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PHRASAL VERBS IN ACADEMIC LECTURES
Some semantic and pragmatic insights from a corpus-assisted analysis

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Abstract – Phrasal verbs are notoriously challenging for L2 learners of English, especially when such composite structures are not present in their native languages. Features of phrasal verbs that can create considerable comprehension issues include varying degrees of semantic opaqueness and high levels of polysemy, as well as the dynamic nature through which new forms and meanings frequently emerge. This paper provides an in-depth analysis of phrasal verbs in academic lectures as a spoken genre that requires listeners to process complex and abstract content in real time. The transcripts of 15 multi-disciplinary lectures collected from the OpenCourseWare web sites of Yale University and the Massachusetts Institute of Technology were analysed with corpus methods, including part-of-speech tagging, in order to shed light on the use of phrasal verbs in terms of forms, meanings, and patterns of usage, with a view to those that may be problematic for L2 listeners. Results showed that phrasal verbs were quite frequent, while also displaying substantial variation in form and with roughly half having figurative meanings. Further contextual analysis of figurative phrasal verbs revealed instances of pragmatic strengthening to both expand on core meanings and communicate speaker attitude. The article concludes with a discussion of the pedagogical implications of the analysis, with attention to strategies for helping L2 learners more effectively cope with the difficulties of phrasal verbs.

Keywords: lectures; phrasal verbs; corpus analysis; academic discourse; part-of-speech tagging.

1. Introduction

The challenges faced by L2 learners when listening to academic lectures have been well documented in the relevant literature. On a linguistic level, L2 listeners must cope with an extensive range of language features on various levels: phonological (Norris 1995; Rost 2002), lexico-syntactic (Deroey, Taverniers 2012; Flowerdew 1994; Swales 2004), structural (Crawford Camiciottoli 2007; Young 1994), pragmatic (Fortanet 2004; Simpson 2004), and cultural (Crawford Camiciottoli 2018; Miller 2002; Zhu, Flaitz 2005). At the same time, they are required to process a high concentration of complex content with abstract concepts imparted by academics who may also have unfamiliar approaches to lecturing and classroom interaction (Lynch 2011).

This unique combination of linguistic, content-related, and contextual factors that all come into play during a lecture means that academic listening is considerably more demanding for L2 learners than their L1 counterparts, even for those at high proficiency levels in the target language (Mulligan, Kirkpatrick 2000).

Other potential difficulties for L2 lecture comprehension are related to what Buttery *et al.* (2015, p. 208) have described as the phenomenon of "conversationalisation" in spoken academic discourse. Already as far back as the 1990s, Dudley-Evans (1994, p. 148) identified the ''conversational style" lecture as one in which the topic had been planned but not the actual speech, thus resulting in a relatively informal delivery and some interaction with the student audience. Since then, other studies have confirmed a trend towards lectures becoming increasingly conversation-like and interactional (Crawford Camiciottoli 2007; Morell 2004; Swales 2004). Studies based on corpora of authentic lecture discourse have also revealed a number features that are typically associated with informal speech production. These include discourse dysfluencies such as pause fillers and false starts (Crawford Camiciottoli 2007; Glass *et al.* 2004,), as well as various lexical features of an informal nature, for example, discourse markers (Schleef 2008; Swales, Malczewski 2001), question tags (Pérez-Llantada 2005), hedging and vagueness indicators (Mauranen 2004), and idioms (Crawford Camiciottoli 2007; Simpson, Mendis 2003). Among informal lexical features of spoken language, we can certainly list phrasal verbs (hereafter PVs) that both Quirk *et al.* (1985) and Biber *et al*. (1999) characterize as commonly present in English conversation and largely informal in tone. However, how PVs are used in academic lectures appears to have been explored only marginally. Crawford Camiciottoli (2004) identified some PVs within discourse structuring patterns to announce to students how the lecture will unfold (e.g., *I'm gonna go through it now*, *we'll go over the main points*). Liu (2003) provided the example of the PV *come up with* found in a multi-genre corpus that included academic lectures. Thus, previous research on PVs in lecture discourse has been quite sporadic and lacking in systematicity. In an attempt to address this gap, this study examined the use of PVs in a corpus based on the transcripts of 15 academic lectures. The aim was to shed light not only on their linguistic forms, but also on their meanings in this context of usage, with particular attention to those that may be challenging for L2 listeners. To do so, I addressed the following research questions:

1. To what extent are PVs used by the lecturers?
2. Which categories of PVs can be identified?
3. Which patterns of usage can be identified?

