

The Treatment of Argument Structure Constructions in Online English Learners' Dictionaries: The Case of *V N ADJ* ASCs

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Abstract: Despite their diversity and complexity in structure and meaning, little research has been conducted into the systematic presentation of argument structure constructions (ASCs) in English learners' dictionaries (ELDs). To fill in the gap, this paper focused on the treatment of *V N ADJ* ASCs in the "Big Five" online ELDs against usage data. First a list of 40 target verbs was obtained using two measures of contingency (i.e., faithfulness and collocation strength) through collocation analysis of *V N ADJ* ASCs in the British National Corpus, and then the related ASCs regarding their macro- and micro-structural presentation in selected dictionaries were examined. It was found that most ELDs attach importance to ASCs, notably LDOCE, which assigns many of them the status of phrases. Nevertheless, the treatment of ASCs in current ELDs is inadequate. First, the inclusion of ASCs in most ELDs is far from sufficient. Second, in some cases, there is a mismatch between a valency pattern illustration and an illustrative example. Last but not least, most ELDs are not consistent with respect to their policy of listing and encoding ASCs, and assigning them the status of phrases. We proposed, in the framework of the usage-based construction grammar, some suggestions for optimizing the treatment of ASCs.

Keywords: ARGUMENT STRUCTURE CONSTRUCTIONS, ONLINE ENGLISH LEARNERS' DICTIONARY, PHRASEOLOGY, COLLOCATIONAL ANALYSIS, USAGE-BASED CONSTRUCTION GRAMMAR

Opsomming: Die leksikografiese hantering van argumentstruktuurkonstruksies in aanlyn Engelse aanleerderswoordeboeke: Die geval van *V N ADJ* ASK's.

Ten spyte van hul diversiteit en kompleksiteit in struktuur en betekenis is daar nog min navorsing oor die sistematiese voorstelling van argumentstruktuurkonstruksies (ASK's) in Engelse aanleerderswoordeboeke (EAW'e) gedoen. Om hierdie gaping te vul, is daar in hierdie artikel gefokus op die hantering van *V N ADJ* ASK's in die "Groot Vyf" aanlyn EAW'e teenoor gebruiksdatabasis. Eers is 'n lys van 40 doelwerkwoorde verkry deur twee gebeurlikheidswaardes (d.i. betroubaarheid en kollostruksionele sterkte) met behulp van kollostruksionele analise van *V N ADJ* ASK's in die Britse

Nasionale Korpus te gebruik, en daarna is die verwante ASK's ten opsigte van hul makro- en mikrostrukturele voorstelling in geselekteerde woordeboeke ontleed. Daar is bevind dat die meeste EAW'e ASK's belangrik ag, veral die LDOCE, wat frasestatus aan baie van die ASK's toeken. Die hantering van ASK's in huidige EAW'e is nogtans ontoereikend. Eerstens is die insluiting van ASK's in die meeste EAW'e glad nie voldoende nie. Tweedens is daar in sommige gevalle 'n wanverhouding tussen 'n valensiepatroonillustrasie en 'n illustratiewe voorbeeld. Laastens, maar nie die minste nie, is die meeste EAW'e nie konsekwent rakende hul beleid van opname en enkodering van ASK's nie asook nie ten opsigte van die toekenning van frasestatus aan hierdie ASK's nie. Ons doen binne die raamwerk van die gebruiksgebaseerde konstruksiegrammatika enkele voorstelle vir die optimalisering van die hantering van ASK's aan die hand.

Sleutelwoorde: ARGUMENTSTRUKTUURKONSTRUKSIES, AANLYN ENGELSE AANLEERDERSWOORDEBOEKE, FRASEOLOGIE, KOLLOSTRUKSIONELE ANALISE, GEBRUIKSGEBASEERDE KONSTRUKSIEGRAMMATIKA

1. Introduction

Traditionally, dictionaries are meaning-driven: they deal with lexicon, and focus on the different senses of individual words. But they reveal little about the phraseology that separates one sense from another. By comparison, grammars are structure-driven: they contain the productive rules for constructing utterances, and describe how words combine to form sentences (Hanks and Može 2019).

However, the advent of corpus linguistics since the 1980s has provided ample evidence that there is no clear dividing line between grammar and lexicon, and that they are merely different ends of the same continuum. The notion in traditional lexicography that meanings can be identified in individual words has been increasingly challenged. The viability of the traditional model of the dictionary as an ordered listing of individual words and senses has been undermined, pointing towards a radically different model where meanings are located through and within phraseology (Sinclair 1991; Kilgarriff 1997; Hunston and Francis 2000; Sinclair 2004; Hanks 2008; Hoey and O'Donnell 2008; Moon 2008; Herbst and Klotz 2009; Stubbs 2009; Hanks 2012, 2013; Hunston 2014; Rundell 2018; Hunston 2019; Hunston and Su 2019; Hanks and Ma 2020). The existence of phraseological dictionaries demonstrates that the distinction between lexicon and grammar is by no means as clear-cut as was often assumed (Herbst and Klotz 2009).

In the usage-based construction grammar, the boundary between lexicon and grammar is blurred. Constructions, like traditional words, are construed as conventional, learned pairings of form and meaning/function at different levels of schematicity. Language is a network of constructions, ranging from substantive word construction to highly schematic argument structure constructions (ASCs). The acquisition of language is the learning of constructions (Goldberg 1995, 2006; Hoffmann and Trousdale 2013; Goldberg 2019). These tenets of construction

grammar highlight the commonality between words and phrasal units, and make it viable to characterize all conventional constructional units in a similar way to the representation of lexical units in traditional lexicography.

