The Prepositions Verbs Associate with:
A Corpus Investigation of Collocation in Prepositional Verbs

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Abstract

Prepositional verbs such as *focus on, listen to*, and *account for* are much more common in all registers than phrasal verbs and are especially abundant in academic writing. These multi-word lexical items, however, tend to receive far less classroom attention than phrasal verbs and often prove to be a major source of error for even advanced learners of English. Through the examination of an academic writing sub-corpus of the British National Corpus, this study investigates the collocational strength of 192 different verb-preposition combinations in order to determine which ones collocate strongly enough to warrant their being taught as single lexical units. The verb-preposition combinations that collocate most strongly are presented and some implications of these findings for pedagogical practice in the area of prepositional verb instruction are subsequently discussed.

1. Introduction

For learners of English, prepositions pose one of the most difficult obstacles to achieving both accuracy and fluency in the language. Even at the highest levels of proficiency, these little words, such as *of*, *on*, and *to*, pose an immense struggle. According to Lindstromberg (2001), less than 10% of EFL learners are able to correctly use and understand prepositions. While some native speaker norms, such as those regarding prepositions and articles, can safely be discarded in many situations[1], English academic writing represents an international linguistic arena in which mere intelligibility is insufficient and failure to adhere to British or American English norms can have very negative consequences for non-native English writers. In spite of the fact that omission or non-standard use of prepositions seldom affect a reader's understanding of what is being expressed, these sorts of deviations from prescribed norms are invariably considered by instructors, examiners, and journal reviewers to be errors, and as Biber, Conrad, & Reppen (1998) remind us, "On a practical level, even local errors that do not interfere with meaning can be annoying to teachers and damaging to students' overall evaluations" (p. 197).

One reason for the preposition difficulties learners face is that prepositional systems vary enormously across languages. In Japanese, for example, there are far fewer postpositions used to convey the same spatial and temporal relations as English prepositions and there is little correspondence between Japanese

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1   As proponents of the English as a lingua franca (ELF) research paradigm, such as Jenkins (2007) and Seidlhofer (2004), are quick to point out, mutual intelligibility and communicative efficiency are the main concerns for an increasing number of English learners/users who utilize English primarily to communicate with fellow non-native speakers and seldom interact with native English speakers from countries like the U.S., U.K., or Australia. In such contexts, lack of proficiency with prepositions is arguably not a big problem.

postpositions and their English preposition translations (Shinkawa, 1979). The huge variety of functions that English prepositions perform also causes difficulties for learners. English prepositions take care of a multitude of functions that, in many languages, are achieved through inflectional affixes (Celce-Murcia & Larsen-Freeman, 1999). Because there is also great variety from culture to culture in the metaphors employed to conceptualize the relations expressed by prepositions (Boers & Demecheleer, 1998), many of the problems learners have with English prepositions could also be due to the fact that, in their perceptions of the same physical relationships, they are drawing from different schemata than native English speakers. As the meanings of English prepositions move from representing concrete physical relationships to more abstract metaphorically extended relationships, the choice of preposition in a given situation appears even more arbitrary to learners (Celce-Murcia & Larsen-Freeman, 1999), who are likely to declare the whole endeavor of preposition mastery utterly hopeless.

In her comparison of the English prepositions *at*, *in*, *on*, and *by* with the Japanese postpositions *de*, *ni*, and *o*, Shinkawa (1979) concludes that the choice of preposition in English depends on the noun object that follows it, while in Japanese, the choice of postposition depends on the verb. Although this conclusion is accurate in many cases where English prepositions show spatial and temporal relations (Oda, 2002), there does exist in English a type of multi-word verb in which, according to Quirk, Greenbaum, Leech, & Svartvik (1985), "the preposition is selected by reason of the verb, rather than by independent semantic choice" (p. 1157). These multi-word verbs, composed of verbs and their prepositional collocates, are known as prepositional verbs.

While phrasal verbs have long been in the pedagogical spotlight, receiving extensive treatments by linguists and textbook writers, prepositional verbs have received a very scant attention. Biber, Johanssou, Leech, Conrad, & Finegan (1999), however, do provide a corpus informed listing of the prepositional verb combinations they found to occur at least 20 times per million words in various registers of the corpus they examined. According to Biber et al. (1999), prepositional verbs are three to four times more likely to occur in native English speaker corpora than phrasal verbs and, in academic writing in particular, prepositional verbs occur at a frequency of 4,200 times per million words. Partington (1998) identifies prepositional verb collocation – the problem of "knowing what prepositions follow *rely*, *accuse*, *blame*, *criticize* etc" – as a "major source of error in non-native language" (p. 80). It is these sorts of multi-word verbs that are the focus of the study described in this article, which examined the collocational strength of 192 different verb-preposition combinations in a corpus of academic writing by native English speakers.

2. Prepositional Verb Identification

Distinguishing prepositional verbs from phrasal verbs is an issue fraught with controversy. There is, in fact, no clear consensus among linguists and textbook authors as to the syntactic behavior of the prepositions in prepositional verbs. Prepositional verbs are often treated in the same manner as phrasal verbs, considering the noun phrases following the prepositions to be the direct objects of the two-word prepositional verbs (Biber et al., 1999). Quirk et al. (1985) illustrate, however, the clearly differing syntactic function of a prepositional verb's preposition and the object of the preposition when they state, "In using the term PREPOSITIONAL VERB we indicate that we regard the second noun phrase in a sentence like 'Many people looked at *the pictures*.' as the complement of the preposition at and not as the direct object of a verb *look at*" (pp. 1155-1156). Darwin & Gray (1999) summarize the varying analyses of these multi-word verbs and make a plea for some standardization, arguing that the lack of consistent treatment by different teachers and textbooks contributes to the already considerable amount of confusion learners experience in regard to English prepositions and multi-word verb combinations.

