Csilla Tóth

On the Semantic Structures of Hungarian Static Locative Expressions

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1. Introduction

The dissertation focuses on the following questions:

1. In Hungarian sentences consisting of a DP, a locative PP (the determiner of the DP is a definite article within the PP) and a copula, can locative P-s be interpreted like two-place predicates, or are they to be interpreted as functions mapping the reference objects to regions?

2. Can the denotation of Hungarian static locative adpositions be defined as direct relations between the localized object and the reference object in situations in which there are only two objects: the localized object, and the reference object?

3. How can these questions be answered on the basis of the examination of inferences based on monotonicity; on the basis of data collected using the test of Bowerman – Pederson (1992); and on the basis of examining the semantic role of the copula in locative sentences?

Usually there are two ways to interpret static locative sentences: either as statements about the relations between the localized object and the reference object or as statements about the place of an object relative to another. These interpretations are reflected in the methods applied for the semantic interpretation of the locative sentences. In the dissertation I want to find an answer to the question whether choosing between different methods for the semantic interpretation of the above mentioned sentences has any motivation at all or it's a free choice of the researcher as they are equivalent, by examining the semantic structures of Hungarian static locative sentences with various methods.

It can be supposed that the interpretations are equivalent similarly to the interpretations of determiners. In Barwise – Cooper (1981) it is shown that determiners can be interpreted directly as relations between sets of individuals or as functions from sets of individuals to sets of sets of individuals. These can be called relational perspective and functional perspective respectively.

The results of the examinations from various viewpoints shown in the dissertation supports that in the case of Hungarian static locative sentences the relational interpretation of static locative adpositions cannot be used so widely, that's why the relational and functional interpretation cannot be viewed as two equivalent methods in the case of Hungarian locative adpositions.

2. The chapters of the dissertation

There are four main chapters in the dissertation after the introductory part and the explanation of the basic terms. The first of them is a short presentation of the syntactic structures of the simple locative sentences. The next part deals with the examinations of inferences between Hungarian locative sentences based on the monotonicity of the determiners appearing in the sentences and the monotonicity of the locative particles. The result of this examination gives an argument that the general interpretation of Hungarian locative particles cannot be relational. The next chapter presents the details of the Hungarian language data based on the test of Bowerman – Pederson (1992), and Zwarts' (2012) system coding various relations between the localized object and the reference object. The results of this research enlighten the problems that occured when I tried to identify the relations that could be the components in the denotational definition of the locative particles based on relations. The last chapter deals with the semantic structure of Hungarian locative sentences in details, revealing the semantic role of the copula, and answering Herskovits' (1997) argument against the functional perspective of the interpretation of locative prepositions.

2.1. Outlook: The syntactic structure of locative phrases

Huge literature is known to deal with the syntactic structure of locative phrases and sentences. In the dissertation I chose to present only two approaches that have some connections to the topic of my dissertation.

The starting point was the morphological difference between the Hungarian locative suffixes and postpositions. So I started to examine the question whether this difference should be represented

in the syntactic structure or not. Then I outlined two different syntactic approaches concerning the syntactic structure of the locative phrases. One of them is the theory of Kracht (2002, 2003, 2005, 2006), the syntactic component of which is a categorical grammar, and the other is based on the works of Svenonius (2008, 2012) and Hegedűs (2013). These latter works have the generative syntax as theoretical frame. Presenting these two theories is interesting not because they belong to different syntactic theories but because they have different basic ideas.

Kracht segments every locative particle to two components: M and L, so the locative phrases have the following structure: [[DP L] M]. In this structure L is called *localizer* which turns an object to a location; M is called *modalizer* which turns a location into an event modifier.

The point is that this segmentation has different consequences from that of the conceptual distinction Jackendoff (1983) made between PLACE and PATH in the semantic composition of P-s.

The syntactic distinction based on Jackendoff (1983) is the distinction between the verbs that select place denoting arguments (e.g. *live, stay, remain)* and those that select path denoting arguments (e.g. *go*, *come*). In Kracht's theory the distinction lies in the fact whether a locative phrase appears as an adjunct or a complement in the sentence. If it is an adjunct, it has no syntactic case, its syntactic category is MP (denoting event modifiers) no matter if it is static or directional PP. According to Kracht if the locative phrase is a complement it can be an LP (denoting place) or it can be a DP (denoting an object). So, in Kracht's theory there's no difference in the syntactic category (and the denotation) of the arguments of the verbs selecting place denoting arguments (e.g. *live, stay, remain*) and path denoting arguments (e.g. *go*, *come*): these arguments are all LP-s, denoting locations.

