

A usage-based analysis of alternating syntactic constructions: the case of spray/load constructions and clear constructions

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Abstract

The present paper deals with the polysemous nature of spray/load constructions and clear constructions. The verbs used in these constructions appear in an alternating syntactic pattern: the THM-object variant (e.g. He sprayed paint onto the wall) and the LOC-object variant (e.g. He sprayed the wall with paint). This paper aims to demonstrate that these syntactic alternations are functionally motivated or influenced by topics mentioned in the previous discourse context.

Keywords: *Argument structure constructions. Syntactic alternation. Information structure. Usage-based model. Functional motivation.*

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Introduction

The present paper attempts to demonstrate that argument structure constructions, which have been one of the central topics in the field of Construction Grammar (CxG) (GOLDBERG, 1995, 2006), convey not only semantic properties but also pragmatic/discourse functions. To that end, this paper draws on the *British National Corpus* (hereafter, BNC) to carry out a comprehensive study of two pairs of alternating constructions or “syntactic alternations” (LEVIN, 1993): the *spray/load* alternation and the *clear* alternation.¹ The English verbs *spray* and *load* are recognized as appearing in an alternating syntactic pattern: in the THM-object variant, which takes a THEME (e.g. *paint*, *hay*) as its object, and in the LOC-object variant, which takes a LOCATION (e.g. *wall*, *truck*) as its object.

(1) The *spray/load* constructions

- | | |
|---|--|
| a. THM-object variant
(<i>on/onto</i> -variant) | b. LOC-object variant
(<i>with</i> -variant) |
| He sprayed <u>paint</u> onto <u>the wall</u> . | He sprayed <u>the wall</u> with <u>paint</u> . |
| He loaded <u>hay</u> on <u>the truck</u> . | He loaded <u>the truck</u> with <u>hay</u> . |

In (1) the underlined words represent the semantic role THEME (hereafter, THM), while the double-underlined words represent the semantic role LOCATION (hereafter, LOC).

Likewise, the verb *clear* appears in an alternating syntactic pattern as in *He cleared snow from the road* and *He cleared the road of snow* (LEVIN, 1993): the former is the THM-object variant, which takes THM (e.g. *snow*) as its object, and the latter LOC-object variant, which takes LOC (e.g. *road*) as its object.

(2) The *clear* constructions

- | | |
|--|--|
| a. THM-object variant
(<i>from</i> -variant) | b. LOC-object variant (<i>of</i> -variant) |
| He cleared <u>snow</u> from <u>the road</u> . | He cleared <u>snow</u> from <u>the road</u> . |
| He drained <u>water</u> from <u>the bottle</u> . | He drained <u>the bottle</u> of <u>water</u> . |
| He emptied <u>Coke</u> from <u>the glass</u> . | He emptied <u>the glass</u> of <u>Coke</u> . |

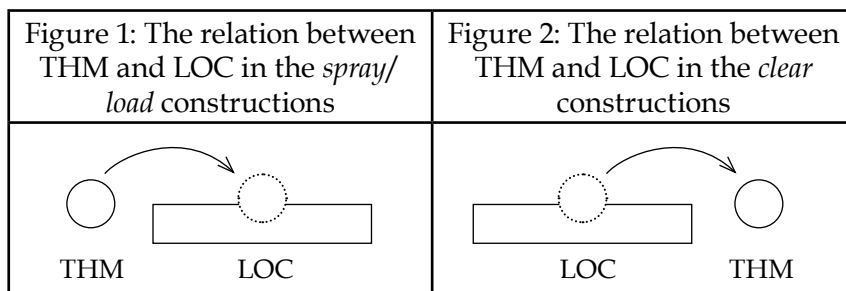
¹ It has been suggested that “many argument structure constructions in English can be paraphrased in terms of another, formally and semantically related argument structure construction” (HILPERT, 2014, p. 45).

The present paper discusses the three verbs *clear*, *drain*, and *empty*, as instances of the *clear* constructions.

In addition to having alternating syntactic constructions, the *spray/load* constructions and the *clear* constructions share two common characteristics. First, they appear in similar syntactic patterns and share the same semantic roles.

- (3) a. NP *spray/load* THM *on/onto* LOC
 b. NP *clear/empty/drain* THM *from* LOC
- (4) a. NP *spray/load* LOC *with* THM
 b. NP *clear/empty/drain* LOC *of* THM

For the sake of simplicity, the variants in (3) are grouped into “the THM-object variants” and the variants in (4) are grouped into “the LOC-object variants.” The difference between the situations illustrated by the two types of constructions lies in the relation between the LOC and the THM. In the *spray/load* constructions, a THM is added to a LOC as in Figure 1, while in the *clear* constructions, a THM is removed from a LOC as in Figure 2.