For this study, I followed the definition provided by Quirk et al. (1985), who characterize the

prepositional verb as a type of multi-word verb which "consists of a lexical verb followed by a preposition with which it is semantically and/or syntactically associated" (p. 1155). I added to this definition four stipulations discussed by Bolinger (1971) to further distinguish prepositional verbs from phrasal verbs[2]. For the purposes of this study, the following forms of manipulation, which phrasal verbs do not allow, had to be grammatically possible for a multi-word combination to be considered a prepositional verb[3]:

1. Adverb insertion (e.g., He responded *immediately* to that question.)
2. Phrase fronting (e.g., *To that question* he responded.)
3. *Wh*-fronting (e.g., *To what question* did he respond?)

While differentiating prepositional verbs from phrasal verbs can sometimes be a challenge, distinguishing prepositional verbs from free combinations in which the verb and preposition each function separately, both syntactically and semantically, is arguably even more difficult, for, as Biber et al. (1999) inform us, "it is hard to make an absolute distinction between free combinations and fixed multi-word verbs; one should rather think of a cline on which some verbs, or uses of verbs, are relatively free and others are relatively fixed" (p. 403). They go on to suggest that since prepositional verbs typically answer *what?* or *who?*, and free combinations generally answer *where?*, *when?*, or *how?*, wh- question formation provides a useful test to help make the distinction. It is this test that I used in this study to discriminate prepositional verb combinations from verb/preposition free combinations. Consider, for example, the following case of two different sentences from the British National Corpus with the combination *succeed in*:

> *We won't **succeed in** predicting new phenomena.*

This sentence answers the question "*What* won't we succeed in? This instance of *succeed in* was, therefore, considered in my study to be a prepositional verb.

> *Capitalist industrialization can **succeed** in the third world.*

This sentence, however, answers "*Where* can capitalist industrialization succeed?" and was, therefore, classified as a free combination and not included in my prepositional verb data.

3. Arguments for a Lexical View of Language

One current trend in language pedagogy, which offers some promise as a possible way to deal with learners' prepositional verb collocation problems, is Michael Lewis' Lexical Approach. This approach to language learning and teaching is based on the notion that grammar is based on the rules of lexis and not vice versa. Although it was Lewis who, in the 1990's, popularized the idea that language is best viewed as prefabricated lexical phrases, this movement has, in fact, been building for some time. Over thirty-five years ago, Bolinger (1975) challenged the generative view of language production and made the now familiar assertion that the language speakers generally use is not at all original or creative, but instead composed of predictable lexical routines. Five years later, McKay (1980) proposed a corpus-based approach to teaching verb colligation[4], explaining that "lexical competence includes knowing the probability of a word's occurrence in a particular context" (p. 18). After discussing various categories

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2   Celce-Murcia & Larsen-Freeman (1999) and Biber et al. (1999), in varying degrees of detail, comment on these stipulations as well.

3   Another criterion also considered in deeming a multi-word verb a prepositional verb is stress. In a prepositional verb, the verb is the element that receives the stress in spoken English, while in a phrasal verb, it is the preposition that receives the stress. In the prepositional verb *respond to*, for example, *respond*, and not *to*, is stressed. In the phrasal verb *pick up*, however, it is *up* that is stressed when spoken. An obvious exception is when contrastive stress is used.

4   The term *colligation* refers to "the way one word regularly co-occurs with a particular (grammar) pattern (Lewis, 2000a, p. 137). Some writers, such as Biber et al. (1999) refer to colligation patterns as *valency patterns*.

of lexical phrases, Nattinger (1980) examined the considerations involved in creating a lexical syllabus, commenting, "Perhaps we should base our teaching on the assumption that, for a great deal of the time anyway, language production consists of piecing together ready-made units appropriate for a particular situation and that comprehension relies on knowing which of these patterns to predict in these situations" (p. 341). Pawley & Syder (1983) argued that learners' lack of collocational competence was what accounted for their production of language that, while technically correct according to the rule-governed system of grammar, was not native-like. The same year, Peters (1983) related the units of adult language with those of children acquiring their first language and hypothesized that both adults and children attempt to convey meaning in the most economical fashion possible and, therefore, rely on conventionalized chunks of language, which she refers to as *speech formulas*.

Over the course of the past twenty years, all of these arguments, further fueled by extensive corpus work by Sinclair (1991), Biber (1993, 1996), Carter & McCarthy (1995), and others, have been discussed extensively and expanded upon. Nattinger & DeCarrico (1992) argue that lexical chunking helps increase the speed of speech production and, hence, aids fluency. Chambers (1998) similarly maintains that chunking increases fluency by allowing longer utterances between pauses. Lewis, of course, has had much to say on the issue, producing a prolific body of work promoting the Lexical Approach (1993, 1997a, 1997b, 2000a, 2000b). One notable argument added by Lewis (2000b) to the growing case for drawing students' attention to formulaic lexical chunks is that doing so can have affective benefits for learners. Borrowing a phrase coined by Dechert (1983), he refers to lexical chunks as "islands of reliability" and asserts that "Chunks which learners are sure are accurate and convey the central meaning of what they wish to say are immensely reassuring, especially when contrasted with the intimidating prospect of constructing everything you want to say word-by-word, on every occasion" (p. 175).

Teaching individual words and then, subsequently, expecting learners to put these single words together into collocations, Lewis (2000a) contends, is an artificial construct of language teaching. A far better procedure, he believes, would be to have students first learn multi-word chunks of language because "it is easier to break down groups and learn to reassemble them than it is to start from isolated words which then have to be combined" (Lewis, 2000b, p. 177). In looking at prepositional verbs from this perspective, it follows that if a given verb almost always appears with the same preposition, the logical order of pedagogical operations for a teacher to follow would be to first teach the verb-preposition combination as one unit, which learners could analyze at a later date. Which prepositional verb combinations though have collocational strength sufficiently strong to justify being taught as single units? This is the primary question that this study seeks to answer.