All these insights have challenged the prevailing notion of headwords in traditional dictionaries with their linear organization, and motivated a transfer from the conventional focus on lexical semantics and morphology to a new trend towards phraseological units of meaning. Following this trend, some linguists and lexicographers have proposed that construction grammar can be applied to broaden the scope of phraseological description for practical lexicography (Przepiórkowski et al. 2017; Croft and Vigus 2017).

Similar to collocations, ASCs are conventionalized but unpredictable, concerning item-specific knowledge with respect to the co-occurrence of one word with a particular grammatical construction (Herbst et al. 2014). Recent research on ASCs has shown that it is implausible to focus on the semantics of verbs alone to explain the syntactic realization of verbs, and that both verbs and constructions contribute meanings and arguments to the whole construction (Goldberg 1995; Boas 2003; Goldberg et al. 2004; Goldberg and Jackendoff 2004; Goldberg 2006; Boas 2009; Faulhaber 2011; Boas 2014; Herbst et al. 2014; Perek 2015; Goldberg 2019). Verbs used in a construction share common constructional meanings and yet demonstrate idiosyncrasies at the same time. For instance, the syntactic frame *V N ADJ* can be the English resultative construction "[X MAKE [Y BECOME Z]]" (Goldberg 1995; Boas 2003; Goldberg and Jackendoff 2004), or the English attributive construction "[X THINK [Y BE Z]]" (Quirk et al. 1985; Hampe 2011).

However, a brief glimpse at *V N ADJ* ASCs in current English learners' dictionaries (ELDs) reveals that dictionary compilers tend to focus mainly on the semantics of verbs, unaware of the possible role of constructions in the argument realization of ASCs. Most ELDs only use labels like [+ adj], [~ sth + adj], or [*v n adj*] to indicate the resultative construction and attributive construction. No further device is used to differentiate the two constructions. As Goldberg and Jackendoff (2004: 563) point out, "having a phrase structure rule *V NP AP/PP* does not tell us enough about the resultative construction". In addition, the great variety and differences in the use of labels to indicate the valency patterns of *V N ADJ* ASCs in the ELDs imply the diversity and complexity of these constructions. Thus, ASCs deserve more attention from lexicographers. Furthermore, for some verb-specific constructions, the words used in each slot may demonstrate idiomatic preferences or restrictions, but current ELDs fail to convey such information. For example, in the OPINION sense of *hold*, words that can be used in the *ADJ* slot in the construction *HOLD N ADJ* are restricted to *accountable*, *liable*, and *responsible* (Francis et al. 1996: 280). However, *Oxford Advanced Learner's Dictionary* (10th ed.) (OALD10) only offers an example (viz., *Parents will be held responsible for their children's behaviour.*) after the pattern ~ **sb/sth adj**, and does not further indicate its restrictions in usage.

Compared with the abundant studies on the treatment of collocations in

dictionaries, little attention has been given to ASCs in lexicography. Though Cheng and Xu (2022) have illustrated how lexicographers can implement the idea of construction grammar to optimize the entry of the *way*-construction in learners' dictionaries, their focus is on a nominal ASC, and their investigation is mainly based on elicitation tasks rather than usage (viz., quantitative analysis of corpus evidence).

To fill in the gap, this study aims to investigate how online ELDs present one of the typical verb-based constructions — *V N ADJ* ASCs — within the framework of the usage-based construction grammar. Specifically, it explores to what extent the description of a language that a dictionary provides reflects the reliable empirical evidence regarding the way in which the language is actually used, and how to implement the basic tenets of the usage-based construction grammar into lexicographic practice.

2. Methodology

2.1 The "Big five" online ELDs

The online dictionaries analyzed in this study include five leading ELDs, known as the "Big Five" ELDs, namely *Oxford Advanced Learner's Dictionary* (OALD), *Longman Dictionary of Contemporary English* (LDOCE), *COBUILD Advanced English Dictionary* (COBUILD), *Cambridge Advanced Learner's Dictionary* (CALD), and *Macmillan English Dictionary* (MED). These dictionaries were chosen because they are widely acknowledged as the most popular ELDs of admirably high standards, and represent the most recent developments in pedagogical lexicography. Additionally, they are all corpus-based and phraseology-oriented, reflecting the tendency in current pedagogical lexicography towards a more explicit representation of formulaic language. The usage patterns found in them are believed to largely correspond to the most frequent lexical and syntactic paradigms in the British National Corpus (BNC). An investigation into the "Big Five" online ELDs helps to gauge precisely the significant and distinctive features of leading ELDs, thus lending more credence to future improvements in lexicography.

2.2 List of Target *V N ADJ* ASCs

2.2.1 Retrieval of instances of *V N ADJ* ASCs from the BNC

V N ADJ ASC, which is also called complex pattern or complex transitive complementation, refers to a clause pattern in which an object is followed by an adjective phrase as its object complement (Quirk et al. 1985; Francis et al. 1996). Given the bottom-up approach adopted in the COBUILD project and its emphasis and reliance on corpus evidence, the complex pattern with an adject-

tive phrase as its object complement (i.e., the *V N ADJ* pattern), and the 97 verbs identified in this pattern (Francis et al. 1996), provided an ideal starting point for our analysis. Since Francis et al. (1996) did not indicate how frequent each of the listed verb types is, our focus upon usage makes it necessary to reconstruct the data.

