

The most-common phrasal verbs with their key meanings for spoken and academic written English: A corpus analysis

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Abstract

English phrasal verbs (PVs) are ubiquitous and often polysemous. These lexical items are thus very important, but also challenging for ESL/EFL learners. Substantial research that can inform instructional approaches to PVs has already been conducted. One strand of this research has focused on identifying PVs that merit prioritization in learning. For example, Garnier and Schmitt (2015) developed a list of the most frequent meanings expressed by the 150 most common PVs. The present study extends their work by examining and comparing the meaning distributions of the 150 most common PVs in spoken English and in academic writing, arguably the two registers that ESL/EFL learners study the most. Using the spoken sub-corpus and the written academic sub-corpus of the Corpus of Contemporary American English, the study evaluates whether the proportional frequencies of PVs' meanings vary across the two registers. The results show a significant cross-register difference in an overwhelming majority of the 150 most common PVs. The findings suggest that instructional approaches to PVs should indeed prioritize different meanings of PVs depending on the kind of register learners engage with. A list of the PVs with their main meanings in each of the two registers is made available as an online supplement.

Keywords

Corpus, phrasal verbs, semantic senses, word lists

I Introduction

Composed of a verb plus a particle, phrasal verbs (PVs) are a very large group of highly frequent multiword lexical items in the English language. They differ from single-word

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verbs not only in structure but also in meaning and use. Often their meanings are non-transparent and their usages idiomatic. Due to their high frequency and unique structural and semantic usage patterns, PVs are often difficult for learners of English as a second language or of English as a foreign language (ESL/EFL) and have long been a topic of interest for researchers and teachers alike (e.g. Alejo-González, 2010; Condon, 2008; Dagut & Laufer, 1985; Deshors, 2016; Gardner & Davies, 2007; Garnier & Schmitt, 2015, 2016; Gilquin, 2015; Hampe, 2012; Hulstijn & Marchena, 1989; Liao & Fukuya, 2004; Liu, 2011). In this introduction, we will first review the existing research on PVs to provide the background and rationale for the present study and then discuss three other important issues related to the present study: the definition of PVs, vocabulary selection, and the importance of register in vocabulary learning. The introduction ends with a statement of the study's purpose and research questions.

1 Existing research on PVs: Background and rationale for the present study

Studies on PVs fall roughly into three major lines of research or perspectives. The first focuses on the learning and teaching of PVs (Alejo-González, 2010; Condon, 2008; Dagut & Laufer, 1985; Deshors, 2016; Garnier & Schmitt, 2016; Gilquin, 2015; Hampe, 2012; Hulstijn & Marchena, 1989; Laufer & Eliasson, 1993; Liao & Fukuya, 2004; Nassaji & Tian, 2010; Strong, 2013). It is important to note that some recent studies in this research line were corpus-based and approached PVs from a cognitive linguistic or constructional perspective (e.g. Alejo-González, 2010; Deshors, 2016; Gilquin, 2015; Hampe, 2012). The second line of research investigates, from different theoretical angles, how PVs are unique in terms of their mental representation, processing, and use as shown in Goldberg's (2016) constructional account and Cappelle, Shtyrov, and Pulvermüller's (2010) psycholinguistic exploration. The third research line centers on the description of PVs, including their frequency and usage patterns (Biber et al., 1999; Darwin & Gray, 1999; Gardner and Davies, 2007, Garnier and Schmitt, 2015; Liu, 2011).

The research on the learning and teaching of PVs has produced many interesting and important findings, including EFL/ESL learners' tendency to avoid using PVs (Dagut & Laufer, 1985; Laufer & Eliasson, 1993; Liao and Fukuya, 2004), the challenges EFL/ESL learners face in learning PVs as constructions (Deshors, 2016; Gilquin, 2015), and the effectiveness of teaching the cognitive motivations of PVs on PV learning (Condon, 2008; Strong, 2013). Some of these studies also explored the reasons for learners' challenges and their tendency to avoid PVs by analysing issues such as cross-linguistic differences (including the lack or low use of PVs in learners' L1) and the complex syntactic and semantic usage patterns of many PVs (Alejo-González, 2010; Dagut & Laufer, 1985; Laufer & Eliasson, 1993; Liao and Fukuya, 2004). The research on the mental representation and processing of PVs has shown that PVs are item-specific constructions enabled and motivated by general constructions such as the caused-motion construction (Goldberg, 2016) and that a PV 'is not assembled [i.e. processed] syntactically but rather accessed as a single lexical chunk' (Cappelle et al., 2010, p. 189).

The third line of research (i.e. research on the description of PVs) has identified the most frequent PVs and their most commonly used meanings (Biber et al. 1999; Garnier & Schmitt, 2015) and developed lists of the most frequently used PVs (Gardner & Davies, 2007; Garnier & Schmitt, 2015; Liu, 2011). As this line of research is directly related to the purpose of the present study—the compiling of the most frequently-used PV meanings in speaking and academic writing, more detailed discussion is in order. As a comprehensive study of the English language grammar, Biber et al. (1999) identified the frequencies and usage patterns of some of the most frequent PVs. In comparison, Gardner and Davies (2007) and Liu (2011) conducted exclusive studies on PVs and each produced a list of the most frequently-used PVs. The reason for developing lists of the most frequently-used PVs is that there are over 10,000 of them in English, some of which have a very low frequency. Furthermore, a small number of the most frequent PVs account for the majority of the uses of PVs in English (Gardner and Davies, 2007). These facts highlight the pedagogical importance of focusing on the most frequent PVs in ESL/EFL learning and teaching, an issue of importance we will return to below.

Gardner and Davies's list was based on the examination of the British National Corpus (BNC) and contains 100 PVs made up of the 20 most frequent verbs. In other words, it does not include any PVs whose verbs fall outside of the 20 most frequent lexical verbs. The list may have left out some useful PVs whose verbs are not among the 20. Furthermore, Gardner and Davies' list does not include any cross-register distribution information of the PVs analysed, which is another issue of importance for the present study that we will discuss below. Building on the work of both Biber et al. (1999) and Gardner and Davies (2007) and using both the British National Corpus (BNC) and the Corpus of Contemporary American English (COCA; Davies, 2008–) as data, Liu's (2011) list contains the 150 most frequent PVs (50 more than Gardner and Davies's list). It also includes cross-register distribution information and a comparison of PV usage patterns between the BNC and the COCA.

