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On vs. Above: Lexical Semantics and Syntactic Factors Affecting Spatial Acquisition

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1. Introduction

In this work we investigate developmental properties of locative expressions manifested as complex prepositions in Greek. More specifically, our interest revolves around the exceptional behavior that Greek speaking children demonstrated on the prepositions *on* and *above*, when tested in a series of locative prepositions in Greek. The experimental results showed a discrepancy between children's comprehension and production on these two prepositions, suggesting nevertheless that *above* is acquired before *on*, contrary to the generally assumed (reverse) order. Our approach to the phenomenon was to examine the role of the syntactic structure of locative prepositions in the process of their acquisition and, consequently, in the overall development of spatial terms. To anticipate some of our main conclusions, we claim that the syntactic structure onto which locative expressions are mapped, along with the thematic properties of the participating constituents affects their order of acquisition. An important prediction of this state of affairs therefore is crosslinguistic variation as far as the developmental order of locatives expressions is concerned, to the extent that even languages such as English and Greek, which express space similarly (at least in the domain under investigation), demonstrate a different developmental pattern.

Before going into the details of our study we offer in the following section some background information on how and why the venture into the realm of locative prepositions originated, and, subsequently, instigated our interest in the relationship between form and meaning of spatial expressions and its role in their acquisition.

1.1. Locative P(reposition)s in linguistic theory

Out of all P(reposition)s, locatives in particular have preoccupied linguistic theory extensively, especially with respect to where they should be placed along the functional vs. lexical dimension. That their status and properties are not straightforward is manifested by the fact that there are several, and diverging, views that seek to accommodate them.

According to some linguists, locatives are considered lexical elements (Svenonius 2004, den Dikken 2006), others take them to be functional (Grimshaw 1991, Baker 2003, Botwinik-Rotem 2004) and, finally, there are accounts according to which locatives are somehow in between, that is, *semi-lexical* (van Riemsdijk 1990, 1998).

In the spirit of the latter views, Littlefield (2006) studies acquisition of English Ps which she classifies according to the combination of the features [+/-functional], [+/-lexical] in (1). She claims that acquisition proceeds from (1a) to (1d), namely, from the most to the least lexical one (expressing doubts as to the order of (1b)).

- (1) a. Adverbs: *put down the cup* [+lexical, -functional]
 b. Particles: *he ate it up* [-lexical, -functional]
 c. Semi-lexical prepositions: *run to the store* [+lexical, +functional]
 d. Functional prepositions: *translation of the book* [-lexical, +functional]

Our study of the acquisition of Greek prepositions therefore focused on locatives primarily because of the intricacies they present for syntactic theory, and, furthermore, because the majority of locative Ps in Greek are composed rather clearly by a functional and a lexical element, in ways we will elaborate below, hence offer a rich testing ground for the aforementioned theories and debates on Ps.

1.2. Locative expressions in Greek

Locative expressions are mapped onto various syntactic structures in Greek.

a. Location via a Complex P structure.

As demonstrated by examples (2) – (3), the counterparts of the English mainstream locative prepositions are expressed via complex preposition structures in Greek. These are structures in which the first part is an expression of location and the second is either one of the two ‘small’ Ps *se* or *apo*. The ‘small’ Ps may not contribute to the meaning of the first part, as is the case in (2), or may indeed contribute, hence, determine the meaning of the complex P, as is crucially the case with *on* and *above*, (3).

- (2) ***Brosta se/apo*** to spiti
 in-front se/apo the house
 ‘in front of the house’
 (3) ***Epano se/apo*** to trapezi
 on se/apo the table
 ‘on/above the table’

In (4) we offer an exhaustive list of locative complex Ps divided in groups according to the ‘small’ Ps that may follow the lexical part and the meaning the latter may (or may not) contribute. Thus, the locatives in (4a) can

only be construed with *apo*, the one in (4b) only with *se*, the ones in (4c) either with *se* or with *apo* with no difference in meaning depending on which one of the ‘small’ Ps is employed and, finally, those in (4d) for which a different meaning emerges depending on whether *se* or *apo* is employed. The shaded ‘small’ Ps in (4c) mark the versions we tested in the experiments.

