Caused-Motion and Caused-Position: Syntactic Patterns and Semantic Networks

Joo, Ian[1] and Liu, Meichun[2]

[1]Hong Kong Polytechnic University
[2]City University of Hong Kong

Abstract

According to Goldberg (1995), placement verbs (such as *put*) are instantiated in the Caused-Motion Construction. Rohde (2001), however, argued that placement verbs in fact occur in a different construction, which she names the Caused-Position Construction, whose semantic value is not 'CAUSE TO MOVE' but rather 'CAUSE TO BE POSITIONED'. The present paper redefines and justifies the postulation of Caused-Position Construction. The Caused-position Construction is compatible with not only placement verbs but also a variety of other verbs, such as verbs of creation (*write* or *build*) or certain stative verbs (*want* or *need*), many of which also occur in the Locative Inversion construction. Further, a similar distinction between Caused-Motion and Caused-Position can be attested in Mandarin as well, which suggests that the distinction between two patterns of spatial causation may not be idiosyncratically confined to the English language but motivated by the general patterns of human cognition.

Keywords: Construction Grammar; Caused-Motion Construction; Caused-Position Construction; Locative Inversion; Polysemy; English; Mandarin

1 Introduction

In her seminal monograph on Construction Grammar (CxG), Goldberg (1995) denies the strict division between lexicon and syntax, assuming no morphosyntactic constraints that are totally irrelevant to lexicon. CxG is thus a monostratal grammatical theory that aims to analyze abstract constructions that embed meaningful symbols as a higher layer of meaningful symbols.

CxG offers a non-compositional approach to analyze form-meaning pairing units. But a recurrent puzzle lies in defining what a 'unit' is. How should each unit, or construction, be distinguished from each other? This paper aims to probe into this issue and present a case where **syntactic patterns** and **semantic networks** may help define distinct constructions. Specifically, we will show how two closely related constructions, **Caused-Motion Construction** and **Caused-Position Construction**, can be subtly but clearly differentiated by shedding light onto their semantic and syntactic division of labor.

2 Previous studies

According to (Goldberg, 1995:Ch. 7), the English Caused-Motion Construction (henceforth Caused-Motion) is a construction that is syntactically (1) and semantically specified as (2).

(1) [SUBJ [V OBJ OBL]]

(2) X CAUSES Y to MOVE Z

where OBL is a directional phrase and V a non-stative verb. (3) is an example (our own):

(3) a. I put the book on the table.

'I, by putting, caused the book to move onto the table.'

b. I kicked the ball into the goalpost.

'I, by kicking, caused the ball to move into the goalpost.'

The mapping between semantic and syntactic structures of the construction as in Table 1 (Goldberg, 1995:163, slightly modified)

	Table 1: Caused-Motion Construction				
Sem	CAUSE-MOVE	[	cause	path	theme	]
	PRED	[				]
	↓		↓	↓	↓	
Syn	V		SUBJ	OBL	OBJ	

Rohde (2001) argued that cases like (3a) are not instances of the Caused-Motion but rather a different construction which she names **Caused-Position Construction** (henceforth Caused-Position). That is, the definition of (3a) should be 'I, by putting, caused the book to be positioned on the table'.

Rohde's argument is that **verbs of putting and positioning** (PaP verbs) such as *put, sit, place,* and *lay,* do not occur in Caused-Motion but in Caused-Position. These two constructions are syntactically and semantically similar but should be distinguished given their clear differences in PP-collocations. The evidence supporting this distinction is that the PaP verbs in general do not allow directional PPs (such as *to/into/onto* NP). She argues that in the construction where the PaP verbs occur, OBL is not a dynamic path but a static endpoint (which she names **goal point**) where the theme gets positioned in/at/on. In other words, the constructions with the PaP verbs cannot be semantically 'X CAUSES Y to MOVE Z' but rather 'X CAUSES Y to BE POSITIONED Z'. Following Goldberg's template, she presents the illustration of the construction as in Table 2 (Rohde, 2001:230)

	Table 2: Caused-Position Construction				
Sem	CAUSE-POSITION	[	cause	goal point	theme	]
	PRED	[				]
	↓		↓	↓	↓	
Syn	V		SUBJ	OBL	OBJ	

Based on her corpus data, Rohde classifies English prepositions based on the **Index of Dynamicity**, which is the number of occurrences of a preposition in dynamic context (e. g. preposition *into* occurring in the context of *I moved into the room*) divided by its total number of occurrences. The Index of Dynamicity of 19 prepositions are shown in Table 3. Rohde divides the preposition into dynamic prepositions (Index of Dynamicity > 0.5) and static prepositions (Index of Dynamicity < 0.5). For example, *into* and *onto* are highly dynamic prepositions, whereas *in* and *on* are highly static ones.

Based on the partitioning between static and dynamic prepositions, Rohde makes two arguments regarding the difference between how the Caused-Motion and the Caused-Position instantiate prepositions.

(i) In general, Caused-Motion instantiates a dynamic preposition, whereas Caused-Position instantiates a static preposition.

(ii) When Caused-Motion instantiates a static preposition, the construction coerces the preposition into a dynamic reading (MOVE). The opposite is true for Caused-Position, which coerces a dynamic preposition into a static reading (BE POSITIONED).

Rohde presents concrete corpus and experimental evidence for argument (i). For example, in the "distribution of PPs with *put* in 250 randomly selected utterances describing concrete spatial motion" (p. 210), we see that 83.6% of the PPs are static (e. g. *put X in Y*) and the rest are dynamic (e. g. *put X into Y*).

Goldberg (1995:Ch. 7) has argued that the preference for static preposition in cases like *put X in Y* can be explained in terms of constructional coercion. Constructional coercion is the semantic conformation between the lexical item and the construction. As Michaelis (2004:25) describes it, "if a lexical item is semantically incompatible with its morphosyntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded."

Within the Caused-Motion, argues Goldberg, *put X in Y* is coerced into the dynamic reading of 'by putting, cause X to move into Y' even though the preposition instantiated is *in* and not *into*. Rohde posits the argument (ii), that it is the other way around: *put X in Y* fully instantiates the static reading of Caused-Position, whereas *put X into Y* is coerced into a static reading of 'by putting, cause X to be positioned in Y' even though the instantiated preposition is *into* rather than *in*.

Table 3: Index of Dynamicity of English prepositions

Preposition	Index of Dynamicity
Through	0.985
Onto	0.964
Into	0.932
To	0.915
Under	0.884
Toward	0.874
Out	0.851
Out of	0.838
From	0.802
Over	0.717
By	0.674
Along	0.624
Across	0.600
Between	0.400
In	0.163
At	0.158
Outside	0.157
Inside	0.156
On	0.148

The argument (ii) is difficult to justify with cases of PaP verbs alone, since **PaP verbs themselves lexicalize the Caused-Motion sense, even if they occur in the Caused-Position construction** (Rohde, 2001:236). For example, the verb *put* itself means to **move** something to a place. Rohde's argument was that even if the **verb** *put* encodes motion, the Caused-Position **construction** (where the verb occurs) does not. This relationship between the verb and the construction makes it difficult to judge whether the preposition *into* in *put X into Y* is given a dynamic reading (in coherence with the dynamic meaning of the verb) or coerced into a static reading (in coherence with the static goal point of the construction). In order to justify that the coercion to static reading indeed occurs in Caused-Position, we need to examine cases of this construction with verbs other than PaP verbs, where there is no motion implied by the verb.

