

Words as Constructions

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1. A lexical learnability problem

The average English speaker with secondary school education knows about 60,000 words; many speakers know 100,000 words or more (Miller 1996). 'Knowing a word' involves knowing a variety of things: its phonological form, grammatical properties, meaning, and, for some words at least, the social contexts and genres in which it is normally used (e.g. the word *horsy* is used primarily in informal spoken language, while *equestrian* is much more formal). It is also a matter of degree: a person may have only passive knowledge of a particular word, i.e. be able to recognise it but not produce it, or have only a rough idea of its meaning: for example, one might know that *trudge* is a verb of motion without being aware what specific kind of motion it designates. At the other extreme, many speakers have very detailed representations which enable them to distinguish *trudge* from near-synonyms such as *plod*, *yomp*, and *lumber*.

How is such knowledge acquired? To answer this question, it will be useful to make a distinction between 'basic' and 'non-basic' vocabulary. By 'basic vocabulary' I mean words designating relatively concrete entities which are learned early in development in the context of face-to-face interaction, where the extralinguistic context offers a rich source of information about meaning. In the simplest case, the

learner hears a label (*Look! A cat!*) in the presence of a referent (the neighbours' Burmese) and infers that the phonological form [kæt] refers to the animal.¹ Learning relational words such as verbs and prepositions is a more complex process because relations cannot be experienced or conceptualised independently of the entities participating in them (cf. Langacker 1987: 215, 298ff). Moreover, relational words are rarely used in isolation. Thus, learning the meaning of a relational word usually involves performing a sentence-to-world mapping (cf. Gleitman 1990). For example, to learn the meaning of the preposition *on*, the learner must be exposed to sentences such as *The cat sat on the mat* in a context which enables him or her to infer the meaning of the sentence, and to establish correspondences between chunks of phonological structure (e.g. [kæt], [mæt], etc.) and aspects of semantic structure (in this case, the cat and the mat). A further complication arises from the fact that verbs are typically *not* experienced in the presence of the referent: the events described by sentences such as *He broke it* and *Let's go out*, for example, refer to events which occurred either before or after the speech event. However, in all of these cases, learners have access to a variety of situational clues which help them to establish the conventional meanings of the words they are exposed to.

Non-basic vocabulary includes words which are acquired later in development, typically without the benefit of much extralinguistic support. Prime examples of non-basic vocabulary are words for abstract concepts such as *future*, *compute*, *knowledge*, or *aware*, which refer to entities which cannot be directly observed. Another, less obvious, subcategory are words like *scurry*, *ogle*, *capacious*, and *promontory*, which have relatively concrete referents and whose meanings could *in principle* be learned in the same way as basic vocabulary, through exposure during face-to-face interaction with adults in a suitably rich situational context – but which,

in practice, cannot be learned in this way because they are simply not encountered in such contexts: words like *scurry* and *capacious* are overwhelmingly used in written texts.

This distinction is, of course, a matter of degree: many words are encountered in written texts as well as in informal interaction; some learners are exposed to richer spoken input than others; and speakers of all ages occasionally encounter new words in face-to-face contexts. The point is that, as their vocabularies increase, language learners have fewer and fewer opportunities for learning words in the context of informal conversation simply because they already know nearly all the words they hear in such contexts (West, Stanovich and Mitchell 1993). Since vocabulary growth does not slow down but actually increases in late childhood and early adolescence (Anglin 1993), it follows that learners must be learning words in non-face-to-face contexts. Hayes and Ahrens (1988) point out that older learners are exposed to new words primarily in written texts: children's books contain 50% more rare words than adult television or the conversation of university-educated adults; and articles in popular magazines contain three times as many rare words as television programmes and adult conversation.