Second, the two variants in these constructions are associated with different semantic effects. That is, the LOC-object variant (the *with*-variant and the *of*-variant) is associated with the “holistic effect,” i.e., LOC is affected completely by the action, while the THM-object variant (the *on/onto*-variant and the *from*-variant) is not (e.g. FILLMORE, 1968; LEVIN, 1993; GOLDBERG, 1995). This suggests that the speakers’ determinant of the two variants is semantically motivated.

The present study deals with the *spray/load* constructions and *clear* constructions from a usage-based perspective

(BYBEE, 1985; LANGACKER, 1988)². The “usage-based” approach is crucial here, because major previous studies of these constructions have not been usage-based in the sense that they usually deal with made-up examples that are independent of linguistic contexts, focusing only on the semantic effects conveyed by the two variants within these two constructions (e.g. FILLMORE, 1968; LEVIN, 1993).

However, unlike made-up examples, authentic examples are never independent of their contexts. They constitute discourse and convey information structure (LAMBRECHT, 1994; HILPERT, 2014)³. Therefore, though the main focus of previous studies of syntactic alternation is on their semantic properties, this study focuses on the information structure carried by argument structure constructions.

The implication of the usage-based nature of constructions

Before going into the investigation of the *spray/load* constructions and *clear* constructions, I will introduce the theoretical background of this study, focusing on the acquisition of constructions. Though the descriptive characteristics of these two constructions are no doubt an interesting topic, they, at the same time, have at least two theoretical implications of the usage-based account of syntactic alternations: (i) concrete constructions, and (ii) functional motivations that influence the structure of constructions.

Concrete constructions

One of the theoretical implications of the usage-based approach is that we store many more concrete (or low-level) constructions than abstract constructions: if our knowledge of grammar is abstracted from our utterances, this knowledge should be acquired gradually. On the way to gaining this abstract knowledge, we also acquire many concrete constructions. For example, it is unlikely that the knowledge about the transitive construction (NP V NP) is abstracted directly from real utterances such as *I made it*, *John spilled the beans*, and *Jody sang a beautiful song*. Rather, by being exposed to these expressions repeatedly, we first memorize the frequently

² This paper adopts the usage-based definition of constructions that was presented in Goldberg (2006: 5): “Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, patterns are stored as constructions even if they are fully predictable as long as they occur with sufficient frequency.”

³ In this paper, information structure is defined as “that component of sentence grammar in which propositions as conceptual representations of states of affairs are paired with lexicogrammatical structures in accordance with the mental states of interlocutors who use and interpret these structures as units of information in given discourse contexts” (Lambrecht 1994: 5).

used phrases verbatim, such as *I made it*, *spill the beans*, and *sing a song*. Then we generalize to more abstract constructions, such as NP *made* NP, NP *spill* NP, and NP *sing* NP. And finally, these somewhat abstract constructions are further generalized into the more abstract transitive construction (= NP V NP). However, it should not be posited uncritically that speakers actually store this kind of abstract construction in their minds; this should be tested empirically.

One of the approaches that empirically tests the existence of concrete constructions is the collostructional approach (STEFANOWITSCH; GRIES, 2003; GRIES; STEFANOWITSCH, 2004). Within this corpus-based approach, Gries and Stefanowitsch (2004) investigate syntactic alternations. Their method “identifies lexemes that exhibit a strong preference for one member of the pair as opposed to the other, and thus makes it possible to identify subtle distributional differences between the members of such a pair” (GRIES; STEFANOWITSCH, 2004, p. 97). The different collocational preferences of the two constructions provide empirical evidence for (i) the distinctive meanings of the two constructions, and (ii) the existence of concrete constructions where a verb slot is filled by lexical items.⁴

Functional motivations

Another implication of the usage-based model for CxG is that constructions convey pragmatic/discourse functions in addition to semantic properties. Constructions usually emerge from usage in discourse, and instances of use cannot be separated from their discourse context. Discourse is inherently structured so that all the parts or ideas connect to each other and thus form a united, coherent whole. To achieve this coherence, instances of use have various signs that show they are part of a discourse context. These signs have traditionally been studied in terms of cohesive devices (HALLIDAY; HASAN, 1976), discourse markers (SCHIFFRIN, 1987), and so on. Likewise, the pragmatic functions of some constructions, such as cleft, *IT/WH*-cleft, left/right dislocation, topicalization, and *as-for* constructions, have been discussed in previous studies. However, as for argument structure constructions, few studies have focused on their discourse functions. Previous

⁴ Other research that focuses on concrete constructions is Boas (2003), Iwata (2008) and Perek (2015).

studies of argument structure constructions generally analyze the specific semantic properties conveyed by particular argument structure constructions (e.g. GOLDBERG, 1995; BOAS, 2003; IWATA, 2008). Similarly, these studies have paid little attention to the functional motivations that cause syntactic alternations.⁵

One exception is Chen (1986), who focuses on how the dislocation of the particle of a phrasal verb is motivated by discourse factors.