2.2. An argument against the generality of the interpretation of static locative adpositions as two-place predicates

In the fifth chapter of the dissertation I give an outline of Zwarts – Winter's (2000) vector space model, because they defined point-monotonicity of locative P-s in this theoretical frame. I use this theoretical frame for the formal analysis of the inferences based on monotonicity between simple locative sentences. This chapter proves that generally it is not the monotonicity of the locative adpositions that determines the validity of the inferences. To prove this I applied an

indirect argumentation. The starting point is that the inference rules based on monotonicity can be defined for any kinds of linguistic units such as sentences, sentence operators, generalized quantifiers, determiners. In each of these cases the monotonicity of a linguistic unit has a direct relationship with some inferences. In the case of locative prepositions Zwarts – Winter (2000) defined point-monotonicity for locative phrases not for the sentences containing them.

Assuming that locative P-s are interpreted like two-place predicates, we could expect that an inference rule based on the monotonicity of the locative P-s similar to the one of left-monotone determiners would predict the consequence of the inference. That is if they were two-place predicates their monotonicity would guarantee certain valid inferences predicting their validity according to the enlargement or the diminution of the reference objects.

With the help of formal tools I can show explicitly the role of the monotonicity of the locative P-s in these inferences. The various aspects of this role are summarized as follows.

The monotonicity of static locative P-s has an important role in inferences:

1. If the determiner of the DP referring to the localized object(s) is right monotone increasing than we can infer the truth of a statement containing a larger reference object in the case of point-monotone increasing locative P-s and to the truth of a statement containing a smaller reference object in the case of point-monotone decreasing locative P-s. (Assuming that the larger reference object contains the smaller one.)

2. If the determiner of the DP referring to the localized object(s) is right monotone decreasing, it changes the 'direction' of the inference: we can infer the truth of a statement containing a smaller reference object in the case of point-monotone increasing locative P-s and the truth of a statement containing a larger reference object in the case of point-monotone decreasing locative P-s. (Assuming that the larger reference object contains the smaller one.)

3. If the determiner of the DP referring to the localized object(s) is not right monotone, we cannot infer even if the locative P is point-monotone.

4. If the locative P is not monotone, the right monotone determiner alone is not enough for a valid inference.

2.3. Prototypical situations in the use of Hungarian static locative suffixes and postpositions on the basis of the relations between the localized object and the reference object

In this chapter I wanted to answer the following question: if we could define the denotations of Hungarian static locative adpositions as relations between the localized and the reference objects in situations which contain only the localized object and the reference object, which relations would characterize the meaning of the Hungarian locative adpositions. In order to do this I collected data with the help of the Bowerman – Pederson test, which has been widely used for decades. The *Topological Picture Series* (Bowerman – Pederson 1992) contain 71 pictures each of which shows two objects. The one marked with a black arrow is the localized object.
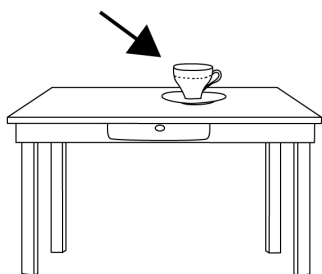

fig.1.

I characterized the pictures with the codes defined by Zwarts (2012). These codes represented topological relations, force-dynamical relations and the relations concerning the objects vertical arrangements. The test was designed to represent the main topological relations. Unfortunately, the pictures are not representing these relations equally. This had to be taken into consideration in the evaluation of the data. I followed the instructions of the test during the interviews. I interviewed 30 Hungarian native speakers.