3   Research Goals

The research questions of this paper are twofold:

- **Is the instantiation of the Caused-Position limited to PaP verbs, or does the construction embrace other verbs as well?** By investigating other verbs used within the Caused-Position, we can further investigate whether the coercion hypothesis is true and justify the distinction between Caused-Position and Caused-Motion.

- **Does the distinction between Caused-Motion and Caused-Position only occur in English, or can we observe a similar distinctive pattern in another language as well?** If the distinction between the two types of causation is not an idiosyncratic convention but a general cognitive pattern, we would predict that a similar pattern occurs in a language typologically distinct from English, such as Mandarin.

In Section 4, we will claim that the transitive verbs that occur in passive voice in the **Locative Inversion Construction** (henceforth Locative Inversion) also occur in the Caused-Position. This co-occurrence is not a coincidence, since the Caused-Position and Locative Inversion are semantically closely related constructions. Among the verbs that occur in both constructions, there are verbs that involve no motion of the theme (such as *write*), are compatible with dynamic prepositions (such as *write onto*), but nevertheless coerce a static reading. This justifies the coercion argument introduced in Section 1.

Furthermore, in Section 5, we will investigate whether the Caused-Position is polysemous, similarly to Caused-Motion. Since Goldberg has argued that Caused-Motion bears polysemous extensions (such as X HELPS Y to MOVE Z), it would be interesting to see if Caused-Position has similar extensions as well, and if so, what verbs are instantiated in such extensions.

Lastly, Section 6 is a corpus study demonstrating that similar PP collocations (Caused-Motion verbs with dynamic prepositions and Caused-Position verbs with static prepositions) occur in Mandarin as well. The fact that two typologically distinct languages show similar patterns adds further support to the claim that the distinction between the two constructions have general cognitive motivations.

4   Locative Inversion

4.1   Locative Inversion and Caused-Position

Various studies (Levin and Hovav 1995; Birner 1996, etc.) have found out that the verbs instantiated in Locative Inversion need to express either **existence** or **appearance**. Examples are shown in (4).

(4)   a. In the room stood a man. (EXISTENCE)
      b. Into the room walked a man. (APPEARANCE)

This leads to most verbs being either intransitive or passive, because transitive verbs in active voice usually do not express existence or appearance (with exceptions such as *take place*, which does occur in Locative Inversion). Levin and Hovav (1995:245-246) have observed from their corpus study that the transitive verbs listed in (5) occur as passives within Locative Inversion.

(5)   a. VERBS OF PUTTING: display, embed, heap, locate, place, put, range, situate, store, ...
      b. VERBS OF PUTTING IN A SPATIAL CONFIGURATION: hang, lay, mount, perch, seat, suspend, ...
      c. VERBS OF ATTACHMENT: glue, hook, lace, paste, pin, staple, ...
      d. VERBS OF IMAGE IMPRESSION: engrave, imprint, inscribe, scrawl, scribble, stamp, write, ...
      e. VERBS OF CREATION: build, carve, cook, erect, ...
      f. VERBS OF PERCEPTION: discern, glimpse, hear, realize, see, ...

We have illustrated the example of each verb type occuring in Locative Inversion as in (6).

(6)   a. On the table was placed a book.
      b. On the chair was seated a lady.
      c. On the wall was pinned a poster.
      d. On the book cover was written a name.
      e. In the city was built a mansion.
      f. On the table was seen a letter.

(7) shows that the verbs occuring in (5) also occur in the Caused-Position.

(7)   a. VERBS OF PUTTING: I placed a book on the table.
      b. VERBS OF PUTTING IN A SPATIAL CONFIGURATION: I seated a lady on the chair.
      c. VERBS OF ATTACHMENT: I pinned the poster on the wall.
      d. VERBS OF IMAGE IMPRESSION I wrote a name on the book cover.
      e. VERBS OF CREATION: I built a mansion in the city.
      f. VERBS OF PERCEPTION: I saw a letter on the table.

Rohde has already argued that verbs of putting (PaP verbs) occur in Caused-Position and not Caused-Motion. Attachment Verbs are also a kind of PaP verbs (illustrating placement in specific manners). What is interesting is that (7) has verbs that do not involve motion: verbs of image impression, creation, and perception. In (7d), the name is not "moved" onto the book cover. Yet it fits exactly into the definition of the Caused-Position: X CAUSES Y (the name) to BE POSITIONED Z (on the book cover). Moreover, even if we replace the preposition *on* in (7d) with *onto*, the sentence still yields a static reading: writing a name *onto* the book cover does not imply that one has "moved" the name from somewhere else onto the book cover. The instantiation of creation verbs within the Caused-Position adds support to Rohde's theory that the Caused-Position does not entail motion and coerces a dynamic preposition into a static reading.

What may be confusing to the reader is (7f): seeing a letter on the table does not mean causing a letter to be on the table, so how could (7f) be an occurrence of Caused-Position? We argue that it is in fact an instance of Caused-Position by the virtue of the conceptual metaphor PERCEPTION IS EFFECTUAL ACTION as proposed by

del Campo Martínez (2013), who argued that verbs of perception also occur in Caused-Motion. Although she lists several examples of such occurrence, since many of her examples are drawn from miscellaneous web pages, we will instead present our own examples found in the Corpus of Contemporary American English or COCA (Davies 2009, accessed via `www.english-corpora.org`) in (8) (emphasis ours).

(8) a. "I love working with women," she says. "I love giving them the support and the natural environment that doctors don't, and I love **seeing babies into the world**." [SIGHT]

  b. It was still a shock to **hear my name from the mouth of such a dreadful creature[.]** [HEARING]

  c. All I could do was smell Dorothy's hair and **feel her shoulders through her sweater[.]** [TOUCH]

  d. Hanner can feel Frances standing behind her inside the screen door, even **smell the soap from her hair** like when she was a little one. [SMELL]

  e. **Tasting the salt from the glass's rim**, I looked about the cantina: intimate, heavy with history; faded elegance, but still inviting. [TASTE]

None of the sentences in (8) imply that the subject's perception has literally caused the object's movement in the oblique phrase. Yet, their Caused-Motion-like syntactic structure makes them likely to be instances of Caused-Motion. Del Campo Martínez explains that the abovementioned metaphor of effectual action licences (8) to be Caused-Motion, by "allow[ing] us to see perceptual activities as if they were effectual" (p. 194). In other words, the source domain of perceiver and the perceivee are mapped onto the target domain of causer and the causee. This may explain why they are syntactically expressed as transitive sentences in the first place.

Based on her argument, we can also argue that (7f) is an instance of Caused-Position, where the verb *see* metaphorically illustrates the effectual action of positioning a letter on the table, and thereby conclude that verbs of perception appear metaphorically in both Caused-Motion and Caused-Position.

We thus make the following prediction: **If** a transitive verb occurs passively in Locative Inversion, **then** it also occurs in Caused-Position. Note that we do not claim the reverse, that a verb occurring in Caused-Position necessarily occurs in Locative Inversion, which may not hold.