V N ADJ ASC consists of syntactic categories such as a nominal phrase and an adjective phrase. Such categories are very complicated and diverse, and some involve combinations of more than two words. Therefore, it is not easy to capture them through a simple corpus search with any degree of precision. Considering this, the BNC was chosen for the quantitative analysis because it is a balanced corpus with a size of 100 million words. We can obtain instances of *V N ADJ* ASCs in the BNC via Sketch Engine, whose distinctive feature is Word Sketch which can be used as a one-page summary of a word's syntactic and collocational behavior (Kilgarriff et al. 2014; Thomas 2014). In the results of Word Sketches, *V N ADJ* ASCs can be identified by "adjectives after 'VERB' and noun". Figure 1 presents information about the adjective complements of *confess*.

adjectives after "confess" and noun		
	<u>227</u>	0.00
ignorant	<u>15</u>	6.54
guilty	<u>47</u>	6.05
unable	<u>37</u>	5.18
daily	<u>12</u>	2.93
first	<u>14</u>	0.77
due	<u>18</u>	0.40

Figure 1: Adjective complements of *confess* in the BNC

In accordance with previous studies (Boas 2003; González-García 2009; Hampe 2011), an expression will be counted as an instance of *V N ADJ* ASCs if the complement is (1) object-related, (2) non-deletable, and (3) not deletable without a change in the semantics of the VP. A close examination of the data in Figure 1 shows that *daily*, *first*, and *due* do not belong to *V N ADJ* ASCs, because these adjectives are adjuncts instead of object-complements (e.g., *I will <confess> my sins daily to God ...*).

Considering the noise in the results of the Word Sketch for the adjective complements of *confess* in the BNC, a pilot study was conducted to estimate the precision of Sketch Engine. First, we randomly sampled 10 out of the 97 verbs.

Second, each verb in the BNC was queried via Word Sketch in Sketch Engine, and all the concordances for each query were downloaded. Then, errors were manually discarded, and we conducted a precision analysis. Results show an average of 97.7% in terms of precision. This suggests that Sketch Engine is a reliable tool for this research. Note that precision¹ was prioritized over recall in the analysis, because the research aims to provide evidence for lexicographic presentation, in which typical instances of usage are provided. Therefore, we decided to use the data provided by Sketch Engine. We searched the 97 verbs one by one, downloaded all the instances of *V N ADJ* ASCs, detected errors manually, and identified their token frequency. It was found that 13² out of the 97 verbs do not occur in *V N ADJ* ASCs, and that the token frequency of *have* in *V N ADJ* ASCs is difficult to calculate. Thus, we discarded them from our analysis, and finally obtained a list of 83 verbs.

Thereafter the type and token frequencies of verbs that occupy *V N ADJ* ASCs were calculated. To determine whether they fall into a coherent meaning group, we measured their contingency of associations with *V N ADJ* ASCs and the semantic associations of these verbs. The words used in each slot in each verb-based *V N ADJ* ASC were retrieved as well.

2.2.2 Sampled verbs and verb-based *V N ADJ* ASCs

To make the analysis more reliable, we had to ensure that *V N ADJ* ASC is the typical and common usage pattern for each verb sampled. Following the instructions of collocation analysis (Stefanowitsch and Gries 2003)³, *R* scripts were used (Gries 2014) to calculate two measures of contingency — faithfulness and collocation strength — for the verb types occupying *V N ADJ* ASCs in our searches.

Faithfulness refers to the proportion of tokens of total verb usage that appear in a particular construction. It is the simplest measure of contingency. The high value of faithfulness implies the high proportion of a verb occurring with a particular construction. Collocation strength measures the association strength between a particular construction and the lexical elements filling certain slots in the construction. The higher the value of collocation strength is, the stronger the association between the verb and the construction is. By using both faithfulness and collocation strength, we can ensure that *V N ADJ* ASC is one of the most common and typical usages of the chosen verbs, thus deserving to be described in ELDs.

Therefore, based on the results of the collocation analysis, the top 30 verbs in order of faithfulness, and 10 verbs from the top 20 verbs in order of collocation strength were picked. In other words, the 40 verbs sampled are among either the top 30 verbs in order of faithfulness or the top 20 verbs in order of collocation strength. Table 1 lists the 40 verbs. It is worth noticing that some verbs (i.e., *hold*, *find*, *judge*, and *jerk*) belong to more than one group.

Table 1: Verbs sampled for investigating *V N ADJ* ASCs in the "Big Five"

Verb groups	Members
MAKE	<i>make, render, leave, keep, hold</i> <i>drive, knock, send, scare</i> <i>set, push, wrench, prise, slam, yank, jerk, clamp, lever</i> <i>shoot, paint, shake, stuff, wipe, cram, scrub, towel, jerk</i>
CONSIDER	<i>consider, think, find, hold, deem, prove, judge, rate, believe</i>
CALL	<i>call, declare, pronounce, presume, certify, judge, find, profess</i>

A close examination of these verb groups shows that the general constructional meanings of *V N ADJ* ASCs can be generated from the lexical semantics of the matrix verbs that belong to at least two relatively distinct semantic groups, viz. the "MAKE" group, and the "CONSIDER/CALL" group. The "MAKE" group consists of a broad range of verbs that can have an effect on someone or something when used in *V N ADJ* ASCs. Those verbs instantiate the resultative ASCs with the semantics "X CAUSES Y to BECOME Z" for the syntactic pattern $NP_x V NP_y AdjP_z$. The "CONSIDER/CALL" group comprises a number of verbs expressing opinions, feelings, or facts. Thus, these verbs provide a solid usage foundation for the predicative ASCs with the semantics "X THINKS/FEELS/DECLARES Y to BE Z" for the syntactic pattern $NP_x V NP_y AdjP_z$.

