Semantic structures of English locative prepositional phrases

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A locative prepositional phrase is decomposed into three semantic elements: locative relation, reference entity and place value. Some prepositions are unspecified with place value meaning, thus they are able to co-occur with another preposition which has a place value meaning. Each locative expression allows only one locative relation and one place value. Thus co-occurrence of two pure locative relation markers and co-occurrence of two prepositions which are both specified with place value are ruled out. No embedded locative relations are allowed in the semantic structure of a single locative expression. The specific locative relation denoted by a preposition is not specified in the lexicon. It varies with eventuality types.

1. Purpose

The purpose of this study is to put forward a new analysis of the semantic structure of English locative prepositional phrases (PPs). This analysis accounts for the combination possibilities of various prepositions. In addition, it provides a unified semantic structure for both syntactically simplex and complex PPs. Furthermore, it links the types of locative relations with the types of eventualities.

In section 2, I present an overview of the semantic decomposition hypothesis on locative PPs. Section 3 discusses place values and section 4 discusses locative relations. Section 5 deals with the relation between locative relations and eventuality types. Section 6 is a brief summary.

2. Semantic decomposition of simple locative PPs

Generally speaking, a locative PP always co-occurs with some other semantic constituent, which I call X.

(1.) a. X PP
b. There is a book on the table.
c. He put a book on the table.

Semantically, a locative PP, first of all, expresses a locative relation between X and a place, e.g. a certain place is the position, the source, the goal, or the route of X. Secondly, a reference entity, which is the object NP of the P syntactically, is obligatory. Thirdly, a value of the place with respect to the reference entity is usually expressed by the locative PP, for example, the surface (on), the interior (in), the space below (under), the space behind (behind) of a reference entity. A place value indicates a definite space or point in a place coordinate which takes the

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reference entity as its origin. For instance, in (1b) and (1c), the locative PP has the following semantic elements: (i) in (1b), the locative relation between X, i.e. the existence of a book, and the table is that *on the table* is the POSITION, while in (1c) the locative relation between X, i.e. the transference of a book, and the table is that *on the table* is the GOAL. (ii) the reference entity in these two sentences is *the table*, not the chair. (iii) the place value of the locative expressions is the SURFACE of the table, not the INTERIOR of the table. In the semantic structure I proposed, reference entity and place value form a higher level constituent: PLACE. I use LR to represent locative relation; PV to represent place value, and RE to represent reference entity. Thus, the locative PPs in (1b) and (1c) have the following semantic structures respectively.

(2.) a. \[ \text{LR POSITION [PLACE [PV SURFACE][RE table]]} \]
   b. \[ \text{LR GOAL [PLACE [PV SURFACE][RE table]]} \]

English *at* indicates LR only, while *on, in* and many other locative prepositions express both LR and PV.\(^1\) Prepositions of the latter group behave like portmanteau morphs in that they express two semantic elements at the same time. Some languages have analytic forms for these three different meanings. In Indonesian, the semantic elements of locative relation and place value are realized as two agglutinative morphemes of a preposition. In Chinese, these two semantic elements are realized as two separate words.

(3.) English:

<table>
<thead>
<tr>
<th></th>
<th>on the table</th>
<th>under the table</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ \</td>
<td>LR PV RE</td>
<td>LR PV RE</td>
</tr>
</tbody>
</table>

(4.) Indonesian:

<table>
<thead>
<tr>
<th></th>
<th>di-atas médja at top table</th>
<th>di-bawah médja at below table</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LR PV RE</td>
<td>LR PV RE</td>
</tr>
<tr>
<td>'on the table'</td>
<td></td>
<td>'under the table'</td>
</tr>
</tbody>
</table>

(5.) Chinese:

<table>
<thead>
<tr>
<th></th>
<th>zai zhuozi shang at table surface</th>
<th>zai zhuozi xia at table down</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LR RE PV LR RE PV</td>
<td></td>
</tr>
<tr>
<td>'on the table'</td>
<td></td>
<td>'under the table'</td>
</tr>
</tbody>
</table>

Not all English locative prepositions are as synthetic as *on* or *under* with respect to semantic structures. The preposition *in* in the phrases *in front of* and *in back of* expresses the locative relation, and the words *front* and *back* indicate the place value.

