than that of children ($M=12.57$, $SD=4.07$).

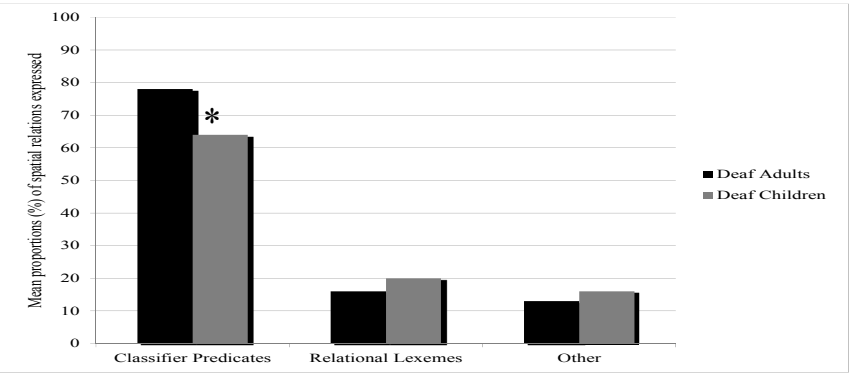

Figure 4. The strategies of Deaf participants to describe spatial relations

A similar analysis on the strategy preference to describe a spatial relation by hearing children and adults revealed the use of a spatial lexeme in Turkish (See example 2) as the most preferred strategy. Children were similar to adults in employing this strategy most of the time: there was no significant difference ($F(2, 11)= .338$, $p=.720$). On the other hand, hearing participants almost never used a general locative case marker in their spatial descriptions.

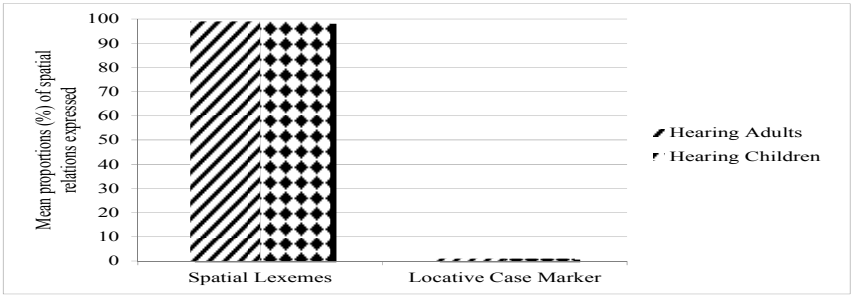

Figure 5. The strategies of hearing participants to describe spatial relations

4.4. The simultaneous expression of Ground and Figure in a locative expression

Finally, we calculated the mean proportion of classifier predicates used in simultaneous constructions, i.e. linguistically encoding Figure and Ground simultaneously. Non-simultaneity, on the other hand, refers to the expression of Figure and Ground with sequential classifier predicates. There was no statistically significant difference between Deaf adults and children in the (non)-simultaneous representation of Figure and Ground ($F(2, 11)= 1.40$, $p=.288$). This is shown in Figure 6.

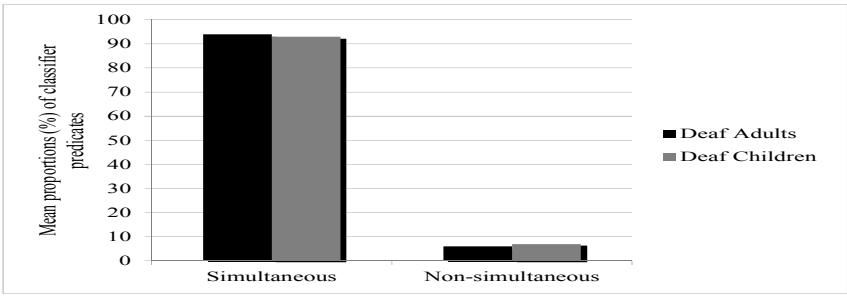

Figure 6. Classifier predicates that include (non) simultaneous expression of Ground and Figure

5. Conclusions and Discussion

Our findings indicate that school-age Deaf and hearing children are similar to adults in the frequency of spatial descriptions and in using "Ground before Figure" order in the introduction of the objects. Another similarity observed between children and adults in both languages relate to their preferred strategies. As stated earlier, two strategies are available for the encoding of spatial relations for the hearing group (locative case markers and spatial lexemes). Both adults and children in this group appeared to use spatial lexemes most of the time and children were thus clearly adult-like in this respect.