The occurrence of the same verbs in Caused-Position and Locative Inversion is not a coincidence. As noted above, the verb employed in Locative Inversion must express either existence or appearance. Caused-Position, by definition, profiles the theme's **position** (i. e. **existence** at a location) as the goal point. Caused-Motion, on the other hand, profiles a **path** towards a **goal**, which is not equivalent to existence (at a location).

4.2   Locative Inversion and Caused-Motion

The following question then arises: Why can't Caused-Motion verbs in passive voice be employed in Locative Inversion by virtue of expressing **appearance**? For example, (4b) expresses the appearance of a man who walks into the room. *Walk* is a motion verb. Thus, at first sight, it seems theoretically possible that Caused-Motion can also express appearance by motion within Locative Inversion.

In order to solve this problem, let us first note that Caused-Motion in passive voice within Locative Inversion is **theoretically** possible. For example, according to Birner (1996:108), (9) is grammatical.

(9)   Into the yard was thrown a ball.

We have informally consulted a number of native speakers, and most agreed that (9) was acceptable, even though it sounds somewhat "poetic". Why, then, are cases like (9) completely absent in the corpus of Levin & Hovav?[1]

The reason for this absence can explained by the fact that appearance by definition entails that **only what appears (and not what makes it appear) comes into perception**. Fukada (1996) illustrates the image schema of (physical) appearance as Figure 1 (She further argues that the image schema can be extended to metaphorical appearance as well).

In Figure 1, we see that only the trajector (tr) comes into the field of view (landmark: lm) and not the causer of the trajector's movement. Based on this model, we claim the following: **appearance entails that whatever caused the appearance must not be perceptually salient**.

According to this claim, (9) is only acceptable if the ball *but not the thrower* is perceptually salient, i. e. in the (quite rare) circumstance where the ball thrown by someone is salient to the speaker but whoever throws it is not. The rarity of such situation explains why (9) does not occur in real language usage even though it is theoretically possible. This explanation is first supported by the fact that in most cases, agentative *by*-phrases are not allowed in Locative Inversion, as shown in (10).

---

[1]Of course, absence in a corpus does not strictly imply unacceptability, incorrectness, or non-existence.

Figure 1: Image schema of physical appearance (Fukada, 1996:66)

tr: physical entity
lm: field of view
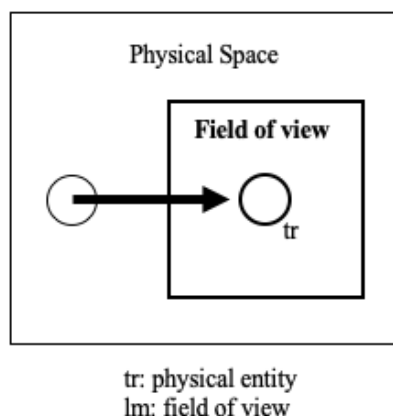
(10)   ?Into the yard was thrown by Pam a ball. (Birner, 1996:108)

Thus, (10) is odd since Pam is syntactically present and therefore perceptually salient.

The restriction against the salience of the cause of appearance is supported by the fact that most *Appear* Verbs listed by Levin (1993) (such as *appear*, *rise,* and *surge*) do not allow causative uses, as shown in (11).

(11)   a. A dove appeared from the magician's sleeve.

       b. *The magician appeared a dove from his sleeve. (Levin, 1993:48)

(11a) is acceptable because dove "magically" appears from the magician's sleeve and what can be considered as the cause of the appearance is not perceptually salient. In (11b), however, the speaker knows that the magician is the person causing the dove to come out of his sleeve. This event can thus no longer be regarded as an "appearance", which makes it infelicitous with the very definition of the verb *appear.*

Similarly to appearance, which seizes to be "appearance" when its cause becomes salient, existence also seizes to be "existence" when whatever causes the existence becomes salient. Levin (1993), also listing *Exist* Verbs (e. g. *exist*, *live*, *stay*), confirms that they do not allow causative uses, as shown in (12).

(12)   a. A solution to this problem exists.

       b. *The famous mathematician existed a solution to the problem. (Levin, 1993:250)

A transitive verb (like a PaP verb) can occur (in passive voice) **unless the causer is salient**. Thus, *by*-phrases are also odd in Locative Inversion where passive Caused-Position is employed, as shown in (13).

(13)   ??Among the guests of honor was seated my mother by my friend Rose. (Bresnan, 1994:79)

The oddity of (13) comes from the syntactic presence (and, as a result, the cognitive salience) of *my friend Rose*, the causer of the mother's sitting. If we remove *by*-Phrase, however, the phrase is completely acceptable, as shown in (14).

(14)   Among the guests of honor was seated my mother.

Caused-Position cases like (14) are frequent within the corpus of Levin & Hovav, unlike Caused-Motion cases like (9), which are absent. This is due to the fact that **it is easy to only perceive what is caused to be positioned and not perceive what caused it to be positioned** whereas **it is difficult to only perceive what is caused to move without perceiving what caused it to move**. In other words, it is easy to perceive a seated woman without having in mind whoever seated her, whereas it is difficult to perceive a thrown ball without perceiving whoever threw it.

In sum, Caused-Motion verbs do not occur in Locative Inversion, because it (i) it cannot express existence; and (ii) it (under normal circumstances) cannot express appearance without the cause of appearance also being perceptually salient. Caused-Position verbs can, however, express existence under the circumstance where the cause of existence is not perceptually salient.[2]

---

[2]Similarly, in Mandarin Chinese, motion verbs such as 搬 *bān* 'to move' do not allow Locative Inversion, while placement verbs (which encode caused-position) such as 放 (*fàng*) 'to place, put' occur in Locative Inversion (Chen and Jing-Schmidt, 2014; Liu and Chang, 2015b).

4.3 Summary

So far, we have confirmed the distinction between Caused-Position and Caused-Motion by explaining why the former occurs in Locative Inversion whereas the latter does not. Thus, through the Locative Inversion diagnosis we can claim that the two constructions show different syntactic patterns, which are motivated by semantic differences. In other words, transitive verbs occurring in Locative Inversion also occur in Caused-Position because Caused-Position profiles position (i. e. existence at a location), whereas they do not occur in Caused-Motion because Caused-Motion profiles motion through a path, which normally entails the salience of the causer of the motion and therefore cannot be perceived as existence or appearance.

5   The Polysemy of the Two Constructions

In this section, we will investigate whether Caused-Position show similar polysemous patterns as Caused-Motion does. We claim that the polysemous extensions of the two constructions are remarkably similar but all express different Force-Dynamic patterns.

5.1 The Polysemy of the Caused-Motion

To argue for the constructional status of Caused-Motion, Goldberg claimed that Caused-Motion, other than its core meaning of 'X CAUSES Y to MOVE Z, can convey the following extended meanings (pp. 161-162):

(15) **Conditions of Satisfaction Imply**: The conditions of satisfaction associated with the act denoted by the predicate entail: 'X causes Y to move Z'.
  a. Sam ordered him out of the house.
  b. Sam asked him into the room.
  c. Sam invited him out to her cabin.
  d. Sam beckoned him into the room.
  e. Sam urged him into the room.
  f. Sam sent him to the market.

(16) **Cause-Enable**: 'X ENABLES Y to MOVE Z.'
  a. Sam allowed Bob out of the room.
  b. Sam let Bill into the room.