Locatives in some languages are morphologically realized as case, as in Finnish, or gender, as in some Bantu languages such as Chichewa (Bresnan and Kanerva 1989). In these

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\(^1\) Compared the prepositions *in* and *on* with *near* and *at*, Jackendoff and Landau (1992:111) claim that *near* and *at* require only that the reference object is bounded in extent. Since it is impossible to have an unbounded object as the reference object of a location, I think that the function of *at* is simply to show a locative relation.
languages, locative expressions can always be decomposed into the three kinds of semantic elements: locative relation, place value and reference entity.

3. Place values

Place value is a semantic category, generalized from various primitive elements. It can be elaborated as much as the communication requires. In English, primitive elements of place values can be realized either as part of the meaning of a locative preposition, e.g. on, as discussed in section 2 above, or as an NP, e.g. the inner part, the top, the bottom, etc. The following is my rough list of place value primitive elements of some English prepositions, based on a semantic analysis by Bennett (1975:92).

(6.)

<table>
<thead>
<tr>
<th>Higher (above, up)</th>
<th>Surround ((a)round)</th>
<th>Anterior (in front of)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wards (towards)</td>
<td>Off (off)</td>
<td>Length (along)</td>
</tr>
<tr>
<td>Lower (below, down)</td>
<td>Proximity (by, past)</td>
<td>Space below (under)</td>
</tr>
<tr>
<td>Surface (on, onto)</td>
<td>Superior (over)</td>
<td></td>
</tr>
<tr>
<td>Transverse (across)</td>
<td>Exterior (out of, outside)</td>
<td></td>
</tr>
<tr>
<td>Interior (in, in, through, inside)</td>
<td>Space behind (behind, in back of)</td>
<td></td>
</tr>
</tbody>
</table>

3.1 Unspecified place value

Some locative prepositions in English are unspecified with place values, as shown in (7).

(7.) a. John is at the supermarket.
   b. Trevor came from the supermarket.
   c. Trevor walked to the supermarket, but he didn't enter it.
   d. *Trevor walked into the supermarket, but he didn't enter it.

Compared with (7c), (7d) is unacceptable because the specified place value of the preposition into contradicts with the meaning of the following clause. In contrast, to in (7c), which expresses the locative relation of goal and is unspecified with place value, does not conflict with the meaning of the following clause. Prepositions such as at, from, to, and via are purely locative relation markers and unspecified with place value. They differ from other semantically synthetic locative prepositions in that they cannot be decomposed into a locative relation and a place value.

Lack of specification of place value does not mean the absence of a structural position for place value in a semantic structure. Theoretically, all purely locative relation markers can co-occur with a place value marker. The empty structure position of PV can be filled. For example, the contrast between (8a) and (8b) is that the former contains an empty PV, while the latter has a filled PV.

(8.) a. from the desk
   b. from the back of the desk
Thus I proposed that the PP in (8a) should have a semantic structure (9b), rather than (9c), which is used in Jackendoff (1990).

(9.) a. Trevor came from the office  
   b. [LR SOURCE [PLACE [PV ᵒ] [RE office]]]  
   c. [PATH FROM [THING office]]

The relevant difference here is that one has a position for place value, while the other does not. My proposal provides a unified semantic structure for both (8a) and (8b).

3.2 One place value per locative expression

There is a constraint on locative expressions: each locative expression allows only one place value. Thus two synthetic forms, both of which contain a place value meaning, cannot co-occur in the same locative expression. The following (10a) and (10b) are unacceptable:

(10.) a. *in on the table  
   b. *into under the building  
   c. from behind the desk

They are in contrast to (10c), which contains only one place value SPACE BEHIND in the word behind.

3.3 Speaker oriented place value

Some locative PPs have an explicit place value, but the place value varies with the speaker's perspective. The same PLACE primitive element in the real world may be expressed in different ways. For example,

(11.) a. on the street  
   b. in the street

(11a) presents a two-dimensional conceptual structure of the place, while (11b) shows a three-dimensional conceptual structure of the place. However, this choice of place value has nothing to do with the choice of locative relations. When describing the same event, some people use on the street, others use in the street, but they would not disagree between from the street and to the street. On the street and in the street have the same locative relation: POSITION, while from the street and to the street have different locative relations: one is SOURCE, the other is GOAL.