4. Research Design

4.1 Use of Corpus Data

According to Biber (1996), a corpus-based approach "enables a scope and reliability of analysis not otherwise feasible" (p. 172). Indeed, for a study such as this one in which only an objective view of natural language in large quantities could provide a reasonably representative sample of verb-preposition co-occurrence information, the use of any other method to obtain data seems impractical and inappropriate. As Moon (1997) states, "Collocational studies are now inevitably associated with corpus studies, since it is difficult and arguably pointless to study such things except through using large amounts of real data" (p. 41). While a researcher's intuition is certainly a valid starting point for collocational studies, many aspects of the way we use language have a way of eluding our conscious minds. Large corpora provide us with a view of the language we produce rather than the language we think we produce.

One aspect of language that is not at all easy to gauge intuitively is frequency. Hunston (2002)

illustrates this fact with the comment, "anyone might guess that *take* is a more frequent verb than *disseminate*, but it is difficult to guess whether *fare* or *fantasy* is more frequent" (p. 21). Because the results of this study ultimately lead to speculation regarding the question of what prepositional verb combinations might best be taught explicitly as single units, frequency information is of great importance, both in terms of the number of times a prepositional verb occurs in the entire corpus and how frequently a given verb lemma occurs with a specific preposition. If we view language learning and teaching from a cost/benefit perspective, corpus evidence can significantly inform the pedagogical choices we make in the classroom. It is this point of view that Johns (1997) expresses with the following comment: "It is probably not worth teaching anything that does not occur at least x times in a corpus of *y* million words" (p. 102).

4.2 Corpus Selection

Biber et al. (1999) remind us repeatedly that lexical frequency, collocation, and patterns of use can all vary dramatically from one register to another. Since I was, in this study, focusing exclusively on prepositional verb usage in academic writing, it was essential that I avoided corpus contamination from other registers that would have skewed my data. The corpus chosen also needed to be large enough that valid insights into prepositional verb usage in academic writing could be extrapolated from the resulting data, and, in the interest of obtaining a balanced sample, the inclusion of texts from a variety of disciplines was desired.

After carefully considering a number of possible corpus options, I chose the British National Corpus (BNC) World Edition for this study. The corpus, in its entirety, is comprised of 100,106,008 words encompassing 24 spoken and 46 written language genres[5]. Since I intended to only examine academic writing, I had no immediate use for most of the vast array of data the BNC offered. I therefore created an academic writing sub-corpus consisting of a total of 7,938,308 words in 236 different text files[6].

4.3 Data Collection

In preparation for my investigation, I first compiled a list of prepositional verb combinations to examine. As a starting point, I selected all the prepositional verbs that Biber et al. (1999) had found to be the most frequently occurring combinations in the register of academic prose, as well as several that their corpus data had revealed to be less frequent in academic prose, but quite common in other registers. The prepositional verbs that rounded out my list were simply those that I intuitively felt were worth investigating.

An essential tool in my collection of data was the MonoConc Pro concordancer, which offered several features that most commercially available concordancers lacked. Most notable among these features was a context window, which provided me with the entire text that a concordance line had been extracted from. This feature not only addressed the often heard criticism that corpus concordancers remove all context from a text, but also allowed me to search beyond single concordance lines to locate prepositional verbs. Due to adverb insertion, phrase fronting, and *wh*-fronting, the prepositions in prepositional verb combinations were not always immediately to the right of the verbs. The context window, however, allowed me to view entire sentences and identify many prepositional verb instances that would have eluded me if my view had been restricted to only individual concordance lines[7].

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5   For further information on the BNC's design and contents, contact Oxford University Computing Services, or refer to the BNC website at http://www.natcorp.ox.ac.uk.
6   These files fall under the genre classifications of *school essays* (7 files totaling 146,474 words), *university essays* (4 files totaling 65,385 words), *academic writing – humanities & arts* (87 files totaling 3,319,624 words), and *academic writing – social science* (138 files totaling 4,406,825 words).
7   For further information on MonoConc Pro concordancing software, see the Athelstan website at www.athel.com.

To collect my data, I first systematically performed searches for each verb on my list of prepositional verbs. This involved searching all forms of the given verb lemma. For the verb *insist*, for example, I performed searches for *insist*, *insists*, *insisted*, and *insisting*. Although the BNC is tagged to identify parts of speech, I found several instances of incorrect tags early on in my research. Consequently, I chose not to rely on the tagging and instead manually deleted all non-verb concordance lines immediately after performing each search. After deleting all noun and adjective usages (e.g., noun usages of *care*), I simply scrolled down the screen, examining each concordance line (and its corresponding full sentence in the context window) one at a time, identified prepositional verb instances, and counted each prepositional verb co-occurrence of the given verb and the different prepositions it collocated with. After completing my examination of each verb, I tallied up the total number of instances that it co-occurred (as a prepositional verb) with each preposition.

Generally, in collocation studies, the strength of a collocation is determined using the statistical measures of MI (Mutual Information) scores or z-scores. Both of these measures use the total number of instances the collocating words appear in a corpus to arrive at their statistical score. Because the collocates in this study are prepositions, however, which occur so frequently in the corpus performing a multitude of functions, any information the MI scores or z-scores would provide me would be quite meaningless. I chose instead to determine the strength of each prepositional verb's verb-preposition collocation simply by figuring the percentage of the total verb lemma instances that the verb co-occurred with the given preposition as a prepositional verb. Out of a total of 153 verb instances of *object*, *objected*, and *objecting*, for example, 103 instances were prepositional verb co-occurrences with the preposition *to*. Occurring together in 67.3% of the total corpus instances of the verb lemma *object*, the verb *object* and the preposition *to* do indeed collocate strongly. I consider this method quite accurate in indicating collocation strength since 103 co-occurrences out of 153 instances is no coincidence. The fact that, for this study, I did not rely on the concordancer to do collocation counts but instead excluded free combinations and manually counted each co-occurrence renders statistical measures of collocation strength unnecessary since their main purpose in collocation studies is to factor out chance co-occurrences.