(17) **Cause-Prevent**: 'X PREVENTS Y from MOVING Comp(Z) (complement of the potential motion)'
  a. Harry locked Joe into the bathroom.
  b. He kept her at arm's length.
  c. Sam barricaded him out of the room.

(18) **Cause-Aid**: 'X HELPS Y to MOVE Z'
  a. Sam helped him into the car.
  b. Sam assisted her out of the room.
  c. Sam guided him through the terrain.
  d. Sam showed him into the livingroom.
  e. Sam walked him to the car.

Furthermore, Goldberg pointed out that this polysemous network parallels with that of the Ditransitive Construction ('X CAUSES Y to RECEIVE Z'), which can be similarly extended to meanings such as 'X ENABLES Y to RECEIVE Z' or 'X PREVENTS Y from RECEIVING Z'. This parallel between two polysemous networks shows that they are not ad-hoc inventions, according to Goldberg, who claims that "patterns of polysemy recur, although not strictly predictably so" (p. 164).

Given the observation of del Campo Martínez (2013) that perception verbs also occur in Caused-Motion but only metaphorically so, it becomes also necessary to add this metaphorical extension into the polysemy schema. (19) shows the definition and the examples of the extension **Cause-Perceive**. The examples are modified versions of (8). We have also paraphrased them *in italic* to match the definition of Cause-Perceive.

(19) **Cause-Perceive**: 'X PERCEIVES PERCEPTUAL CHARACTER OF Y MOVE Z'

a. Standing next to his wife giving birth, Sam saw his baby into the world. (*Sam, by seeing, perceived the sight of his baby move into the world.*)

b. Sam heard his name from the mouth of his dying father. (*Sam, by hearing, perceived the sound of his name move from the mouth of his dying father.*)

c. Sam felt her shoulders through her sweater. (*Sam, by feeling, perceived the feel of her shoulders move through her sweater.*)

d. Sam smelled the soap from her hair. (*Sam, by smelling, perceived the smell of the soap move from her hair.*)

e. Sam tasted the salt from the glass's rim. (*Sam, by tasting, perceived the taste of the salt move from the glass's rim.*)

Since Rohde made it clear that the Caused-Motion and Caused-Position are closely related constructions, it is highly likely that the polysemy of the Caused-Motion parallels that of the Caused-Position. We will illustrate how all the Caused-Motion polysemous extensions shown in (15-19) occur in Caused-Position as well. This will further add support the Rohde's idea that Caused-Position is a full-fledged construction that must be distinguished from Caused-Motion.

5.2   The Polysemy of the Caused-Position

5.2.1   Conditions of Satisfaction Imply

In Goldberg's Caused-Motion model, it is made clear that stative verbs (such as *want* or *need*) are excluded from the Caused-Motion. But we have already shown that verbs of perception, which are also stative verbs, do occur in Caused-Motion. Furthremore, we will show that the stative verbs *want* and *need* occur in Caused-Position due to their semantic compatibility with the constructional meaning; specifically, they occur in Caused-Position's polysemous extension of **Conditions of Satisfaction Imply**. Consider (20).

(20)   a. I want you in my office.

b. I need a TV in my room.

(20) exactly matches the definition of Caused-Position in that the PP expresses a goal point where the theme should end up being, and also the definition of the Conditions of Satisfaction Imply extension in that the satisfaction of *want* and *need* entails the position of the theme in the goal point.

(20) cannot be explained in terms of Caused-Motion, for two reasons. First, the *want* and *need* do not allow dynamic paths as their PPs, but only static goal points. This is made evident by the fact that the they generally do not collocate with dynamic prepositions, as we will show in Section 5.3.

Next, (20) does not necessarily entail any motion, even if what is wanted or needed is satisfied. (20a) can be interpreted as the speaker wanting the hearer to remain in the speaker's office without moving, and (20b) can be the speaker stating that s/he wants the TV to remain in his/her room. Even though (20a-b) can illustrate cases where the hearer is ordered to come into the office or the TV is requested to move into the room, given the sentences' non-compatibility with dynamic prepositions, such motions are better interpreted as pragmatic implications necessitated by the semantic definition of the hearer or the TV being positioned in the room, rather than the meaning of the two sentences per se.

Since (20) syntactically only allow static prepositions and semantically do not entail motion, it cannot be occurrences of the Caused-Motion. But the fact that it does not necessarily entail the actual position of the theme in the goal point (e. g. (20a) does not entail that the hearer will actually come to the office), it must be a polysemous extension of Caused-Position, i. e. The conditions of satisfaction associated with the act denoted by the predicate entail: 'X causes Y to be positioned Z'.

5.2.2   Cause-Enable

The verbs *keep* and *leave* elicit the Cause-Enable meaning of the Caused-Position. An example is shown in (21).

(21)   Leave the cake in the box! (Talmy, 1988:66)

(21) does not illustrate a case where the speaker demands the hearer to move the cake into the box. The cake is already in the box, and the hearer is demanded to let it remain there. The semantics of (21) is thus 'X ENABLES Y to BE POSITIONED Z.' In Talmy's terms, (21) is equivalent to: 'Let the cake be (keep being) on the box!'

This sense of the Caused-Position can be explained in Talmy's (1988) theory of **Force Dynamics**, where the stronger, agentive Antagonist allows the weaker, patientive Agonist to sustain its static tendency. This is

schematically illustrated as Figure 2, where "1" (labelled as the agent) is the Antagonist and "2" the Agonist. The Agonist has a tendency to rest, represented by its black dot, and the Antagonist, stronger than the Agonist (represented by its plus sign), allows the Agonist to stay static. The stative result is illustrated as the line under the circle, with a black dot representing the staticity and the 'be' representing that the Agonist ends up *being* at a place.
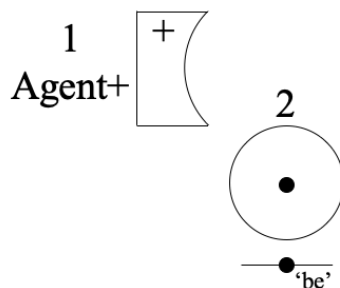

Figure 2: A Force-Dynamic schema of permitted staticity (Talmy, 1988:66)

In the light of this Force-Dynamic schema, it becomes clearer that the Cause-Enable of the Caused-Position is distinct from that of the Caused-Motion, since the former enables the static tendency of the object whereas the latter enables the dynamic tendency of the object.

5.2.3 Cause-Prevent

As for the Cause-Prevent extension, we argue that Cause-Prevent is not a semantic extension of the Caused-Motion, but actually part of the core meaning of Caused-Position.

First, the three verbs Goldberg took as examples in (17) are all compatible with static prepositions, as shown in (22).

(22)   a.   Harry locked Joe **in** the bathroom.
      b.   He kept her **at** arm's length.
      c.   Sam barricaded him **outside** the bathroom.

If (22a) were to be analyzed in the Goldbergian definition of 'X PREVENTS Y from MOVING Comp(Z) (complement of the potential motion)', it would then be paraphrased as *Harry prevented Joe from moving the complement of the potential motion of "in the bathroom"*. This is difficult to understand, since *in the bathroom* does not suggest any potential motion. It follows then the Caused-Motion coerces *in the bathroom* into the dynamic reading of 'into the bathroom.' Such coercion is unlikely, given that the verb *lock* occurs far more frequently with *in* than *into*, as we will show in Section 5.3.