It is well known that PVs can create comprehension difficulties for L2 learners due to their wide-ranging degree of semantic transparency/opaqueness and

idiomaticity (Celce-Murcia, Larsen-Freeman 1999; Cornell 1985; White 2012), and high level of polysemy (Gardner, Davies 2007; Garnier, Schmitt 2016). In addition, although PVs are highly frequent in English, most languages do not possess such verb + particle combinations (Celce-Murcia, Larsen-Freeman 1999), which can further exacerbate difficulties when the native language of L2 learners lacks such constructions. Another complicating feature of PVs for L2 learners is that they are very dynamic, such that new forms and meanings are coined with extreme frequency and ease (Bolinger 1971; Darwin, Gray 1999).

In light of all the issues discussed in the preceding paragraphs, it is important to acquire a better understanding of how PVs are actually used in lecture discourse in order to promote more successful L2 comprehension of this key feature that characterizes the speech of native and proficient speakers of English (Garnier, Schmitt 2016). As the linguistic focus in this research, in the following section I provide a brief overview of some salient aspects involved in analyzing PVs.

2. Phrasal verbs

As common features of the English language, phrasal verbs have stimulated considerable interest among linguists who have proposed various definitions, descriptions, and classifications in relation to their syntactic and semantic properties.[1] According to Quirk *et al.* (1985), phrasal verbs are multi-word verbs containing a verb and an adverb particle that can be categorized into two types: intransitive (with no direct object) or transitive (with a direct object and possible variation in the position of the adverb particle). They also mention the potentially idiomatic meanings and intensifying function of PVs, as in *liven up* (Quirk *et al.* 1985, p. 1152). Biber *et al.* (1999, p. 403) similarly define PVs as "multi-word units consisting of a verb followed by an adverbial particle" and also describe their transitive/intransitive variations with possible particle movement, while noting the complex semantic properties of particles such as *out, in, up* or *down*, in terms of "core spatial or locative meanings", as well as frequent "extended meanings" (Biber *et al.* 1999, p. 403). Based on an analysis using the British National Corpus, Gardner and Davies (2007, p. 341) provide an empirically-driven definition of PVs as two-part verbs comprised of a lexical verb and an adverbial particle "that is either contiguous (adjacent) to that verb or noncontiguous (i.e., separated by one or more intervening words)". While this definition accounts for the considerable variation in the syntactic patterning of PVs, it does not encompass issues linked to their meanings.

[1] For in-depth theoretical discussions of PVs that are beyond the scope of this study, see the book-length treatments by Bolinger (1971), Fraser (1976), Sroka (1972), and Thim (2012).

Focusing instead more on the semantic relations between verbs and particles in PVs, Fraser (1976, p. 6) described "verb-particle combinations" as figurative (e.g., *figure out, look up*) with idiomatic meanings, completive (e.g., *fade out, beat up*) where the particle encodes a sense of completion to the overall meaning, and systematic where the particle retains its "adverbial force" to a greater or lesser extent. For instance, in *hide away*, the adverbial meaning of *away* is largely retained, while in *hunt down*, the adverbial meaning of *down* is less clear. Laufer and Eliasson (1993, p. 38) later formulated three semantic categories of PVs: literal meaning (e.g., *go away*), semitransparent meaning that can be retrieved from context (e.g., *eat up*), and figurative meaning (e.g., *let down*). Their study was conducted in an instructional context in order to shed light on why L2 learners may avoid using PVs. The results showed that learners whose first language has no PVs (in this case, Hebrew) tended to avoid them (especially those with figurative meanings) more than learners whose first language does have PVs (in this case, Swedish). Thus, the native language appears to play an important role in the acquisition of PVs among L2 learners. Interestingly, English PVs are often synonyms of single verb forms of Latinate originate (e.g., *get rid* of vs. *eliminate*, *go down* vs. *descend* (McArthur 1989; Swales, Feak 2004). For L2 speakers of Latin-based Romance languages, such single verb forms in English are largely transparent. On the contrary, these speakers may encounter difficulties understanding their PV alternatives as forms that do not occur in their native languages.