Different choices of locative prepositions have been treated as a problem in locative research. Van Langendonck (1974:1 cited from Somers 1987) distinguished between 'internally referring' (semantically void) and 'externally referring' (semantically valid) prepositions. Some effort has been made to analyze the similar phenomena in Dutch and French, but the conclusions are confusing, as mentioned by Somers (1987). This unsatisfactory situation might arise from the lack of a proper semantic decomposition of locative PPs.
4. Locative relations

Locative relation is also a semantic category. Following the general classification of locative relations, I distinguish four primitive elements for this category: POSITION, SOURCE, GOAL, and ROUTE. The latter three can also be grouped into a more general group PATH. The definitions of these primitive elements of locative relation are the following:

(12.) In X [LR Z [PLACE [PV] [RE Y]]],
if Z is POSITION, it shows that the PLACE is the position of X;
if Z is GOAL, it shows that the PLACE is the terminus of X;
if Z is SOURCE it shows that the PLACE is the starting point of X;
if Z is ROUTE it shows that the PLACE is the space intervening from SOURCE to GOAL taken by X.

4.1 One locative relation per locative expression

There is a constraint on natural languages: one locative expression allows only one locative relation. Forms such as *at from, *from at, or other combination of two pure locative relation markers are unacceptable. Bennett (1975: 26) assumes that the underlying structure of to church in go to the church should be to at the church. He claims that though neither English nor French has such a surface form, "but there are also languages whose surface structure resembles the underlying structure proposed for English and French. One such language is Nyanja, a Bantu language spoken in Malawi. At the door is translated into Nyanja as ku-chitseko, and from the door as chokera ku-chitseko (literally 'from at the door')." However, based on both the published reference (Thomson 1955, Stevick and Hollander 1965) and the information given by my informants, a couple who are native Nyanja speakers, I found Bennett's claim faulty. Though both ku-chitseko and chokera ku-chitseko are acceptable forms, the literal translation of the latter should be 'come from the door', not 'from the door'. The word chokera is a verb, meaning 'come', not a preposition. In Nyanja, locative ku is rather abstract. As in the case of ku in Chichewa, it can denote POSITION, SOURCE, or GOAL. Chichewa examples are shown in (13) (Bresnan and Kanerva 1989:39).

(13.) a. Mu-ma-thamang-a ku-ti?
   II HON SB-PRS HAB-run-IND LOC-Q
   'Where do you usually run?'

b. Mu-ma-thamang-ir-a ku-ti?
   II HON SB-PRS HAB-run-APPL-IND LOC-Q
   'Where do you usually run to?'

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2 Other terms for POSITION and PATH used in the literature are: locative vs. directional (Bennett 1975, Somers 1987), place vs. path (Jackendoff 1990), and non-motional vs. motional (Gruber 1976).

3 The abbreviations used for grammatical categories of Chichewa are:
   II: second person     HON: honorific     SB: subject
   PRS HAB: present habitual     IND: indicative     APPL: applicative
Thus, my investigation shows that, like English, Bantu languages do not allow two purely locative relation markers to co-occur in one locative expression. This constraint is also supported by Chinese fact:

(14.) a. zai zhuozi shang
    at table surface
    'on the table'

    b. cong zhuozi shang
    from table surface
    'from the table'

    c. *zai cong zhuozi shang
    at from table surface

    d. *cong zai zhuozi shang
    from at table surface

The absence of forms such as *from at, *to at, *at from, or other purely locative relation marker combination is not an accidental gap in human languages. It shows a constraint on our conceptual structure: one locative relation per locative expression, if only one reference entity is considered. Gruber (1976:68) assumed that at or to is deleted after another preposition such as from, without explaining why such a deletion is obligatory. My constraint accounts for the impossibility of co-occurrence of two pure locative relation markers.

4.2 Semantic structures of complex PPs

The constraint that one locative expression allows only one locative relation implies that when a semantically synthetic form such as behind, which expresses both a locative relation and a place value, occurs with a pure locative relation marker, as in (15a), its locative relation meaning is suppressed. In (15a), the only locative relation SOURCE is expressed by the pure locative relation marker from. The locative PP in (15a) has the semantic structure of (15b).