One of the existing research findings regarding PVs that is particularly important for the present study revolves around the fact that many PVs have very different meanings (Biber et al., 1999; Gardner & Davies, 2007; Liu, 2011). For example, the PV *make up* can mean 'compensate', 'compose', 'fabricate', or 'put on cosmetics'. However, while some studies have touched on this important issue, none other than Garnier and Schmitt (2015) systematically examined the various meanings, especially the key meanings of the most common PVs. Clear information about such semantic information regarding PVs will be highly valuable for language learning as well as teaching since it will enable ESL/EFL learners to focus on the most useful semantic usages of the PVs they are learning. Garnier and Schmitt's (2015) study has helped address this research gap. They conducted a close analysis of the key semantic senses of the 150 most frequent PVs from Liu's (2011) list by manually reading 200 randomly selected tokens of each of the PVs in the COCA. Their analysis resulted in a very useful list of the 150 PVs' key meanings (each key meaning being determined by meeting a minimum percentage in the overall semantic uses of a PV, a procedure to be described in the methodology) and the percentages of these meanings. Two factors motivated their decision to focus on key semantic sense(s). First, for some PVs, a key semantic sense accounts for over 75% of their overall

uses. Second, many PVs have more than five different meanings; some contain over 10 separate meanings (e.g. *come up* and *pick up*). Therefore, by including only the key semantic senses, their list allows learners to concentrate on the most useful meanings of the PVs, rather than spending time on those rarely used ones.

However, as a list developed for learning PVs for a general purpose, i.e. as one that ‘aims to be of general usefulness for people using English for a variety of reasons and through exposure to various media’ (Garnier & Schmitt, 2015, p. 655), the list does not provide information about the frequently used PV meanings in different registers. Therefore, it may not be particularly helpful for learners of English for specific registers or purposes. It will be virtually impossible to adequately teach such a PV if we do not know its various key meanings and the registers in which these meanings are used. Hence, there is a need for cross-register examinations of PV meanings and the development of lists of PVs’ key meanings in specific registers.

2 Definition of PV

How to define a PV is an important and complex task since there is no clear consensus on this issue (Darwin & Gray, 1999; Gardner & Davies, 2007; Liu, 2011; Sawyer, 2000). For example, some scholars (e.g. Gardner and Davies, 2007) confine their definition of PVs to verb phrases that each consist of a lexical verb plus an adverb particle (AVP), i.e. the particle needs to be an adverb, not a preposition. Based on this definition, *call up* and *look over* are PVs, but *call on/upon* and *look into* are not. This is because *up* and *over* in *call up/look over* are AVPs as they each can appear either adjacent to or separated from the verb by its object, e.g. we can say either *call up Mary/look over the situation* or *call Mary/her up/look the situation/it over*. In contrast, *on/upon* and *into* are prepositions since they cannot be separated from the verb, i.e. we do not say **call Mary/her on* or *look the issue/it into*. However, many other scholars do consider verb phrases of the latter type PVs (Larsen-Freeman & Celce-Murcia, 2015). Another difference in the definition is that while many scholars include a semantic criterion (e.g. Biber et al., 1999), others do not (e.g. Gardner and Davies, 2007). For instance, according to Biber et al. (1999), PVs are those that ‘have meanings beyond the separate meanings of the two parts’ (p. 404). In contrast, Gardner and Davies’ (2007) definition contains only a syntactic criterion as it portrays PVs simply as lexical items ‘consisting of a lexical verb (LV) proper ... followed by an adverbial particle’ without any semantic restriction (p. 341). Given that whether the meaning of a PV is beyond the separate meanings of its two parts is not always clear or binary, this criterion is difficult to apply. Because of this, Liu (2011) and Garnier and Schmitt (2015) adopted Gardner and Davies’s straightforward definition. This definition will also be used in the present study.

3 Vocabulary selection in language learning

To develop a list of vocabulary items, it is very important to understand the key factors or criteria involved in vocabulary selection for language learning and teaching. While there are various factors to consider, such as learner needs, it is generally important to first learn high-frequency words (typically the first 2,000 most frequent words) because

'these words cover a very large portion of the running words in spoken and written texts and occur in all kinds of uses of the language' (Nation, 2001, p. 13). Furthermore, frequency also plays a key role in learning constructions (to which PVs have been considered to belong as shown above), for research has shown that the learning of the most frequent exemplars of a construction accelerates the learning of the construction (Ellis & Ferreira-Junior, 2009). Hence, frequency should be a key factor in determining which PVs and which of their meanings should be learned first.

Another factor that may need to be considered in PV selection for learning is whether a PV is literal (often transparent) or figurative (often opaque) in meaning since research has shown that learners generally have less difficulty using semantically transparent PVs than non-transparent ones and tend to avoid the latter type (Dagut & Laufer, 1985; Hulstijn & Marchena, 1989; Liao & Fukuya, 2004). However, in practice, such a criterion is not easy to apply because semantic transparency is not a binary variable. One more factor to consider is whether the PV is different or absent in learners' L1 because incongruences between L1 and L2 and/or absence of PVs in L1 have been found to be the major cause of difficulty and avoidance in EFL/ESL use of PVs (Dagut & Laufer, 1985; Laufer & Eliasson, 1993; Liao & Fukuya, 2004). From a cognitive linguistics perspective, the difficulty of PV learning for EFL students with a PV-less L1 is the result of attentional blocking of 'earlier learned cues', i.e. the lack of PVs in their L1 (Ellis & Sagarra, 2010).