Lastly, by the virtue of Occam's razor, explaining (22) as part of the core meaning of Caused-Position is favorable compared to explaining it in terms of a seemingly counter-intuitive polysemous extension of Cause-Prevent. This reduces the need for one polysemous extension. It would, however, imply revising Goldberg's theory on the overlap between the polysemy of Caused-Motion and Ditransitive Construction, namely that the Cause-Prevent of Caused-Motion parallels the Cause-Prevent of Ditransitive Construction. This would not be a big problem, since constructional polysemy do not strictly predictably recur, as Goldberg has also stated. One polysemous extension of a construction not occurring in the other would not falsify that the two polysemous schemata largely overlap. All in all, explaining (22) as Caused-Position results in less theory with better explanation.

Based on Talmy's Force Dynamics theory, we can illustrate (22) by Figure 3, which Talmy takes 23 as an example of.

(23)   The ridge kept the log on the incline. (Talmy, 1988:66)

In 23, the log has an inherent tendency to move, and the ridge keeps it at a static position. Likewise, in (17), the direct objects have a tendency to move, but the subjects keep them at a static position. We can thus classify (17) as cases of the schema of Figure 3. And since the resulting state of this schema is staticity, we can classify the schema as part of Caused-Position rather than part of Caused-Motion.
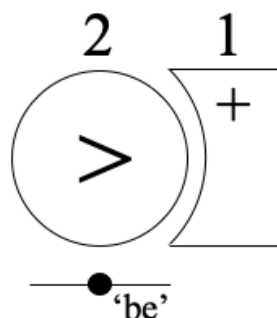
Figure 3: A Force-Dynamic schema of forced staticity (Talmy, 1988:66)

5.2.4   Cause-Aid

Verbs such as *hide* or *seat* can be used in the Caused-Position with an animate direct object in the sense of Cause-Aid, i. e. 'X helps Y to be positioned Z.' (24) illustrates such examples.

(24)   a. The woman hid the man in her house.
         b. The man seated the woman on the chair.

In (24a), it is the man who actually carries out the action of hiding, and the woman only helps him to do so. Likewise, in (24b), the man only helps the sitting action, and the woman is the one who actually sits on the chair.

5.2.5   Cause-Perceive

We have already discussed in Section 4.1 that verbs of perception occur both in Caused-Motion and Caused-Position. It is, however, more difficult to identify a Cause-Perceive extension of Caused-Position than that of Caused-Motion. Consider (25).

(25)   a. I saw the woman into the car.
         b. I saw the woman in the car.

(25b) is difficult to judge as Caused-Position because *the woman in the car* can itself be interpreted as an independent NP (i. e. woman sitting in the car), whereas *the woman into the car* in (25a) cannot be interpreted as a stand-alone NP, leaving no difficulty for interpreting (25a) as Caused-Motion.

A way of identifying occurrences of Cause-Perceive extension of Caused-Position would be to first find occurrences of Locative Inversion with verbs of perception and then rephrase those into the Caused-Position form, since we have already argued that if a verb occurs passively in Locative Inversion, then it occurs in Caused-Position. (26) shows some examples of such Locative Inversion, again from COCA, which we converted into Caused-Position.

(26)   a. On the altar are seen the large bronze heads [...] ⟶ Sam saw the large bronze heads on the altar. [sight]
         b. In the quiet is heard the stuttering, clattering song of the sparrow. ⟶ Sam heard the sturring, clattering song of the sparrow in the quiet. [hearing]

We couldn't find any verbs of tactile, gustatory, or olfactory perception appearing in Locative Inversion, which makes it difficult to judge whether they appear in Caused-Position at all.

5.3   PP-collocation of polysemous Caused-Position Verbs

In this section, we have presented several verbs that we claim to appear in Caused-Position and not Caused-Motion (*want, need, leave, keep, lock, barricade, hide*, and *seat*). It thereby follows that these verbs, like PaP verbs analyzed by Rohde (2001), must significantly prefer static prepositions over dynamic ones.

We test this hypothesis through a brief corpus analysis of COCA. The hypothesis is that the abovementioned verbs will more frequently collocate with the static prepositions *in/on* than with their dynamic counterparts *into/onto*, compared to how the three verbs *move, push*, and *kick*, arguably prototypical Caused-Motion verbs, collocate with these four prepositions.

In COCA, we searched for frequency of the following search per each verb:

(27)   VERB ART NOUN PREPOSITION ART NOUN

where VERB is the corresponding verb, PREPOSITION the corresponding preposition (in/into/on/onto), ART any article, and NOUN any noun. Among the verbs, *barricade* was excluded because it occurred 0 time as (27). Table 4 shows the frequencies of the collocations and the quotient of $\frac{into}{in}$ and $\frac{onto}{on}$ (rounded into three digits after decimal).

Table 4: Collocation frequencies

VERB	in	into	QUOTIENT	on	onto	QUOTIENT
want	360	5	0,014	232	0	0
need	232	2	0,009	113	0	0
leave	1512	6	0,004	1015	0	0
keep	1441	3	0,002	2753	0	0
lock	101	17	0,168	30	5	0,167
hide	374	1	0,003	29	0	0
seat	2	0	0	2	0	0
MEDIAN			**0,004**			**0**
move	128	179	1,398	61	20	0,328
push	114	453	3,974	148	33	0,223
kick	106	50	0,472	13	4	0,308
MEDIAN			**1,398**			**0,308**

The medians of the quotients of Caused-Position verbs (0,004 and 0) are much lower than the medians of the quotients of Caused-Motion verbs (1,398 and 0,308). In other words, the verbs we have claimed to be Caused-Position verbs show a great preference for *in/on* as opposed to *on/onto*, compared to the the three Caused-Motion verbs. This further strengthens our claim that the verbs shown in this section to be part of the Caused-Position polysemy only occur in Caused-Position and not in Caused-Motion (except for the verbs of perception, which occur in both constructions), given that these verbs show a high preference for static prepositions like PaP verbs do. When they do collocate with dynamic prepositions, the Caused-Position coerces them into a static reading, as Rohde (2001) has claimed for the case of PaP verbs as well.

5.4   Summary

In this section, we have seen that Caused-Position allows several polysemous extensions equivalent to those of Caused-Motion. Furthermore, some of these extensions can be classified in terms of Force-Dynamic patterns. In Table 5 we see that two constructions, with their semantic extensions, complement each other, in the sense that they fill in the four possible Force-Dynamic "slots" given the two options of forced *v.* permitted and of towards motion *v.* rest.

Table 5: Force-Dynamic Patterns of Caused-Motion and Caused-Position

	Forced	**Permitted**
Motion	I pushed him into the room.	I allowed him into the room.
Rest	I locked him in the room.	I left him in the room.

6   Caused-Motion and Caused-Position in Mandarin

In this last part of our study, we will demonstrate that a similar distinction between Caused-Motion and Caused-Position can be found in Mandarin, a language typologically distant from English, based on a corpus analysis of PP collocations. Specifically, we wish to test if the Mandarin Caused-Motion verbs and Caused-Position verbs show preference for the two prepositions 在 *zài* 'at' and 到 *dào* 'to'.