(4)	a.	<i>ekso</i>	* <i>se/apo</i>	‘outside of’
		<i>kato</i>	* <i>se/apo</i>	‘under’
		<i>pišo</i>	* <i>se/apo</i>	‘behind’
		<i>makria</i>	* <i>se/apo</i>	‘far’
	b.	<i>konda</i>	<i>se</i> /* <i>apo</i>	‘near’
	c.	<i>brosta</i>	<i>se/apo</i>	‘in front’
		<i>dipla</i>	<i>se/apo</i>	‘beside’
		<i>anamesa</i>	<i>se/apo</i>	‘between’ ¹
	d.	<i>epano</i>	<i>se/apo</i>	‘on/above’
		<i>mesa</i>	<i>se/apo</i>	‘inside/from inside’

Theoretical work on Greek Ps has held that: a) the **first** parts of complex Ps, to which traditional grammars often refer as locative *adverbials* (Tzartanos 1945/1996), are lexical elements (Terzi 2006) and b) the **second** parts, i.e., the ‘small’ Ps *se* and *apo* are functional (Theophanopoulou-Kontou 2000, Terzi 2006). In a comparative study of Greek and Hebrew locative Ps, Botwninik-Rotem and Terzi (2008) claim that *se* and *apo* are responsible for checking the Case feature of the DP complements of the locative, also known as *ground arguments*, thus, they are indeed functional. *Apo* is exceptional in certain ways however, as it seems to contribute semantic input with interesting consequences for the syntactic frame in (7) below, (see Terzi 2006).²

b. *Location via the ‘small’ Ps se or apo*

The ‘small’ Ps *se* and *apo* can also be used on their own to express location, namely, followed directly by their DP ground arguments. In particular, *se* expresses location, (5), while *apo* direction (source), (6).

¹ Despite the fact that there seems to be no difference between *brosta se* and *brosta apo* ‘in front of’ when locational meaning is conveyed, see (2) earlier, we should point out that there is an additional meaning in the structure of *brosta se*, namely, that of ‘in the presence of’. This meaning is not associated with *brosta apo*, (i).

(i) Sikose to heri tu brosta *se*/**apo* to pedhi
‘He raised his hand in the presence of the child.’

We consider this fact to further support our view that *se* does not contribute to the spatial meaning of complex Ps the way *apo* does (see discussion in section 3.2).

² Terzi (2006) points out that (7b) can only be the short form for *epano se afti* ‘on her’ and not of *epano apo afti* ‘above her’, indicating that *apo* cannot be omitted in this particular instance, presumably because it contributes semantic input. On the other hand, all locatives of (4c) have short forms, indicating that *apo* can be omitted. We do not discuss the last locative in (4d), as it presents complications that are not relevant to our current purposes.

- (5) To vivlio ine s-to trapezi/sirtari.
the book is se-the table/drawer
'The book is on the table/in the drawer.'
- (6) Erxome *apo* to grafio.
come-1s apo the office
'I come from the office.'

We thus see that in the above syntactic frame both 'small' Ps have semantic content while they are also responsible for the Case of their DP complement, a combination of properties that renders them semi-lexical according to (1).

c. Location without a 'small' P

The lexical parts of Complex Ps can be followed by their DP complements without the mediation of a 'small' P, as long as the complement is expressed in the form of a clitic (with genitive Case):

- (7) a. Brosta tu
in-front he-cl
'in front of him'
- b. Epano tis
on she-cl
'on her'

d. Location without a complement

The lexical parts of complex Ps can also appear without a complement, in a frame presumably responsible for them to also be known as (locative) adverbs. Their meaning is similar, but not always identical to the meaning they have when in complex Ps. (8b) demonstrates the latter instance.

- (8) a. O Petros stekotan brosta/piso.
the Peter was-standing in-front/behind
'Peter was standing in front/behind.'
- b. I Maria kathete epano/kato - meni epano/kato
the Mary sits on/down - lives on/under
'Mary is sitting on/down - lives upstairs/downstairs.'