In the dissertation I present all the results for each Hungarian static locative adpositions one by one. Here I show two maps that summarize the results gained from the language data. Each picture of the test can be characterized by one of 31 different sequences of codes. The sequences of codes that turned out to be prototypical for some locative adpositions became the kernels of the regions. The other sequences of codes were arranged around these kernels so that each sequence of codes is the closest to the kernel representing the adposition most frequently used in

the case of the kernel code. The boundaries of regions were drawn using the rules of Voronoi-tessellations given in Gärdenfors – Williams (2001) so that the sequences of codes belong to the region they are the closest to.
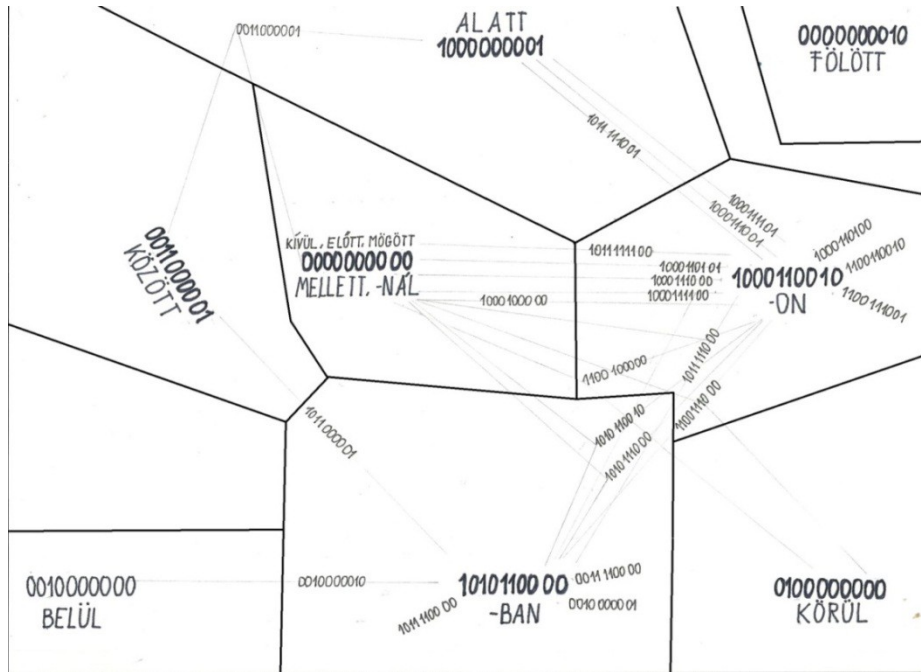

fig.2.

In the second map the arrangement of the situations represented by the sequences of codes are the same, but the boundaries are drawn on the basis of language data. If a locative adposition could be used in the description of some situation represented by a sequence of codes, that situation (sequence of codes) belongs to the region dominated by the sequence of codes prototypical for that adposition.
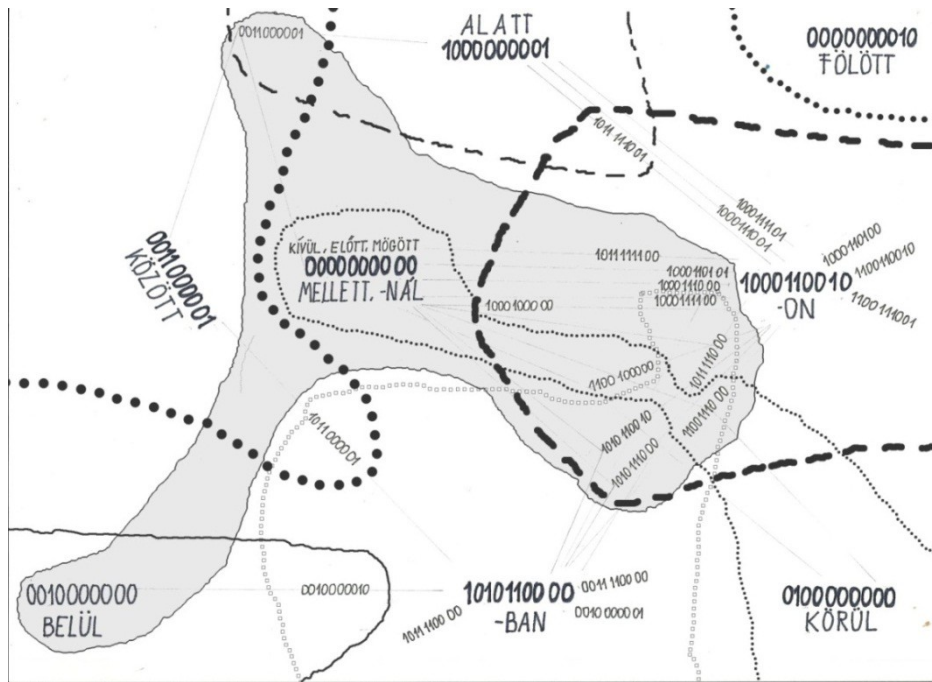
fig. 3.