2.3 Examination of target verb entries in the "Big Five"

We then looked up all the target verb entries, and examined how the target *V N ADJ* ASCs are presented in the "Big Five" through a detailed analysis of their macro- and micro-structures. Macrostructurally, we explored the extent to which constructions are treated as multiword expressions like a phrase/idiom, or placed under the entry verb to illustrate one of its senses. Microstructurally, we adapted previous frameworks for microstructural classification and examination (e.g., Atkins and Rundell 2008: 203-246), and concentrated on the following devices: definition, valency pattern label by means of syntactic code (see CALD and COBUILD) or pattern illustration (see OALD, LDOCE, and MED), and illustrative example. We investigated all the entry components in the "Big Five", and calculated the frequencies each device is used for presenting verb-based *V N ADJ* ASCs.

3. Results

Table 2 displays the overall coverage of *V N ADJ* ASCs in the "Big Five". It

demonstrates that the inclusion of the 40 instances in each dictionary differs. COBUILD includes all of them: while three (i.e., *consider*, *set*, and *believe*) are solely labeled with syntactic codes, the others are provided with examples as well, and some are further illustrated in definitions. OALD also has an extensive coverage, with only the TOWEL *N ADJ* ASC excluded. In contrast, the number of *V N ADJ* ASCs covered in the other three ELDs is relatively low: LDOCE presents 30, CALD shows 28, and MED illustrates 25. The three ELDs also vary markedly in terms of *V N ADJ* ASCs that are not presented. A Chi-square test indicates that the coverage varies significantly across the "Big Five" online ELDs ($\chi^2 = 29.435$, $df = 4$, $p < .05$).

Table 2: Coverage of the 40 instances of *V N ADJ* ASCs in the "Big Five"

	OALD	LDOCE	CALD	COBUILD	MED
inclusion	39	30	28	40	25
phrase	0	21	3	2	8
idiom	4	0	2	0	0
definition	54	60	37	54	36
valency pattern	53	58	31	77	33
illustrative example	83	167	70	64	43

3.1 Macrostructure

The rise of corpus linguistics and the feasibility of studying language data in quantitative dimensions open up entirely new possibilities for presenting phraseology in dictionaries (Rundell 1999; Dobrovolskij 2015; Steyer 2015). Multiword expressions (MWEs) such as phrases and idioms demonstrate the collocational preferences of a particular lexical unit in a prominent way. The five ELDs differ significantly in treating *V N ADJ* ASCs as MWEs.

As indicated in Table 2, OALD gives four instances of *V N ADJ* ASCs the status of idioms, and lists them in the IDIOMS column, which is located at the bottom of the main entry. They are *make something good*, *scare somebody shitless*, *wipe the slate clean*, and *knock somebody dead*. Among them, *make something good* and *knock somebody dead* are provided with not only definitions but also example sentences, whereas the other two are only indicated in definitions. Similarly, CALD treats two instances (viz., *make it quick/fast* and *scare sb shitless*) as idioms, places them in the IDIOMS column at the bottom of the entry, and uses hyperlinks to direct the constructions to the idioms, which are illustrated with definitions and examples. In addition, CALD presents three instances (i.e., *keep*

sth quiet, drive sb mad, crazy, etc., and drive sb wild) as phrases in the main entry, and provides them with definitions and examples.

In LDOCE, 21 instances of *V N ADJ* ASCs enjoy the status of being phrases in two different ways: (a) six are treated as "PHRASES" in the **COLLOCATIONS column**, which is placed at the end of an entry; and (b) fifteen are displayed as phrases with hyperlinks, which are listed within the main entry and numbered in the same way as other sense divisions. The six "PHRASES" in the **COLLOCATIONS column** are provided with examples, and most of them are glossed in brackets. Almost all the hyperlinked phrases are supplied with both definitions and examples except for *keep something quiet* and *not be as black as you are painted*, which are offered with definitions.

COBUILD displays two instances as phrases, namely *wipe the slate clean* and *knock them/em dead*. They are treated as a separate sense for the headword, and hyperlinked with the phrases which are illustrated with both definitions and examples. MED treats eight instances as phrases, places them in the PHRASES column at the end of each entry, and hyperlinks them with the phrases equipped with definitions and examples.

3.2 Microstructure

3.2.1 Definition

As shown in Table 2, each dictionary splits a different number of senses for the 40 instances of *V N ADJ* ASCs. LDOCE gives the most, viz., 60 with a mean of 1.50 sense divisions, and CALD and MED offer the least, being 37 (0.93) and 36 (0.90) respectively. A one-way ANOVA test indicates that the differences in sense divisions among the "Big Five" are statistically significant ($F(4, 195) = 2.657$, $p < .05$).

Results of post hoc tests further indicate that there are considerable differences between LDOCE and CALD ($p < .05$), and between LDOCE and MED ($p < .05$), whereas the differences between other ELDs are not statistically significant. The differences between LDOCE and CALD/MED may stem from the policy of the former giving many ASCs the status of phrases.