2. Earlier work on the Acquisition of Greek Prepositions

Previous work on acquisition of prepositions in Greek (Alexaki et al. (2007)) was primarily concerned with the following issues:

- a) whether there is a difference in age of acquisition between the first (i.e., lexical) and the second part (i.e., functional) of complex Ps.
- b) whether there is a difference in age of acquisition between 'small' Ps when they are part of complex prepositions, i.e., as functional, and when used alone to convey location, i.e., as semi-lexical.

2.1. The experimental methods in Alexaki et al. (2007)

The above study employed two types of experimental procedures:
a. structured experiments, and b. spontaneous speech analysis.

a. Structured Experiments

69 children participated in the structured experiments. Their ages were from 2 to 6 and were divided in the 8 age groups below:

1st age group: 5;07 – 5;11 (n=9) 5th age group: 3;07 – 3;11 (n=9)
2nd age group: 5;00 – 5;06 (n=9) 6th age group: 3;00 – 3;06 (n=9)
3rd age group: 4;07 – 4;11 (n=9) 7th age group: 2;07 – 2;11 (n=8)
4th age group: 4;00 – 4;06 (n=9) 8th age group: 2;00 – 2;06 (n=7)

First task: Comprehension of Locative Adverbials

The first experimental task tested comprehension of the lexical parts of complex Ps when used without a complement, that is, in the frame referred to as locative adverbs, (8). The following locative expressions were tested:

<i>epano</i>	‘on/above/upstairs’
<i>dipla</i>	‘besides’
<i>makria</i>	‘far’
<i>brosta</i>	‘in front’
<i>mesa</i>	‘inside’
<i>kato</i>	‘under/down/downstairs’
<i>konda</i>	‘near’
<i>piso</i>	‘behind’
<i>ekso</i>	‘out/outside’

Testing took place via a (version of) picture verification task. A big picture was utilized, showing a building whose tenants were looking outside from the windows. In order to test comprehension of *epano* ‘on/upstairs’, for instance, the experimenters pointed to a particular person on the picture and asked a question such as: *Afti ine i Maria. Dikse mu to koritsi pu meni epano.* ‘This is Maria. Show me the girl who lives above/upstairs.’

Second task: Comprehension of Complex Prepositions

The second task investigated comprehension of the complex preposition structures, that is, of structures such as in (2)-(3). The following complex locatives were tested (compare them with their counterpart locative adverbials in the first task, right above).

<i>epano se</i>	‘on’
<i>epano apo</i>	‘above’
<i>dipla se/apo</i>	‘beside’
<i>makria apo</i>	‘far’
<i>brosta se/apo</i>	‘in front’
<i>mesa se</i>	‘inside’
<i>mesa apo</i>	‘from inside’

<i>kato apo</i>	‘under’
<i>konda se</i>	‘near’
<i>piso apo</i>	‘behind’
<i>ekso apo</i>	‘outside of’
<i>anamesa se/apo</i>	‘between’

This was also a picture verification task, but different from the previous one. Children were now presented with a set of three pictures, the target picture and two others containing the opposite locative. They then had to choose one of the three, after hearing a sentence such as: *Dikse mu ti fotografia pu to pedhi ine konda sto spiti* ‘Show me the picture where the child is close to the house.’

Third task: Production of Complex Prepositions

Production of complex Ps was tested after comprehension, by using (some of) the same pictures as in the comprehension task, but one at a time. Assistance was provided when necessary, in a way that did not give away the answer. The experimenters would ask, for instance: *Pu ine to pedhi?* ‘Where is the child?’ If no complete answer was obtained (which was often the case), they would continue with something like: *Lipon, edo ine to pedhi ki edo ine to spiti. To pedhi ine konda i makria?* ‘So, here is the child and here is the house. Is the child near or far?’ If no full answer was obtained again, namely, an answer including the ‘small’ P and its DP object, the experimenter would continue with: *Konda pu?* ‘Near where?’

b. Spontaneous Speech

The spontaneous speech data of the above study came from two sources:

- a. the CHILDES database, and
- b. a longitudinal study of the spontaneous speech of 3 children age 2;2 to 3;5.