So from about 10 years of age, children encounter most unfamiliar words in written texts and other situations where the amount of extralinguistic information is very limited. This raises obvious learnability issues: how can the learner discover the meanings of words encountered in such contexts? One obvious source of information is explicit definitions: once the learner has become a reasonably competent language user, he or she can learn new words from verbal descriptions provided by other language users. Some words, especially words referring to scientific concepts taught at school, are probably learned in this way; however, it is unlikely that explicit verbal

definitions play a very prominent role in lexical development. School-aged children learn 12-15 new words every day (Miller and Gildea 1987, Anglin 1993, Bloom 2000), and we can safely assume that most children are not exposed to anywhere near this number of explicit definitions. Furthermore, most people are not very good at defining words, even words designating relatively concrete concepts. Consider the following definitions produced by five different British undergraduate students:

- (1) a. People do this when they are being big-headed or feeling particularly pleased with themselves.
- b. Move in a dance-like manner.
- c. Jump around in the manner of a loony! To be bouncy, overexcited. Performing reindeer do this.
- d. Walk in an extravagant, showy, arrogant manner, usually in order to attract attention.
- e. Move affectedly. Most often associated with people taking the mickey out of ballerinas or camp men. The most common situation would be a camp man trying to get attention.

All of these are definitions of the same lexical item: the English verb *prance*. It is difficult to envisage how a language learner could learn the conventional meaning of the verb from these descriptions (although of course some useful information *can* be gleaned from them).

Definitions found in dictionaries and textbooks are usually more accurate than those produced by ordinary language users, but this doesn't mean that they are always more helpful. For one thing, they often define synonyms in terms of each other. For

example, the *Collins English Dictionary* defines *prance* as ‘swagger or strut’. If we look up *strut*, we are told that it means ‘walk in a pompous manner; swagger’, and *swagger* means ‘walk or behave in an arrogant manner’. A learner would be able to form a general idea about the meanings of these words from the dictionary – something like ‘walk in a pompous or arrogant way’ – but not the differences between them. (Note, too, that this definition is not entirely accurate for *prance*, which refers to a walk with exaggerated movements, but does not necessarily imply arrogance: one can prance when one is overexcited or in high spirits.)

Last but not least, children are not very good at learning words from explicit definitions. Consider the following sentences (from Miller and Gildea 1987) produced by children participating in a vocabulary-building programme at school:

- (2) a. I was meticulous about falling off the cliff.
- b. Our family erodes a lot.
- c. Mrs Morrow stimulated the soup.

Miller and Gildea were rather puzzled by such sentences, until they discovered that, according to the dictionary that the children were using, *meticulous* means ‘very careful or too particular about small details’, *erode* means ‘eat out, eat away’, and *stimulate*, ‘rouse, excite, stir up’. Clearly, the children have not learned the conventional meanings of these words.

How, then, can learners acquire the meanings of non-basic words? There is a growing consensus in the language development literature that non-basic vocabulary is learned through incidental exposure in texts, primarily written texts (Sternberg 1987, Schwanenflugel, Stahl and McFalls 1997, Nagy, Anderson and Herman 1987).

The relative success of computational models such as Latent Semantic Analysis (Landauer and Dumais 1997, Landauer 1998) and Hyperspace Analogue to Language (Burgess, Livesay and Lund 1998) demonstrates that such learning is possible, although it is generally agreed that the mathematical algorithms used by the models are unlikely to correspond in any direct way to what the human brain does. We also know that there is a robust correlation between vocabulary size and the amount of reading that a person does (West et al. 1993, Anderson, Wilson and Fielding 1988) – but, interestingly, not between vocabulary size and the amount of time spent watching television. The most convincing evidence, however, comes from experimental studies demonstrating that performance on vocabulary tests increases if learners are exposed to texts containing words from the test (see, for example, Schwanenflugel et al. 1997, Nagy et al. 1987, Eller, Pappas and Brown 1988, Robbins and Ehri 1994, and Swanborn and de Glopper 1999 for a review).