4 Register

Register is an important issue in vocabulary learning and use because research has shown that vocabulary use, like language use in general, varies significantly across registers (e.g. Biber et al., 1999; Nation, 2001). The use of PVs is no exception as shown in Liu's (2011) analysis. Take the aforementioned PV *make up* as an example. Its four main semantic uses mentioned above differ substantially across registers: while the 'fabricate' and 'put on cosmetics' meanings are used mainly in speech and fiction, the 'compose' meaning is the overwhelming dominant sense used in academic writing (Liu, 2011). It is thus highly necessary to conduct a cross-register examination of PVs. In fact, Gardner and Davies (2007), who did not include a cross-register analysis in their PV study, mentioned, as a suggestion for future research on PVs, the need for 'a reanalysis of the [PV] lists across major registers (e.g. spoken versus written English)' (p. 354).

Given the above information, this study aims to examine and identify the most common meanings of the 150 most frequent English PVs (identified by Liu, 2011, and used in Garnier and Schmitt's 2015 study) that are used in speaking and academic writing. Our rationale for focusing on the typical meanings of PVs specifically in these two registers is twofold: (1) speaking and academic writing are often the two main registers of English that most EFL/ESL students are expected to learn, and (2) speaking and academic writing arguably occupy the two ends of the language formality continuum. Some may question the worthiness of including academic writing in the analysis on the grounds that PVs are not frequent in this register, especially when compared with their use in speaking. However, as shown in Liu (2011), all 150 items on his list of the most frequent PVs appear in academic writing. In fact, 67 of them register a minimum frequency of 5 tokens per million words (PMWs), and 29 have a minimum frequency of 10 tokens

PMWs. Furthermore, quite a few (e.g. *point out*, *carry out*, *go on*, *take on*, *make up*, and *set up*) boasted quite a high frequency (all above 40 tokens PMWs) in academic writing. Even more importantly, several PVs (e.g. *point out*, *carry out*, and *bring about*) were actually used most frequently in academic writing. For example, *carry out* and *bring about* each showed a frequency in academic writing that more than doubled their frequencies in speaking: 62.25 vs. 26.48 and 27.44 vs. 10.72 per million words (PMWs) respectively (Liu, 2011). Quite a few other PVs show comparable frequencies in the two registers, including *break down*, *carry on*, and *make up*. It should be acknowledged that some of the PV tokens in academic writing are in speech quotations. Yet, the fact that they are included as quotes in academic writing suggests that there is the need for ESL/EFL learners to understand these PVs when reading academic English.

5 Statement of purpose of the study and Research questions

The purpose of this study is to examine and identify the 150 most frequently used PV meanings and their percentages in speaking and academic writing and then develop a list of the PVs with a description of their most frequent meanings and percentages in the two registers. In the process, the study aims to answer the following two questions:

1. Of the 150 most common PVs, what are the main meanings and the frequencies used in speaking and academic writing respectively?
2. Whether and to what extent do the PVs' meanings and their frequencies vary across the two registers?

II Methodology

1 Corpus used

The Spoken and Academic Writing sub-corpora of the COCA were used for identifying the main meaning senses of the most common PVs. Our rationales for using COCA are threefold. First, COCA was the corpus used both in Liu (2011) and Garnier and Schmitt (2015), the latter being the work of which our study is intended as an extension. Second, COCA is made up of contemporary English with recent data added regularly. Third, it is very large and composed of five balanced sub-corpora, including spoken and academic written English: the two registers that are the foci of this study.

2 Item selection

As mentioned earlier, the items included in this study are the 150 PVs on Liu's (2011) most frequently used PV list and were the same items examined in Garnier and Schmitt's (2015) general semantic analysis of the most common PVs.

3 Semantic information analysed and reported

As an extension of Garnier and Schmitt's (2015) work with the aim to identify the register-specific key meanings of the 150 PVs used in speaking and academic writing, this

study will examine and report the same types of information that they provided: (1) meaning senses, (2) meaning sense frequency percentages, (3) example sentences, and (4) item and meaning sense ordering. Below, as Garnier and Schmitt (2015) did, we elaborate on each of the four types of information and its importance for inclusion.

a Meaning senses. Given the large number of PVs and their many different meanings, identifying and providing the key meanings of the most frequent PVs is of paramount importance for language learning purposes. Successfully doing so can result in a list of the most frequent PVs with their most essential semantic senses specified, i.e. allowing us to produce a PV list with a reduced number of semantic senses from the total number of senses, a number that is considered manageable and highly beneficial for learners. Furthermore, as Garnier and Schmitt argue, including only a manageable number of semantic senses is what makes this list pedagogically valuable and functionally different from a dictionary of PVs, as the latter is designed to provide every meaning sense for each PV. However, deciding on how many and which meanings to include often involves a difficult balancing act. On the one hand, for the list to be truly useful, the meanings of a PV included should cover a high enough number of its total tokens. On the other hand, the number of meanings included should be limited to avoid turning the list into a dictionary. Garnier and Schmitt (2015) employed two principles to help ensure that the number of meanings selected reflects a best ‘cost–benefit equilibrium’: (1) the included meaning senses ‘should account for a large majority of occurrences’ and (2) ‘those not included ... should only represent a very small fraction of the combined occurrences’ (p. 652). This study will follow these two principles in meaning sense selection.

b Meaning frequency percentages. Applying the above two principles means that we must know how much coverage a given PV’s meaning has of the total number of that PV’s tokens. A given meaning’s amount of coverage of a PV’s total occurrences is measured by its frequency percentage in the total frequency of the PV. However, because the distribution of the frequency percentages of the different meanings often varies substantially across PVs, deciding on a percentage number as a consistent threshold measure for the inclusion of meaning senses has proven to be a very complex and challenging task, as illustrated in Garnier and Schmitt’s (2015) study. After repeated testing and consideration, they decided to include only meanings that account for at least 10% coverage of the uses. Their rationale was that the meaning senses of a PV with less than 10% coverage would not warrant explicit learning. In this study, we adopt the same practice. Furthermore, to help language learners and teachers clearly understand the relative value and significance of each selected meaning, we will also follow Garnier and Schmitt (2015) in reporting the percentage number of a meaning sense after its meaning definition, a practice that is modeled on West’s (1953) highly influential General Service List (GSL).