The two maps reveal two interesting facts. First, the situations could be arranged on the basis of language data so that they could form connected regions (fig. 2.). On the other hand the boundaries based on the language data differ significantly from the boundaries drawn by the Voronoi-tessellation rules. I think that if the meaning of the locative adpositions were the relations between the locative and reference objects the boundaries on the two maps would be similar.

Below I summarize the problems that occurred and would cause difficulties in the relational interpretation of the Hungarian locative adpositions:

The Hungarian suffix -*nÁl* ('at') was unique because there were no such situations represented among the pictures of Bowerman – Pederson (1992) in which the interviewees gave answers exclusively using the suffix -*nÁl*. It was significant that the -*nÁl* was used in the alternative second answers the most frequently, like no other adpositions, and it was the most frequent in the first answers when the situation had relations between the localized and reference objects which were not appropriate for the use of any other locative adpositions. This suggests that the meaning of this suffix is underspecified. Yet, the sequence of codes which is the closest to the prototypical use of the -*nÁl* suffix is the one which represents no relations between the two objects. However this sequence of codes is not underspecified at all.

Another (and general) problem is that horizontal directions cannot be determined by the arrangement of the two objects. It depends on the decision of the speaker. He can decide to choose the inherent directions of the reference object (like the front and the back of car) or to choose his own viewpoint. So in this system used on the basis of Zwarts we could not make difference between the meanings of those locative adpositions that differ only in horizontal directions applied.

There is another fact concerning the postposition *körül* ('around'). There were two kinds of situations when this postposition was used: one kind of these situations has a certain relation between the localized object and the reference object. This relation is called *partial enclosure*, which roughly means that the reference object is partially enclosed by the localized object. The other kind of situations in which this same postposition was also used in some cases does not have this feature. If we would like to define the meaning of this postposition on the basis of the relations between the localized and reference object we should give two different meanings to this postposition. In the case we define its meaning as a function which maps the reference objects to regions we need only one definition for the meaning.

The alternative answers (when two or more adpositions were used in the description of the same situation or in different situations which can be represented by the same sequence of codes) cannot be explained on the basis of the relations between the localized and the reference objects nor on the basis of a hierarchy between them defined in the Optimality Theory.

The problems mentioned did not occurred in case of every locative adposition but if we want to treat them in the same theoretical frame we have to take these facts into consideration.

We can conclude that the relations between localized object and reference object are rather parameters of the context and they are inputs for pragmatic principles.

2.4. The semantic structure of Hungarian locative sentences

In the last chapter of the dissertation I gave a more precise picture of the semantic structure of Hungarian locative sentences containing a DP, a PP and a copula. I take the view that in Hungarian the property of 'being somewhere' is expressed by the locative PP and the copula

together. I assume that the copula is not a semantically vague expression, and its denotation can be given in Zwarts – Winter's (2000) theory as a function from regions to sets of objects (the loc^{-1} function) and the denotation of the PP itself is a region defined by the endpoints of some vectors. In this theoretical frame I suggest a simple solution to the problem when the localized objects are not fully contained in region denoted by the locative phrase. A special case of this problem is the case of the preposition *on* (Herskovits (1987)): it could be never stated that an object is contained in the region denoted by locative phrase which is a surface defined by null vectors in the case of the *on.*

3. Conclusion

On the basis of the results of my dissertation I summarize the answers to the questions put in the beginning:

1. The Hungarian static locative adpositions do not generally behave like two-place predicates in sentences containing a DP, a PP (with a definite article within the PP) and a copula. As a consequence we should not define their denotations as direct relations between the localized object and the reference object.

2. The examination based on the language data collected with the Bowerman – Pederson (1992) test and analyzed on the basis of Zwarts' (2012) codes, revealed that it is not unproblematic to define the meanings of Hungarian locative adpositions in terms of relations between the two objects.

3. If the locational property of objects is expressed in Hungarian by a locative PP together with the copula, and the copula is not semantically vague, then the locative adpositions – should be interpreted as functions; that is the denotation of the locative PP is a region.

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