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Campoy Cubillo, Mari Carmen

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Phrasal and prepositional verbs in specialised texts: a creative device

Mari Carmen Campoy Cubillo

Universitat Jaume I

Abstract

New phrasal and prepositional verbs are created in the English language to express new concepts. In this sense, research and innovations carried out in scientific and technical fields may make use of these verb and particle combinations to phrase new thoughts. In this article, the use of phrasal and prepositional verbs in specialised texts is discussed. The final section analyses phrasal and prepositional verbs using the particles 'up', 'down', 'off', 'over', and 'out' in a corpus of 80 research articles in the area of Botany.

Key Words: Phrasal verbs, Prepositional verbs, Corpus, Qualitative analysis

Resumen

Los verbos compuestos y preposicionales son uno de los recursos que utiliza la lengua inglesa para expresar nuevos conceptos. En este sentido, la investigación e innovación dentro del ámbito científico-técnico puede utilizar dichos verbos para expresar nuevos pensamientos o conceptos. El presente artículo analiza el uso de verbos con partícula en textos especializados. En la sección final se estudian las distintas combinaciones compuestas y preposicionales con las partículas *up*, *down*, *off*, *over*, y *out* en un corpus formado por 80 artículos de investigación que pertenecen al área de la Botánica.

Palabras clave: verbos compuestos y preposicionales, corpus, análisis cualitativo

Introduction

One of the most productive patterns of the English language is that of phrasal and prepositional verbs. Studies dealing with the processes of word formation (Bauer, 1983; Quirk et al., 1985) usually disregard the study of phrasal verbs as a lexical and syntactic resource for word formation. Exception is made in the case of nominalised phrasal verbs and in those combinations which are occasionally formed by means of a hyphen, that is, creativity in word formation is frequently limited to the concept of word as one lexical and structural unit.

Bauer (1983: 206-212) includes examples of word formation such as: *see-through* (*blouse*), *overeducate*, *before-tax* (*profits*), *in-crowd* or *drop-out*. Though it is easier to take an already existing phrasal verb and convert it into a noun or an adjective, the use of verb and particle in new combinations should be considered as creative as nominalised forms. Furthermore, for those new nominalisations which are used when no parallel verb is used (or does not yet exist), the concept is difficult to explain unless reference is made to a possible (not necessarily existing) phrasal or prepositional verb. This is frequent with adjectives based on the phrasal verb patterns such as *beered-up* (Glowka et al., 2001).

The flexibility of verb plus particle combination to form different word categories should be seen as an advantage when it comes to creating or expanding new ideas. The advantage of phrasal verbs for the creation of new concepts lies then in the fact that phrasal verbs may be nominalised and they may also be used as adjectives in their participle forms. Thus, once the concept is created, it is easy to talk about it in any possible word form: *to pile up things* / *piled-up things* / *a pile-up effect*.

Another example is the word *shop-in*. This is used in journalism by analogy with *sit-in*, which does have its verb though it is not as frequently used as its nominal counterpart. The meaning of *shop-in*, as explained by Glowka et al. (2001), is a “protest in which participants crowd in a store or place of business but do not make purchases”. Another instance, found in computer related language is *talk-off*, “the action of being cut off in the middle of leaving a voice-mail message” (Glowka and Lester, 1997a), that is, by blending “cut off” and “talk” the new phrasal verb and its nominalisation is created. Verbal examples may be *roll up* (Glowka and Lester 1997b) “to end or complete an intelligence operation as in “Rolling up Iran”.

In the section that follows, the role of phrasal and prepositional verbs in specialised texts will be discussed. This implies the explanation of how different subsenses and subtle differences are bound to appear when the verb is significant in a special context. It also implies exemplification on how context determines, in most cases, the specialised sense of a phrasal or prepositional verb. The last part of this paper is a qualitative corpus-based analysis of the occurrence of such patterns in a corpus of 80 agricultural articles taken from the *American Journal of Botany*.