6.1   Background

Previous literature has extensively studied placement verbs in Mandarin (Liu, 2003; Cheng, 2008; Luó, 2011; Chen, 2012; Liu and Chang, 2015a, 2018). Examples of Mandarin placement verbs include 放 *fàng* 'to put', 挂 *guà* 'to

hang', 存 *cún* 'to store', 摆 *bǎi* 'to place', and 装 *zhuāng* 'to load/fill'. Mandarin placement verbs all collocate with a locative phrase, which either precedes the verb (preverbal) or follows it (postverbal).

Li and Thompson (1981:404) observe that Mandarin verbs of placement subtly differ from **verbs of displacement**. Verbs of displacement such as 扔 *rēng* 'toss' or 推 *tuī* 'push' describe the movement from one location to another. They collocate with a directional phrase beginning with the preposition 到 *dào* 'to' and not a locative phrase beginning with the preposition 在 *zài* 'at'. (28) illustrates that 搬 *bān* 'move', a verb of displacement, occurs with a directional phrase led by *dào* but not with a locative phrase led by *zài*.

(28) 我 把 杂志　　　搬　　到/*在 书架　　　上。
      wǒ bǎ zázhì　　*bān*　*dào/*zài shūjià*　*shàng*.
      I　BA magazine move to/*at　bookcase on

      'I moved the magazines to the bookcase.'

Thus, verbs of displacement, which are caused-motion verbs, semantically require a directional phrase (*dào*-phrase) and not a locative phrase (*zài*-phrase). This difference in verb-preposition collocation suggests a distinction between Caused-Motion with a directional path and Caused-Position with a locative ground.

6.2 Hypothesis

It is then predicted that Mandarin Caused-Motion verbs will more often collocate with *dào* 'to' whereas Mandarin Caused-Position verbs will more often collocate with *zài*, parallel to how English Caused-Motion verbs prefer to collocate with dynamic prepositions while English Caused-Position verbs prefer to collocate with static prepositions.

6.3 Methodology

To verify the abovementioned hypothesis, we employ the existing classification of Mandarin verbs in Mandarin VerbNet (Liu and Ye 2020, `http://verbnet.lt.cityu.edu.hk`). Mandarin VerbNet is a web resource that analyzes, annotates, and categorizes the lexical classes of Mandarin verbs from a frame-based constructional approach, using corpus data from Chinese Gigaword (Huang et al., 1996) for semantic and constructional annotation. It resembles the English FrameNet (Baker et al., 1998) in specifying frame-related information while providing constructional patterns as structural criteria for defining each semantic frame. It aims to offer deep annotations of semantic and syntactic properties for Mandarin verbs and verb classes along a hierarchical scheme of frames that may consist of Archi-frame, Primary frame, Basic frame, and Micro-frame. For details, cf. Liu and Chiang (2008); Liu and Chang (2018); Liu and Ye (2020).

The Mandarin VerbNet contains a list of Caused-Motion verbs in Mandarin. It labels Caused-Motion as the "Archi-Frame", i. e. the largest scope of frames equivalent to a semantic domain, which is further divided into various "basic frames", as shown in table 6.

Table 6: Basic frames of Caused-Motion

Frame	Example
CARRY	带 *dài* 'carry'
CAUSED-TO-MOVE	移 *yí* 'move'
PLACE	摆 *bǎi* 'put'
PLACE-CONTAINER	藏 *cáng* 'hide'
PLACE-SURFACE	抹 *mǒ* 'smear'
RELEASE	释 *shì* 'release'
THROW	投 *tóu* 'throw'

We have argued throughout the paper that verbs expressing placement, such as 'put' or 'hide', are instantiated in Caused-Position and not Caused-Motion. Thus, among the frames listed in table 6, PLACE, PLACE-CONTAINER, and PLACE-SURFACE should be classified as verbs of Caused-Position rather than those of Caused-Motion. And if the association between Caused-Position and static preposition and between Caused-Motion and dynamic preposition in English is not limited to English but has a general cognitive motivation, we would expect that a similar pattern would be found in the Mandarin verbs of Table 6 as well.

The most common spatial prepositions in Mandarin are *zài* 'at' and *dào* 'to', expressing static position and dynamic path, respectively. The prediction is thus that Mandarin verbs compatible with Caused-Motion (those

listed in Mandarin VerbNet under the Archi-Frame of Caused-Motion other than the verbs of placement) will show a preference for *dào* 'to' whereas the placement verbs will prefer *zài* 'at'.

In order to test this prediction, we first selected sample verbs to count the number of occurrence of. Among the verbs of VerbNet, only monosyllabic verbs were selected as the sample and disyllabic compounds were excluded, since many of them can overlap with the occurrences of the monosyllabic verbs. For example, the occurrences of 摆 *bǎi* 'to place' overlap with the occurrences of 摆放 *bǎifàng* 'to lay out'. The verb 放 *fàng* 'to put, release' was also excluded, because it is labeled as both the frame PLACE (which belongs to Caused-Position) and the frame RELEASE (which belongs to Caused-Motion).[3]

Next, we have searched for the number of occurrences of each sample verb within the strings (29) from the *BCC Corpus* (Xún et al., 2016). [4]

(29)   a.   *bǎ* * verb *zài*
       b.   *bǎ* * verb *dào*

Where *bǎ* is the accusative-marking preposition. We specifically target the construction (29) because in Mandarin, postverbal locative PPs generally denote the endpoint of the event, whereas preverbal location PPs generally denote the location of the event, as exemplified in 30.

(30)   他 在 桌子 上   写   字   (PREVERBAL)
       tā zài zhuōzi shàng xiě   zì
       he at table   on   write character

'He wrote characters (on a piece of paper) at the table.'
       他 把 字   写   在 桌子 上   (POSTVERBAL)
       tā bǎ zì   xiě   zài zhuōzi shàng
       he BA character write at table   on

'He wrote the characters on the surface of the table.' (Tai, 1975:156).

An example of the searches of (29) is shown in figure 4.

Figure 4: First 10 entries for the search of 把*带到 *bǎ * dài dào* 'take * to'

Next, it was necessary to know the overall frequency of *zài* and *dào* in the construction (29). In order to find out this frequency, we searched for the two strings (31), where "v" equals any verb.

---

[3]According to Liu and Chang (2015a), *fàng* 'to put' is polysemous with two distinct but related meanings: (i) 'to place' as in 我把画放出来 *wǒ bǎ huà fàng chūlái* 'I put the painting out (for display)', and (ii) 'to release' as in 我把狗放出来 *wǒ bǎ gǒu fàng chūlái* 'I released the dog (from a cage).' With the releasing sense, it profiles the object's departure a source, while the placing sense profiles its landing at a location.

[4]The BCC corpus consists of different subtytpes such as literature or journalism. We chose the subtype "multi-domain" (多领域 *duōlǐngyù*) to control for the source bias.