We further compared the treatment of the *HOLD N ADJ* ASC in the "Big Five" against the usage data in the corpus. As discussed in Francis et al. (1996), the verb *hold* in the *V N ADJ* ASC belongs to at least two general meaning groups, namely the "MAKE" group and the "CONSIDER" group. The distributional patterns of the *HOLD N ADJ* in the BNC reveal that it conveys the meaning of "keeping something or somebody in a particular state or position" when it co-occurs with adjectives such as *open, high, close, firm, and steady*, "to keep somebody in a particular place" when combined with adjectives like *captive* and *incommunicado*, and "an opinion or belief" when followed by adjectives such as *responsible, liable, and accountable*.

As far as the sense divisions are concerned, both CALD and COBUILD

split the HOLD *N ADJ* ASC into two senses, whereas the other three ELDs provide no less than three senses. In addition to three sense divisions, LDOCE and MED respectively give *hold someone/something dear* and *hold someone responsible/accountable/liable* the status of phrases, supply them with definitions and examples, and hyperlink them to the phrasal entries.

A closer look at the meanings explained in the "Big Five" reveals that these ELDs differ in the specificity of senses assigned to the HOLD *N ADJ* ASC. All the five ELDs give the meaning of "keeping something or somebody in a particular position or state". The differences lie in that LDOCE provides two senses for *hold something open*, MED differentiates between *hold something steady/shut/still* and *hold something tight/close*, while the other three ELDs do not make such a clear-cut distinction. All of them include its OPINION sense, but they indicate it in a markedly different style: CALD explains it in a traditional way, offering the meaning "to believe an idea or opinion", and illustrating it with examples; OALD divides it into two senses; LDOCE and MED treat it as a phrase; and COBUILD uses a full-sentence definition to explain its meaning. Additionally, only LDOCE and MED take into account the meaning "to keep somebody in a particular place", and include *hold somebody/something dear* as a separate phrase.

3.2.2 Valency pattern illustration

The "Big Five" online ELDs vary in the way they convey valency information about *V N ADJ* ASCs.

(1) In OALD, valency patterns of *V N ADJ* ASCs are presented in bold type, for example, ***find somebody/something + adj.*** and ***render something + adj.*** Most pattern illustrations of this type precede example sentences.

(2) Slightly different from OALD, LDOCE and MED use specific words rather than "adj." in the adjective slot, for instance, ***render somebody/something impossible/harmless/unconscious etc.***

(3) CALD encodes valency patterns of *V N ADJ* ASCs with both formal (i.e., [+ adj]) and functional categories (i.e., [+ obj]). Patterns used in CALD are somewhat inconsistent and vary slightly for different verb-based ASCs, as displayed below:

- (a) [+ adj] (*render, towel, make, set, prove, and send*);
- (b) [+ noun/adj] (*deem and certify*);
- (c) [+ obj + adj] (*find, keep, leave, shoot, scrub, paint, hold, presume, knock, shake, and believe*);
- (d) [+ obj + noun/adj] (*pronounce and deem*);
- (e) [+ obj + (to be) + noun/adj] (*declare*).

(4) COBUILD devises two ways to present valency information of *V N ADJ* ASCs: (a) specific pattern illustrations embodied in full-sentence definitions, and (b) general pattern illustrations in terms of pure formal categories. The first type of pattern illustrations is designed for verbs such as *render, towel, prise, wrench, find, make, and hold*, while the second is provided for every verb-based *V N ADJ* ASCs and placed after the corresponding examples. In addition, COBUILD makes a distinction between verb-based *V N ADJ* ASCs in the active form (e.g., [*V n adj to-inf*] for *make*) and those in the passive form (e.g., [*be V-ed adj/n*] for *deem* and *set*), and provides them with different patterns. In contrast, the other four ELDs fail to make such a distinction.

COBUILD offers an exhaustive list of valency patterns for *V N ADJ* ASCs. However, in COBUILD, verbs in the same class are sometimes not given a consistent pattern. Take *cram* and *stuff* as an example. While the valency pattern provided for the illustrative example *I crammed my bag full of swimsuits and T-shirts ...* is [*V n full of*], the pattern for the sentence example *He grabbed my purse, opened it and stuffed it full, then gave it back to me ...* is [*VERB noun adjective*]. Moreover, previous research (Bogaards and Van der Kloot 2001) has questioned the usefulness of the rich syntactic information indicated after illustrative examples, because most learners are unable or unwilling to take note of such information (Bogaards 2003).

The "Big Five" vary in the number of valency pattern illustrations (see Table 2). A one-way ANOVA test shows that the differences are statistically significant ($F(4, 195) = 4.533, p < .05$). Post hoc tests further indicate that there are considerable differences between COBUILD and CALD, between COBUILD and MED, and between LDOCE and CALD, while the differences between other ELDs are not statistically significant. The differences between COBUILD and CALD/MED may be attributed to the policy of COBUILD providing every example with a corresponding pattern code on the one hand, and the lower coverage of *V N ADJ* ASCs in CALD and MED on the other hand.

Even though there is considerable variation among the "Big Five", their coding systems share a common feature that they assume very little grammatical knowledge on the part of users. They aim to satisfy users' needs in a much more explicit and self-explanatory way.