Phrasal and prepositional verbs and their role in specialised texts

Although adverbial and prepositional verbs may seem to be confined to the spoken language and to be frequently used in informal conversation, this is not always the case. In fact, some of them are used in formal and written contexts, some are used in slang, and still others are euphemisms. It is true that these verbs have a higher frequency of occurrence in informal contexts, but this fact by no means relegates them only to that level. The following are examples taken from several dictionaries (Cowie and Mackin, 1993, Cullen and Sargeant, 1996, Lavín and Benedito, 1975) which illustrate the different levels of formality in which they may be found:

Formal use: mete out, impinge on, dive on something, yield up, call down on someone,

Literary: something falls on someone (happen to them), send forth/out, yearn for

Euphemistic: pass away, go out (die),

Taboo: piss off, bugger off, fuck up (things, projects)

Informal use: shake down, suss out, beef up

Slang: put the finger on (accuse), bang up, cock up

There is a widely spread idea that spoken and written corpora materials differ considerably from one another regarding linguistic structures. However, as already demonstrated in Biber (1988), the differences in linguistic structures are to be found in different genres more than in the spoken/written dichotomy, that is, it is the genre that chooses specific structures and not so much its spoken or written versions as opposites.

Phrasal verbs are one of the most creative resources of the English language, since new combinations are easily created by attaching particles to verbs which were not previously attached, and in this way they express some new concept. The examples that follow show how combinations of verb and particle are brought together when there is a concept or idea that may be patterned onto them:

- 1) Commentators have referred to it as the Dumbing of America; it has its own verb now: *"to dumb down" to make more stupid*. It is no accident that the most popular film in America at the moment is called Dumb And Dumber. (Greaves 2001; *Times* 1995, January)

This combination may then pass on to other areas, *dumb down* has started to be used in educational contexts to talk about the effect of new educational programmes on the students, and also to talk about how software is designed so that it is easy to use:

- 2) the FBI is not only asking the industry to *dumb down* existing software, it wants to prohibit it from developing new technologies that might interfere with the government's ability to intercept various oral and electronic communications (Greaves 2001; *Times* 1995, January)
- 3) Teachers accuse the tests of '*dumbing down*' learning and producing a generation of intellectually passive box-tickers. (*British National Corpus*)

It is difficult to determine, however, which context is the first to call for a specific combination of verb and particle, since it is a common language device and different (sub)senses may happen to be used and/or to be created simultaneously. The creativity of phrasal verbs in specialised texts becomes evident when we observe that they may appear to (a) express new concepts, (b) talk about things that belong to a special area of knowledge, and (c) be created by a professional community to speak informally about a topic they are interested in. Examples of phrasal verbs which are characteristic of one area of knowledge may be *log on/off*; *log in/out*, in computing. Verbs created *ad hoc* to express something that is happening and that it is recognisable in a given context may be exemplified in *flame out* (*anger someone by sending angry e-mail messages*).

An examination of Cowie and Mackin (1993) has provided us with a wide range of examples of specialised uses of adverbial and prepositional verbs:

Botanic: *put forth/out* (*a leaf, bud, shot*)

Chemistry: *break up*

Commerce: *turn round* (*start showing an opposite trend*)

Computing: *log off*

Cinema: *zoom in/out*

Economics: *put through* (*a good business deal*)

Legal: *hand down* (*a sentence*)

Mathematics: *bring down* (*figures from one part of the calculation to another*)

Nautical: *put out* (*to sea*)

Space technology: *blast off*

Sport: *knock out*

As seen from the examples above, phrasal verbs occur in specialised areas. But it is the preference for certain particles over others or the productivity of some particles in one area that is of special interest. Thus, as shown in Alejo (2001), it may be said that *out* is a productive particle in economic texts because it is useful, for instance, to talk about *money/workers/goods going in and out of a firm/household*. Another example could be the use of *up* in chemistry texts where its main usage is to relate it to a maximum temperature (*heat up*). The use of *on* and *off* related to whether a machine is working or not may pattern onto different phrasal verbs (*switch on / off, turn on / off, shut off*, etc.):

4)

To shut off an engine or other large machine is to stop it working by stopping its power supply. You switch on televisions and other electrical appliances when you make them begin working by pressing the switch that lets electricity flow to them.

(Cullen, K. and H. Sargeant, 1996)

The pair *up / down* is also used for this sense in:

5)

“be up” Working, in order. E.g. “The down escalator is up.”