Finally, we used the following major well-known sources on PVs as guides in determining the meaning senses of each PV:

- *Cambridge international dictionary of phrasal verbs* (1997)
- *Longman phrasal verbs dictionary* (Taylor, 2000)
- *Oxford phrasal verbs dictionary for English learners* (2001)

- *NTC's dictionary of phrasal verbs* (Spears, 1993)
- *WordNet 3.1*

We have also extensively consulted Garnier and Schmitt's (2015) semantic definitions and classifications of the 150 PVs. In fact, as noted earlier, we have tried to align our meaning definitions with theirs as closely as possible.

c Example sentences. Using example sentences to illustrate the meanings of lexical items is a common, effective teaching practice. Hence, many learner dictionaries and other reference/learning materials, including West's (1953) GSL, have provided example sentences to help illustrate the meanings of words and phrases they cover. Similarly, Garnier and Schmitt's (2015) phrasal verb list also includes one example sentence for each meaning. The present study adopts this same practice by providing one example sentence under each meaning definition. The example sentences were modeled on or adapted from those in COCA and written in accessible language as evidenced by the fact that 92.9% of the words were those of the GSL (87.3 being among the first 1,000 most common words and 5.3 being among the second 2,000 most common words); 1.9% were those on Coxhead's (2000) academic word list (AWL); the remaining 5.2% consisted of (1) compound words composed of GSL words (e.g. *daycare*, *newsroom*, and *playtime*), (2) names of people or well-known cities and countries (e.g. Boston, Chicago, and Japan), and (3) numerical numbers referencing time (hours or years).

d Ordering. As in Garnier and Schmitt (2015), the frequency-based item ordering of Liu's (2011) list is retained as it allows learners to easily know which PVs are the most frequent ones. The meanings of a PV are also listed based on their frequency or percentage ranks. It is important to note, though, that for some of the PVs, our frequency and percentages results differ from those of Garnier and Schmitt (2015). For easier comparison between our results, we have decided to use the same sense numbers as Garnier and Schmitt's whenever feasible. For the senses that we identified but which did not appear in Garnier and Schmitt's study, we numbered them first by the frequency of spoken tokens and then by the frequency of academic tokens.

To show our work as an extension of theirs but also to indicate it is a separate list, we named our list 'the S&A WPHaVE List' where 'S&AW' stands for spoken and academic writing and 'PHaVE List' stands for Pedagogical Phrasal Verb List and is also the abbreviated name of Garnier and Schmitt's (2015) list. Furthermore, we also followed Garnier and Schmitt's (2015) practice of providing the list in alphabetic order to allow easier item searching. The two lists are provided online in the Supplementary Materials section of the journal's website.

4 Corpus query and semantic analysis

a Corpus query techniques and procedures used. Identifying the key meanings for each of the 150 PVs in the spoken and academic written sub-corpora of the COCA requires reading its tokens in context (concordance lines). As has been noted by both Liu (2011)

CONTEXT	ALL	SPOKEN	FICTION	MAGAZINE	NEWSPAPER	ACADEMIC
[SET] [UP]	32908	6387	4998	8763	8335	4425
[SET] [OUT]	9620	1337	2109	2709	1621	1844
[SET] [OFF]	6001	846	1818	1536	1364	437
[SET] [DOWN]	2026	121	1443	215	114	133

Figure 1. Cross register frequency result of set-base PVs via the search <[set] [rp*]>.

and Garnier and Schmitt (2015), searching PV tokens in the COCA is not a simple, straightforward task. One cannot simply type in a target phrasal verb as a search string, e.g. <go on>, to retrieve its tokens because doing so will generate irrelevant tokens, such as ‘Just don’t go on Sundays’ where *on* is not an AVP for *go*, but a preposition in the time adverbial phrase ‘on Sundays’. To avoid this problem, we followed essentially the same techniques and procedures used by Liu (2011). First, we searched all the relevant PVs with the same verb by entering the search string <[verb] [RP*]>, such as <[set] [RP*]> to search for all the relevant *go-related* PVs, e.g. *set up*, *go out*, *set off*, and *set down*. [RP*] is a search code where RP stands for AVP (adverbial particle) and * (a wildcard symbol) stands for any AVPs. Also, the brackets used in [set] are the code for lemma, i.e. such a search will generate and display all the different inflected forms of *set* (i.e. *set/sets/setting*) as [set] [up], [set] [out] etc. as shown in Figure 1.

It is important to note that transitive PVs allow their AVPs to be separated from the verbs by their objects and that this separation is obligatory when the object is a pronoun, e.g. *look it [the word] up*. To search the tokens of AVP-separated PVs, we used the following query strings respectively: <[verb] * [RP*]> (where the * between [verb] and [RP*] is a wildcard code standing for any word) for those PVs whose verb and AVP are separated by one word and <[verb] ** [RP*]> for those whose verb and AVP are separated by two words. In line with the practice in the previous PV studies (Gardner & Davies, 2007; Garnier & Schmitt, 2015; Liu, 2011), we did not query the tokens of PVs whose verb and AVP were separated by three or more words because such PV usages were very rare. A search for them would usually yield a lot of false tokens. Furthermore, the purpose of our study is not to identify all the PVs. In addition, the meaning senses of a PV usually do not change whether or not its verb and AVP are separated (e.g. *look up the word* and *look the word up* have the same meaning although the choice of one over the other is often motivated by factors such as discourse context and the speaker’s focus).