When examining issues involving PVs in L2 instructional settings, it is also important to acknowledge the pragmatic nature of some facets of meaning. In an in-depth analysis of English phrasal verbs, Mahpeykar (2014) applies the notion of *pragmatic strengthening* (Traugott 1988) to describe new meanings that become associated with certain lexical forms arising from implicatures in certain recurring contexts of usage. For example, Mahpeykar (2014) contrasts the central sense of *take off* (meaning to get hold of something and remove it) with the pragmatically strengthened *take off* (meaning to stop working temporarily), in which a person removes him/herself from the place of work.[2] According to Traugott (1988, p. 407), pragmatic strengthening also entails a "strengthening of the expression of speaker involvement". In the context of PV usage, this can be seen in choices that encode evaluative meanings. For example, some uses of the PV *show up* may imply a critical attitude (e.g., *After over an hour, she finally showed up*), rather than a more neutral choice such as *arrived*. Clearly, these pragmatic aspects of PVs can create obstacles to successful comprehension among L2 learners.

[2] The PV *take off* has other extended meanings: leave (*the plane took off; she took off from the party last night*); become popular or successful (*the new book really took off*); provide a discount (*you can take off 10% from the original price)*

3. Methodology

3.1. The corpus

The transcripts of 15 lectures were collected from the OpenCourseWare (OCW) platforms of Yale University (eight lectures) and the Massachusetts Institute of Technology (MIT) (seven lectures).[3] In an effort to avoid potential skewing related to disciplinary aspects, I selected lectures from a variety of disciplines spanning the humanities, social sciences, and hard sciences. However, this selection was somewhat constrained by the different disciplinary traditions that characterize the two institutions. MIT has a strong research focus in applied sciences and engineering, while Yale's curriculum continues to reflect its origins that privileged the classics and theology. The Yale lectures were delivered in the timeframe from 2007 to 2011, while the MIT lectures were delivered during the period from 2010 to 2013.[4] Table 1 provides an overview of the corpus.

Lecture	Discipline	Course title	Univ.	Tokens
1	Art History	Roman Architecture	Yale	15623
2	Ecology and Evolutionary Biology	Principles of Evolution, Ecology and Behavior	Yale	7408
3	History	The American Revolution	Yale	8285
4	Psychology	Introduction to Psychology	Yale	8259
5	Geology and Geophysics	The Atmosphere, the Ocean, and Environmental Change	Yale	6969
6	Classics	Introduction to Ancient Greek History	Yale	9466
7	English	Modern Poetry	Yale	5081
8	Political Science	Capitalism: Success, Crisis, and Reform	Yale	5583
9	Economics	Principles of Microeconomics	MIT	7677
10	Biology	Fundamentals of Biology	MIT	5654
11	Electrical Engineering and Computer Science	Introduction to Algorithms	MIT	7016
12	Civil and Engineering Dynamics	Engineering Dynamics	MIT	6659
13	Physics	Quantum Physics I	MIT	11143
14	Chemistry	Introduction to Solid State Chemistry	MIT	6654
15	Literature	The Film Experience	MIT	6566
				118,043

Table 1.
The Yale/MIT OCW lecture corpus.

[3] https://oyc.yale.edu/ and https://ocw.mit.edu/courses/audio-video-courses/.

[4] The 2007-2013 timeframe of the corpus was conditioned by issues of accessibility and representativeness. Specifically, it includes only courses that did not require formal enrollment in order to be accessed and courses that would ensure an adequate multi-disciplinary representation.