“go down” To stop functioning; usually said of the system. The message from the console that every hacker hates to hear from the operator is “System going down in 5 minutes”.

“take down”, “bring down” To deactivate purposely, usually for repair work “I’m taking the system down to work on that bug in the tape drive.” Occasionally one hears the word “down” by itself used as a verb in this sense

(Howes, 2001)

Endowing the particle *down* with the sense of not working, however, is not enough to explain these verbs. As may be seen in the above examples, the choice of *take* versus *go* also implies a different patterning of syntactic and lexical roles involved in the action. Thus, in the context of computer use, it is the system that goes down, not the person while it is the person who takes the initiative to deactivate the machine, the one who brings it down.

Due to the lack of studies regarding the use of adverbial and prepositional verbs in specialised texts (exceptions are Pitch, 1987 or Alejo, 2001), it is difficult to determine which lexical features of these verbs may be prominent in a specialised text. Since the majority of senses expressed by phrasal verbs have a basic (usually spatial) sense which may be used with a metaphorical meaning, it would be advisable for the

teaching of these structures to provide a cognitive explanation for the possible extended meanings. A clear suggestion is found for instance in Hannan (1998). This may be applied to phrasal verbs used in specialised texts. The following two examples taken from the *Journal of the European Ceramic Society* (1999 (19) 4; 1999 (9) 2) illustrate this point:

- 6) The dispersants were *diluted down* to allow more accurate measurements of the optimum concentrations
- 7) In zirconia layer the crack *deflects back* to its original direction

Example (6) may be explained: “down as less” > “make less strong” > “make weaker” and “water down: add water to make weaker”. Example (7) may be related to “go back” where movement is more specific, “deflect”.

Definitions given in specialised dictionaries regarding phrasal verb meanings should also be given special attention. The use of these lexical items in a specialised context implies sometimes subtle, sometimes open differences in their use. Likewise, there are phrasal and prepositional verbs which are only used in a special area of knowledge. Examples (6) and (7) contrast the definitions in the *GardenWeb Glossary of Botanical Terms* with those given in Cowie (1993). The contrast does not imply that either one dictionary or its definitions are better than the other, but that the use of different dictionary types should be determined by different user needs:

- 8) damping off (alt. dampen off)
 - Collapse of small seedlings due to fungi attacking stem at soil level. (*GardenWeb*)
 - (horticulture) rot and die through excessive damp (S: seedling, cutting). (Cowie, 1993)
- 9) harden off
 - To gradually accustom a plant to more difficult living conditions, e.g., moving a plant from the greenhouse to the partial shade of a tree before planting it in a garden. (*GardenWeb Glossary of Botanical Terms*)
 - (horticulture) (make a plant) become strong enough to be planted out of doors. (Cowie, 1993)

An ESP student may use either of the above dictionaries to understand a text where these phrasal verbs appear depending on his/her needs as a dictionary user. If (s)he needs a definition to understand the basic or general meaning of words in the text, the information provided in Cowie (1993) may be satisfactory. If (s)he wants to know, for instance, what kind of things may help a plant to become strong, the *GardenWeb Glossary of Botanical Terms* definition will be more useful.

Looking up these verbs in specialised dictionaries may also provide us with specific subsenses as in the following example:

10) thinning out

1. The removing of all interior branches of a shrub or tree to allow better air circulation.
2. The removing of excess seedlings to allow stronger growth of the remaining ones. (*GardenWeb Glossary of Botanical Terms*)

It is interesting to note how many specialised phrasal verbs (such as *damping off* and *thinning out* above) are given participle form entries in dictionaries (i.e., the main entry is *damping off* and not infinitive or base *damp off*), suggesting that the use of these verbal nouns is primarily that of describing processes related to specific contexts.

Finally, it should be pointed out that the same phrasal verb may have a different meaning depending on the context it is used in. In (9) the verb *line out* is defined in two different areas, horticulture and sports:

11) line-out, line out

- To set out young rooted plants in the outdoor nursery to grow larger or on which to work grafts. (*GardenWeb Glossary of Botanical Terms*)
- (Rugby football) parallel lines of forwards formed at right angles to the touch line, to receive a ball which has just gone out of play. (Cowie, 1993)

Phrasal and prepositional verbs in a specialised corpus

Corpus analysis is not limited to the study of the most frequent words of a language. As a text processor, concordancers may give us all the occurrences of a word or combinations of words we are interested in, however small in number these may be.