However, the gains reported in such studies are typically quite small. A meta-analysis of 15 studies of incidental word learning during reading by Swanborn and de Glopper (1999) revealed that the mean probability of a person learning a previously unknown word to a given criterion was 0.15. This figure is probably an overestimate: in many of the studies the participants were given a pre-test assessing their knowledge of the target words before they read the texts containing them, which probably sensitised them to the words, thereby improving learning. The mean learning rate in studies which didn't use a pre-test, or which used a pre-test with distractor items, was 0.11. Furthermore, only one of the studies in the Swanborn and de Glopper sample (Nagy et al. 1987) measured word learning after a week's delay; in all other studies, the vocabulary test was administered immediately after the participants read the passages. Thus, one could argue that these studies measured how good children were

at inferring word meaning from context, not how good they were at learning words. In the Nagy et al. study, performance increased by only 5%.

The fact that the increase in knowledge gained from a single exposure in a written text is relatively small is not particularly surprising, given that individual contexts are not very informative (Nagy, Herman and Anderson 1985, Schatz and Baldwin 1986), but performance improves with more exposures (Jenkins, Stein and Wysocki 1984, Robbins and Ehri 1994). Thus, vocabulary learning from context is a slow, incremental process: a learner must encounter a new word in a number of contexts before he or she is able to form a complete lexical entry.

Research on word learning from context suggests that older children and adults are usually better at this than younger children (Swanborn and de Glopper 1999) and that children with larger vocabularies improve more than children with smaller vocabularies (Robbins and Ehri 1994). The properties of the text are relevant, too: for example, learners are more likely to correctly infer the meaning of a particular word if the density of unfamiliar words in the text is low (Swanborn and de Glopper 1999). Finally, high imageability words are learned better than low imageability words, and, interestingly, non-nouns (verbs, adjectives and adverbs) are learned better than nouns (Schwanenflugel et al. 1997). On the other hand, contextual support (how transparent the context is) and text importance (the importance of the sentence containing the word in the story) appear to have no effect on the amount of learning (Schwanenflugel et al. 1997).

What is less clear is exactly how learners construct lexical representations for new words encountered in reading. It is generally agreed that this involves some kind of 'contextual abstraction', but little attempt has been made to isolate the specific

clues that learners exploit. Nippold (1998: 18) lists some types of cues that are often available in school textbooks; a selection of items from her list is given in (3) below.

- (3)
- a. appositives: *Indigo*, a blue dye taken from plants, was sold by Southern plantation owners.
 - b. the conjunction or: Sir Edmund Hillary climbed to the *summit*, or highest point, of the world's tallest mountain.
 - c. metaphor: The bean-shaped *mitochondria* are the cell's power plants.
 - d. cause-effect: The pain was *alleviated* as a result of the drugs suggested by the doctor.
 - e. participial phrases: The cat, *drenched* by the heavy rain, was distressed.

Note that the cues given in (3a-c) are essentially definitions. Explicit definitions are often available in textbooks, but are not reliably present in other types of texts.² The other cues rely on the learner's ability to make inferences on the basis of real-world knowledge: heavy rain will make a cat wet, drugs can relieve pain, and so on. Being able to make such inferences would allow the learner to formulate a reasonable hypothesis about the meanings of the relevant words. However, Nippold gives no evidence that learners actually use such cues, just notes that they could be used.

Sternberg (1987) does attempt to provide such evidence through two instructional experiments which involved teaching children to attend to specific aspects of context (e.g. temporal, spatial, and causal cues) and to isolate those which are relevant to the meaning of the word. Children who received such training

performed better on a subsequent post-test (in which they were required to define new words they encountered in written texts) than a control group who had not. However, it is not clear that the effect was due to attending to the specific clues mentioned by Sternberg – rather than to the fact that the experimental group were encouraged to process the texts more deeply, for example – or how this relates to word learning in the real world, i.e. whether children use the same strategies outside the classroom, and whether the improvement reflects enhanced ability to learn words from context and not simply an enhanced ability to write definitions.

This is not to deny that pragmatic inferencing plays an important role in vocabulary acquisition. The involvement of inferencing processes is largely responsible for the high correlation between vocabulary and IQ,³ and also explains why the ability to learn words from context improves with age. However, there are other sources of contextual information available to the learner which rely on simpler forms of information processing.