3.2. The analysis

The corpus described above was compiled into a single file in plain text in order to process it with the part-of-speech (POS) tagger of Wmatrix (Rayson 2008), which automatically assigns a tag to each word according to its corresponding part of speech on the basis of a predetermined tagset. The tagset contains 137 tags that identify parts of speech at a highly articulated level and, according to its developers, has an accuracy of 96-97%. The POS tagged file was then elaborated with Wordsmith Tools (Scott 2008) using the tag RP (preposition or adverb particle) as a search term. The initial query retrieved 1032 concordance lines containing the following lexical items tagged as RPs: *about, along, around, back, by, down, in, off, on, out, over, through*, and *up*. The concordance lines were then resorted to order them according to various verb tags[5] to the left of the RP tag, which enabled the identification and elimination of all instances in which the particles were not used in PV structures, and thus not relevant to this study. For example, there were many instances in which adverb particles were combined with deictic elements here/there and spatial adverbs (e.g., *out there, over here, up here, down there, down below, up above*), in coordinated lexical phrases (e.g. *up and down, in and out, through and through*), in temporal expressions (e.g., *early on, later on*), or in enumerating expressions (e.g., *first off*). There were also numerous concordance lines in which the item tagged as RP functioned as a simple preposition followed by a NP (e.g., *the last class was about the comparison model, buttressed by two barrel vaults, they are in everything*). The raw concordance output thus required extensive filtering to remove unwanted items. To resolve dubious cases of whether items qualified as PVs or not, I further examined items in an extended context of usage beyond the concordance lines and/or consulted the Oxford Phrasal Verbs Dictionary for Learners of English (2001).

After the first phase of filtering, 794 concordances lines containing PV structures remained. In line with previous descriptions of PVs (Biber *et al.* 1999; Gardner, Davies 2007; Quirk *et al.* 1985), there was some structural variation in that particles were not always adjacent to the verb and that the number of intervening words could vary, for example, *let me back up, write it up, flesh this out, got the thing off to* […], *break the problem down, start them all off*. The 794 concordance lines were then submitted to a second phase of filtering in order to identify PV categories in terms of transparency of meaning. Particular attention was paid to distinguish those that could be interpreted as

[5] In the tagset, the following lexical verb forms are articulated: VV0: base form of lexical verb, VVD: past tense of lexical verb, VVG: *-ing* participle of lexical verb, VVGK: *-ing* participle catenative, VVI: infinitive, VVN: past participle of lexical verb, VVNK: past participle catenative, VVZ: *-s* form of lexical verb.

figurative or semantically opaque, as these are the specific type of PVs that are likely to be the most challenging for many L2 listeners, and thus of particular interest to this study. More specifically, following Laufer and Eliasson (1993) and Biber *et al.* (1999), I manually examined the 794 PVs within their context of usage to tease out figurative PVs whose meanings were non-compositional and/or contained particles that did not reflect literal spatial meanings. For example, I eliminated *go down* meaning *descend* as semantically transparent (Laufer, Eliasson 1993) as its particle encodes a literal spatial meaning, whereas I retained *go on* meaning *happen* as semantically opaque as its particle does not encode a literal spatial meaning. I also opted to remove PVs of a completive nature (Fraser 1976), such as *add up*, *divide up*, and *cut up*, as these encoded relatively transparent meanings based on the verbal element. At the end of this process, the items whose meanings were interpreted as figurative or semantically opaque (Laufer, Eliasson 1993) were examined and interpreted within their context of usage to determine patterns of usage that may have implications for L2 lecture comprehension.

4. Results and discussion

4.1. Global analysis of PVs

In terms of overall frequency, the 794 PVs that emerged from the Yale/MIT OCW lecture corpus corresponded to 6.72 occurrences per 1000 words. Of those, 372 encoded figurative meanings, corresponding 3.15 occurrences per 1000 words and accounting for 46.8% of all PVs in the corpus.[6] Because, to the best of my knowledge, no previous studies have systematically examined the frequency of PVs in lecture discourse, let alone the frequency of figurative PVs, it is difficult to determine conclusively whether these results reflect high or low usage in the corpus. However, two helpful observations can be made. First, Biber *et al.* (1999, p. 409) found overall phrasal verb frequencies of 1800 per million words (i.e., 1.8 occurrences per 1000 words) in English conversation. Thus, 6.72 PVs per 1000 words overall in the Yale/MIT OCW lecture corpus and even 3.15 occurrences per 1000 words of figurative PVs indicates that they are quite prominent in these lectures. Second, the 372 figurative PVs correspond to an average of 24.8 per lecture and there were no lectures in the corpus without any PVs. Therefore, it seems reasonable to surmise that figurative PVs are relatively common features of lecture

[6] The remaining 422 items (53.2%) were broadly categorized as literal/semitransparent since clear distinctions between the two categories are not always discernable (Thim 2012). These PVs were not subjected to further in-depth analysis primarily because they are less likely to cause comprehension problems for L2 listeners, but also for reasons of space and feasibility.

discourse, suggesting that L2 listeners indeed have numerous opportunities to encounter them.