The purpose of the spontaneous speech analysis was:

- a) to investigate whether children start to use ‘small’ Ps as parts of complex Ps at the same age as in the structured experiments.
- b) to investigate whether there is indeed an age difference between the use of ‘small’ Ps in the above frame and in their ‘semi-lexical’ use, that is, when ‘small’ Ps are used alone to express location, (5)-(6).

2.2. The results in Alexaki et al. (2007)

The production results of the structured experiment appear in Table 1 below and show a sudden explosion of children’s production of ‘small’ Ps at age 3, in addition to the fact that only after age 3:6 they attain use of *se* and *apo* as parts of complex Ps at a percentage higher than 90%.

Table 1: Production of Complex Prepositions (structured experiment)

Age group	1(n=9)	2(n=9)	3(n=9)	4(n=9)	5(n=9)	6(n=9)	7(n=8)	8(n=7)
Age	5;7 - 5;11	5;0 - 5;06	4;7 - 4;11	4;0 - 4;06	3;7 - 3;11	3;0 - 3;06	2;7 - 2;11	2;0 - 2;06
Adverbial	1	1	0	2	5	7	16	5
Complex Ps	122 (97%)	121 (96%)	124 (98%)	117 (93%)	114 (91%)	109 (86,5%)	26 (21%)	0 (0%)
Other	3	4	2	3	4	10	7	0
No answer	0	0	0	4	3	0	63	98

The spontaneous speech data indicated that children start using *se* and *apo* alone as locatives, i.e., in the frame in (5)-(6)), earlier than the age of 3, as one would indeed expect if they are semi-lexical. The first ‘small’ P they produce in this frame seems to be *apo* (see Alexaki et al. 2007 for details). Table 1 also indicates that only after the age of 3 do children use the lexical part of complex Ps productively, since before then only a small percentage of complex Ps is substituted for an adverbial.

3. The current study: Acquisition of on vs. above in Greek

This work focuses on the three older age groups of the Alexaki et al (2007) study. The questions that call for an answer are motivated primarily by children’s behavior at the locatives *epano se* ‘on’ and *epano apo* ‘above’.

Note that the three older age groups of Table 1 (i.e., the shaded cells of the Table), produced complex prepositions at very high (close to adult) rates. Their (few) production errors appear in Table 2 next page and we see that, with the exception of *metaksi* ‘between’ for the two older groups, and *brosta* ‘in front’ for the third group, no other error was found.

We should note that we did not count as errors those instances in which children did not give the expected answer, but gave answers which did not contradict common sense knowledge of spatial relationships. That is, if the expected answer was *the dog is outside the house* but we obtained *the dog is in front of the house*, we did not consider the response as an error. The Table lists this type of answers with their number of occurrence in parentheses.

The second part of the Table indicates production errors involving ‘small’ Ps. Recall that *makria* ‘far’, *ekso* ‘outside’ and *piso* ‘behind’ are only construed with the ‘small’ P *apo*, (4a). In the above (and the following) Tables, n=9 stands for the number of children of each age group, and for the number of tokens for each locative - since each child was tested only once on each locative expression. Recall that all locative expression in section 2.1. were tested, hence the full structured experiment was too long to include more than one instances of the same P.

Table 2: Production Errors on Complex Prepositions

	<i>Age group 1</i> (n=9)	<i>Age group 2</i> (n=9)	<i>Age group 3</i> (n=9)
Locative Ps			
	<i>inside</i> (for <i>between</i>) 1	<i>Inside</i> (for <i>between</i>) 1	<i>above</i> (for <i>on</i>) 1
		<i>from inside</i> (for <i>between</i>) 1	<i>Behind</i> (for <i>in front</i>) 1
		√ <i>near</i> (1) (for <i>beside</i>)	√ <i>near</i> (1) (for <i>beside</i>)
		√ <i>in front of</i> (1) (for <i>outside of</i>)	√ <i>beside</i> (2) (for <i>near</i>)
		√ <i>on the step</i> (1) (for <i>beside</i>)	√ <i>in front, near</i> (2) (for <i>outside</i>)
			√ <i>outside</i> (1) (for <i>behind</i>)
Total	1	2	2
Small Ps			
	far: <i>se</i> for <i>apo</i> 1	0	outside: <i>se</i> for <i>apo</i> 1 behind: <i>se</i> for <i>apo</i> 1
Total	1	0	2