Thus, corpus analysis concerned with research on, for instance, idiomatic expressions, may provide the researcher with only a few (though valuable) examples.

Some collocations in specialised texts which may not stand high on frequency counts may be relevant in specialised vocabulary. An example of this can be seen in collocates for the word *leaf/leaves* like *opposite leaves*, or *leaves at successive nodes* in agriculture texts which may not be the most frequent in these texts but are meaningful syntactic and lexical patterns in that discourse. The same happens with phrasal and prepositional verbs in agriculture texts where spatial senses, for instance, are essential. Thus, the use of spatial *in*, *out*, *off*, *up*, or *down* however frequent or infrequent cannot be ignored when we need to explain how a plant grows, what has happened to or with the seeds or other parts of a plant, etc.

In the teaching of ESP or LSP a teacher may decide to use qualitative and/or quantitative analysis and focus on qualitative analysis in the class when the collocation is genre specific and therefore useful for a particular group of students (see explanation of *carry-over* below). As McEnery and Wilson (1996:62) point out: “in qualitative research the data are used only as a basis for identifying and describing aspects of usage in language and to provide ‘real-life’ examples of particular phenomena”. The analysis presented in this part of the article is mainly qualitative: the focus is not so much on frequency of occurrence but on how the phrasal verb system is used to express concepts in a particular domain and how the concepts expressed by means of phrasal verbs are organised in such a way that new meanings can be created by analogy to the existing ones. It must be pointed out that the use of one particle with a specific sense may occur with several verbs. Thus, the separation sense of *off* is present in *fall off*, *drop off*, *cut off*. A quantitative analysis of data would miss this information.

In this section phrasal and prepositional verbs found in a corpus of 80 texts taken from the *American Journal of Botany* are discussed. The *American Journal of Botany* is an internationally recognized journal containing research papers on all aspects of plant biology. This journal also includes “rapid communications” and special papers, which include reviews, critiques and analyses of controversial subjects. The research articles used as corpus in the present article were published between 1997 and 2000. They are Botany articles related with the issue of seed dispersal (seed emergence, growth and survival are second in importance) and reproductive modes.

For reasons of space, only those verbs with the most frequent particles (*down*, *off*, *out*, *over*, and *up*) will be studied here. Some examples of recurrent nominalised phrasal verbs are also included. Examples are organised according to the particle. The frequency of occurrence for the particles analysed here is shown in Table 1. The most frequent word in the texts (*of*) represents 3.99% of the corpus. *Over*, *out* and *up* are among the first one thousand most frequent words. The corpus has a 3.17 type/token ratio with 772,257 tokens (total amount of words) and 24,448 types (number of different words). Most words (such as *would*, *represent*, *show*, *grow*, *size*, *reason*, *problem*, etc.) are in the 0.05 / 0.02 % frequency range.

Particle	Total frequency	Percentage
Over	414	0,05
Out	172	0,02
Up	161	0,02
Off	63	---
Down	27	---

Table 1.- Particle frequency and percentage in corpus

Examples with *up*

Table 2 illustrates the most common collocates in the co-text of *up* with phrasal verbs and the word clusters that *up* triggers off. Word clusters represent repeated phraseology in the concordance for the searched word. L (left) and R(right) indicate the preference for the collocate to appear a number of words (1 to 5) to the right or left of *up*:

Collocates	Frequency	Word clusters
To (R1)	103	-up to (the)/#
long (R4)	24	-taken up by
cm. (R3)	14	-(a) (median) close
mm. (R3)	16	-up (of)
taken/took (L1)	16	
set (L1)	5	