4.4 Limitations of the Study

The biggest limitation of this study and, in fact, all corpus-based research is the simple fact that a corpus ultimately shows us only the language used in that particular corpus. Although the BNC is arguably a very valid sample of a wide variety of British English and careful deliberation undoubtedly went into its creation, any findings that result from its examination can hardly be treated as definitive. As Hunston (2002) reminds us, "Although it may (justifiably) claim to be representative, all attempts to draw generalizations from a corpus are in fact extrapolations...Thus conclusions about language drawn from a corpus have to be treated as deductions, not as facts" (p. 23).

The fact that the British National Corpus represents only British English might also be seen as a limitation of this study. Since standard varieties of British and American English, however, both serve as models against which academic writing tends to be judged, I believe the BNC to be a valid indicator of the norms of academic writing, especially since I do not intend for the results of this study to exclusively benefit ESL learners in America. In any case, I do not feel that variation in multi-word lexical items, in particular, poses much of a validity threat. According to Moon (1997), "Some items appear to have varying frequencies in British and American English, but the variations are generally not significant" (p. 62).
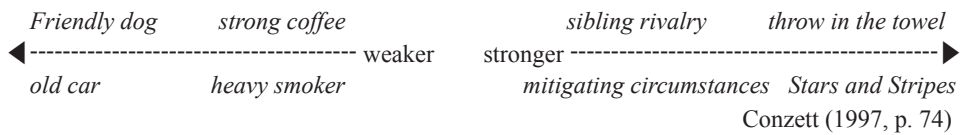
Lastly, the prepositional verb combinations that I investigated for this study by no means make up an exhaustive list. Although great pains were taken to include as many as possible, I am constantly reminded of prepositional verbs that somehow managed to elude my examination. Sometimes such omitted

combinations are ones that intuition tells me are likely to collocate quite strongly. *Correspond to* and *cope with*, for example, are two prepositional verbs I did not think to include until long after the research phase of the study had been completed.

6. Results of the Study

6.1 The Collocational Strength Continuum

In discussing collocation, Conzett (2000) states, "Collocations may be strong – the presence of one word means you strongly expect the other word to be there too – or weak, when the collocates can vary a great deal" (p. 74). To help illustrate this distinction, she provides a continuum with examples that are mostly adjective-noun collocations:

Friendly dog   *strong coffee*   *sibling rivalry*   *throw in the towel*

◄-------------------------------- weaker   stronger ------------------------------------►

old car   *heavy smoker*   *mitigating circumstances*   *Stars and Stripes*

Conzett (1997, p. 74)

For this study, I have chosen to conceptualize the verb-preposition collocation of prepositional verbs in much the same manner, classifying verb-preposition combinations as *almost fixed*, *very strong*, *strong*, *relatively strong*, or *relatively weak*, based on the given combination's percentage of total verb lemma instances in the academic writing sub-corpus. Any method one might use to assign fixed points to demarcate the five classifications on the collocation strength continuum would, of course, be arbitrary. The way I chose to designate these division lines was to locate naturally occurring gaps in the collocation percentage data. No prepositional verb combination on this list, for instance, fell between 82.3% and 77% of total verb lemma instances. This is, therefore, the point I chose to be the dividing line between the categories of *almost fixed* and *very strong*. It is in this manner that I decided upon the following categories:

Prepositional Verb's % of Total Verb Lemma	Category
100% - 82%	*almost fixed*
77% - 63%	*very strong*
62% - 48%	*strong*
46% - 29%	*relatively strong*
28% - 2%	*relatively weak*

In light of the fact that the practical application of this study's results is the selection of verb-preposition combinations with collocational strength high enough to justify their being taught as single units, I will focus my subsequent discussion on the prepositional verbs that are the most likely candidates for such instruction – those that fell into the category of *almost fixed*. Of the prepositional verb combinations examined, 23 fell into this category. The following table summarizes the data gathered on these 23 verb-preposition combinations, showing the percentage of total verb lemma occurrences for each combination, the number of instances that they occurred in the corpus, and the total number of occurrences of the verb lemmas. For percentage and frequency data for the investigated combinations that fell into the *very strong*, *strong*, *relatively strong*, and *relatively weak* categories, see the appendices.

Prepositional Verb Combinations with *Almost Fixed* Collocational Strength

Prepositional Verb	% of Total Verb Lemmas in Corpus	Number of Corpus Instances	Total Number of Lemma Instances in Corpus
Rely on/upon	100%	661	661
Refrain from	100%	29	29
Depend on/upon	99.5%	1644	1652
Account for	99.4%	777	782
Adhere to	99%	103	104
Associate with	98.1%	1578	1608
Refer to	96.6%	2133	2208
Deal with	96.5%	1639	1698
Base on/upon	95.3%	2314	2429
Deprive of	94.9%	166	175
Subscribe to	93.3%	70	75
Accuse of	92.3%	204	221
Focus on/upon	92.2%	879	935
Derive from	91.6%	1025	1119
Abide by	90.5%	19	21
Belong to	90.2%	681	755
Relate to	89.5%	2050	2291
Regard as	89.1%	1549	1738
Conform to	84.6%	225	266
Contribute to	84.5%	742	878
Consist of	83.7%	822	982
Interfere with	82.7%	124	150
Participate in	82.3%	270	328

6.2 Passive Instances

While use of the passive voice is not terribly common in conversation, it occurs with great frequency in the register of academic prose. This tendency, according to Biber, Conrad, & Leech (2002), can be attributed not only to the fact that the passive voice provides an objective sense of detachment that is valued in the academic community, but also the nature of the information structure of academic writing. Unlike the register of conversation, where human agents are usually the focus, and hence, the subjects of sentences, the topic of discourse in academic writing is frequently an object of study, with the human agent either irrelevant or of secondary importance. As the topic, the object of study is generally information already discussed earlier in the text, which provides further motivation for a writer to place it first as the subject, before any new information is introduced later in the sentence.