(15.) a. Trevor appeared from behind the desk
    b. [LR SOURCE [PLACE [FP SPACE BEHIND][RE desk]]]

Current analyses in the literature assume that (15a) has a complex semantic structure, in which POSITION is embedded in SOURCE. The above analysis allows us a unified semantic frame for both syntactically simple and complex locative PPs.

From the analysis above, we have seen that the proposed semantic decomposition of locative PPs not only accounts for the acceptability of different combinations of locative
prepositions, but also provides a unified semantic analysis to both simple and complex locative PPs.

5. Eventuality types and locative relations

Eventuality is a general term referring to both event processes and states (Bach 1980). There are two types of eventuality: unbounded and bounded. The former consists of state and activities, while the latter covers various processes which have an intrinsic temporal ending.

Recall that in section 2 on can mark different locative relations: POSITION and GOAL. In contrast with current work on locative expressions, I do not distinguish between position prepositions and path prepositions. The specific locative relation marked by a preposition varies with eventuality types and the function of the locative PP in the sentence. I will discuss this issue in this section. Although every locative preposition can express a certain kind of locative relation, it is not specified with the kind of locative relation. However, it is specified with whether it has place value and what place value it has.

5.1 Unbounded eventualities and POSITION

Locative prepositions occur with an unbounded eventuality always denote the locative relation of POSITION, except the cases which will be discussed in section 5.2.

(16.) a. to work in the office
     b. sitting in the office
     c. standing to the left of the window
     d. The terrified child trembled behind the desk.

Locative prepositions can be divided into three groups with respect to whether place value is required. The first group is represented by at, which does not require but allows a place value, as in (17).

(17.) a. He was at the station.
     b. The plate is at the end of the table.

The second group is represented by on, along and through, which are synthetic forms indicating both locative relation and place value, as in (18). The place value is SURFACE in (18a) and LENGTH in (18b) (See (6)).

(18.) a. The book is on the table.
     b. There are a lot of shops along this street.

The third group is represented by to and from, which require a place value, as in (19-22). In the following, the underlined parts indicate the place value.

(19.) a. Mary stood three feet from the house.
     b. John remained away from the table.
     c. *John remained from the table.
(20.) a. the house standing next to the hospital.
   b. *John stood to the house.

(21.) a. The territory is to the south of the river.
   b. *The territory is to the river.

(22.) a. The terrified child trembled to the left of the bed.
   b. *The terrified child trembled to the door.

Bennett (1975: 90) proposed that in cases like (20-22), to is still a GOAL marker, and in the semantic structure GOAL is embedded in POSITION. Thus the structure of the PP in (21), for example, might be [LR POSITION[LR GOAL [...]]]. I propose an alternative analysis. Typical unbounded eventualities have only the locative relation of POSITION. No GOAL occurs in the locative semantic structure of unbounded eventualities, except the cases discussed in the next section. Thus no embedded locative relation is allowed. The structure of the PP in (21) is [LR POSITION[PLACE [PV SOUTH [RE river]]]].

5.2 Unbounded eventualities and PATH

There are three cases in which locative prepositions denote GOAL, SOURCE or ROUTE in unbounded eventualities. In all of these cases, bounded eventualities are implied.

First, locative prepositions in unbounded eventualities which are composed by repeated bounded events can express SOURCE, GOAL or ROUTE.

(23.) a. He goes to the department every day.
   b. He comes from North York every day.

In such sentences, the locative relations GOAL and SOURCE are linked to each of the bounded events, rather than to the general unbounded eventuality, which is quantified by every day.

Second, from expresses SOURCE in expressions showing source identity. In (24), from is used in an unbounded eventuality. Such expressions show the source identity of an entity. I assume that some bounded eventuality meaning is implied here. The interpretation of these expressions are always that an entity came from a certain place.

(24.) a. I am from China.
   b. people from China

The constructions to be from + NP and NP from + NP as expressions of source identity are not universal. Chinese does not allow such expressions.