Table 2. Collocates and word clusters for *up*

Polysemic verbs, and among these phrasal verbs, are determined by the context they appear in. All delexical verbs (*get, give, take, bring, have*) not only form phrasal verbs with most particles, but also have several subsenses for each combination while meanings are generally context and co-text determined. In Cowie (1993) as many as 28 different senses for *take off* are listed. A good example for discussion is the pair *soak up/take up*. The Oxford dictionary includes under *take up* the sense of “absorb” but explains only its “soak up” meaning. Typical subjects proposed are blotting paper, sponge and flannel. In agriculture, however, although *take up* may be used both in the soaking and raising senses, it is preferably used with the meaning of absorb and raise to other parts of the plant. This is better exemplified in the *Chambers Dictionary of Phrasal Verbs* (1996): “to take up a substance is to absorb it specially from the ground or from a lower place” and provides the example “with this system the tomato plants will take up essential minerals more readily”. Examples in our corpus confirm the preference of *soak up* over *take up* for the “soaking sense”:

- (Ex. 1) the strips were left in the spurs for one minute to *soak up* all the nectar
- (Ex. 2) beetles appear to be *taking up* nectar from the petal nectaries
- (Ex. 3) A general lowering of pH may result in a decrease of the plant’s capability to *take up* nutrients

Statistically speaking, three verbs are important in the co-text of *up* in our corpus. These verbs are positive in the mutual information counts with *up*: *pick* (picked MI 5,66), *take* (took MI 4,98) and *keep* (MI 4,79). Phrasal verbs with *up* include examples where the particle is used to express upward movement (*take up*); completive sense (*water up*); approximation (*close-up*); compose something by putting things in one group or category (*make up*); in preparation, organising (*set up*); put into an enclosed or compact position (*roll up*); referred to an activity that is gradable (*grow up*):

- (Ex. 4) *close-up* of a single pollen grain (detailed photography)
- (Ex. 5) flowers whose stigmas have *dried up*
- (Ex. 6) apparently water stressed, although they were *watered up* to twice daily to prevent wilting
- (Ex. 7) cultivated plants *grow up* into neighboring tree crowns
- (Ex. 8) Syrphids made up 3.9% of all visits; of the seven genera that *make up* subtribe Balsamocitrinae, only two
- (Ex. 9) Pollen grains were *picked up*
- (Ex. 10) after germination, seedlings washed with distilled water were *potted up*;
- (Ex. 11) the lower half of its lip is rolled up tightly and functions as a tube
- (Ex. 12) pollination drop on an experimental set-up floated for one minute

- (Ex. 13) Enhance signal by *breaking up* long branches, which in the Laureates involves...;
 (Ex. 14) This *breaking-up* is different from Saxifragaceae;
 (Ex. 15) Some ramets *wind up* in patches with

Examples with *off*

Collocates	Frequency	Word clusters
trade (L1)	25	-(a) trade-off between
number (R2,3,4,5)	6	-off-road vehicle use
size (R2,3,5)	6	
use (R3)	5	

Table 3. Collocates and word clusters for *off*

The word cluster “off-road vehicle use” refers to the importance of this vehicle use as a means of seed dispersal in sentences like: “High levels of habitat loss and fragmentation due to housing development (...) and off-road vehicle use”.

The most common sense of *off* in the texts analysed is falling or causing something to fall and/or be separated from the plant (*shake off*, *fall off*, *drop off*, *cut off*, *abraded off*):

- (Ex.16) if the flowers *fell off* at the end of the first day...
 (Ex. 17) some anthers have *dropped off* during processing
 (Ex. 18) tetrads may have been present but were *abraded off* stigmata during handling
 (Ex. 19) were *cut off* with a razor blade;

Also found as noun in “is the chosen cut-off level”, indicating a point of reference as in “off-median” in: “the last sepal is initiated in adaxial but off-median position”.

The most productive pattern with *off* is the nominalisation *trade-off*, which has the sense of operating an exchange where some sort of balance has to be reached, sometimes at the expense of something else:

- (Ex. 20) we suggest that a trade-off between flower number and flower size is a more general picture of floral resource allocation

Many of the uses of *off* are similar to those of *out*, the difference being that when *out* is used there is always a recipient with an interior from which something comes or is taken out. *Out* is also used when the thing that is coming out is very “showy” as in the example with “flush out”. *Off* is preferred for surfaces:

- (Ex. 21) a treatment in order to *shake off* the dust on the surface (*seed surface*)
- (Ex. 22) Pollen was *shaken out* of the keels onto petri dishes
- (Ex. 23) the nectar in the spur was *pushed out* by blowing air
- (Ex. 24) After a short while, they *crept out* and flew away
- (Ex. 25) the beetle *coming out* of the flower
- (Ex. 26) the stamens beneath act as a piston *forcing out* a string of pollen onto the underside
- (Ex. 27) these were then *excised out* and wafered in serial section
- (Ex. 28) the plant is *flushing out* new shoots after a disturbance, but normally...