In TİD, two strategies (classifier predicates and relational lexemes) and strategy combinations are available. Deaf children and adults both appeared to prefer classifier predicates. However, there was a difference in the frequency of use of classifier predicates between adults and children: the Deaf children used fewer classifier predicates than Deaf adults did. Thus, the Deaf children distributed the available strategies slightly differently than the Deaf adults.

In terms of simultaneous expression of Ground and Figure, Turkish Deaf children are also adult-like. This finding contradicts the findings of the studies reporting that Deaf children usually omit Ground even until the age of 13 (Engberg-Pedersen, 2003; Slobin et. al., 2003; Tang et. al., 2007). However, these studies collected data through the narrations of picture stories, which mostly include motion events rather than the static location events. In a study on the expression of caused motion events in Turkish, Furman (2012) found that adults and children (aged 5 years) omitted Ground in their speech. Therefore, the omission of Ground can be the result of the structure of the language and type of spatial relations encoded (motion vs. static events). Moreover, there are usually more semantic elements (e.g. path, manner, goal) of a motion event than a static location event in which there are usually Ground and Figure. In a study with English-reared infants (7-12 months), Göksun, Hirsh-Pasek, and Golinkoff (2009) showed that grounds were better noticed in the absence of motion and suggest that the movement of Figure decreases attention to other aspects of a motion event when compared to static one.

The high frequency of simultaneous expressions seems to contradict the results of earlier studies where TİD signers mostly preferred non-simultaneous constructions (Özyürek et. al., 2010; Perniss, Zwitserlood, and Özyürek, 2011). We surmise that the difference is due to the prototypical and non-contrastive spatial relations between the entities (e.g. picture on wall) for which signers are less likely to use simultaneous constructions.

By comparing the spatial expressions of TİD and Turkish acquiring children with adult patterns in both languages, we have shown that overall, both school-age Deaf and hearing children are already tuned into language specific patterns of their respective languages, regardless of the modality. Data from younger children are needed to understand how early such language specificity manifests itself.

References:

Arık, Engin. (2009). Spatial language: Insights from signed and spoken languages. Purdue: Purdue University dissertation.

Arık, Engin. & Wilbur, Ronnie. (2008). Locatives, existentials, and possessives in Turkish Sign Language (TİD). Poster presented at the 82nd Annual Meeting of the Linguistic Society of America, Chicago, IL, January 3–6.

Clark, Eve V. (1973). Non-linguistic strategies and the acquisition of word meanings. *Cognition 2(2)*, 161-182.

Dromi, Esther. (1979) More on the acquisition of locative prepositions: an analysis of Hebrew data. *Journal of Child Language, 6*, 547-62.

Emmorey, Karen. (2002). *Language, cognition, and the brain: Insights from sign language research*. Mahwah, NJ: Lawrence Erlbaum Associates.

Emmorey, Karen. & Casey, Shannon. (1995). A comparison of spatial language in English and American Sign Language. *Sign Language Studies*, 88, 255-288.

Engberg-Pedersen, Elisabeth. (2003). How Composite is a Fall? Adult's and Children's Descriptions of Different Types of Falls in Danish Sign Language. In K. Emmorey (Ed.), Perspectives on Classifiers in Signed Languages: 311-332. Mahwah, NJ: Lawrence Erlbaum Associates.