Although these general tendencies of academic writing were clearly evident in my corpus investigation, the use of the passive voice with prepositional verbs varied greatly from one prepositional verb combination to another. Biber et al. (2002) note that prepositional verbs that take only one object rarely occur in the passive voice, while prepositional verbs that take two objects tend to be used quite frequently in the passive. The data I observed in this study generally supported this assertion. Single-

object prepositional verbs such as *refrain from* and *participate in* tended to have few or no passive occurrences. Instances of the passive voice for the two-object prepositional verbs I examined, in contrast, were far more plentiful. Many of these prepositional verbs, in fact, occurred more often in the passive voice than they did in the active voice. *Base on*, for example, occurred in the passive voice (*be based on*) in over 94% of the instances in which it appeared in the corpus. Other prepositional verbs that could take either one object or two, such as *focus on/upon* (e.g., *I will focus on collocation.* or *I will focus my attention on collocation.*) took one object far more frequently than two. Their passive occurrences in the corpus, therefore, were relatively infrequent. *Focus on/upon*, for instance, only occurred in the passive voice in 13.4% of its total corpus occurrences, *concentrate on/upon* in just 4.2% of corpus instances, and *lead to* in less than 1%.

6.3 Brief Discussion of Individual *Almost Fixed* Prepositional Verbs
Rely on/upon[8] (100%)

Out of a total of 661 corpus instances of the verb lemma *rely*, every one occurred with either *on* or *upon*. Although intuition might tell us that since *upon* is thought to be more formal than *on*, there would be more occurrences of *upon* than *on* in a corpus of academic prose, this proved not to be the case. In 532 instances, *rely* occurred with *on* (86.1%), while *rely upon* occurred in only 92 corpus instances (13.9%).

Refrain from (100%)

With only 29 instances in the corpus, *refrain from* was not a frequently occurring prepositional verb. These 29 occurrences, however, accounted for all instances of the verb lemma *refrain*, attesting to the strength of the bond between *refrain* and *from*.

Depend on/upon (99.5%)

Out of 1,652 total corpus instances for the verb lemma *depend*, 1,644 were with either *on* or *upon*. Only eight instances were not. Of these eight instances, six were simply *It depends*. For these instances, an argument could be made that *on* or *upon* plus a noun phrase was present in the mind of the writer and simply elided. The following two sentences are the two in which *depend* did not occur with *on* or *upon*. In each of these cases, again, one might contend that *on* or *upon* had simply been elided:

> *It depends how things turn out.*
> *It depends what speakers happen to be talking about.*

Just as with *rely on/upon*, the corpus instances of *depend on* (75.6%) far exceeded those of *depend upon* (23.9%).

Account for (99.4%)

Out of 782 instances of the verb lemma *account*, all but five were *account for*. There was one instance of *account to (somebody)*. The remaining four instances were all passive *be accounted +NP* constructions (e.g., *Travel must be accounted one of the major catalysts of change.*).

Adhere to (99%)

All but one of the 104 corpus instances of the verb lemma *adhere* were instances of *adhere to*. 26 of the 104 instances (25%) were in the passive voice. The lone instance where *adhere* did not occur with *to* was the following sentence:

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8   Since the prepositions *on* and *upon* are almost identical, both semantically and morphologically, with *upon* only considered the more formal of the two, I chose to treat them as one preposition for the purposes of this study.

> *It is the capacity to commercialize and commodify all ideas and*
> *the material products in which they adhere.*

Associate with (98.1%)

A frequently occurring prepositional verb combination in the corpus, *associate with* occurred in 1,578 of the 1,608 instances for the verb lemma *associate*. It was used with the passive voice in the vast majority of its corpus instances (89.6%). Other observed collocations and colligations included *associate in*, *associate together*, and *associate NP and NP*.

Refer to (96.6%)

With 2,133 occurrences out of 2,208 instances of the verb lemma *refer*, *refer to* was one of the most frequently occurring combinations in the study. Most of the 75 instances in which *to* did not accompany *refer* were cases where the *NP*s were understood from context and, therefore, not necessary for readers' understanding (e.g., *She was referred for therapy and management help*.). 24.6% of the instances of *refer to* were in the passive voice.

Deal with (96.5%)

Deal with, another frequent prepositional verb combination in the corpus, occurred in 1,639 of the 1,698 instances of the verb lemma *deal*. Only 227 (13.9%) of these instances were passive. The prepositional verb combination *deal in* only occurred 23 times (1.4%). The fact that one corpus text dealt with the heroin trade accounts for many of the instances in which *deal* did not occur with *in* or *with* (e.g., *to deal drugs*).

Base on/upon (95.3%)

With 2,314 instances out of a total of 2,429 for the verb lemma *base*, *base on/upon* was one of the most frequently occurring prepositional verbs in this study. Use of the passive voice was overwhelmingly preferred over the active voice with *be based on* occurring in 94.2% of corpus instances. Once again, *base on* (83.7%) occurred far more frequently than *base upon* (11.5%). Other observed collocations for the verb lemma *base* included *base at*, *base in*, and *base around*. These tended to be passive instances as well.

Deprive of (94.9%)

Of the 175 instances of the verb lemma *deprive*, there were only nine cases where *deprive* was not accompanied by *of*. In these cases, *of NP* was generally understood from context or replaced by an adverb (e.g., *These children are deprived intellectually by such an upbringing*.). 89 instances of *deprive of* (53.6%) were in the passive voice.

Subscribe to (93.3%)

Subscribe to appeared in 70 of the 75 instances of the verb lemma *subscribe*. Of these 70 instances, only one was the 'magazine subscription' sense of *subscribe to*. All other instances were the sense of 'to agree with or support.'

Accuse of (92.3%)

Of the 221 instances of the verb lemma *accuse*, 204 were *accuse of*. 54.9% of these were in the passive voice. Only seventeen instances did not include *of*. Once again, most of these were cases where *of NP* had been elided because it could easily be understood from context. Consider, for example, the following sentence:

> *Co-wives accuse each other of witchcraft, but do not accuse their husband.*

To include *of witchcraft* with the second instance of *accuse* in this sentence would have been unnecessarily redundant.