- (5) a. John picked up the book. NO PARTICLE MOVEMENT
 b. John picked the book up. PARTICLE MOVEMENT

Though Chen (1986)'s view is different from the CxG view in that it regards the sentence in (5b) as derived from that in (5a), the study reveals that four discourse factors are related to speakers' selection from the two variants. These factors are: (i) length of the direct object, (ii) encoding type of the direct object, (iii) distance to the last mention of the direct object, and (iv) time of subsequent mention of the direct object.

In summary, argument structure constructions are usually context-dependent to some extent because they emerge from usage in discourse. This suggests that argument structure constructions inherently have both semantic properties and discourse/pragmatic functions.

Data and methods

This study investigates two types of alternating syntactic constructions, *spray/load* constructions and *clear* constructions. Since there are many verbs that are used in these two constructions (LEVIN, 1993), I chose the verbs *spray* and *load* as typical examples of *spray/load* constructions, and *clear*, *drain*, and *empty* as typical of *clear* constructions. These verbs were chosen for two reasons: First, as the names of the constructions suggest, the verbs *spray/load/clear* are thought to be central members of these constructions. Second, a certain number of instances of the five verbs were collected in the pilot study. Though other verbs are also used in *clear* constructions, the pilot study found that the frequency of these other verbs used

⁵ Some exceptions are observed in the study of phrasal verbs (GRÍES, 2003) and of the ditransitive and *to*-dative (KASCHAK; GLENBERG, 2000; BRESNAN *et al.* 2007). These studies revealed that given vs. new information is one of the most fundamental determinants of speakers' choices of syntactic alternations.

in the constructions is not sufficiently high for a representative empirical study.

To collect a large number of examples of the verbs *spray/load/clear/drain/empty* from actual usage, this study uses data from the *BNC*, which consists of over 100 million words of written and spoken British English. All examples used in this study were collected in the following way. First, I extracted all examples of the verbs *spray/load/clear/drain/empty* using the parts-of-speech search in the *BNC* (using the TAGs: [VB.*|VD.*|VH.*|VV.*]). The frequencies of each verb are as follows: *spray* (790), *load* (2589), *clear* (5648), *drain* (1777), and *empty* (1028). Second, I copied the concordance lines into a spreadsheet and selected all examples of *spray/load* constructions and *clear* constructions. At this stage, constructions such as passives, intransitives, and transitives were excluded manually. I only collected instances of active voice sentences that take both LOC and THM either as their objects or as their complements. Then I classified them into two variants. The results are shown in Table 1.

Table 1. Distribution of the variants in the *spray/load* and *clear* constructions:
Source: self-elaborated

	spray	load		clear	drain	empty
THM-object variant	36	66	THM-object variant	119	49	7
LOC-object variant	111	95	LOC-object variant	197	55	66
Total	147	161	Total	316	104	73

The “THM-object” variants take THM as their object NP as in *He sprayed paint on the wall* and *He cleared the snow from the driveway*, while the “LOC-object” variants take LOC as their object NP as in *He sprayed the wall with paint* and *He cleared the street of snow*. Third, I then manually annotated five features for all the instances: (i) prepositions, (ii) definiteness of the object noun, (iii) word class of the object noun, (iv) definiteness of the complement noun, and (v) word class of the complement noun. Table 2 shows the variables and values used for the case studies.

Table 2. Variables and values: Source: self-elaborated

	Variables	Values
(i)	Prepositions	(1) with, (2) on/onto, (3) from, (4) of
(ii)	Definiteness of the object	(1) definite noun, (2) indef. noun phrase
(iii)	Word class of the object	(1) noun phrase, (2) pronoun
(iv)	Definiteness of the complement	(1) def. noun phrase, (2) indef. noun phrase
(v)	Word class of the complement	(1) noun phrase, (2) pronoun

The definiteness of the NP is usually difficult to classify compared to other grammatical features. To annotate this variable, I focused on the distribution of determiners: an NP is classified as definite when it includes a definite article, demonstrative, or possessive pronoun. Likewise, proper nouns and definite pronouns are classified as definite. In contrast, other NPs, including those with indefinite articles or no articles, are classified as indefinite.

An excerpt of the annotation from a spreadsheet is shown in Table 3.

Table 3. Excerpt of the annotation: Source: self-elaborated

previous context	keyword	following context	(i)	(ii)	(iii)	(iv)	(v)
They shall	load	your weapons onto carts	onto	noun	def.	noun	indef.
I	sprayed	him with that stuff.	with	pronoun	def.	noun	def.
He	cleared	his head of false sensation	of	noun	def.	noun	indef.

Based on the annotated data, I carried out two case studies on the *spray/load* constructions and *clear* constructions in order to analyze how information structure such as new/given information is conveyed by these constructions. The two case studies together test the hypothesis that the THM-object variant occurs with given themes and new locations, and the LOC-object variant is used with given locations and new themes.