b Corpus analysis procedure. Because many of the 150 PVs boast a very high frequency (e.g. *go on* has 37,665 tokens in COCA’s spoken register and 5,454 tokens in the academic writing register), it was not feasible to read all their token concordance lines as the task would require an enormous amount of time and effort that few researchers could afford. Therefore, Garnier and Schmitt (2015) decided to read a total

of 200 randomly sampled concordance lines of each PV. Specifically, they first searched and read 100 randomly sampled concordance lines and then searched and read another 100 concordance lines. They then compared the results from the first 100 tokens with those from the second 100 tokens. The comparison showed a very high similarity between the results of the two sample sets, suggesting the two sets of sample concordance lines were representative of all the tokens. To enhance the reliability of our analysis, we read 600 tokens in each register (i.e. 600 in speech and 600 in academic writing)¹ except in the following two situations. The first concerns those PVs that had fewer than 600 total tokens in a sub-corpus. This was the case for only 4 of the PVs in the spoken sub-corpus but for 48 of the PVs in the academic sub-corpus (13 had fewer than 200 tokens). For these PVs, we read all the available tokens. The second situation involved those PVs that, according to Garnier and Schmitt's (2015) analysis, had essentially one predominant meaning, i.e. a meaning expressed by 80% or more of their tokens, such as *grow up* and *point out*. For each of these PVs, we read 200 tokens in the spoken and academic registers respectively. If our results were essentially the same in both registers (less than 3% variation between Garnier and Schmitt's findings and our own), we then reported the same findings as theirs. Otherwise, we read 600 tokens in each register.

To make both the reading and recording of the meaning coding of the concordance lines easier, we imported all the sample concordance lines into Excel files. Because of the enormous amount of reading and coding work involved, the two authors divided the work, but one author read a large majority (107) of the 150 PVs.

c Interrater reliability. To ensure the accuracy and reliability of the sense identification, we, like Garnier and Schmitt (2015), conducted an interrater reliability test of a small random sample. However, compared with their study, our test involved more additional readers and covered more random sample items. Garnier and Schmitt used one additional reader, who read the 200 concordance lines of only five PVs (10th, 20th, 30th, 40th, and 50th PVs on the list: *grow up*, *look up*, *stand up*, *turn around*, and *move on*). In comparison, we employed three additional readers (all native English speaker MA students in applied linguistics) and had them each check four different PVs, resulting in a total of 12 PVs included in our interrater reliability test, which is more than twice of that included in Garnier and Schmitt's (2015) study. In terms of selection of the PV items for the interrater reliability test, we followed their practice by checking every 10th PV on the list, i.e. the 10th, 20th, and all the way up to the 120th. However, because the 10th PV, *grow up*, has only one meaning according to both Garnier and Schmitt's (2015) and our analysis, it would not be meaningful to include it in the interrater reliability test. Hence, we chose to check the 11th PV, *set up*, a PV that has several meanings and should serve as a more useful test for interrater reliability checking. The 12 PVs included in our interrater reliability checking were: *set up* (11th), *look up* (20th), *stand up* (30th), *turn around* (40th), *move on* (50th), *go off* (60th), *turn up* (70th), *break up* (80th), *move in* (90th), *carry on* (100th), *bring down* (110th), and *move back* (120th).

Furthermore, our interrater reliability test procedure also differed from theirs in two aspects. First, before the additional reader analysed the concordance lines of each of the five PVs chosen for the interrater reliability test, Garnier and Schmitt did not discuss

with the additional rater how the meaning senses of each PV were or should be classified (i.e. how many meaning senses the PV had and what they were). In contrast, before our additional readers began their work, we did discuss in length how the meaning senses of every checked PV were classified. The reason for this had to do with the fact that while a small number of PVs has essentially one meaning (e.g. *grow up* and *point out*), a large majority, as noted earlier, is polysemous and/or homonymous; many have more than half a dozen meaning senses. Classifying the meaning senses of these latter PVs is thus a very challenging task as evidenced by the fact that the meaning classifications of many PVs vary across PV dictionaries.

Another procedural difference related to the way the interrater reliability was calculated and reported. Garnier and Schmitt (2015) simply compared the percentages of the meaning senses assigned by the two raters. We have chosen to compute and report Cohen's Kappa (K), the conventional interrater reliability measure for categorical or nominal variables (for the semantic senses were nominal, not ordinal variables). The Kappa test results were as follows: $K = .924$ ($p < .000$) for the agreement between additional reader 1's and our categorizations, $K = .942$ ($p < .000$) for additional reader 2's, and $K = .939$ ($p < .000$) for additional reader 3's. According to Landis and Koch (1977), a K value of .81–1 is considered a 'perfect' agreement. Our discussions of the sense classifications with the additional readers before they began reading may have helped us attain this high interrater reliability.

III Results

I Overview

Our data analysis first identified all the major meaning senses of the 150 PVs and their percentages in speaking and academic writing respectively. The major meanings of the PVs are included in our S&A WPHaVE List (provided as an online supplement) along with their percentage numbers and example sentences. This information helps answer the first research question. Regarding the second research question about whether and to what extent the PVs' meanings and their frequencies vary across the two registers, we conducted a Chi-Square test on the cross-register meaning distributions for 110 of the 150 PVs because the remaining 40 each shared essentially a single meaning in both registers based on Garnier and Schmitt's (2015) and our analyses. The results of the Chi-Square tests, reported in Table 1 below, show a significant difference in 106 (96.36%) of the 110 or 70.66% of all the 150 PVs, i.e. an overwhelming majority.

Based on the extent and the way in which their meanings differ across the two registers, the 150 PVs fall into the following three groups, with the items in groups 1 and 2 showing a significant cross-register difference in meaning distribution.

1. Significantly different in both sense order and percentage across the two registers (72 PVs [48%] belong to this group).
2. Similar in sense order but significantly different in percentage (34 PVs [22.66%]).
3. Not significantly different in either, with most of them sharing a single meaning for at least 80% of the uses in both registers (44 PVs [29.33%]).

Table 1. Chi-square test results.