In Table 3 below we give the same children's comprehension errors when tested on (the same) locative Ps. The Table indicates that children have serious problems comprehending *epano se* 'on', which they interpret as *epano apo* 'above' even at stages the rest of locative prepositions have presumably been acquired, if we judge from their very few errors in Tables 2 and 3. By contrast, Table 2 demonstrated that children's production on *on* and *above* is almost fine.

Table 3: Comprehension Errors on Complex Prepositions

<i>Age group 1</i> (n=9)	<i>Age group 2</i> (n=9)	<i>Age group 3</i> (n=9)
<i>above</i> (for <i>on</i>) 5	<i>above</i> (for <i>on</i>) 4	<i>above</i> (for <i>on</i>) 4
<i>far</i> (for <i>near</i>) 1	<i>inside</i> (for <i>outside</i>) 1	<i>on</i> (for <i>above</i>) 2
Total 6	5	6

Note that one cannot easily say that the children of our experiments have not grasped the meaning of the lexical part of the complex preposition, namely, the meaning of *epano*. As mentioned in section 2.1, comprehension of the lexical part of complex locatives was tested as well. The results appear in Table 4 below, and demonstrate that children did not have trouble understanding *epano*.

Table 4: Comprehension Errors on Locative Adverbials

Age group 1 (n=9)	Age group 2 (n=9)	Age group 3 (n=9)
no errors	<i>near</i> (for <i>far</i>) 1	<i>near</i> (for <i>far</i>) 3
	<i>behind</i> (for <i>in front</i>) 1	<i>behind</i> (for <i>in front</i>) 1
	<i>far</i> (for <i>near</i>) 1	<i>far</i> (for <i>near</i>) 1
	<i>In front</i> (for <i>behind</i>) 1	
Total	0	5

3.1. The issue(s)

Given the above findings, what we were initially concerned with was the discrepancy children manifested between comprehension and production on the locatives: *epano apo* ‘above’ and *epano se* ‘on’. The relevant results are summarized in Table 5, which also raises two interrelated questions:

- why is comprehension on these two locatives worse than production?
- why is it that the preposition *above* is comprehended (acquired?) before *on*?

Table 5: Children’s errors on above and on

	Age group 1 (n=9)	Age group 2 (n=9)	Age group 3 (n=9)
Comprehension			
	<i>above</i> (for <i>on</i>) 5	<i>above</i> (for <i>on</i>) 4	<i>above</i> (for <i>on</i>) 4
	0	0	<i>on</i> (for <i>above</i>) 2
Production			
	0	0	0
	0	0	<i>on</i> (for <i>above</i>) 1

The latter question becomes particularly important in view of the literature which reports that there is a relatively consistent order in which spatial words emerge crosslinguistically and that *on* is one of the first such terms to be mastered (Bowerman and Choi 2001, Leikin 1998, Johnston and Slobin 1978, Johnston 1988). It should also be brought into attention that it is not the case that Greek utilizes different semantic structuring with respect to these two spatial notions when compared to English. In other words, *epano se* and *epano*

apo mean exactly what ‘on’ and ‘above’ mean in English.³ Nevertheless, it seems that Greek ‘above’ is mastered before Greek ‘on’, a fact which, if indeed true, requires an answer.

3.2. Accounting for the asymmetry

The answer to the second question above, namely, why children seem to acquire *above* before *on*, has probably become transparent from the discussion so far: children do not seem to have problems with the lexical part of the two locatives, that is, with understanding the feature of ‘vertical orientation’ that *epano* involves. This is suggested by the absence of errors on *epano* in Table 4. We conclude, therefore, that the problems children have with understanding *on* in Greek most likely lie with understanding the properties of the ‘small’ Ps *se* and *apo*.