First, there is the syntactic frame. Given an unfamiliar word in a sentence with a directional complement (e.g. *He **gorped** to the park*), one can infer that *gorp* probably refers to some kind of motion; the presence of a sentential complement (e.g. *He **tammed** that she had left*) suggests a verb referring to a mental state or a communication event, and so on. There is considerable evidence that language learners are able to use such cues – indeed, for verbs, the syntactic context is much more informative than the extralinguistic context alone (Gleitman 1990, Gleitman and Gillette 1995, Gillette et al. 1999).

However, the information that syntactic frames provide is very general: it allows learners to identify the broad semantic category of the verb (motion v. transfer v. mental state) but not its precise meaning. Much more specific cues can be gleaned

from a word's collocations and semantic preferences, and I would like to suggest that this is the single most important source of information that learners use to learn relational words from linguistic context.

This proposal was inspired by the work of lexicographers such as Sue Atkins (Atkins 1994, Atkins and Levin 1995) who observed that near-synonyms tend to have distinct collocation patterns.⁴ Systematic comparison of these patterns allows lexicographers to bring out the differences in meaning and thus write better definitions; likewise, I suggest, language learners can use the information inherent in typical collocation patterns and semantic preferences to construct lexical representations in their mental lexicons.

To be able to do this, learners and lexicographers alike must first identify typical collocation patterns. This is not a trivial matter, as it involves sifting through vast amounts of information, much of which is irrelevant. Consider the following sentences with the verb *trudge* (all taken from the British National Corpus):

- (4) a. He set out at ten; he viewed as many houses as possible, truded across miles of fitted carpet and sanded floors, exchanged weary smiles with anxious vendors.
- b. My watch alarm woke us to a finger cold pre-dawn, though I remained only half awake as we truded through knee-deep snow to the bottom of the Supercouloir, both of us cursing that we had not brought our skis.
- c. Then he and Ranulf truded wearily off to bed.
- d. Once there, we lifted ourselves and looked at one another, both of us laughing, trudging grass-stained to the top again.

- e. She trudged slowly behind Evelyn, who took the cloth and started to rub out the first word with painstaking precision.
- f. Due to a power blackout, their hotel was in total darkness when they arrived, and they had to trudge up the stairs with their luggage to the 10th floor.

Much of the information in these sentences is irrelevant to determining the meaning of *trudge*. For example, it won't help the learner to know that in the episode described in (4b), the speaker is only half awake, or that the speaker and his companion are cursing that they had not brought their skis; or that in (4d), the walkers were grass-stained and that they were laughing. What is relevant in these sentences is the reference to deep snow in (b), the walkers' weariness in (c), the upwards path in (d) and (f), the slowness of the motion in (e), and the heavy luggage in (f) – but the learner or lexicographer cannot know this until he or she has considered many more sentences.

To assist them in the task of identifying patterns in the data, lexicographers use concordancing programs which pull out corpus sentences containing a particular word and sort them by surrounding context; many such programs also extract collocates and sort them according to the strength of the relationship with the target word. Language learners, of course, do not have the advantages of modern technology; and moreover, they are presented with exemplars one at a time, which makes the task of comparing them to other exemplars even more difficult.

How then are learners able to isolate typical contexts for a particular word? I suggest that what helps them to accomplish this formidable task is the fallibility of human memory: the fact that we don't normally remember things that we encounter only once or twice (unless they are particularly striking, or highly significant for