	Phrasal verb (PV)	Chi-square	p
1	come up	530.72	0.00
2	hold on	455.41	0.00
3	make up	453.74	0.00
4	fill in	266.44	0.00
5	hang on	239.66	0.00
6	go on	211.84	0.00
7	work out	197.29	0.00
8	put out	167.60	0.00
9	open up	155.47	0.00
10	take out	141.88	0.00
11	set off	138.55	0.00
12	break down	135.59	0.00
13	catch up	121.82	0.00
14	break up	120.31	0.00
15	bring up	119.12	0.00
16	lay down	105.53	0.00
17	move back	103.81	0.00
18	carry on	95.11	0.00
19	come on	92.73	0.00
20	move in	92.07	0.00
21	make out	91.58	0.00
22	bring out	89.27	0.00
23	back up	85.27	0.00
24	take up	84.99	0.00
25	show up	81.82	0.00
26	lay out	79.86	0.00
27	go over	79.05	0.00
28	bring in	78.67	0.00
29	stand up	77.77	0.00
30	move on	75.62	0.00
31	stand out	73.17	0.00
32	hold out	72.30	0.00
33	look up	68.94	0.00
34	set out	64.44	0.00
35	turn up	59.92	0.00
36	follow up	56.09	0.00
37	pick out	55.85	0.00
38	take on	53.05	0.00
39	hold up	52.59	0.00
40	take back	52.55	0.00
41	pull out	50.23	0.00
42	call out	50.12	0.00
43	pay off	49.52	0.00

(Continued)

Table 1. (Continued)

	Phrasal verb (PV)	Chi-square	p
44	turn over	48.81	0.00
45	take off	48.09	0.00
46	go out	44.95	0.00
47	take down	44.72	0.00
48	get off	44.65	0.00
49	move up	42.45	0.00
50	pick up	41.53	0.00
51	hold back	40.98	0.00
52	sort out	38.68	0.00
53	come through	38.20	0.00
54	get on	37.61	0.00
55	take in	36.88	0.00
56	pull up	36.19	0.00
57	run out	36.09	0.00
58	keep up	34.30	0.00
59	close down	33.79	0.00
60	get out	33.54	0.00
61	pass on	33.31	0.00
62	look out	32.77	0.00
63	get through	32.31	0.00
64	go off	29.58	0.00
65	go up	28.80	0.00
66	put down	26.95	0.00
67	go down	24.43	0.00
68	throw out	23.93	0.00
69	line up	23.21	0.00
70	get in	22.66	0.00
71	turn off	22.64	0.00
72	give up	22.58	0.00
73	put off	22.55	0.00
74	blow up	21.81	0.00
75	look down	21.06	0.00
76	carry out	20.86	0.00
77	set up	20.05	0.00
78	clean up	19.84	0.00
79	go along	18.58	0.00
80	look back	18.20	0.00
81	come down	18.02	0.00
82	go around	17.78	0.00
83	set down	16.57	0.00
84	settle down	15.48	0.00
85	come around	15.27	0.00
86	hang up	15.15	0.00

(Continued)

Table 1. (Continued)

	Phrasal verb (PV)	Chi-square	p
87	put in	14.65	0.00
88	bring back	14.12	0.00
89	turn around	12.51	0.00
90	come off	11.73	0.00
91	sit back	11.16	0.00
92	get down	10.86	0.00
93	put up	9.96	0.00
94	come along	9.89	0.00
95	step back	9.50	0.00
96	come out	8.55	0.00
97	cut off	8.46	0.00
98	go through	8.24	0.00
99	pull back	7.59	0.00
100	turn back	6.41	0.01
101	build up	5.94	0.01
102	put on	5.82	0.01
103	break out	5.03	0.02
104	break off	4.72	0.02
105	come in	4.47	0.03
106	send out	4.05	0.04
<i>Not statistically significant:</i>			
107	hand over	3.55	0.06
108	bring down	3.45	0.07
109	fill out	3.30	0.07
110	give out	3.08	0.08

Notes. Items are listed in order by Chi-square/P value. The following 40 PVs each share essentially one single meaning in both registers (no Chi-square test was conducted): *come back, go back, find out, point out, grow up, turn out, end up, get back, figure out, sit down, get up, go ahead, wake up, take over, check out, look around, go in, reach out, shut down, slow down, wind up, hang out, come over, start out, sit up, turn down, put back, keep on, shut up, bring about, bring down, play out, walk out, write down, fill out, rule out, hand over, give back, sum up, move out, give out, give in, come about, set about.*

It is necessary to note that in Group 1, some of the PVs each have the same most frequent meaning in both registers, but the percentages differ significantly and the order of the rest of the main meanings and percentages also vary significantly across the two registers. To help users of the S&A PHaVE List better notice the cross-register semantic usage differences and prioritize their PV learning or teaching, we have indicated on the list for each PV the group it belongs to. In other words, the grouping information is provided in the PV list.

Given the limited space and the fact that the various meanings and percentages of the 150 PVs are already reported as a supplement online, we will analyse and discuss only three PVs from group 1 (*break up, make up, and come up*) below. For each PV, we report its major meaning senses and their percentages the way they are presented on the S&AW PHaVE list.

2 PVs from group 1: 'break up', 'make up', and 'come up'

As noted above, the PVs in this group are those whose most frequently-used meanings differ significantly between speaking and academic writing. The three sample PVs are good representatives of the group. Let us look at them one by one.

Come up (Group 1): Spoken:

Sense 2: (Be coming up) Be happening soon (62.5%)

Example: The show is coming up next.

Sense 1: Bring forth or produce (13.2%)

Example: We need to come up with new plans because we are under attack.

Sense 3: Move close to (typically the speaker) (12.7%)

Example: Tom came up to me to say goodbye.

Sense 4: Arise or come to light (11.4%)

Example: Is the issue coming up in any of these meetings?

Come up (Group 1): Academic:

Sense 1: Bring forth or produce (58.5%)

Example: Other companies have also come up with helpful data.

Sense 4: Arise or come to light (18.6%)

Example: These issues will soon come up to be judged.

Sense 3: Move close to (typically the speaker) (16.8%)

Example: The students need to come up to the teacher to go over their answers.

As the results show, whereas *come up* in speaking is used overwhelmingly in the sense of previewing or setting up something that will soon transpire (62.5%), its most frequent meaning in academic writing is 'to bring forth or produce' (58.5%) as, in academia, professionals and students are constantly asked to *come up* with new ideas and solutions to problems. Furthermore, both of the most frequently-used senses in their respective registers dwarf the competition. It is important to note, however, that the highly frequent use of the sense of 'happen/occur soon' in the spoken register might have resulted from the fact that the data in the spoken sub-corpus of COCA is made up of broadcasting language where it is common for an anchor or speaker to announce what is coming up next in the program or show.