(25.) a. *wo shi cong Zhongguo
    I be from China
b. wo lai zi Zhongguo
   I come from China
   'I am from China.'

c. *cong Zhongguo de ren
   from China MODI people

   people from China

   In Nyanja, source identity is expressed by verb 'come' in present tense, while a
   bounded eventuality is expressed by verb 'come' in past tense.

   (26.) a. Ine chokera Zambia
      I PRS-come Zambia
      'I am from Zambia.'

   b. Ine nachokera Zambia
      I PST-come Zambia
      'I came from Zambia.'

   Thus, it seems that the missing part in the semantic structure of English (24) is an
   element denoting bounded eventuality. One hypothesis is that an implicit relative clause might
   be involved. In other words, (24a) implies that I am a person who came from China. The
   preposition from in (24) expresses SOURCE of a bounded eventuality, rather than POSITION.

   Finally, in figurative speech cases, where an unbounded state is described as a bounded
   eventuality, locative prepositions can express SOURCE and GOAL. Compare (27a) with
   (27b),

   (27.) a. The Mall goes from Buckingham Palace to Trafalgar Square.
   b. John run from Buckingham Palace to Trafalgar Square.

   (27a) differs from (27b) in that it allows an exchange of the reference entities of the two
   locative expressions, without a change in meaning:

   (28.) The Mall goes from Trafalgar Square to Buckingham Palace.

   Thus (27a) does not express a usual bounded eventuality. I assume that in (27a) from and to
   express SOURCE and GOAL respectively in an imagined bounded eventuality.

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4 de is a modification marker occurring between a modifier and the modified element.

(i) Xiao li de shu  (ii) [Xiao li mai] de shu
   book            buy book
   'Xiao li's book' 'the book that Xiao li bought'
5.3 Bounded eventualities and locative relations

If a locative PP occurs in a bounded eventuality, it indicates the locative relation of path, specifically, SOURCE, GOAL or ROUTE, if it is not a predicate-external adjunct.\(^5\) However, if it is a predicate-external adjunct, it indicates POSITION only.\(^6\)

(29.) a. *In the office building, he put a letter in the mailbox.

In this sentence, in the office building is a predicate-external adjunct, while in the mailbox is not. The preposition in in the former shows POSITION while in the latter expresses GOAL. (30a) shows that in go eventuality, locative preposition behind is ambiguous between ROUTE and GOAL without adequate context.

(30.) a. \(\text{\text{\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_='
(34.) a. The drunkard wobbled behind the building.
   b. The drunkard wobbled behind the building to the street.

The following (35b) is unacceptable because in here represents both LR ROUTE and PV INTERIOR. However the ready-made through is a more suitable candidate. In contrast, there is no correspondent ready-made form for both LR ROUTE and PV for either behind or under, so these two prepositions can express ROUTE + PV in (32), (33) and (34).

(35.) a. Trevor walked in the kitchen.
   b. *Trevor walked in the kitchen to the hall.
   c. Trevor walked through the kitchen to the hall.

Notice that English prepositions used in (32), (33) and (34) are ambiguous in POSITION, GOAL and ROUTE, not SOURCE. Ambiguous locatives also exist in other languages. We have seen in (13) above that in Chichewa locative ku is ambiguous in POSITION, GOAL and SOURCE. Different degrees of interpretation ambiguity of locatives show the different degrees of abstractness with respect to lexicalization of locative relation across languages.

6. Summary

In this research, a locative prepositional phrase is decomposed into three semantic elements: locative relation, reference entity and place value. Prepositions such as at, from, to and via are unspecified with place value meaning. Each locative expression allows only one locative relation and one place value. Thus co-occurrence of two pure locative relation markers and co-occurrence of two prepositions which are both specified with place value are ruled out. When two prepositions co-occur in one locative expression, one marks the locative relation and the other marks the place value only. No embedded locative relations are allowed in the semantic structure of a locative expression. Both syntactically simplex and complex PPs have the same semantic structure: [LR [PLACE [PV [REF ]]]]. Locative relation categories show functional category properties. They lack substantive meaning. They are a closed set (POSITION, GOAL, SOURCE and ROUTE), and they do not permit recursion with respect to one reference entity.

This research also argues that specific locative relation denoted by a preposition is not specified in the lexicon. It varies with eventuality types and the function of the PP in the sentence.

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