A contrast should also be made between *off* and *out* in the sense of ejecting, releasing, producing something. In this sense *off* is used simply to indicate that, for instance, a part of a plant is developing (buds, branches, etc) and is visible. *Out* also indicates that the plant is producing some new part, but usually adds the sense that the plant is growing. Likewise, the eject sense of *out* is frequently modified by manner adverbials (*quickly, rapidly, sylleptically, etc.*) which does not happen with *off*:

- (Ex. 29) the petal bundles *give off* sepal lateral traces
- (Ex. 30) the nectary primordia continue to *bulge out*, forming a slightly smiling-mouth shaped structure
- (Ex. 31) a shoot can either form a thorn, *grow out* vegetatively or ...

Grammatical patterns for *off* and *out* also differ in the place given for the thing(s) that is released or produced. With *off* it appears in object position in the structure “V+off+N(object)”; with *out* the grammatical choice is to give it a subject role “N(subject)+V+*out*”.

The noun *offspring* collocates with: *abortion of, quality, quantity, parental, maternal, differences*, and *number* and has a total frequency of 239.

Examples with *out*

Collocates	Frequency	Word clusters
of (R1)	173	- (experiments / study / analyses) (were / was) carried out (in / on / by / using)
the (R2)	91	- out of dormancy
carried (L1)	58	- (cannot)(be) ruled out (the possibility); completely rule out
in (R1)	49	- come out of
were/was (L2)	63	- one out of
experiments (L3)	13	- pointed out that
on (R1)	13	
rule/ruled (L1)	20	

Table 4.- Collocates and word clusters for *out*

Apart from the uses explained above, *out* is also used in other combinations. Completive sense (*dry out*, *fade out*) may be seen in the examples below. In contrast with *up* the use of *out* is preferred when the action is seen as a (long) process leading to a final state. This is sometimes reflected in the verb choice (*fade*) or in the use of the adverb (*gradually*):

(Ex. 32) only the median remains visible before *fading out*

(Ex. 33) the mucus on the stigmatic rays gradually *dried out*;

Two verbs are frequent in the texts since they are research related. These are *carry out* and *bear out*. The first is recurrent in all research texts, the second is typical of experimental sciences. But in our texts, it is not only the scientists who *carry out* a task or study, insects are frequently the subjects of this verb:

(Ex. 34) more detailed studies have to be *carried out* to confirm this interspecific hybridization; It may stimulate bees to *carry out* pollen-collecting movements

(Ex. 35) the high seed set seems to *bear out* effective wind pollination

The words *outcross* / *outcrossing*, meaning the introduction of a new genetic variation, yield a high frequency of occurrence (361) and provide positive mutual information with the words *beneficial* (5,68) and *perform* (4,98).

Examples with *over*

Collocates	Frequency	Word clusters
yr (R2)	45	- over the past #
time (R1)	44	- (was/were) tested over (the)
all (R1)	41	- over the course of
for (L3,4,1,2)	37	- over all sites/plants
period (R1)	29	- over the entire
species (L1)	27	- averaged over all
pollen (L5-1)	23	- over long periods of / over a longer / over a range /the course of the
averaged (L1)	16	- was placed over
dispersal (L2)	14	
range (R3)	14	
tested (L1)	14	

Table 5. Collocates and word clusters for *over*

A common use of *over* is in sentences expressing some kind of control or power where the subject of the phrasal verb with *over* is the one that controls the situation:

- (Ex. 36) the serpentine outcrop is usually *taken over* by an abundance of perennial grasses; they are rarely elaborated to *take over* other roles; allowing staminoides to *take over* roles not performed by stamens
- (Ex. 37) the section name Lobatae *has priority over* the better known name Erythrobalanus; *giving* us increased resolving *power over* equal weighting