As a consequence of the previous conclusion, we propose that children’s (almost) impeccable performance at *epano se* ‘on’ does not reflect that they know the meaning of this complex preposition. Instead, we believe that what children do when they produce *epano se* is to use *se* as a Case marker for the DP ground argument of the preposition. Support for this idea comes from two directions:

- a) children are way after the age at which Case has been acquired. Marinis’s (2003) findings on the acquisition of Case in Greek indicate that the process is completed around age 3, long before the age of our study group (above age 4;6).
- b) *se* is considered a pure Case marker in Botwinik-Rotem and Terzi (2008), by contrast to *apo* which cannot be considered to only play this role always. In particular, when it occurs in a complex P involving *epano*, *apo* appears to make semantic contribution (see also footnotes 2 and 3).

The remaining question is why children’s comprehension of *epano se* ‘on’ is not concealed in a similar manner, that is, why is it that children do not appear to do well at comprehension of *epano se*, presumably via some similar strategy. We speculate that the following scenario takes place, having to do with the tasks that are at stake during comprehension and production. In production, the task for the child is to say something, namely, to map a spatial meaning to a linguistic form/word. At the same time, however, she is (also) concerned with the grammaticalness of the form she produces, which, given her age, includes Case marking of the DP ground argument. As a consequence, she uses *se* to Case mark this argument (since the only role of *se* in complex Ps is to check the Case of the nominal argument of the locative).

Comprehension obviously involves a different task: the child is now has to assign interpretation to the form provided by the speaker, which involves

³ Unlike, for instance, pairs such as English *put in* (containment) and Korean *kitta* ‘put in’ (tight fit), which constitute pairs (of verbs) with respect to which the two languages categorize space differently, Choi et al. (1999), hence justify different patterns/order of acquisition of these elements (Bowerman and Choi 2001).

identifying predicates and their arguments. We suggest that the role of functional elements, such as *se*, is arguably less important in this process and it may then be that the child overgeneralizes, assuming that every element contributes semantically. Hence, she takes *se* to contribute just like *apo* (whose meaning we assume she knows).⁴

We believe that the above manner of accounting for the findings is consistent with the comprehension results, according to which children interpret *on* as *above*, rather than *above* as *on*. We also believe that this line of reasoning leads us to consider *above* to indeed be mastered earlier than *on* in Greek.

Therefore, the answer to the first question raised by Table 5 is that children's production at *on* is only apparently better than their comprehension. The answer to the second question raised by Table 5 on the other hand, is that *above* is indeed comprehended/acquired before *on* in Greek. This is a surprising, given that the literature considers *on* to be one of the first locatives in children's language (taking also into consideration that Greek and English structure space similarly, at least when it comes to these two spatial expressions).

If our findings are on the right track, two possibilities are suggested:

a) the views according to which there is a uniform order of (non-linguistically determined) acquisition of spatial expression, with *on* acquired before *above* across languages, are not right.

b) the views according to which *on* is acquired before *above* across languages are essentially right. Nevertheless, the order of acquisition is affected by the particular means languages utilize for expressing spatial terms, more precisely, by the syntactic structure to which the spatial expressions are mapped and the semantic contribution of the components of this syntactic structure. We believe that our findings argue for the latter option. In Greek, the element *epano* expresses 'vertical orientation', not distinguishing non-contiguity from the ground argument. The latter information is contributed by *apo*, which, as a (semi)lexical element, is mastered before *se*. As a result, *epano + apo* = 'above' is mastered before *epano + se* = 'on'.

4. Conclusions

This work focused on some exceptional facts concerning the development of the locative prepositions *on* and *above* in Greek.

We concluded that a comprehension vs. production asymmetry manifested by the acquisition data in this domain is not accidental; to the contrary, it reveals that the order of spatial acquisition is strongly affected by the contribution made by each of the elements involved in the structure of a particular preposition. It comes as no surprise therefore that acquisition of *above* precedes acquisition of *on* in Greek, given the (linguistics) means that the language employs in order to express these notions.