Figure 5: PP-collocations of Caused-Motion verbs.
*, FDR < 5% (*zài* 'in' < *dào* 'to'); !, FDR < 5% (*zài* 'in' > *dào* 'to')
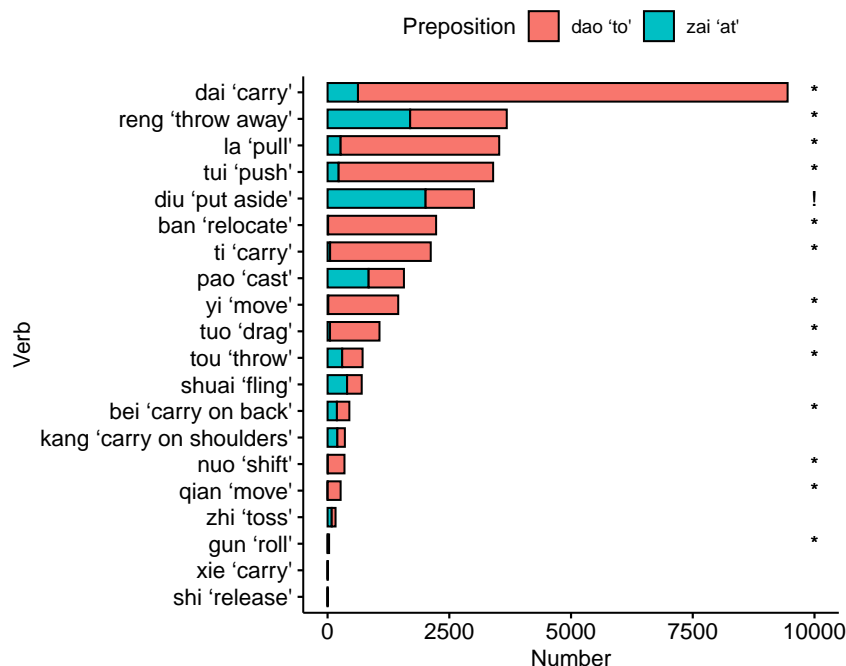
(31)   a.   *bǎ* * v *zài*
       b.   *bǎ* * v *dào*

(31a) yielded 160215 results, whereas (31b) yielded 125574.

Based on this data, we conducted a two-tailed binomial test for each verb, the hypothesized probability of success being the number of occurrence of (31b) divided by the sum of the numbers of occurrence of (31a) and (31b), i. e. $\frac{125574}{160215+125574}$. The number of successes was the occurrence of (29b) per each verb. The verb 拭 *shì* 'to wipe' was excluded from the binomial test because it occurred 0 time in (29a) and (29b). The binomial tests of Caused-Motion verbs and those of Caused-Position verbs were controlled for multiple comparisons by the Benjamini-Hochberg Procedure (Benjamini and Hochberg, 1995) at the False-Discovery Rate (FDR) of 5%.

6.4   Results

Figure 5 shows the PP-collocation of each Caused-Motion verb, whereas Figure 6 shows that of each Caused-Position verb. We see that 13 out of 20 Caused-Motion verbs significantly prefer *dào* over *zài* (marked with *), only one verb showing the opposite preference (marked with !). As for the Caused-Position verbs, 25 out of 33 of the verbs show preference for *zài*, with only 5 verbs preferring *dào*. From these results, it becomes clear that Caused-Motion verbs tend to be collocated with the dynamic preposition *dào*, whereas the Caused-Position verbs tend to be collocated with the static preposition *zài*, which parallels the pattern we have observed in English.

The fewer occurrences of incongruous mappings can partially be explained by the polysemy of the tested verbs. For example, *dài* can be used in the two senses shown in 32:

(32)   a.   带   到 学校
            dài   *dào xuéxiào*
            carry to   school
            'carry to school'
       b.   带   在 手   上
            dài   *zài shǒu shàng*
            carry in hand on
            'carry on hand'

The *dài* in (32a) and (32b) are semantically different: the former means 'move something to a location by

Figure 6: PP-collocations of Caused-Position verbs.
*, FDR < 5% (*zài* 'in' > *dào* 'to'); !, FDR < 5% (*zài* 'in' < *dào* 'to')
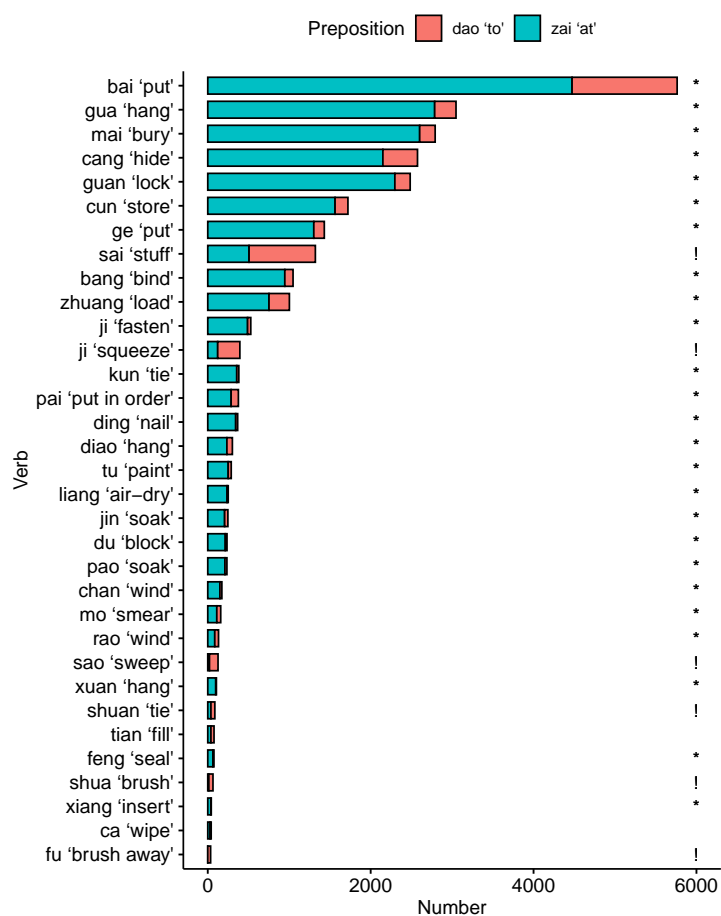
holding it', whereas the latter means 'keep holding something'. In the latter sense, *dài* is a Caused-Position verb (since it refers to placing something onto one's hand) and it is not surprising that it is collocated with *zài*.

6.5   Summary

Our corpus study shows that the Mandarin verbs and prepositions in Caused-Motion and Caused-Position collocate in a way similar to English. This comparative analysis suggests that the PP collocation patterns in English Caused-Motion and Caused-Position are not merely conventionalized rules but cognitive strategies to pair semantically compatible lexemes to each other.

7   Discussion

In this paper, we have seen that there exist verbs other than PaP verbs that are compatible with Caused-Position, notably those that do not entail any motion. We further discovered that the transitive verbs in passive voice appearing in Locative Inversion are also compatible with Caused-Position, which confirms Caused-Position profiles a static position as its endpoint. Moreover, Caused-Position has several polysemous extensions that parallel with those of Caused-Motion. And it is shown that these extensions cannot be explained within the model of Caused-Motion but must be explained within Rohde's Caused-Position model. The semantic difference and the polysemous extensions proposed in this study further verify the existence of Caused-Position and clarifies its distinction from Caused-Motion. Lastly, the Mandarin PP collocation patterns that closely parallel with the English patterns demonstrate that this distinction is not limited to English and may apply to typologically distinct languages such as Mandarin. Although the sample of two languages is far too scarce to make a general typological claim, it calls for future studies to investigate whether similar patterns occur in other languages as well, which may add further support to our prediction that this distinction is based on human cognitive biases rather than idiosyncratic language rules.