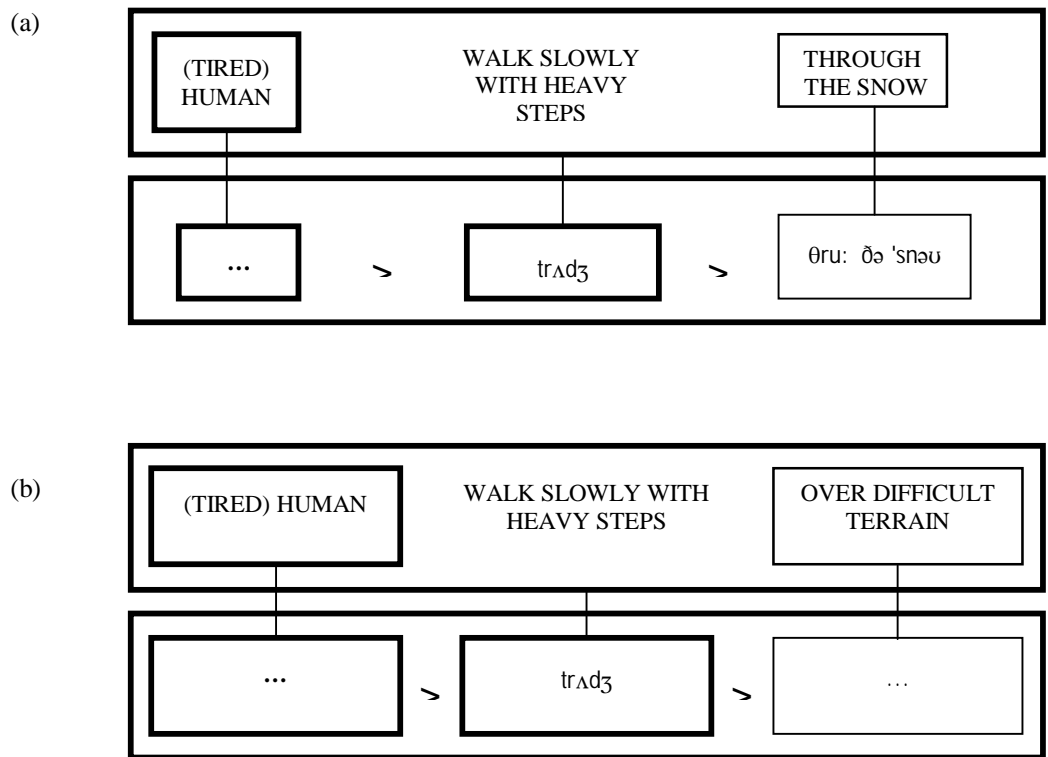
personal reasons), but we do tend to remember things we are exposed to many times. In other words, memory acts a kind of filter: learners develop robust representations of comparatively frequent collocations like *trudge wearily*, *trudge slowly*, *trudge through the snow* (or, more generally, *trudge through* plus an expression specifying a dense medium such as snow, mud or thick vegetation), *trudge up the stairs* (or, more generally, *trudge UPWARDS*, which is schematic for *up the stairs*, *upstairs*, *up the steps*, *up the hill*, *to the top*); on the other hand, learners do not store rare, perhaps unique combinations such as *trudge across miles of fitted carpet and sanded floors*. The same process allows learners to note that sentences with *trudge* also repeatedly mention the walker wearing heavy footwear, carrying something heavy, covering a considerable distance, and being cold, wet, and miserable.

2. A Cognitive Grammar solution⁵

Thus, the immediate linguistic context contains a wealth of clues about meaning. Critically, much of this information is explicitly mentioned in actual sentences, and thus does not have to be inferred by the learner. Because of this, learning can rely on a relatively simple process of pattern extraction. Clearly, inferencing and real world knowledge also play an important role: a learner who is able to link the information derived from the textual contexts with visual images of people walking through deep snow, or tired or depressed walkers, will have a richer semantic representation of *trudge*; and a learner who is able to glean additional information through inferencing will need fewer exposures to construct an accurate semantic representation. The point

is simply that a considerable amount of learning can occur without invoking such computationally demanding processes.

Using distributional cues as described above, a learner would be able to construct a schematic representation such as that depicted in Figure 1b. The figure follows the usual cognitive grammar conventions (cf. Langacker 1987): the boxes represent units; vertical lines represent symbolic relationships; horizontal lines represent semantic relationships; items in capitals represent semantic units; items in phonemic transcription represent phonological units; and ‘...’ represents a maximally schematic phonological unit (a placeholder indicating that some phonological content is present, but not specifying what it is). An additional convention adopted here is the use of the ‘<’ symbol to represent linear precedence; and for clarity, boxes around symbolic units have been omitted.