3.2.3 Illustrative example

The "Big Five" always give at least one example to illustrate *V N ADJ* ASCs they include, except for COBUILD which fails to provide one for *CONSIDER N ADJ*, *SET N ADJ*, and *BELIEVE N ADJ*. As Table 2 indicates, the "Big Five" vary considerably in the number of examples used to illustrate *V N ADJ* ASCs. A one-way ANOVA test reveals that the differences are statistically significant ($F(4, 195) = 9.455, p < .05$). Post hoc tests further indicate that LDOCE substantially differs from the other four ELDs, while the differences between other

ELDs are not statistically significant. The differences may be due to the policy of LDOCE providing plentiful examples in the extra column "Examples from the Corpus" on the one hand, and giving many ASCs the phrase status and equipping them with abundant examples on the other hand.

4. Discussion

This section discusses whether the treatment of *V N ADJ* ASCs in the "Big Five" online ELDs systematically reflects the language in usage, and proposes some suggestions for optimizing the presentation of ASCs in ELDs.

4.1 Strengths of the treatment of ASCs in each ELD

Based on the analysis above, it can be concluded that OALD, LDOCE and COBUILD provide much richer and more comprehensive constructional information for *V N ADJ* ASCs than CALD and MED do. Specifically, as far as the 40 instances of *V N ADJ* ASCs are concerned, OALD and COBUILD include almost all of them, and provide not only illustrative examples but also valency pattern illustrations. For *V N ADJ* ASC typical of a verb, they highlight the construction as a whole either by giving a pattern illustration before its definition (OALD) or by explaining it in a full-sentence definition (COBUILD).

LDOCE is relatively richer in providing constructional information. Despite the fact that the total number of *V N ADJ* ASCs included in LDOCE is lower than in OALD and COBUILD, LDOCE offers abundant examples for each instance of *V N ADJ* ASCs, not only in the main entry but also in the "Examples from the Corpus" column. It is worth noticing that all the five ELDs exhibit a phraseology-orientation towards constructions, but it is LDOCE that gains prominence, because it gives a much larger number of *V N ADJ* ASCs the status of phrases, and treat them as a separate sense-division.

In contrast to the other three ELDs, CALD and MED present *V N ADJ* ASCs in a simpler way. They include a relatively lower number of ASCs. In addition, the number of definitions, illustrative examples, and valency pattern illustrations they provide for *V N ADJ* ASCs is far lower than the other three, and the constructional information they offer is inadequate.

4.2 Inadequate treatment of ASCs in current online ELDs

The treatment of *V N ADJ* ASCs in the "Big Five" is inadequate in the following respects.

4.2.1 Insufficient inclusion of ASCs in ELDs

As explained in Section 2.2.2, the 40 instances of *V N ADJ* ASCs examined are

prototypical ones. Thus, they deserve due attention, and are supposed to be presented in ELDs. However, a close investigation into the coverage of them in the "Big Five" online ELDs reveals that they are inadequately included in current ELDs.

The reasons might be as follows. Firstly, whether a construction for a particular verb is included in an ELD might be related to the frequency of the verb as well as the frequency of the construction in usage. Verbs in the MAKE group such as *make*, *render*, *keep*, *leave*, and *hold* have a very high token frequency in usage, and the *V N ADJ* ASCs for them are prototypical ones. Thus, they attract a great deal of attention from dictionary compilers, and their various constructions, including *V N ADJ* ASCs, are adequately presented in dictionaries. In contrast, the fact that instances of some *V N ADJ* ASCs like *CRAM N ADJ*, *STUFF N ADJ*, and *PRISE N ADJ* are unduly treated in ELDs might be due to the relatively lower token frequency of such verbs as *cram*, *stuff*, and *prise*. Nevertheless, the collocation analysis shows that their *V N ADJ* ASCs are faithful and prototypical for each verb. Therefore, all of them should be covered from the perspective of the usage-based construction grammar. Secondly, it might be attributed to the different types of constructions they belong to. *V N ADJ* ASCs for verbs like *make*, *render*, *keep*, *leave*, etc. are instances of Type A resultative ASCs, and the words in every slot in the construction are obligatory. In contrast, in Type B resultative ASCs such as *CRAM N ADJ*, *STUFF N ADJ*, *SLAM N ADJ*, *WIPE N ADJ*, and *TOWEL N ADJ*, the adjective result phrase is optional, and it can be omitted without affecting the grammaticality of the sentence. The result is implied by the verbal event, and can be conveyed by a restricted range of adjectives. Generally, there is little difference between the sentences with and without the adjective phrase. Given that, some dictionary compilers might think it unnecessary to include both of them in ELDs. As a result, some of the Type B resultative ASCs are presented in ELDs, whereas some are not included. However, based on the construction grammar approach, a sentence without an adjective phrase focuses on the verbal event while a sentence with an adjective phrase not only conveys the verbal event but also specifies the resultative event. Therefore, they belong to two different constructions, and deserve to be fully presented and differentiated in dictionaries.

Although lexicographers have attached importance to frequently-used headwords and to constructions of words with a high frequency, little attention has been given to constructions of words with a low frequency. In addition, there is no consistent policy for including ASCs in the "Big Five". Therefore, with respect to the coverage of ASCs in ELDs, there is still room for improvement.

4.2.2 Mismatch between valency pattern illustrations and illustrative examples

A scrutiny of the treatment of ASCs in specific entries indicates that the "Big Five" sometimes inconsistently encode the constructional information in valency

pattern illustrations and illustrative examples. As the following shows, for some ASCs, there is no one-to-one match between pattern illustrations and sentence examples.