4.2. Contextual analysis of figurative PVs

With particular reference to the figurative PVs that emerged from the lecture corpus, the Appendix lists the lemmas of the various inflected forms that were identified as having distinct meanings from the in-depth analysis of the concordance lines. They are ranked according to frequency and presented along with their corresponding meanings within the specific context of usage. Five items were polysemous (i.e., *get back*, *go on*, *make up*, *pick up*, and *work out*) with each meaning being counted separately, for a total of 109 distinct meanings across 104 different PV types.

Among the top-ranking PVs (10+ occurrences), several could be clearly linked to the instructional setting in which an expert seeks to impart knowledge and guide student audiences through the lecture content. For example, *come back* (n=13), *go back* (n=10), and *go on* meaning *continue talking* (n=10), were often used in a discourse structuring or metadiscursive capacity to provide signposts for listeners as to how the lecture is unfolding. This result thus corroborates Crawford Camiciottoli's (2004) study which also found metadiscursive PVs in lectures. Examples 1-3 illustrate this usage. Similarly, the frequent use of *turn out* (n=25) and *end up* (n=18) which both refer to something that develops or concludes in a particular or unexpected way (see the Appendix) were often used to help learners focus on the important result or outcome of the situation, as seen in examples 4 and 5. The relatively high frequency items *figure out* (n=28) and *come up with* (n=16) encode the mental processes of the senser (Halliday 1985), as shown in examples 6-7. In example 6, the mental process refers to the learners' own development of conceptual knowledge in line with the goals of academic lectures.

(1) So let's *come back* to computing expectation values for momentum. *(Quantum Physics I/MIT)*

(2) I want to stop at this point to *go back* to another issue. *(Introduction to Psychology/Yale)*

(3) Let's *go on* now - z double dot? *(Engineering Dynamics/MIT) 3*

(4) The availability of that silver would *turn out* to be crucial at various moments in Athenian history. *(Introduction to Ancient Greek History/Yale)*

(5) So did the company […] *end up* paying or not? *(Capitalism: Success, Crisis, and Reform/Yale)*

(6) So our problem is to *figure out* how did this all get going? (*Principles of Evolution, Ecology and Behavior/Yale)*

(7) A number of the established elite in Massachusetts — lawyers, particularly merchants, wealthy merchants — were forced to *come up with* their own solution. *(The American Revolution/Yale)*

The most frequent PV in the corpus was *go on* (n=39) meaning *happen* (examples 8-10). This more informal alternative supports the trend towards the "conversationalisation" of academic discourse observed by Buttery *et al.* (2015, p. 208). It was typically used in the present perfect continuous tense and sometimes in the form of a rhetorical question which the lecturer then proceeds to answer, as a way to focus the students' attention on a particular aspect of lecture content (example 10). This is similar to what Bamford (2005) described as self-elicitation questions used by lecturers to stimulate and maintain audience interest.

(8) These two things are *going on* at once. *(Modern Poetry/Yale)*

(9) So that's what's *going on* inside. *(Introduction to Solid State Chemistry/MIT)*

(10) So what's *going on* in all of these cases? At the surface of the ocean […] *(The Atmosphere, the Ocean, and Environmental Change/Yale)*

However, the more frequent items (i.e., 10+ occurrences) discussed above would seem unlikely to cause serious comprehension difficulties for two reasons. First, L2 learners may already be familiar with them as PVs are commonly included in English language teaching syllabi and assessment instruments even at intermediate levels of proficiency.[7] Second, their meanings could be recovered relatively easily from the context of usage, as for the discourse structuring items (i.e., *go back*, *go on, come back*). In the latter case, such PVs could even be reclassified as semitransparent in this particular context of usage, following Laufer and Eliasson (1993), thus demonstrating the challenge of applying rigid semantic categories to PVs. Indeed, as Thim (2012, p. 13) noted in relation to the semantic properties of PVs, "it is not always possible to draw clear-cut distinctions".