Focus on/upon (92.2%)

Out of 935 instances of the verb lemma *focus*, the verb occurred with either on or *upon* in 879 occasions. 779 of these 879 instances (88.6%) were with *on* and 100 (11.4%) were with *upon*. As a prepositional verb that only occasionally takes two objects, it is not terribly surprising that *focus on/upon* was used in the passive voice in just 13.4% of its corpus instances.

Derive from (91.6%)

Derive occurred with *from* in 1,025 instances out of 1,119 occurrences of the verb lemma *derive*. It was used with the passive voice in almost half of these cases (49.4%). Since, in many of the instances where *derive* occurred without *from*, the prepositional phrase with *from* was observed in preceding sentences, we here have an especially strong case for the ellipsis argument.

Abide by (90.5%)

Although there were just 21 instances of the verb lemma *abide* in the corpus, only two of these failed to occur with *by*. The two instances that did not include *by* were the following, which showcase a decidedly less common construction:

> *The passage will obviously abide more interpretations than one.*
> *Williams could abide American reality.*

Belong to (90.2%)

Out of 755 instances of the verb lemma *belong*, 681 occurred with *to*. Other observed collocations were the prepositional verb combination *belong with*, which occurred in slightly less than 1% of *belong* instances, and the free combination *belong in*.

Relate to (89.5%)

With 2,050 occurrences out of 2,291 instances of the verb lemma *relate*, *relate to* was an extremely common prepositional verb combination in the corpus. The passive voice was used with this combination in 46.8% of corpus instances. One interesting item to note about *relate to* refers to the prepositional verb's two senses. The sense best defined as 'to show a relationship' occurred in far more instances than the 'convey' sense (e.g., *to relate something to somebody*). Only nine instances of the 'convey' sense were observed.

Regard as (89.1%)

Regard as appeared in 1,549 of the 1,738 instances of the verb lemma *regard*. 55.6% of *regard as* occurrences were passive. The only other prepositional verb combination with *regard* that appeared with any frequency was *regard with*, which had 20 corpus occurrences (1.2%).

Conform to (84.6%)

Out of 266 instances of the verb lemma *conform*, 225 were *conform to*. There were only 14 instances of *conform with*. In all 27 of the instances that *conform* did not occur with *to* or *with*, the NP object was perfectly clear from context.

Contribute to (84.5%)

Of the 878 instances of the verb lemma *contribute*, 742 were *contribute to*. There were 14 instances of *contribute towards*. Although there were 74 instances where the verb lemma *contribute* was used in the passive voice, there were no passive instances of *contribute to*. In each of the instances that did not include *to* or *towards*, the receiving entity was understood from context.

Consist of (83.7%)

Out of 982 instances of the verb lemma *consist*, 822 were *consist of*. Almost all other corpus occurrences (158 to be precise) were the formal prepositional verb *consist in*, meaning 'depend on' (e.g., *The inhumanity does not consist in the ascription of certain cognitive states*.).

Interfere with (82.7%)

Out of 150 verb lemma instances of *interfere*, 124 were *interfere with*. There were 12 instances of *interfere in*. In the remaining 14 instances that did not include *with* or *in*, the NP that was interfered with was, once again, clear from context.

Participate in (82.3%)

Of the 328 verb lemma instances of *participate*, 270 were *participate in*. There were five instances of *participate as* (1.5%) and just one instance each of *participate for (fun)* and *participate at (all levels)*.

7. Pedagogical Implications

7.1 Broad Observations

Looking broadly at the data culled from this investigation, a few general observations leap forth. Although quite a few prepositional verb combinations had collocational strength that could be characterized as *almost fixed*, some of these prepositional verbs tended not to occur with great frequency. There was also great variation observed in the colligation patterns of different prepositional verbs, depending mostly on whether they took one object or two.

Although the findings of this study could have a large number of potential implications for prepositional verb instruction, cursory observations such as the ones outlined above lead me to a few specific recommendations that I shall briefly comment on.

7.2 Collocation Strength

Insights from the Lexical Approach seem particularly valid in the instruction of prepositional verbs that fell into the *almost fixed* category. If a given verb lemma rarely occurs without a specific preposition, after all, it seems completely logical to present that verb and preposition to students as one chunk of language and to stress the fact that remembering the lexical item as one unit will provide an "island of reliability," aiding learners' goals of achieving both fluency and accuracy (Lewis, 2000b).

The islands start to become somewhat less reliable, however, for prepositional verb combinations further down on the collocational strength continuum. The prepositional verbs whose collocational strength placed them in the *relatively strong* and *relatively weak* categories represent verb-preposition combinations which do have an undeniable bond, but if we view preposition selection in terms of gambling, the odds of learners achieving accuracy by placing their bets on these combinations are significantly worse than doing so with the combinations in the *almost fixed*, *very strong*, and *strong* categories. The prepositional verb, *know of*, for example, appeared in only 3% of corpus instances of the verb lemma *know*. The prepositional verb combinations *know as* and *know about* both occurred somewhat more frequently. Far greater still

were the number of instances in which the verb lemma *know* occurred with no accompanying preposition. Placing prepositional bets on *know of* would, therefore, be quite unwise.