Results and discussion:
case study 1 – the *spray/load* constructions

This case study discusses how information structure is carried by the *spray/load* constructions, investigating the definiteness and word class of the object/complement NPs in these constructions. To that end, the concordance lines of the verbs *spray* and *load* that occur in the THM-object variant and the LOC-object variant were extracted into a spreadsheet. The number of instances of each of these variants is given in (6) and (7).

- (6) *Spray* (147 instances)
- a. NP *spray* THEME *on/onto* LOC (36 instances) [THM-object variant]
 - b. NP *spray* LOC *with* THEME (111 instances) [LOC-object variant]
- (7) *Load* (161 instances)
- a. NP *load* THEME *onto* LOC (66 instances) [THM-object variant]
 - b. NP *load* LOC *with* THEME (95 instances) [LOC-object variant]

As shown in (6) and (7), the *spray/load* constructions occurred 147 and 161 times, respectively. Note that I only deal with active voice examples of the verbs *spray* and *load* that include both THM and LOC in their respective argument structures. Passives and intransitives are excluded from the investigation. The results are shown in Tables 4 and 5.

Table 4. Distribution of definite/indefinite NPs with *spray*: Source: self-elaborated

<i>spray</i> (147)	THM-object variant (36 instances)		LOC-object variant (111 instances)	
	obj. (THM)	comp. (LOC)	obj. (LOC)	comp. (THM)
definite NP	7 (2) [14.5]	22 (1) [14.5]	85 (28) [51]	17 (2) [51]
indefinite NP	29 [21.5]	14 [21.5]	26 [60]	94 [60]

THM-object variant: X^2 (df = 1, N = 72) = 12.991, $p = 0.0003$

LOC-object variant: X^2 (df = 1, N = 222) = 83.867, $p < .0001$

Table 5. Distribution of definite/indefinite NPs with *load*: Source: self-elaborated

<i>load</i> (161)	THM-object variant (66 examples)		LOC-object variant (95 examples)	
	obj. (THM)	comp. (LOC)	obj. (LOC)	comp. (THM)
definite NP	42 (12) [39]	36 (2) [39]	<u>74 (21)</u> [47]	20 (1) [47]
indefinite NP	24 [27]	30 [27]	21 [48]	<u>75</u> [48]

THM-object variant: X^2 (df = 1, N = 132) = 1.1282, p = 0.2882

LOC-object variant: X^2 (df = 1, N = 190) = 61.396, p < 0.0001

Tables 4 and 5 show the distribution of definite/indefinite NPs and the frequencies of pronouns in the *spray/load* constructions. The numbers in parentheses are the frequencies of pronouns, such as *it*, *him*, and *me*, within definite noun phrases. The numbers in square brackets are the expected frequencies. To take the LOC-object variant of the verb *spray* as an example, there are 111 occurrences in the data. Within the 111 instances, 85 take definite objects and 26 take indefinite objects, while 17 take definite complements and 94 take indefinite complements. 28 out of 85 definite NP objects are definite pronouns. The LOC-object variant (the *with*-variant) occurs about three times more frequently than the THM-object variant (the *onto*-variant).

The results of the investigation point to suggest common prominent characteristics in both *spray/load* constructions: in the LOC-object variants, the object tends to take definite noun phrases, while the complement of the preposition tends to take indefinite noun phrases. This is statistically significant in Pearson's chi-square test as shown in Table 4 and 5. Moreover, more than 90 percent of definite pronouns appear in the object position. The LOC-object variant clearly exhibits preferred patterns as in (8).

- (8) a. So spray it with a contact insecticide. [CH1]⁶
 b. She ran the bath, loading it with bubble-bath, and sank down into the water. [HA0]
 c. Two girls are loading the donkeys with water containers and sacks. [FA]
 d. Avoid spraying your plants with pesticides, grow plants ... [BN4]

⁶ The abbreviations in square brackets indicate the name of sub-corpus of the BNC where the examples are located.

Usually, NPs whose referents are more activated in discourse tend to appear in the higher positions in sentences (SUBJECT > OBJECT > COMPLEMENT), while NPs with less activated referents tend to appear in the lower positions (GIVÓN, 1983; GUNDEL, HEDBERG and ZACHAERSKI, 1993). So these results suggest that the speakers' selection of the LOC-object variant is functionally motivated or influenced by the topics mentioned in the previous discourse context.

The investigation also revealed dispreferred patterns in the LOC-object variant as well. That is, utterances that have an indefinite object noun/pronoun and definite complement noun/pronoun (such as *He sprayed a wall with it* and *He loaded a truck with the hay*) are strongly dispreferred. There are only 20 instances with the verb *spray* and 12 with the verb *load*. Some examples are shown in (9).

- (9) a. We loaded a trolley with our suit cases and bags. [HDB]
 b. ... is initiated by loading accumulator B with the next value in the excitation list. [H7R]

As shown in (9), most of the dispreferred patterns share one characteristic: the object indefinite NP is shorter than the complement definite NP. In particular, lengthy NPs, or so-called heavy NPs, tend to appear in the complement position. It has been suggested in previous studies that heavy NPs often appear to the right of their canonical position under certain circumstances (i.e. heavy NP shift).