This may also be seen in noun phrases with *over* specially when there is a context in which words related to power, fight or discussion form part of the co-text of *over*:

- (Ex. 38) The *preference* of one member of the pair *over* the other
- (Ex. 39) This is indicative of a master *control over* final megagametophyte
- (Ex. 40) Some *controversy over* terminology involving the viscidium exists;

Another prepositional use of *over* is to express extension related to a surface or extension in time. Unlike *during*, *over* seems to emphasize that a process is carefully followed in that period of time. Cohesion between verb and preposition varies from one example to another:

- (Ex. 41) The pattern did not change appreciably *over* the 10yr period
 (Ex. 42) Transport pollen *over* a considerable distance; Scattered all *over* the leaf surface; Populations distributed *over* a relatively homogeneous habitat

This use is seen with the verbs *test* and *sample* when *over* introduces the object of analysis or time. A different sense is conveyed when the preposition *for* is used, it implies that the test is searching for specific data:

- (Ex. 43) populations of *J. osteosperma* *sampled over* a large geographic area
 (Ex. 44) nectary secretions were *tested for* glucose with diabetes test paper
 (Ex. 45) the effect of variety was *tested over* days and the effect of days was *tested over* individuals

The word *effect* in the phrase “the effect of X over Y” may also be related to the sense of *over* use in a context of power or control. It seems that when the preposition *on* is used with this phrase, the writer is talking about an effect that has already been proved while with *over* the results of the testing are still unknown:

- (Ex. 46) summer temperature during the previous year *had* the strongest *effect on* flowering

Mutual information counts for *over* inform us about the relevance of the association “carry+over”. Mutual information statistics compare the probability of observing two words together with the probabilities of observing them independently. Since the act of “carrying over” is essential to seed dispersal discourse, the use of the noun *carry-over* emerges from a necessity to name a concept derived from that action:

- (Ex. 47) the effect of pollen *carry-over* will presumably decrease in each visit

Examples with *down*

Collocates	Frequency	Word clusters
the (R1)	25	- down the style
pollen (L3)	7	
to (L2)	6	
tubes (L5,4,3,2)	5	

Table 6. Collocates and word clusters for *down*

Down is not as frequent as the other particles examined here. It is basically used to indicate downward movement as in:

(Ex. 48) the petal has completely *folded down* over the keel

(Ex. 49) is *layed down* into horizontal position

(Ex. 50) the stamen (...) *hangs down* over the lip

(Ex. 51) bundles can be easily *followed down* the flower

(Ex. 52) *crawl down* between the staminodes and the style

Its second most frequent use is in the combination *break down* with the meaning of “decompose” and also “destroy”:

(Ex. 53) become compressed and/or *break down* at the time of fruit maturity

Concluding Remarks

Concordances, the list of occurrences of a word or words in a context drawn from the texts in a corpus, provide useful examples of language in use. In language, particularly in specialised texts, meaning is a product of context. The analysis of the use of phrasal and prepositional verbs in different specialised corpora may provide, as suggested in this article, interesting results in the use of verb-particle combinations which although linked to their use in general language, present particularities in a particular domain.

The examples in our corpus provide some guidelines for classroom presentation of the most common uses of particles in seed dispersal articles. Thus, the findings in this article could be summarised as follows: the particle *up* is used with a spatial sense to express position, organisation and upward movement. When referring to an action it is used to express completion and development. The noun *close-up* is frequent due to the fact that photographs are common in this field of research to illustrate detailed features of parts of a plant.

The particle *off* has two main uses. One is to express detachment and the other is to refer to a ballance in nouns such as *trade-off*. Examples from the corpus show how *off* is used in relation to a surface while *out* is used in relation to a recipient or interior part of something. Another overlapping use of *off* and *out* is to express the ejection or production of some part of a plant where *off* indicates a more neutral ejection and

out focusses on the growth that is taking place and on the manner in which this progress is taking place. The other frequent use of *out* is in the verb *carry out*, indicating gradual completion of research tasks.

Over is related to the senses of control or power and extension in time, surface, or sample population. Finally, *down* is used to indicate downward movement, decomposition and destruction.

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