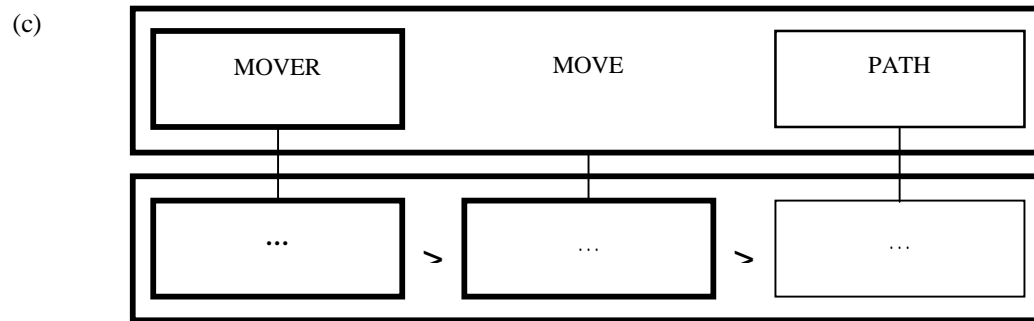


Figure 1. A specific collocation, *trudge through the snow* (a), the lexical representation of the verb *trudge* (b), and the intransitive motion construction (c)

The schema in Figure 1b can be regarded as the lexical representation of the verb *trudge*. Such generalized schemas contain representations of the salient participants in the event (in this case, the walker), salient aspects of the setting (difficult terrain), and the phonological form of the linguistic expression used to describe such events. The phonological representation is partially underspecified, in that the segmental content of the phonological subunits corresponding to the walker and the setting is left open; but the unit does specify the ordering of the three subunits. Note that the lexical entry is represented in the same format as constructions and indeed has the same overall structure as the intransitive motion construction (cf. Figure 1c). The only difference between the two representations is that the lexical unit is more specific: it provides more phonological detail and specifies that the mover is human and typically tired, that the motion is slow and bipedal, and happens over difficult terrain. Thus, relational words are, in effect, a special type of construction – one which is partially specified phonologically.

Seeing relational words in this way has several theoretical advantages. Firstly, it makes possible a unified treatment of various aspects of lexical knowledge,

including what is traditionally referred to as subcategorization frames and selectional restrictions, as well as frequently co-occurring optional modifiers. All of this information is directly represented in the schematic specifications of the entities participating in the relationship which are part of the profile of the verb. In this example, the walker is human, and the verb typically, but not always, takes a path expression denoting difficult terrain. The non-obligatory nature of the path expression is represented by thinner lines which indicate that it is less salient than the walker. In addition, specific collocations (e.g. *NP trudge through the snow*, *NP trudge upstairs/up the stairs*) can be represented as independent constructions (cf. Figure 1a) linked to the *trudge* construction via categorizing relationships (Langacker 1987, 2005) or inheritance links (Goldberg 1995), just as *trudge* is linked to the intransitive motion construction. Secondly, seeing relational words as a special type of construction allows a unified treatment of early lexical and grammatical development (acquisition of ‘verb islands’ and other lexically-specific constructions) and explains the strong correlations between lexical and grammatical knowledge observed in development (e.g. Bates and Goodman 1997): since early constructions are, in effect, big words (cf. Dąbrowska 2000, 2004), we would expect the same mental processes to be involved in their acquisition. Last but not least, as hinted earlier, it explains how, later in development, words can be learned from (written) linguistic context, and allows the analyst to aptly characterize the subtle knowledge that speakers have about the differences between near-synonyms.

On the empirical side, there is a substantial amount of evidence that early in development, children’s grammatical knowledge is best characterized as a repertoire of memorised phrases and lexically-specific units such as *CONSUMER-eat-FOOD*, *RUNNER-run-PATH*, *Can I PROCESS?* (Tomasello 1992, 2000, 2003, Lieven, Pine

and Baldwin 1997, Dąbrowska 2004). More general constructions such as the transitive, intransitive motion, and Y/N question constructions are acquired later in development by generalizing over the more specific patterns (Tomasello 2000, Dąbrowska 2004).