What emerged as particularly interesting from the analysis was the wide variety among distinctive types of figurative PVs used by the lecturers. In fact, while only 8 (7.3%) occurred 10 times or more, 55 (50.4%) occurred only once, pointing to considerable variation in usage. Many of the less frequent PVs (i.e., <10) were used in similar ways as the more frequent ones described above, but took on less familiar forms and encoded a higher degree of idiomaticity. For example, there were other PVs beyond those mentioned previously that performed a discourse structuring function as illustrated in examples 11-14.

[7] See, for example, English language teaching resources that indicate PVs as topics covered at intermediate levels: https://www.cambridgeenglish.org/Images/126460-cec-handbook-for-teachers.pdf; https://www.gatehouse.it/CLASSIC/docs/Examination%20Specification%20B2.pdf; http://blairexamenglish.com/fce/general/50-phrasal-verbs-commonly-used-fce-exam.

(11) I want to talk a bit about two crucial issues and some other matters that will *come up* later. *(The Film Experience/MIT)*

(12) So today what I want is *pick up on* the discussion of the uncertainty principle that we sort of outlined previously. *(Quantum Physics I/MIT)*

(13) We'll first *go over* some basic facts about language. *(Introduction to Psychology/Yale)*

(14) So the last step, which I'll *touch on* very briefly, was proof of what's called semi-conservative replication. *(Fundamentals of Biology/MIT)*

Other figurative PVs encoded mental processes related to understanding concepts or formulating thoughts, but contain highly opaque verbal elements, as illustrated in examples 15-18. Such meanings may be familiar to many L2 students without dedicated instruction.

(15) I want to *tease out* some of those meanings for you as well. *(The Film Experience/MIT)*

(16) So in particular, just to *flesh this out* a little more, if we were in 3D, for example […] the wave function would be a function of all three positions x, y and z. *(Quantum Physics I/MIT)*

(17) But ornamentation or decoration that has certain meaning to it: a meaning that certainly *conjures up* ancient Greece. *(Roman Architecture/Yale)*

(18) So Eigen tried to *cook up* a way out of this, and he called it hypercycles. *(Principles of Evolution, Ecology and Behavior/Yale)*

Following Mahpeykar (2014), some PVs seemed to display the process of pragmatic strengthening whereby a new meaning that expands on the central sense becomes established through recurrent usage in particular contexts. In example 19, *pull out* means to bring something into the discussion in a strategic way instead of its central sense of physically taking something out of somewhere. Similarly, in examples 20 and 21, respectively, *put out* means to be made irrelevant (vs. to extinguish, for example, a fire) and *pull off* means to succeed in doing something difficult (vs. succeeding in removing something from somewhere).

(19) The Peloponnesian War is about to break out, the enemies of Pericles will *pull out* the curse of the Alcmaeonidae to use against him, because his mother was of Alcmaeonids family. *(Introduction to Ancient Greek History/Yale)*

(20) The lost state of Franklin had this little tiny moment of almost existing and then "poof," it was *put out*. *(The American Revolution/Yale)*

(21) Since we don't have clickers, but I want to *pull off* the same effect, and we can do this, because it's binary here. *(Quantum Physics I/MIT)*

The notion of pragmatic strengthening involving an upscaling of speaker attitude and involvement (Traugott 1988) was also evident. In example 22, *comes in* takes on a negative connotation related to an unjust intrusion or interference, while in example 23 *sitting around* implies critical attitude linked to idleness that leads to problems.

(22) What happens when the government *comes in* and says you have to pay $1.05 for every kilogram of pork you sell? *(Introduction to Microeconomics/MIT)*

(23) Look at what happens when you have a standing army *sitting around*. They can't help themselves; they're always threatening to overturn the government. *(The American Revolution/Yale)*

The lecturers also used some highly colloquial PVs typically associated with casual conversation between peers, as seen in examples 24-28. The uses of the latter two (i.e., *cop out* and *poke around*) also convey a sense of mild self-deprecation, perhaps to create a less authoritative atmosphere and build rapport with the audience, in line with previous work on lecture discourse in U.S. educational settings (Crawford Camiciottoli 2005; Dyer, Keller-Cohen 2000). From the perspective of interpersonal pragmatics, such "relational work" (Locher 2013, p. 236) reflects the process of building and maintaining relations in social-situated interactions.