Make up (Group 1): Spoken:

Sense 4: Create or invent (31.8%)

Example: He made up the story.

Sense 1: Form a whole/compose (20.8%)

Example: You need more people to make up a team.

Sense 2: (*for*) compensate or correct (20.8%)

Example: He works seven days a week to make up for the pay he lost.

Sense 3: (Make up one's mind) Make a decision (20.3%)

Example: He made up his mind to become a dancer.

Make up (Group 1): Academic:

Sense 1: Form a whole/compose (82.2%)

Example: Children's books made up a large part of the library.

It is clear from the results that while *make up* in academic writing is used overwhelmingly in the sense of forming or composing a whole (82%), its most frequent meaning in spoken English is to 'create or invent' (31%) followed by the sense of 'forming/composing' and the sense of 'compensating'.

Break up (Group 1): Spoken:

Sense 1: End or cause STH to end or fail, esp. relationships (76.8%)

Example: Karen's marriage broke up.

Sense 2: Divide into smaller parts or component (20%)

Example: They wanted to break up the large percentage of poor people and move them to different places.

Break up (Group 1): Academic:

Sense 2: Divide into smaller parts or components (53.8%)

Example: They decided to break up the tests across different times.

Sense 1: End or cause STH to end or fail, esp. relationships (45.8%)

Example: The teacher had to break up the fight.

As the results show, whereas *break up* in speaking is used overwhelmingly in the sense of ending a relationship (77%), its most frequent meaning in academic writing is dividing into smaller parts (53.8%).

3 Comparison of the results of this study with those of Garnier and Schmitt (2015)

The results of this study support Garnier and Schmitt's (2015) findings on the frequency percentages of many of the 150 PVs, especially those in group 3 that have essentially just

one dominant meaning, such as *come back* and *find out*. However, some of our findings differ from theirs. For example, they reported that 88% of the uses of *look up* were in the sense of 'raising one's eyes' and 92% of the uses of *look down* meant 'lowering one's eyes to see what is below'. In other words, they show that the two PVs each had essentially one major meaning. Regarding *look up*, our results showed that in spoken English, the meaning 'raise one's eyes' was used only 54.9% followed by the sense of 'revere/regard someone (often as a role model)' (23%) and the sense of 'consult something for information' (18.7%); in academic writing, 'raise one's eyes' was used 54.4% followed by the 'consult something' sense (36.3%). As for *look down*, our results show that in spoken English, the 'lower one's eyes' sense was used 82.9% followed by the sense 'regard with a condescending attitude/disrespect' (15.9%) while in academic writing the latter sense was used 26.2%. How do we explain the differences between our and their findings? Before attempting to answer this question, we need to point out that our two studies had different goals or foci: while their study was to identify the main general meaning senses of the PVs (i.e. with all registers included), ours was to uncover the main meaning senses of the PVs in two specific registers. Given this fact, some discrepancies should be expected due to the difference in examined data. It is likely that many of the sample sentences read by Garnier and Schmitt happened to have come from fiction where we should expect 'raise and lower one's eyes' to be highly frequent. In other words, most of the differences between our and their findings likely resulted from cross-register variations.

IV Discussion: Application, and limitations

I Meaning distribution across the two registers

As shown above, the semantic usage distributions of a large majority (106 or 70.66%) of the 150 PVs differ significantly between speaking and academic writing. However, the remaining 44 (29.33%) exhibit similar sense distributions across the two registers with 40 (26.66%) showing only one major sense in both registers. Furthermore, our decision to include only senses that account for at least 10% coverage has resulted in a total of 330 senses for the 150 PVs in speaking and 323 in academic writing. Of the senses in the two registers, most of them (284) overlap, i.e. 86% in spoken and 87.9% in academic writing are overlapping PVs. While the two total numbers of senses are slightly higher than the 288 total general use senses reported by Garnier and Schmitt (2015), they are still fairly manageable numbers for learners, especially considering the possible 840 total estimated meanings these PVs may have (Garnier & Schmitt, 2015, p. 659).

Furthermore, on average, roughly only 2.19 meanings (330/150 and 323/150) are included for each PV. Based on the total percentage coverage by the included senses, 2.19 meanings per PV covered 91.82% of all these PVs' occurrences in speaking and 91.83% in academic writing (the coverage ranged 65.4%–100% in speaking and 57.4%–100% in academic writing). The average coverages are slightly higher than the 83.36% reported by Garnier and Schmitt (2015), likely due to the higher number of senses included in our list. In addition, 40 of the 150 PVs (26.66%) have one listed meaning; also 133 (89%) have three or fewer listed meanings. This result is comparable to Garnier and Schmitt's (2015, p. 659), hence demonstrating again that 'most PVs have a

relatively small number of key meaning senses' in each register. Also, like in their study, most of the PVs with two listed senses have their first sense claiming 50% or more coverage of the PV's occurrences.

2 Application

As shown by the above examples, the specific main meaning senses of each PV, their percentages, and their order in each of the two registers are presented clearly and consistently in the S&AW PHaVE List. Furthermore, example sentences are given in simple language to help illustrate how each main sense is used. In addition, the list provides information on the grouping of the PVs based on the degree of difference and similarity in meaning frequency and percentages between the two registers: information that may help prioritize which PVs to focus on in learning and teaching. As a result, the list may be a useful source for ESL/EFL students, teachers, and material writers alike. In the following, we discuss some specific ways the list may be used to help with the learning and teaching of PVs.