Evans, Nicholas, & Levinson, Stephen. C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. Behavioral and Brain Sciences, 32(5), 429-492.

Furman, Reyhan. (2012). Caused motion events in Turkish: Verbal and gestural representation in adults and children. Unpublished Doctoral Dissertation. LOT, Radbboud University, Nijmegen.

Grimm, Hannelore. (1975) On the child's acquisition of semantic structure underlying the wordfield of prepositions. *Language and Speech, 8*, 97-119.

Johnston, Judith R. & Slobin, Dan Isaac. (1979). The development of locative expressions in English, Italian, Serbo-Croatian and Turkish. *Journal of Child Language* 6, 529-545.

Göksun, Tilbe, Hirsh-Pasek, Kathy, and Golinkoff, Roberta. (2009). Processing Figures and Grounds in dynamic and static events. Proceedings of the 33rd Annual Boston University Conference on Language Development. Somerville, MA: Cascadilla Press.

Kantor, Rebecca. (1980). The acquisition of classifiers in American Sign Language. *Sign Language Studies. 28*, 198-208.

Morgan, Gary, Herman, Ros, Barriere, Isabelle, & Woll, Bencie. (2008). The onset and mastery of spatial language in children acquiring British Sign Language. *Cognitive Development, 23*, 1-19.

Özyürek, Aslı, Zwitserlood, Inge, & Perniss, Pamela. (2010). Locative expressions in signed languages: A view from Turkish Sign Language (TİD). *Linguistics, 48(5)*, 1111-1145.

Perniss, Pamela. (2007). Space and iconicity in German Sign Language (DGS). PhD Thesis, Nijmegen: MPI Series in Psycholinguistics.

Perniss, Pamela, Zwitserlood, Inge, & Özyürek, Aslı. (2011). Does space structure spatial language? Linguistic encoding of space in sign languages. In L. Carlson, C. Holscher, & T. Shipley (Eds.), Proceedings of the 33rd Annual Meeting of the Cognitive Science Society (pp. 1595-1600). Austin, TX: Cognitive Science Society.

Schick, Brenda. (1990). The effects of morphosyntactic structures on the acquisition of classifier predicates in ASL. In C. Lucas (ed.). Sign Language research: Theoretical Issues (pp.358-371). DC: University of Gallaudet Press.

Slobin, Dan, Hoiting, Nini, Kuntze, Marlon, Lindert, Reyna, Weinberg, Amy, Pyers, Jennie, Anthony, Michelle, Biederman, Yael, & Thumann, Helen (2003). A Cognitive/Functional Perspective on the Acquisition of "Classifiers". In K. Emmorey (Ed.) Perspectives on Classifiers in Signed Languages: 271-296. Mahwah, NJ: Lawrence Erlbaum Associates.

Sowden, Steve, & Blades, Mark (1996). Children's and adults' understanding of the locative prepositions 'next to' and 'near to'. First Language, 16, 287–299.

Supalla, Ted R. (1982). Structure and acquisition of verbs of motion and location in American sign language. San Diego: PhD Thesis, UCSD.

Tang, Gladys, Sze, Felix, & Lam, Scholastica (2007). Acquisition of simultaneous constructions by deaf children of Hong Kong Sign Language. In M. Vermeerbergen, L. Leeson, & Onno Crasborn (Eds.) Simultaneity in Signed Languages: 283-316. Amsterdam: John Benjamins.

Vorster, J. (1984). The first prepositions in Afrikaans: Order and semantic distinctions. Paper presented to the Third International Congress for the Study of Child Language, Austin, Texas.

Tomasello, Michael (1987). Learning to use prepositions: a case study. *Journal of Child Language, 14*, 79-98.

Zwitserlood, Inge. (2003). Classifying hand configurations in Nederlandse Geberentaal (Sign Language of the Netherlands). Doctoral Dissertation. LOT, University of Utrecht: Utrecht.