8   Conclusion

Our initial big question was how to distinguish one unit (construction) from another. We have shown through a case study on two closely related yet clearly distinct constructions that this distinction should be made through analyzing the **syntactic patterns** and the **semantic networks** of the lexemes occurring in a given construction. In other words, it is not enough to only analyze the construction per se but also required to thoroughly analyze the lexemes that occur within them, how they behave syntactically (e. g. do they co-occur with certain lexemes?) and semantically (e. g. how are the lexemes occuring in the same construction semantically related to each other?). It was Rohde (2001) who used such a methodology to bring Caused-Position into our attention, and we have hereby proven that she was right, and that her idea can be extended beyond what she initially may have designed it for. Even though her thesis received virtually no attention for nearly two decades following its completion, we thus confirm that her idea, which we elaborated in this paper, can further clarify and strengthen the theory of Goldbergian CxG.

References

Collin F Baker, Charles J Fillmore, and John B Lowe. The berkeley framenet project. In *Proceedings of the 17th international conference on Computational linguistics-Volume 1*, pages 86–90. Association for Computational Linguistics, 1998.

Yoav Benjamini and Yosef Hochberg. Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, 57(1):289–300, 1995. doi: 10.1111/j.2517-6161.1995.tb02031.x.

Betty J. Birner. *The Discourse Function of Inversion in English*. Garland Publishing, Inc., New York; London, 1996.

Joan Bresnan. Locative inversion and the architecture of universal grammar. *Language*, 70(1):72–131, 1994. ISSN 0097-8507.

Jidong Chen. "She from bookshelf take-descend-come the box": Encoding and categorizing placement events in Mandarin. In Anetta Kopecka and Bhuvana Narasimhan, editors, *Events of putting and taking: A crosslinguistic perspective*, pages 37–54. John Benjamins Publishing, Amsterdam, 2012.

Ying Chen and Zhuo Jing-Schmidt. The Mandarin LVS construction: Verb lexical semantics and grammatical aspect. *Cognitive Linguistics*, 25(1):1–27, 2014. doi: 10.1515/cog-2013-0029.

Shan-Shan Cheng. *The comparative research of caused motion construction in English and Mandarin: Based on case study of English verbs of putting and their Chinese correspondents.* Shanghai University (Master's Thesis), Shanghai, 2008.

Mark Davies. The 385+ million word Corpus of Contemporary American English (1990–2008+): Design, architecture, and linguistic insights. *International journal of corpus linguistics*, 14(2):159–190, 2009. ISSN 1384-6655.

Nuria del Campo Martínez. The metaphoric motivation of the caused-motion construction: A case study of perception. *International journal of english studies, Vol. 13 (1), 2013*, 2013. ISSN 1578-7044.

Chie Fukada. On Semantic Extensions of Verbs of Appearance. 言語科学論集 = *Papers in linguistic science*, 2: 63–86, 1996.

Adele E Goldberg. *Constructions: A construction grammar approach to argument structure.* University of Chicago Press, Chicago, 1995.

Chu-Ren Huang, Keh-Jiann Chen, and Li-Li Chang. Segmentation standard for Chinese natural language processing. In *Proceedings of the 16th conference on Computational linguistics*, volume 2, pages 1045–1048. Association for Computational Linguistics, 1996.

Beth Levin. *English Verb Classes and Alternations.* The University of Chicago Press, Chicago; London, 1993.

Beth Levin and Malka Rappaport Hovav. *Unaccusativity: At the Syntax-lexical Semantics Interface.* The MIT Press, Cambridge; London, 1995.

Charles N. Li and Sandra A. Thompson. *Mandarin Chinese: A functional reference grammar.* University of California Press, Berkeley/Los Angeles, 1981.

Mei-chun Liu and Jui-ching Chang. Semantic Profile as a Source of Polysemy: Insight from the Spatial-Configuration Verb fàng in Mandarin. In Qin Lu and Helena Hong Gao, editors, *Chinese Lexical Semantics: 16th Workshop, CLSW 2015, Beijing, China, May 9-11, 2015, Revised Selected Papers*, volume 9332 of *Lecture Notes in Artificial Intelligence*, pages 24–32. Springer International Publishing, 2015a. doi: 10.1007/978-3-319-27194-1.

Mei-chun Liu and Ting-yi Chiang. The construction of Mandarin VerbNet: A frame-based study of statement verbs. *Language and Linguistics*, 9(2):239–270, 2008. ISSN 1606-822X.

Meichun Liu. Motion, direction and spatial configuration: A lexical semantic study of HANG verbs in Mandarin. In Erin Shay and Uwe Seibert, editors, *Motion, Direction and Location in Languages: In Honor of Zygmunt Frajzyngier*, pages 177–187. John Benjamins Publishing Co., Amsterdam; Philadelphia, 2003.

Meichun Liu and Che-Wei Chang. A Lexical-Constructional Approach to Verbal Semantics: The Case of Mandarin 'Hang' Verbs. *International Journal of Knowledge and Language Processing*, 6(4):1–19, 2015b.

Meichun Liu and Jui-Ching Chang. Placement Verbs in Chinese and English: Language-Specific Lexicalization Patterns. In Jia-Fei Hong, Qi Su, and Jiun-Shiung Wu, editors, *Chinese Lexical Semantics: 19th Workshop, CLSW 2018, Chiayi, Taiwan, May 26–28, 2018, Revised Selected Papers*, pages 454–466, Cham, 2018. Springer International Publishing. doi: 10.1007/978-3-030-04015-4.

Meichun Liu and Yingying Ye. The construction and annotation of a semantically enriched database: The Mandarin VerbNet and its NLP application. In Qi Su and Weidong Zhan, editors, *From Minimal Contrast to Meaning Construct: Corpus-based, Near Synonym Driven Approaches to Chinese Lexical Semantics*, volume 9 of *Frontiers in Chinese Linguistics*, pages 165–177. Springer, Singapore, 2020. doi: 10.1007/978-981-32-9240-6.

Yúnpǔ [羅云普] Luó. *Hànyǔ duōyì dòngcí fàng de yánjiū [*漢語多義動詞「放」的研究*].* Guólì qīnghuá dàxué (Shuòshì lùnwén) [國立清華大學（碩士論文)], Xīnzhú shì [新竹市], 2011.

Laura A Michaelis. Type shifting in construction grammar: An integrated approach to aspectual coercion. *Cognitive linguistics*, 15(1):1–68, 2004. ISSN 0936-5907.

Ada Ragna Rohde. *Analyzing path: The interplay of verbs, prepositions and constructional semantics.* PhD thesis, Rice University, 2001.

James H-Y. Tai. On Two Functions of Place Adverbials in Mandarin Chinese. *Journal of Chinese Linguistics*, 3 (2/3):154–179, 1975. ISSN 00913723. URL `http://www.jstor.org/stable/23749872`.

Leonard Talmy. Force dynamics in language and cognition. *Cognitive Science*, 12(1):49–100, 1988.

Ēndōng [荀恩东] Xún, Gāoqí [饶高琦] Ráo, Xiǎoyuè [肖晓悦] Xiāo, and Jiāojiāo [臧娇娇] Zāng. Dàshùjū bèijǐng xià BCC yǔliàokù de yánzhì [大数据背景下 BCC 语料库的研制]. *Yǔliàokù yǔyánxué [*语料库语言学*]*, 3(1): 93–118, 2016.