First, as perhaps the only source that provides register-specific key meaning senses of PVs in speaking and academic writing, the list may serve as a reference tool for learners and teachers of spoken and/or academic English. Whenever unsure, learners and teachers can check the list to find out the key meanings of the 150 PVs in either one or both of the registers based on their needs. Worded in simple vocabulary, the example sentences may be especially helpful for learners in this regard. In addition, the list may help learners and teachers prioritize their learning/teaching of the PVs by focusing first on the most frequently-used meaning of a given PV before moving onto the other key meanings in frequency order and/or also by concentrating on PVs whose key meanings, percentages, and order differ significantly across the two registers (i.e. those in groups 1 and 2). Learners may use the list for explicit learning by memorizing some of the key meanings they find most useful. Research has shown that explicit learning, such as memorization, is an effective strategy for vocabulary learning (Nation, 2001).

Second, the list may aid curriculum designers and material writers in the development of sequenced courses and textbook series. Specifically, the list, along with Garnier and Schmitt's (2015) list, could inform the gradual targeting of PV meanings from beginner level to more advanced levels by first introducing the predominant meanings followed by the less frequently-used ones. In the case of general purpose EFL/ESL course books, Garnier and Schmitt's (2015) list would probably be a good source for sequencing and prioritizing PV meanings, but the grouping information of the PVs in our S&AW PHaVE List may be helpful in guiding teachers to first focus on PVs whose meaning senses and their percentages are the same or similar across registers (groups 3 and 4) before teaching those whose meaning senses and percentages differ substantially (groups 1 and 2). In the case of conversational English and/or course books for English for academic purposes (EAP), our list of the predominant meanings in the two registers would certainly be more useful.

Third, as suggested by Garnier and Schmitt (2015), a meaning-based PV list, such as ours, may also be used for assessment purposes. Knowing the major senses of the PVs and their order in each register may enable teachers and test writers to make sound decisions on which PVs to include in a test based on the test takers' learning goals and

proficiency levels. In other words, teachers and test writers can target specifically the various key meanings of the PVs that are being learned at different levels. For example, for tests used in speaking classes, they could focus on mastering the meanings in spoken English while those for academic English classes can concentrate exclusively on the key academic meanings. Also, a lower level speaking test should include the most frequently used meanings of the multi-meaning PVs whereas an advanced level speaking test may need to select some less-frequent meanings based on the course content. It is important to note, though, that frequency and percentage are just one important criterion teachers should use in making teaching and assessment decisions. Less frequent semantic usages will also need to be learned, but at a later stage (Garnier and Schmitt, 2015).

Fourth, the list may be used as a valuable source of examples for teaching upper level EFL/ESL courses designed to enhance both learner English proficiency and awareness of the importance of style and register variation in vocabulary use. The examples from our list can help show that, in addition to the fact that lexical items are often register-specific (i.e. certain words are used only or mainly in some specific registers), we should also pay attention to the fact that multi-meaning lexical items may have different main meanings when used in different registers, including single words. For example, the meaning of *arrest* in general English differs from its main meaning in medicine, such as *cardiac arrest* and *respiratory arrest*. The significant cross-register differences in the main meanings of many of the PVs on the S&AW PHaVE List are excellent examples to illustrate this important fact about multiword units in vocabulary use.

Finally, to help potential users of our S&AW PHaVE List, a users' manual modeled on Garnier and Schmitt's (2015) is provided in the Supplementary Materials section of the journal's webpage. The manual contains information, such as how the list was compiled, what specific information and features it includes, what it may or may not be used for, and what limitations it has.

3 Limitations

First, the findings from any corpus study are always limited by the data in the corpus used. It is no exception for this study. In other words, the main meanings identified in each of the two registers may not represent all the language used in these two registers. Particularly worth noting is the fact that the spoken sub-corpus of COCA consists mostly of broadcasting language. Hence, it may not represent conversational American English. Second, the interrater reliability testing covered only 12 of the PVs. Third, as Garnier and Schmitt (2015) pointed out, the percentages of the PV senses reported should be viewed as estimates, rather than absolute numbers, due to the limitations of corpus research. The percentages are likely to vary somewhat when a different corpus is used and/or different sense groupings are employed. Fourth, the percentage frequency data cannot be the sole guide for teachers and learners to select PVs and their particular meanings for deliberate learning. As noted earlier in the 'Vocabulary selection' subsection of the Introduction, other factors, such as learners' L1 and the degree of semantic transparency of a PV, should also be considered. For example, regarding the semantic transparency factor, figurative PVs generally need more attention than literal ones. Finally, as COCA is American English, our findings may not accurately represent the

semantic usages patterns of PVs in other varieties of English. Fourth, this study examined only the use of PVs in speaking and academic writing, i.e. it did not investigate their use in other registers, such as fiction, newspaper, and magazine registers in COCA.

V Conclusions and future research

Via close examination of the meanings of the 150 most common PVs in spoken and academic written English, this study has extended Garnier and Schmitt's (2015) work by uncovering the semantic usage patterns of the PVs in speaking and academic writing. Specifically, the study has identified the major meanings of the 150 most common PVs' along with their frequencies, percentages, and order. The results have shown that the semantic usage distributions of many PVs vary substantially across the two registers, demonstrating the important role register plays in the use of a PV. Based on the results, a pedagogical list of the PVs, the S&AW PHaVE List, has been compiled. The list, as explained in the Application section, may be a useful source for EFL/ESL learners, teachers, and material writers alike.

However, there are some limitations of the study as shown above. To address these limitations, future research may include conversational English and compare the meanings of PVs in conversations with their meanings in public speaking or in spoken academic English. Studies can also be done on other registers, including fiction, media, legal, and medical English. Also, researchers may examine other varieties of English on register-specific uses of PVs. Furthermore, researchers may also investigate what semantic senses ESL/EFL learners of different proficiencies know and which ones they do not know or have difficulty grasping. Research findings in this regard may help teachers make more informed instructional decisions.

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Note

1. It is necessary to point out that for each transitive PV, we read 200 additional concordance lines (100 with the verb and particle separated by one word and 100 with the verb and the particle separated by two words) to ensure that a transitive PV does not have any additional/different meanings when used with its verb and particle being separated. In other words, we read 800 tokens for these PVs. However, the additional 200 separated tokens were not included in the final meaning tallying as they were checked solely to see if they contained any additional meaning not present in the unseparated tokens.

Supplemental Material

Supplemental Material for this article is available online.

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