Moreover, it has been suggested that heavy NP shift together with information structure affects the position of definite pronouns. That is, in contrast to the heavy NPs, pronouns have light syllables. So definite pronouns have shorter forms and convey old information. These two factors give definite pronouns a tendency to appear in object position.

In contrast to the similar distribution between the LOC-object variants of *spray* and *load*, the distribution of the THM-object does not suggest common prominent characteristics in terms of information structure. In fact, the THM-object variants of the verb *spray* tend to take indefinite object NPs and definite complement NPs as in (10).

- (10) a. We can't blame them that vandals spray paint on the walls. [B1]
 b. They sprayed weedkiller on pensioner Martha Welsh's prized lawn ... [CH6]
 c. ... so that he could spray water onto his innocent friends while they ... [A6]

There are 13 instances of the “NP *spray* NP_{indefinite} *on/onto* NP_{definite}” pattern in the BNC. This pattern might reflect the different statuses of participants that appear in the event structures illustrated by the verbs *load* and *spray*. In particular, the characteristics of THM are different in the event structures illustrated by *spray* compared to those illustrated by *load*. Unlike typical THMs of a ‘load’ event, typical THMs of a ‘spray’ event, e.g. *paint* or *water*, are often uncountable and unbounded, so even if the THM is activated in the previous context, these nouns are less likely to co-occur with definite articles.

Results and discussion: case study 2 – the *clear* constructions

This case study discusses the way information structure is carried by the *clear* constructions (LEVIN, 1993). The verbs *clear*, *drain*, and *empty* appear in an alternating syntactic pattern: the THM-object variant, *Henry cleared the dishes from the table*, or the LOC-object variant, *Henry cleared the table of dishes*. The results are quite similar to those of case study 1.

The number of instances of each of these variants is given in (16), (17), and (18).

- (11) *Clear* (316 instances)
- a. NP *clear* THM *from* LOC (119 instances) [THM-object variant]
 - b. NP *clear* LOC *of* THM (197 instances) [LOC-object variant]
- (12) *Drain* (104 instances)
- a. NP *drain* THM *from* LOC (49 instances) [THM-object variant]
 - b. NP *drain* LOC *of* THM (55 instances) [LOC-object variant]
- (13) *Empty* (73 instances)
- a. NP *empty* THM *from* LOC (7 instances) [THM-object variant]
 - b. NP *empty* LOC *of* THM (66 instances) [LOC-object variant]

As shown in (11) to (13), the frequencies of the *clear* constructions were 316 (*clear*), 104 (*drain*), and 73 (*empty*). Note that I only deal with the sentences that take both THM and LOC as their objects and complements.

To show how information structure is carried by the two variants, I focus on the distribution of definite/indefinite NPs and the frequencies of pronouns in the *clear* constructions. The results are shown in Tables 6 to 8.

Table 6. Distribution of definite/indefinite NPs with *clear*:
Source: self-elaborated

<i>clear</i> (316)	THM-object variant (119)		LOC-object variant (197)	
	obj. (THM)	comp. (LOC)	obj. (LOC)	comp. (THM)
definite NP	68 (5) [80.5]	93 [80.5]	155 (30) [112]	69 (2) [112]
indefinite NP	51 [38.5]	26 [38.5]	42 [85]	128 [85]

THM-object variant: X^2 (df = 1, N = 238) = 11.999, $p = .0005$

LOC-object variant: X^2 (df = 1, N = 394) = 76.524, $p < .0001$

Table 7. Distribution of definite/indefinite NPs with *drain*:
Source: self-elaborated

<i>drain</i> (104)	THM-object variant (49)		LOC-object variant (55)	
	obj. (THM)	comp. (LOC)	obj. (LOC)	comp. (THM)
definite NP	19 (2) [29]	39 (5) [29]	48 (13) [36]	24 [36]
indefinite NP	30 [20]	10 [20]	7 [19]	31 [19]

THM-object variant: X^2 (df = 1, N = 98) = 16.897, $p < .0001$

LOC-object variant: X^2 (df = 1, N = 110) = 23.158, $p < .0001$

Table 8. Distribution of definite/indefinite NPs with *empty*:
Source: self-elaborated

<i>empty</i> (73)	THM-object variant (7)		LOC-object variant (66)	
	obj. (THM)	comp. (LOC)	obj. (LOC)	comp. (THM)
definite NP	5 (1) [6]	6 [6]	<u>57 (6)</u> [41]	25 [41]
indefinite NP	2 [1.5]	1 [1.5]	9 [25]	<u>41</u> [25]

THM-object variant: X^2 (df = 1, N = 14) = 0.4242, $p = .5148$

LOC-object variant: X^2 (df = 1, N = 132) = 32.968, $p < .0001$

The results of case study 2 are similar to those of case study 1. The following common characteristics are observed: First, the LOC-object variant occurs more frequently than the THM-object variant. Second, in LOC-object variant, the object tends to be a definite noun phrase, while the complement of the preposition tends to be an indefinite noun phrase. This is statistically significant in Pearson's chi-square test as shown in Table 6, 7 and 8. Third, definite pronouns tend to appear in the object position. Thus, preferred patterns are observed in the LOC-object variants of all three verbs, as in (14).