Although combinations that fell into this study's *almost fixed* category do provide learners with excellent odds of accuracy, many teachers might be daunted by the prospect of taking valuable class time to explicitly teach these 23 prepositional verbs. Indeed, some have argued in print that multi-word verbs are best left to implicit learning. Sawyer (2000), for example, claims that prepositional verbs do not pose any special challenge for learners, and suggests that, since both the verbs and prepositions that make up prepositional verbs retain their meanings and function as any typical verb+prepositional phrase construction would, teachers should not bother to teach them. Sheen (2000) expresses similar sentiments, stating that he finds any classification of multi-word verbs irrelevant for teaching purposes and that, in the classroom, it is only necessary to explain to students which multi-word verbs are separable. While these assertions by Sawyer and Sheen are in-line with the views of Krashen (1982, 1985), who contends that implicit learning is sufficient for acquisition to take place, they contrast with the findings of Kubota (1997), who, in investigating the effects of different approaches to prepositional and phrasal verb instruction, found that learners who had been given explicit detailed prepositional and phrasal verb instruction exhibited a greater degree of improvement over a one month period than students who had received more implicit forms of instruction. Kubota's findings are supported by the second language acquisition research of Schmidt (1990), who argues that, for input to become intake, it is necessary for learners to consciously take notice of the target forms. The role of language instruction, Schmidt asserts, is to guide students in noticing those aspects of language that would not otherwise be immediately obvious. Kubota's explicit prepositional and phrasal verb instruction, therefore, served the purpose of drawing students' attention to less obvious aspects of the target language and increased the chances for the input to become intake. This emphasis on "noticing" is a point mentioned repeatedly in much of the literature espousing the Lexical Approach. Lewis (1993, 1997a, 1997b, 2000b) Hill (2000), and Woolard (2000), all stress that the main role of the teacher is to lead learners to notice the characteristics of language that they might otherwise miss if they were merely receiving comprehensible input. They also maintain that, in implementing the Lexical Approach, teachers need only take the time to draw students' attention to lexical items as they come up in the course of a lesson, rather than dramatically changing their teaching practice.

7.3 Focus on Colligation

As I previously noted, prepositional verbs that take both a direct object and a prepositional object, such as *base on/upon*, are more likely to be used in the passive voice and, when used in the active voice, take the colligation pattern *verb + NP + preposition + NP*. I also noted that a number of prepositional verbs, such as *focus on/upon*, sometimes take both a direct object and a prepositional object, but often take only a prepositional object. As I conducted this corpus investigation, it became quite clear to me that every word truly does have its own grammatical behavior and peculiarities, the causes of which can be attributed to many different factors. By conducting their own small-scale corpus investigations in the classroom, learners of English, I believe, could increase their awareness of the various colligation patterns of prepositional verbs. Although presenting students with large amounts of raw corpus data would almost certainly overwhelm them, a lot of data is often not required for patterns to emerge. Just a few pre-selected concordance lines chosen by a teacher could be enough to lead learners to notice colligation patterns and collocations. Taking on the role of researcher in such classroom corpus investigations would likely prove memorable for students, increasing the chance of the experience leaving a trace and positively impacting language development. The fact that, in dealing with corpus data, students would be working with language they know to be authentic could also increase motivation.

7.4 Cost/Benefit Perspective

The final pedagogical implication that I will comment on here concerns corpus frequency. Although the central focus of this study was collocational strength and not frequency, prepositional verb combinations that occurred rarely in the corpus were generally noted. When I normed the prepositional verbs investigated in this study to the standard of a one million word corpus (a common practice done for the purpose of comparing frequencies across corpora), I found, however, that *congratulate on*, a prepositional verb that appeared only 9 times in this study's corpus, had a normed frequency of 1.1 occurrence per 1 million words. To put this data in perspective, Moon (1997), in a corpus study of 6,700 idioms and multi-word lexical items, found that 70% of the items she investigated occurred with a frequency of less than once per million words. "There are a lot of multi-word items in the language," she reports, "but a lot of them are very infrequent" (p. 52).

The most practical viewpoint to take in the determination of what vocabulary items to teach is perhaps one of costs versus benefits. If learners are unlikely to encounter a vocabulary item in their studies or daily lives, it is probably not a wise use of time and energy for either teachers or learners to bother with that item. Ultimately, teachers must make the final judgments regarding such cost/benefit vocabulary decisions. As I previously mentioned, however, frequency is very difficult to gauge intuitively. This is an area where corpus data can very directly inform pedagogical practice. As Nation & Waring (1997) point out, "Frequency information provides a rational basis for making sure that learners get the best return for their vocabulary learning effort" (p. 17). With a normed frequency of 291.4 occurrences per million words in this corpus study, *base on* would certainly be a high priority prepositional verb to teach. *Experiment in*, in contrast, had a normed frequency of .6 per million words and would probably not warrant much classroom attention.

8. Conclusion

This study provides further insight into verb-preposition collocation strength in prepositional verbs. It is my hope that these findings will contribute in some way to a more informed approach to prepositional verb instruction. Although I have briefly touched upon a few pedagogical implications of the research results, many questions remain unanswered. The question of whether prepositional verbs should be taught together with phrasal verbs, for example, is an issue I have not dealt with that certainly warrants study and debate. Similarly, the issue of whether to group prepositional verbs according to their verb components or their preposition components when presenting them to learners is one that deserves attention. Studies of learner treatment of prepositional verbs with a sizeable corpus of learners' writing would also cast a brighter light on the problems these lexical items pose to students and help us better address their difficulties. Although many aspects of prepositional verb instruction have yet to be explored, language teachers today have a dizzying range of available resources to inform and aid their classroom practices. It is up to each individual teacher, however, to make the most of the resources at hand.

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Appendices

Appendix 1. Percentage and Frequency Information for Investigated Prepositional Verb Combinations with *Very Strong* Collocational Strength

Prepositional Verb	% of Verb Lemmas in Corpus	Number of Corpus Instances	Total Number of Lemma Instances in Corpus
Engage in	77%	553	718
Indulge in	75.3%	64	85
Mistake for	75%	36	48
Beware of	74.1%	20	27
Excel in	73.3%	11	15
Concentrate on/upon	72.6%	616	849
Respond to	69.4%	493	710
Care for	69.1%	253	366
Listen to	68.2%	262	384
Object to	67.3%	103	153
Lead to	67.2%	2305	3431
Substitute for	67.1%	106	158
Apply to	66.2%	1108	1673
Connect with	66%	344	521
Result in	65.5%	850	1298
Comply with	63.2%	55	87

Appendix 2. Percentage and Frequency Information for Investigated Prepositional Verb Combinations with *Strong* Collocational Strength