(24) The bath is what they wanted most of all – a place where they could go to bathe, but also *hang out* with their family and friends. *(Roman Architecture/Yale)*

(25) But I'll sure ask you concept questions. I really want you to understand the principles. I don't get real *hung up* on having you do the grungy grind-it-out things. *(Engineering Dynamics/MIT)*

(26) You can bet they will be looking very carefully over the shoulders of the aristocratic archons whenever they are in power to see that they're not *screwing up. (Introduction to Greek History/Yale)*

(27) We're going to prove that under an assumption. We'll have to warm up a little bit. But I'm also going to *cop out* a little as you'll see. *(Introduction to Algorithms/MIT)*

(28) When I was *poking around*, researching this this morning, I found some book — I think it's called something like The Lost State of Franklin. *(The American Revolution/Yale)*

A final example illustrates the use of a PV in a highly discipline-specific context, namely, *glom on*, which is an informal way to express the notion of seizing and appropriating something for oneself (example 29). Here the use of the PV serves to highlight the exploitive nature of a virus in reproducing itself. This particular item is likely to be unfamiliar to L2 learners and would thus need to have its meaning reinforced in some way, perhaps through repetition

(in this lecture, it is actually repeated three times) or with co-occurring non-verbal cues, such as descriptive gesturing.

(29) Where is the transforming principle in the little virus? It *gloms on* to the cell somehow gives something into the cell, and poof, 20 minutes later, half an hour later, lots of viruses. *(Fundamentals of Biology/MIT)*

5. Concluding remarks

This analysis of PVs in a corpus of academic lectures has provided some insights into their usage in an interactional setting that can be broadly characterized as institutional and asymmetrical, with expert to novice communication. Regarding the extent to which PVs were used in the lectures (Research Question 1), the quantitative results indicate that they were considerably more frequent than in casual conversation (cf. Biber *et al.* 1999). Concerning the different categories of PVs (Research Question 2), I distinguished those with figurative meanings from those with either literal or semi-transparent meanings (Laufer, Eliasson 1993), with the former accounting for almost half (46.8%). Given the potentially challenging nature of figurative PVs for L2 listeners, these items were then the focus of the in-depth contextual analysis to identify patterns of usage (Research Question 3). This analysis revealed that many figurative PVs encoded meanings that are core features of the lecture genre: discourse structuring to guide listeners through the lecture and mental process verbs related to the understanding of conceptual knowledge. Such usage could also contribute to the higher frequency of PVs overall in the lectures with respect to general English conversation. There was also a high level of variation across PV types, with roughly half occurring only once and including several that were highly idiomatic and non-compositional in meaning. A number of figurative PVs with pragmatically modulated meanings were detected in the corpus, for example, PVs with new meanings in particular contexts of usage derived from the pragmatic strengthening of their central senses, as well as those that functioned interpersonally to manage the rapport between lecturers and audiences.

The complex synergy of distinctive lexical, semantic, and pragmatic features of the PVs found in the Yale/MIT OCW lecture corpus lends support to previous research that has highlighted their capacity to create difficulties for L2 learners (Celce-Murcia, Larsen-Freeman 1999; Cornell 1985; White 2012), and thus leads to important pedagogical implications. First, because the presence of L2 students in lecture audiences is now a given in the era of globalized higher education, lecturers need to be aware of these students' needs and, specifically, the potential comprehension issues of PVs. Although it is unrealistic to expect content lecturers to analyse their own lecture discourse or

to unnaturally control their use of PVs, they could be encouraged to monitor L2 learners' comprehension of them and be prepared to assist them through strategies to enhance understanding such as repetition, reformulation, or non-verbal cues that mirror or reinforce meanings. Indeed, Lynch (1994) and Flowerdew and Miller (1996) have advocated for training initiatives to prepare lecturers for international audiences and there is some evidence that native English-speaking content lecturers have attempted to make adjustments to their speech delivery and vocabulary to facilitate international students (Crawford Camiciottoli 2005, 2007; Flowerdew, Miller 1996). Second, language practitioners involved in EAP teaching and specifically in preparing L2 students for English lecture listening experiences, need to become more aware of the differing degrees of transparency/opaqueness in PVs. Such knowledge would provide practitioners with more insights into why some PVs may be particularly problematic for learners. Specific professional development activities could be organized for this purpose. As Armstrong (2004, p. 223) argues, it is not sufficient for English language instructors to have the "unconscious knowledge of the native speaker" in relation to PVs; they must develop a "conscious awareness of the semantic systems underlying these complex constructions". In this way, they will be better equipped to teach PVs more effectively and meaningfully to the benefit of their students.