- (14) a. He cleared it of leaves and dragged it out of the corner into ... [BMX]
 b. He walked to the table where he'd left his brandy snifter, lifted it, and drained it of liquid. [JY7]
 c. He tried to empty his mind of all thoughts, preparing for ... [HTY]

In contrast, patterns with an indefinite object noun and a definite complement noun are rarely observed in the *BNC*. Some examples are shown in (15).

- (15) a. It takes only minutes to clear a fridge of CFC gas, which is then stored in a secure container ... [K9H]
 b. Seven months later he was back again for an operation to drain a build-up of fluid on his brain. [K5L]

As shown in (15), most of the dispreferred patterns often share one characteristic: the object indefinite noun is shorter than the complement definite noun. Moreover, as with case study 1, heavy NPs tend to appear in the complement position regardless of the definiteness of the noun phrase.

In contrast to the LOC-object variants of *clear*, *drain* and *empty*, the THM-object variants of those verbs show the opposite results: The THM-object variants of the verbs *clear* and *drain* tend to take indefinite theme object NPs and definite location complement NPs as in Table 6 and 7.⁷ That is, the “NP *clear/drain* NP_{indefinite} *from* NP_{definite}” patterns are preferred. This is rather an unexpected result in that it violates the so-called “given-before-new principle.” One possible explanation for this tendency is related to the value of THEME and LOCATION in the events of clearing and emptying: In these events, THEME is less essential than LOCATION, so it does not need to be specified in discourse. However, this is only a rough hypothesis. Further study is needed.

Interim summary

Though two case studies were carried out independently, the results show three notable similarities between the two constructions: First, the frequency of the LOC-object variant (*with*-variant and *of*-variant) is always higher than that of THM-object variant (*on/onto*-variant and *from*-variant). This tendency is observed in all five of the verbs as seen in Table 9.

Table 9. Frequency of the two variants with the five verbs: Source: self-elaborated

	<i>spray</i>	<i>load</i>	<i>clear</i>	<i>drain</i>	<i>empty</i>
THM-object variant	36	66	119	49	7
LOC-object variant	111	95	197	55	66

In previous non-usage-based accounts of CxG, the two variants of the two constructions are treated as having equal status, because frequency was not considered. However, the results of this study show that the frequency of the LOC-object variant is always higher than that of the THM-object variant. This suggests that the LOC-object variant can be seen

⁷ The frequency of the THM-object variants of the verb *empty* is unfortunately not sufficiently high for a representative empirical study, as shown in Table 8.

as reflecting a more basic construal in that basic argument structure constructions usually designate scenes essential to human experience.⁸ This prediction is supported by the frequency of the passive constructions as well. That is, LOC-subject variants, as in (16), are more frequently used than THM-subject variants, as in (17).

(16) LOC-subject variant

- a. The table was loaded with files and books about the Stuarts. [GUU]
- b. Then the land had to be cleared of its debris for the sowing and pasture, ... [HRC]

(17) THM-subject variant

- a. Our canoes were loaded on the trailer and ... [BMF]
- b. Dinner had been cleared from the dining room, ... [FPF]

Table 10. Frequency of passive constructions of the two variants:
Source: self-elaborated⁹

	<i>spray</i>	<i>load</i>	<i>clear</i>	<i>drain</i>	<i>empty</i>
THM-subject variant	39	106	37	11	0
LOC-subject variant	57	292	233	33	35

Table 10 suggests that LOC-subject variants occur much more often than THM-subject variants. This result also suggests the possibility that construals that take LOC as a primary landmark are more basic than those that take THM as a primary landmark.

The second notable similarity between the two constructions is that in the LOC-object variant, (i) the object NP tends to be definite, while the complement NP tends to be indefinite, and (ii) pronouns tend to appear in the object position and rarely appear in the complement position. So, the preference for patterns like *He sprayed it with paint* and *He cleared the street of snow* is statistically significant at the 0.05 level. This result shows that discourse factors motivate the choice of one of the two variants (the LOC-object variant) of

⁸ See Scene Encoding Hypothesis in GOLDBERG (1995).

⁹ The classification of word class was carried out with the parts-of-speech search in the BNC.

these constructions. In other words, the LOC-object variant conveys information structure such that an NP referring to a previously mentioned, given topic tends to appear in the object position and an NP referring to a new topic tends to appear in the complement position.¹⁰ These preferred patterns can be generalized as in (18).