Prepositional Verb	% of Verb Lemmas in Corpus	Number of Corpus Instances	Total Number of Lemma Instances in Corpus
Compare with	61.8%	1133	1833
Experiment with	60.8	45	74
Abstain from	60%	12	20
Consent to	58.3%	42	72
Succeed in	58.3%	238	408
Glance at	57.9%	11	19
Compose of	57.7%	209	362
Long for	57.6%	19	33
Borrow from	55.5%	96	173
Ally with	55.1%	54	98
Comment on/upon	53.8%	234	435
Congratulate on	52.9%	9	17
Adapt to	52.7%	167	317
Blame for	52.3%	104	199
Disagree with	52.2%	60	115
Rescue from	52.1%	38	73
Aim at	50.9%	282	554
Invest in	50.2%	102	203
Differ from	49.5%	368	744
Divide into	49.4%	407	824
Cooperate with	48.3%	29	60

Appendix 3. Percentage and Frequency Information for Investigated Prepositional Verb Combinations with *Relatively Strong* Collocational Strength

Prepositional Verb	% of Total Verb Lemmas in Corpus	Number of Corpus Instances	Total Number of Lemma Instances in Corpus
Add to	45.9%	636	1386
Dream of	44.8%	30	67
Send to	44.5%	366	823
Vie for	44.4%	4	9
Arrive at	43.4%	242	558
Charge with	43.2%	79	183
Talk about	42.8%	519	1214
Compete with	42.1%	67	159
Inquire into	40%	10	25
Wait for	39.8%	128	322
Look at	39.3%	1367	3474
Ally to	38.8%	38	98
Assist in	37.9%	139	367
Discriminate between	36.9%	58	157
Speculate on/upon	36.8%	32	87
Laugh at	36.3%	41	113
Suffer from	35.7%	304	852
Insist on/upon	35.5%	178	501
Arise from	34.4%	452	1315
Distinguish from	34.3%	397	1156
Prevent from	33.2%	264	794
Perceive as	33.2%	247	744
Occur in	32.6%	932	2862
Discriminate against	31.6%	48	157
Boast of	30%	12	40
Distinguish between	29.8%	345	1156
Persist in	29.4%	69	235
Result from	29%	377	1298

Appendix 4. Percentage and Frequency Information for Investigated Prepositional Verb Combinations with *Relatively Weak* Collocational Strength

Prepositional Verb	% of Total Verb Lemma Instances	Number of Corpus Instances	Total Number of Lemma Instances in Corpus
Define as	27.9%	516	1851
Involve in	27%	1158	4290
Jail for	26.9%	7	26
Recover from	26.6%	69	259
Protect from	26.4%	145	550
Give to	25.1%	2098	8345
Spend on/upon	24.9%	236	946
Criticize for	24%	75	312
Volunteer for	23.1%	6	26
Communicate with	23.6%	82	363
Complain of	22.5%	65	289
See as	22.1%	2803	12678
Approve of	21.2%	45	212
Attend to	21.2%	110	519
Fill with	21%	101	482
Invest with	21.7%	42	203
Talk of	21.6%	250	1214
Agree with	20.4%	215	1053
Save from	20.1%	77	383
Vote for	19.9%	48	241
Complain about	19.7%	57	289
Joke about	19%	4	21
Think of	18.5%	789	4256
Serve as	18.5%	248	1340
Cure of	18.3%	11	60
Compare to	17.9%	328	1833
Connect to	17.7%	92	521
Come from	17.5%	1031	5897
Punish for	17.3%	31	179
Speculate about	17.2%	15	87
Warn against	17.1%	37	216
Talk to	16.6%	202	1214
Come to	16%	946	5897
Express in	16%	284	1780
Obtain from	15.4%	167	1081
Excuse for	14.3%	8	56
Excuse from	14.3%	8	56

Joke with	14.3%	3	21
Blame on/upon	14.1%	28	199
Excel at	13.3%	2	15
Hide from	13.2%	30	228
Look for	13.1%	454	3474
Arrest for	13%	19	146
Warn of	13%	28	216
Use in	12.6%	1346	10650
Know as	12.2%	713	5868
Communicate to	11%	40	363
Charge for	10.9%	20	183
Divide between	10.4%	86	824
Ask for	10.4%	247	2372
Care about	10.1%	37	366
Allow for	10.1%	251	2486
Call for	10%	340	3392
Hope for	9.9%	69	695
Engage with	9.6%	69	718
Agree on/upon	9.1%	96	1053
Hear of	9%	92	1020
Prohibit from	9%	6	67
Disagree on	8.7%	10	115
Use as	8.5%	906	10650
See in	8.5%	1074	12678
Include in	8.4%	383	4582
Require for	8.2%	245	2974
Experiment on/upon	8.1%	6	74
Beg for	8.1%	8	99
Interfere in	8%	12	150
Believe in	7.9%	180	2271
Discriminate from	7.6%	12	157
Agree to	7.3%	77	1053
Use for	7.1%	756	10650
Laugh with	7.1%	8	113
Think about	7%	300	4256
Decide on/upon	7%	84	1207
Make of	6.8%	1030	15037
Experiment in	6.8%	5	74
Reflect on/upon	6.7%	122	1813
Forget about	6.5%	25	385
Know about	6.4%	373	5868
Look like	6.3%	218	3474
Vote against	6.2%	15	241

Disagree about	6.1%	7	115
Obtain for	6%	65	1081
Protect against	6%	33	550
Argue for	5.7%	201	3680
Look to	5.4%	188	3474
Respond with	5.2%	37	710
Choose between	5.2%	62	1191
Choose for	5%	59	1191
Save for	4.7%	18	383
Warn about	4.6%	10	216
Call on/upon	4.5%	151	3392
Disagree over	4.3%	5	115
Consider as	4.3%	169	3908
Express as	4.1%	73	1780
Choose as	4%	48	1191
Aim for	3.6%	20	554
Punish with	3.4%	6	179
Apply for	3.3%	56	1673
Know of	3%	175	5868
Persist with	3%	7	235
Choose from	2.7%	32	1191
Involve with	2.5%	106	4290
Differ on	2.4%	18	744
Hear from	2.3%	23	1020