(1) In some cases, there is not an adequate number of examples to match a pattern illustration. For example, OALD labels WRENCH *N ADJ* with the pattern illustration *wrench (something/somebody/yourself) + adj.*, and provides two illustrative examples (viz., *They wrenched the door open.* and *She managed to wrench herself free.*), but it does not exemplify whether the pattern without the object *something/somebody/yourself* has a similar meaning. In the same vein, OALD supplies only one example (i.e., *Scrub the vegetables clean.*) to the pattern *scrub something/yourself + adj.*

(2) Sometimes the examples provided do not match the patterns to illustrate. For instance, in the "Examples from the Corpus" column in LDOCE, the example sentence *Once a soldier has been certified medically deaf he was always shipped home.* is not matched with the illustrative pattern *certify (that)*, and the sentence example *The defendant is presumed innocent until proved guilty.* is located under the pattern *presume* instead of the pattern *be presumed dead/innocent etc* (see Figure 2). Nevertheless, it is worth noticing that most examples in the "Examples from the Corpus" column in LDOCE are arranged according to their patterns, while the examples in the "Extra examples" column in OALD are not sorted.

Examples from the Corpus

presume

- The price includes all your transportation and hotels, I **presume**?
- Was this the treatment Roman meted out to any female who **presumed** a little too much, grew a little too possessive?
- They say Mind **presumed** an inquiry would involve the families and those advising them and we were astonished when it did not.
- One **presumes** his wife Eimear knew that when she married him.
- As a 19 year-old student, I **presume** I am one of these.
- The defendant is **presumed** innocent until proved guilty.

be presumed dead/innocent etc

- An aerial search of the area proved fruitless, and they were **presumed** dead.
- Nineteen were killed and two went missing and are **presumed** dead.
- The mysterious Mr Kipper has never been traced and Susie is **presumed** dead.
- He was **presumed** dead, but where?

Figure 2: "Examples from the Corpus" for *presume* in LDOCE

It is also untenable for LDOCE to place these illustrative examples at the end of the whole entry, because they are not matched with the senses and patterns

they are intended to illustrate on the one hand, and they might not be noticed by users on the other hand. Instead, they can be directly placed under relevant senses and patterns they aim to illustrate by means of "icons for collapsing and expanding them" (Rundell 2015: 320).

(3) In some cases, some ELDs fail to distinguish the active form from the passive form. In other words, the valency pattern illustrations provided are in the active form, while the corresponding illustrative examples are in the passive form. For example, OALD provides the example *Three people were shot dead during the robbery.* for the illustrative pattern **shoot somebody/something + adj.**; LDOCE supplies the example *The driver was certified dead at the scene.* to the pattern **certify somebody dead**; and CALD provides the examples *The boat's captain is missing, presumed dead.* and *In British law, you are presumed innocent until you are proved guilty.* for the syntactic code [+ obj + adj]. COBUILD is an exception: it makes a distinction between the active and passive forms, and offers a one-to-one match between a syntactic code and an illustrative example (see Section 3.2.2).

4.2.3 Unsystematic treatment of ASCs of the same type

As an important reference tool, ELDs are expected to treat constructions of the same type in a consistent way. However, an examination of the constructional information presented in the "Big Five" demonstrates that some ELDs fail to meet this criterion.

Firstly, the policy for including ASCs is not consistent in some ELDs. Of the same type of constructions, some are listed, and some are not. For example, CALD includes *PROVE N ADJ* and *THINK N ADJ*, but fails to cover *RATE N ADJ*, *PROFESS N ADJ*, *JUDGE N ADJ*, and *CALL N ADJ* despite the fact that the degree of prototypicality of the latter four is higher than that of the first two. A similar problem is also found in LDOCE and MED.

Secondly, the valency pattern illustrations used to encode the same type of ASCs are not consistent, and sometimes are even confusing. For example, in CALD, constructions like *RENDER N ADJ*, *MAKE N ADJ*, *KEEP N ADJ*, *LEAVE N ADJ* and *HOLD N ADJ* belong to the resultative ASCs, but they are labeled with [+ adj] for the first two, and [+ obj + adj] for the latter three. Even instances of the same verb-based ASCs are encoded differently. For example, the sentence example *The area has now been deemed safe.* is labeled with [+ obj + noun/adj], while *We will provide help whenever you deem it appropriate.* is encoded as [+ noun/adj]. A similar problem exists in COBUILD.

The semantic differences between the resultative and the predicative *V N ADJ* ASCs are not negligible (see Section 2.2). Thus, it is necessary to devise an effective way to highlight their differences. However, ELDs such as CALD and COBUILD still resort to the same syntactic label to indicate them.

Thirdly, there is a lack of a clear rule with respect to the specificity of valency pattern illustrations. The usage-based analysis of the distributional

characteristics indicates that the co-varying collexemes for different verbs in *V N ADJ* ASCs vary greatly. In some cases, a wide range of words can be used in each slot of an ASC, for example, *MAKE N ADJ*, and *CONSIDER N ADJ*. In other cases, there are some collocational preferences and semantic prosodic restrictions in the adjective slot. For example, the adjectives occurring in *RENDER N ADJ* usually convey negative prosody, meaning something bad or unexpected. The adjectives used in most Type B resultative ASCs are also restricted. In the case of *confess*, *count*, *profess*, *pronounce*, and *prove*, the nominal group following the verb is always a reflexive pronoun. In indicating the restrictions of such constructions, some ELDs are too general, and some are too specific.