(18) Preferred patterns

- a. NP *spray/load* NP_{LOC/DEF} *with* NP_{THM/IND}
 b. NP *clear/drain/empty* NP_{LOC/DEF} *of* NP_{THM/IND}

As shown in the examples in (18), each construction is strongly related to information structure such as in conveying new/given information¹¹.

The third similarity between the two constructions is that lengthy or heavy NPs tend to appear in the complement position (i.e. heavy NP shift). In particular, extremely heavy NPs are usually observed in sentence-final position as in (19).

¹⁰ In previous studies, it has been noted that the degree of activation reflects the choice of pronouns, definite NPs, and indefinite NPs (e.g. GUNDEL, HEDBERG and ZACHARSKI, 1993). Though NPs referring to unidentifiable referents usually take indefinite articles, once these referents have been identified by participants, they take definite articles and then become pronouns.

¹¹ Interestingly, the opposite tendency is observed in the THM-object variants. That is, the THM-object variants of the verbs *clear* and *drain* show the tendency of taking indefinite theme object NPs and definite location complement NPs. Though this is an interesting result, it is beyond the scope of my study. This should be addressed by future research.

- (19) a. Suzy and Seth loaded the van with food and clothes for the country. ... [ABS]
 b. Emptying his mind of everything except an awareness of the Presence of his Creator. [GVT]
 c. ... refusing to load munitions onto the Jolly George, a ship bound for Poland. [CE7]

As shown in (19), NPs that appear in the complement position tend to be much longer. This tendency is also observed in the passive uses. That is, heavy NPs tend to appear in the complement position of passives rather than in the subject position.

- (20) a. ... by the time the trees are loaded with the beautiful blushing white blossoms. [EER]
 b. Their expressions were drained of personality which gave them the family resemblance possessed by a flock of sheep. [GUU]

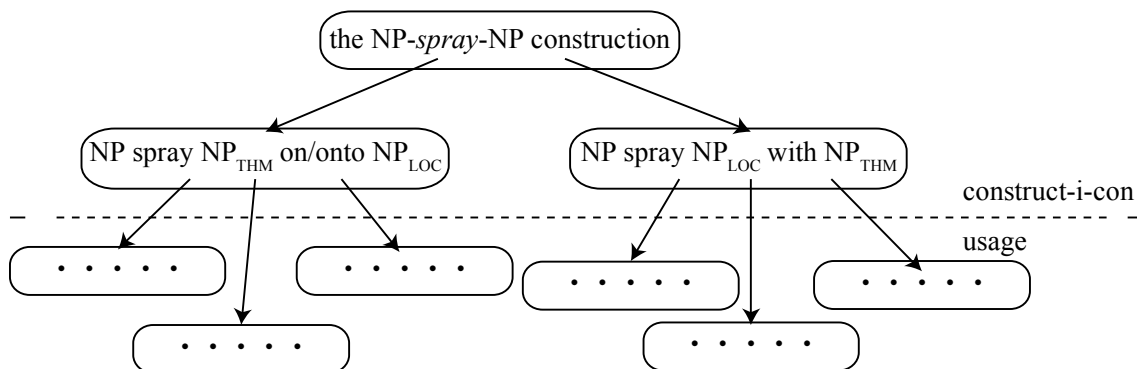
To sum up, these three common characteristics between the two constructions, identified in the case studies, suggest that usage-based analysis is necessary in order to capture general characteristics of the two variants and to discuss the nature of the construct-i-con in more depth.

The usage-based nature of the construct-i-con

This section first discusses how the polysemous nature of the LOC-object variant is stored in the construct-i-con; it then analyzes the theoretical implications of this polysemy for traditional studies of syntactic alternation. Considering the usage-based nature of the construct-i-con, i.e. bottom-up, flexible, and open to discourse, concrete constructions with multiple functions have various theoretical implications for the constructionist approach.

Let me first summarize how syntactic alternations are captured in traditional, non-usage-based studies of CxG. Here I take the verb *spray* as an example; the portion of the construct-i-con assumed in traditional studies of syntactic alternations in CxG is illustrated in Figure 3.

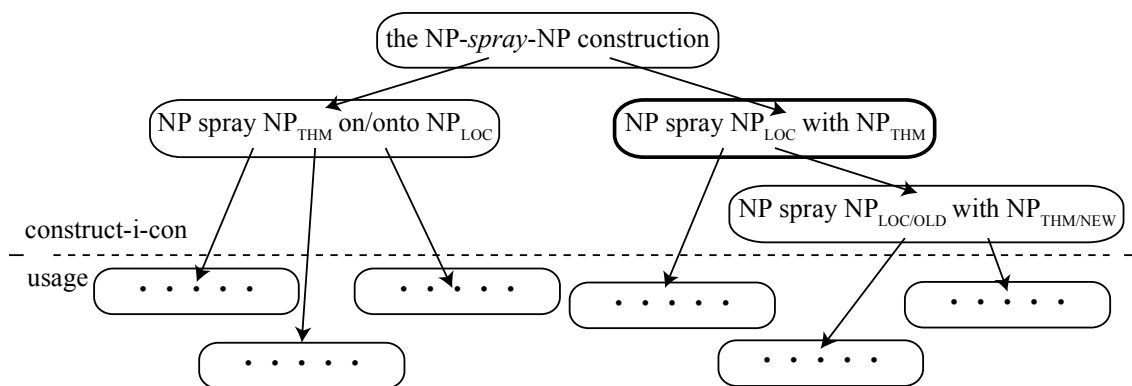
Figure 3. A portion of the construct-i-con assumed in traditional non-usage-based studies