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Annex

	Phrasal verb	Meaning in context of usage	Frequency
	go on	happen	39
	figure out	understand something through careful thinking	28
	turn out	develop or end in a particular way	25
	end up	reach or come to an unexpected conclusion	18
	come up with	think of an idea, answer or solution	16
	come back	talk about again	13
	go back	talk about again	10
	go on	continue talking	10
	come along	insert oneself into a situation	9
	look up	search for meaning in a text	9
	set up	start a process or establish something	9
	take over	conquer	9
	give up	stop trying to do something	7
	live on	continue to exist	6
	get back	return to something/someplace	5
	start off	begin something	5
	break down	divide into parts for the purpose of analysis	4
	glom on	seize and appropriate for oneself	4
	pick up	accelerate	4
	pop up	appear unexpectedly	4
	use up	use all of something so that there is no more left	4
	build up	accumulate	3
	come up	be talked about or discussed	3
	get down	direct attention and effort to understanding something	3
	hold back	prevent from doing something	3
	hold on	wait for a short time	3
	knock off	cause to become separated	3
	make up	constitute	3
	play out	develop and come to an end	3
	show up	arrive at a place	3
	sit back	relax and not become anxious	3
	work out	calculate	3
	work out	develop or end in a successful way	3
	write up	write something in a complete and final form	3
	back up	return to a previous talking point	2
	break out	start suddenly	2
	bring up	mention and start to talk about something	2
	come about	happen	2
	conjure up	evoke an idea about something	2
	cut back	reduce the amount of something	2
	drop out	stop being part of something	2
	fall off	decrease in quantity	2
	hang out	spend time with other people	2
	knock out	eliminate	2
	mess up	do something badly	2
	move on	talk about something different	2
	pick up	pay for	2
	pull out	bring something into a discussion in a strategic way	2
	set out	intend to do	2
	start out	begin talking about	2
	take out	underwrite an official document	2
	think through	consider a problem carefully and completely	2
	throw out	reject something	2
	turn over	give responsibility for something to someone	2
	beat back	make someone move backwards	1
	brew up	become problematic	1
	carve out	find space/time for something	1
	clear up	find an explanation for something	1

	close off	bring the lecture to a conclusion	1
	comes in	insert oneself into a situation	1
	cook up	invent a plan to avoid something	1
	cop out	avoid doing something that should be done	1
	crop up	appear unexpectedly	1
	curse out	berate with curse words	1
	cut down	reduce the amount of something	1
	die down	become less strong gradually	1
	die off	become extinct	1
	fall back	return to a previous course of action	1
	fix up	renovate an object	1
	flesh out	discover more information about something	1
	follow through	complete something that was started	1
	freeze out	prevent someone from taking part in something	1
	get back	contact someone again	1
	get back	talk about again	1
	get off	send something by post or other form	1
	go over	discuss in detail	1
	go through	discuss in detail	1
	hung up	become excessively concerned or worried about something	1
	kick in	start to work or have an effect	1
	lay out	discuss in an organized way	1
	leave off	stop talking about something	1
	make out	manage to see something	1
	make up	invent	1
	narrow down	reduce number of possibilities gradually	1
	pick up on	begin talking about again	1
	pick up	obtain	1
	poke around	do slowly without hurrying	1
	pull off	succeed in doing something	1
	put out	made irrelevant	1
	put up	display in a public place	1
	put up with	accept something that is annoying or unpleasant	1
	rise up	start a fight and refuse to obey	1
	rule out	decide that something is not possible	1
	screw up	do something badly	1
	send off	send something by post	1
	settle down	get used to a new situation	1
	shut down	put an end to something	1
	shut off	keep separate	1
	sit around	spend time doing very little	1
	stand out	be clearly visible	1
	start over	begin explaining something again	1
	step back	reflect calmly and deliberately on something	1
	stir up	cause trouble	1
	take on	challenge someone	1
	tap into	manage to use something for good results	1
	team up	work together with someone else to do something	1
	tease out	find information that is hidden or not clear	1
	touch on	mention a topic briefly	1
	whip out	take something out quickly and suddenly	1
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