Last but not least, the criteria for assigning an ASC the status of phrase or idiom are not explicit. In most cases, the "Big Five" do not pay due attention to the role of ASCs. The constructional information they provide in syntactic codes or sentence examples is mainly used to illustrate the typical context and usage of the entry word. As for ASCs, some ELDs treat them as phrases or idioms, while some present them in valency pattern illustrations and/or illustrative examples. Specifically, LDOCE gives a large number of *V N ADJ* ASCs the status of phrases, equipping each of them with definitions and examples, and hyperlinking them to the main entry. In other ELDs, most *V N ADJ* ASCs are placed in the main entry and presented in the traditional way: being encoded either in valency pattern illustrations or illustrative examples. For ASCs like *wipe the slate clean* and *knock them/em dead*, COBUILD displays them as phrases, while OALD treats them as idioms.

4.3 Presentation of ASCs in construction-driven ELDs

Following the usage-based construction grammar approach, we put forward some suggestions for the design of a new type of construction-driven ELD.

Firstly, a construction-driven dictionary should characterize all conventional constructional units in a similar way to the traditional representation of lexical units. Construction refers to a conventional, learned pairing of form and meaning/function at different levels of schematicity, ranging from substantive word construction to highly schematic ASC. Phrasal units share commonalities with words in the traditional sense. Therefore, in the new type of ELD, the traditional headwords are "no more than access points" (Moon 2008: 253), and can be substituted by constructions. Whether a particular construction will be included in an ELD or not is, in principle, contingent upon its frequency and prototypicality in language usage. Since constructions gain the status of traditional headwords, they can be placed at the beginning of each entry, highlighted in bold type, and followed by corresponding definitions and illustrative examples.

Secondly, context predetermines meaning (Moon 2008). Corpus linguistic research over the past four decades has undermined the traditional notion of words as the autonomous bearer of meaning, stimulated the development of

the idea that meanings are mostly constructed through context, and revealed that recurrence and regularity are essential features of the language system (Rundell 2018). In the new type of ELD, what is defined is the extended constructional unit of meaning as a whole instead of the headword in isolation. As far as the defining style is concerned, it is advisable to make reference to existing definition models as adopted in the "Big Five", insights gained from users' research, and innovations in valency databases such as *A Valency Dictionary of English*, *FrameNet* and *Pattern Dictionary of English Verbs*. In addition, different constructions with the same pattern (e.g., the predicative construction *hold somebody responsible* and the resultative construction *hold something open*) should be distinguished, and listed in separate entries.

Thirdly, illustrative examples offered in the new type of ELD are intended to help advanced learners with productive activities. Corpus-based examples adapted for lexicographic purposes are preferred in most cases. Consistency should be maintained between examples and the patterns/definitions they are intended to illustrate. In the digital age, space is no longer a major concern as of printed dictionaries. The quantity of examples provided will not have an impact on the cost of the e-dictionary. Nevertheless, too many examples could be distracting, resulting in an information overload that is actually detrimental to learning. Hyperlinks can be utilized to relate entries to more illustrative examples. Encoding examples provided in the extra column are supposed to be sorted by patterns, and put directly under relevant senses (rather than at the end of the whole entry). In addition, it is advisable to highlight the constructions embodied in examples in bold type, thus increasing users' awareness of the target construction as a conventional unit.

5. Conclusion

This article examined the treatment of *V N ADJ* ASCs in the "Big Five" against the results of the usage-based constructional analysis of them in the BNC. It was found that the treatment of constructions in existing ELDs is inadequate, and needs improvement. Some suggestions for presenting ASCs in a construction-driven ELD were also proposed.

This study has some implications for the development of a new type of ELD. Traditional headwords should be substituted with constructions. It is constructional units rather than words in isolation that are supposed to be defined. In addition, different devices (e.g., definition, pattern illustrations, and sentence examples) can be combined to present constructions at different levels of generality and schematicity.

It is impossible for one article to adequately address all the issues relevant to the presentation of constructions in ELDs. Future research can enlarge the sample to consider more ASCs and ELDs, further elaborate on how to implement the basic tenets of the usage-based construction grammar in practical lexicography, and investigate learners' reference needs for a corpus-based online ELD.

Acknowledgements

This study was supported by a grant from the National Philosophy and Social Sciences Foundation of China (Grant No. 22BYY010). We are grateful to Mr. André du Plessis and two anonymous adjudicators for their valuable comments and suggestions. Correspondence should be addressed to Dr. Hai Xu.

Endnotes

1. Precision is defined as the quotient of the number of accurate matches returned by a search divided by the number of all matches returned by a search, whereas recall is defined as the number of accurate matches returned by a search divided by the number of all possible accurate matches in the data (Gries 2009: 16).
2. The 13 verbs that do not occur in *V N ADJ* ASCs in the BNC are *label, shove, tape, batter, crank up, turn down, turn up, spray, slice, capture, be born, picture, and serve*. Because our research aims to provide usage evidence for lexicographic presentation that prioritizes prototypical usage, we excluded these verbs from our analysis although some of them (e.g., *shove, tape, batter, slice, and capture*) exhibit characteristics of *V N ADJ* ASCs in our searches of the English Web 2015 (enTenTen 15) via Sketch Engine.
3. See also <https://www.stgries.info/teaching/groningen/index.html>.

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