The arrows in Figure 3 illustrate instantiation. As shown in the figure, traditional studies assume that the *spray/load* constructions have two variants with equal status: In non-usage-based analyses, the frequency of the two variants is not considered, so the construct-i-con positions them on the same hierarchical level. The two variants, which are both stored in the construct-i-con, together sanction instances of the *spray/load* constructions.

However, usage-based analysis has revealed the nature of the construct-i-con more clearly. Here I first summarize the results of the two case studies discussed in the previous sections. The corpus-based research revealed that the so-called alternations are functionally motivated: In the LOC-object variant, NPs referring to old information tend to appear in the object position and NPs referring to new information tend to appear in the complement position. This suggests that, unlike the THM-object variant, the LOC-variant is thought to have multiple functions: it conveys both semantic properties and information structure, as specified in (18). So the part of construct-i-con which is suggested by the results of the case studies can be illustrated as in Figure 4:

Figure 4. A portion of the construct-i-con assumed based on usage-based studies



As shown in Figure 4, unlike the THM-object variant, the LOC-object variant is linked to a lower-level sub-construction, “NP *spray* NP_{LOC/OLD} *with* NP_{THM/NEW}” which exhibits

collocational preferences related to information structure.¹² The existence of the concrete construction does not preclude the existence of the traditionally assumed variant “NP *spray* NP_{LOC} with NP_{THM}.” Rather, they together sanction various instances of the LOC-object variant of the *spray* construction. In addition, Figure 5 also illustrates another finding of the case studies: that the frequency of the LOC-object variant is higher than that of the THM-variant. Figure 5 suggests that the LOC-object variant, which seems to reflect a more basic construal, is likely to be more prominent than the THM-object variant in the construct-i-con.¹³

Conclusions

The present study discussed the so-called syntactic alternations of argument structure constructions containing the five verbs *spray/load/clear/drain/empty*. The findings of the two case studies are, first, that the LOC-object variant is more frequent than the THM-object variant; and second, the LOC-object variant conveys information structure in addition to semantic properties. These results together have two implications about how construct-i-con is structured. First, collocational preferences, i.e. concrete constructions such as “NP *spray* NP_{LOC/OLD} with NP_{THM/NEW}” are stored in the construct-i-con.¹⁴ Second, the higher frequency of the LOC-object variant suggests that it is likely to reflect a more basic construal and is more salient or entrenched than the THM-object variant in the construct-i-con.

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¹² A reviewer suggested the possibility that the prevalence of discourse-given LOC-objects in the LOC-object variant simply comes from a general tendency to place given referents before new ones. So, the lower-level sub-construction, “NP *spray* NP_{LOC/OLD} with NP_{THM/NEW}” would not need to be redundantly represented in the construct-i-con. This is a valid point. The present study provides only indirect evidence for the low-level constructions. However, considering the usage-based nature of our linguistic knowledge (GOLDBERG 2006; HILPERT 2012), if the preferred discourse patterns are repeatedly experienced, then they usually come to be stored in the construct-i-con (DU BOIS 2003). The psychological reality of the sub-constructions should be tested in psychological experiments in further studies.

¹³ Though Figure 5 only illustrates a part of the construct-i-con concerning the verb *spray*, as suggested in this study, similar networks are assumed for portions related to the LOC-variants of the other four verbs, *load/clear/drain/empty*.

¹⁴ The present study provides only indirect evidence for the low-level constructions. The psychological reality of the sub-constructions should be tested in psychological experiments.

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Resumo

Uma análise baseada no uso de construções sintáticas alternantes: o caso de construções de “spray/load” e construções “clear”

O presente artigo trata da natureza polissêmica das clear constructions (construções clear) e spray/load constructions (construções spray/load). Os verbos utilizados nessas construções aparecem em um padrão sintático alternante: a variante tema-objeto (p. e.g. He sprayed paint onto the wall) e a variante local-objeto (p. e.g. He sprayed the wall with paint). Este artigo demonstra que esses padrões de alternância sintática são motivados funcionalmente ou influenciados por assuntos mencionados no contexto de discurso prévio.

Palavras-chave: *Construção estrutural de argumentos. Alternância sintática. Estrutura de informação. Modelo baseado em uso. Motivação funcional.*