⁴ We would like to thank Irena Botwinik-Rotem for discussing these issues with us.

We then predict that even languages which structure space in a similar manner, i.e. Greek and English, will show a different developmental pattern if locative expressions are instantiated by different (complex) syntactic structures. Thus, we expect acquisition of spatial terms to also be determined by the syntactic structure to which a spatial term is mapped in a specific language.

References

- Alexaki, Christina, Maria Kambanaros and Arhonto Terzi (2007) "On the Acquisition of Prepositions", In *Selected Papers from the 18th International Symposium on Theoretical and Applied Linguistics*. University of Thessaloniki (in press).
- Baker, Mark (2003) *Lexical Categories. Verbs, Nouns and Adjectives*, Cambridge University Press, Cambridge.
- Botwinik-Rotem, Irena (2004) *The Category P: Features, Projection, Interpretation*, Ph.D. Dissertation, University of Tel-Aviv.
- Botwinik-Rotem, Irena and Arhonto Terzi (2008) "Greek and Hebrew Locative Prepositional Phrases: a unified Case-driven Account", *Lingua* 118, 399-424.
- Bowerman, Melissa and Soonja Choi (2001) "Shaping meanings for language: Universal and language-specific in the acquisition of spatial semantic categories", In M. Bowerman and S. C. Levinson (eds.), *Language acquisition and conceptual development*, Cambridge University Press, Cambridge, pp. 475-511.
- Choi, Soonja, Laraine McDonough, Melissa Bowerman and Jean M. M. Mandler (1999) "Early Sensitivity to Language-Specific Spatial Categories in English and Korean", *Cognitive Development* 14, 241-268.
- den Dikken, Marcel (2006) "On the syntax of locative and directional adpositional phrases", In G. Cinque & L. Rizzi (eds.), *The Cartography of PPs*, Oxford University Press, Oxford (in press).
- Grimshaw, Jane (1991) "Extended Projections", ms., Brandeis University.
- Johnston, Judith (1988) "Children's verbal representation of spatial Location", In J. Stiles-Davis, M. Kritchevsky and U. Bellugi (eds.), *Spatial cognition*, Erlbaum, Hillsdale, NJ, pp. 195-205.
- Johnston, Judith and Dan I. Slobin (1978) "The development of locative expressions in English, Italian, Serbo-Croatian and Turkish", *Journal of Child Language* 6, 529-545.
- Leikin, Mark (1998) "Acquisition of Locative Prepositions in Russian", *Journal of Psycholinguistic Research* 27, 91-108.
- Littlefield, Heather (2006) *Syntax and Acquisition in the Prepositional Domain: Evidence from English for Fine-Grained Syntactic Categories*, Ph.D. Dissertation, Boston University.
- Marinis, Theodoros (2003) *The Acquisition of the DP in Modern Greek*, John Benjamins, Amsterdam.
- van Riemsdijk, Henk (1990) "Functional Prepositions", In H. Pinkster & I. Genee (eds.), *Unity in Diversity*, Foris, Dordrecht.
- van Riemsdijk, Henk (1998) "Categorial Feature Magnetism: The Endocentricity and Distribution of Projections", *Journal of Comparative Germanic Linguistics* 2, 1-48.

- Svenonius, Peter (2004) “Spatial P in English”, In G. Cinque and L. Rizzi (eds.), *The Cartography of PPs*, Oxford University Press, Oxford (in press).
- Terzi, Arhonto (2006) “Locative Prepositions and *Place*”, In G. Cinque and L. Rizzi (eds.) *The Cartography of PPs*, Oxford University Press, Oxford (in press).
- Theophanopoulou – Kontou, Dimitra (2000) “Τοπικά επιρρήματα και ‘πτώση’ στην Ελληνική: Διαχρονική προσέγγιση”, (Locative Adverbs and Case in Greek: a Diachronic Approach.), *Glossologia* 11/12, 1-40.
- Tzartanos, Achilles (1945) *Νεοελληνική Σύνταξις της Κοινής Δημοτικής*. [Modern Greek Syntax of Dhemotic], Kyriakidis, Thessaloniki (1996).