3. Overview

This paper provides further empirical support for the words-as-constructions view by showing that adult speakers have very specific knowledge about the collocational patterns of particular words which helps them to distinguish between near-synonyms. The specific aspect of linguistic knowledge that will be investigated is verbs of walking or running. English has quite a large number of such verbs, as shown in the list in (5a-b). All of these verbs can be used to describe human bipedal locomotion, although for a few (*gallop, trot, stampede, fly*) this is a secondary sense. There are also a number of more general verbs which are neutral between bipedal and vehicular locomotion (5c), giving a total of about 100 verbs.

- (5) a. walk, **amble**, ambulate, clamber, file, foot it, hike, **hobble**,
hoof it, knock about, **limp**, lumber, lurch, **march**, mosey, **pace**,
pad, parade, perambulate, **plod**, **prance**, promenade, pussyfoot,
ramble, sashay, **saunter**, scuff, **sidle**, shamble, shuffle, skip,
skulk, **slink**, slog, **stagger**, stalk, step, **stride**, stroll, **strut**,
stump, **swagger**, tiptoe, toddle, traipse, tramp, tread, trek, troop,
trudge, waddle, yomp

- b. run, beetle, **bolt**, bound, dart, dash, gallop, hotfoot, fly, jog, leg
it, lope, romp, rush, scamper, scoot, **scramble**, scud, **scurry**,
scuttle, skedaddle, sprint, stampede, trot
- c. move, advance, career, come, decamp, depart, flee, go, hurry,
leave, meander, race, roam, rove, skitter, sneak, speed, tear,
trek, wander, weave, whisk

Eighteen of these verbs (printed in boldface in the list in 5) were chosen as the object of the study. All of the verbs are intransitive but typically take directional complements, although most are occasionally used in transitive constructions (as in *the officer plodding the beat, posturing crabs who swagger the sea-bed in borrowed shells, the designer handbag brigade who strut the Königsallee*, all from the British National Corpus). Apart from *march* all of these are fairly low frequency verbs which are used predominantly in written texts. Adult speakers' knowledge about these verbs was examined by means of a sentence production task (study 1) and three forced choice tasks (study 2).

4. Study 1

The first study was an exploratory analysis of speakers' knowledge about the verbs . The 18 verbs were divided into two lists of 9, and 63 undergraduate students (all native speakers of English) were asked to define all the verbs in the set as precisely as they could, and then to use them in sentences illustrating their meaning. One half of the participants were given the verbs from each list. The sentences produced by the

participants were collated and coded for characteristics of the walker, path, setting, and manner explicitly mentioned in the sentence. Sentences with non-motion and non-verbal senses of the words (e.g. *I like scrambled eggs, I couldn't keep pace with him*) were excluded from the analysis.

In what follows, I report on a subset of the data collected in this way, the illustrative sentences for the nine verbs designating slow movement: *stagger, hobble, limp, trudge, plod, amble, saunter, sidle, and slink*. Twenty sentences for each verb were included in the analysis. Although this sample is too small to allow firm conclusions to be drawn, it does reveal some suggestive patterns which are summarized in Table 1 and discussed below. For ease of exposition, the nine verbs are grouped into four clusters of nearly synonymous verbs. The division into clusters is based on the author's semantic intuitions and confirmed by an informal similarity judgement study.⁶

Table 1. Collocational patterns and semantic preferences in the elicited sentences

	<i>stagger</i>	<i>hobble</i>	<i>limp</i>	<i>trudge</i>	<i>plod</i>	<i>amble</i>	<i>saunter</i>	<i>sidle</i>	<i>slink</i>
Walker									
HUMAN	100	100	95	95	85	100	100	100	65
DRUNK	35	0	0	0	0	0	0	0	0
INJURED/ IN									
PAIN	5	15	40	0	0	0	0	0	0
LEG/ FOOT									
INJURY	0	5	30	0	0	0	0	0	0
CRIMINAL	0	0	0	0	0	0	0	10	15
MALE	65	55	60	40	45	20	60	75	25
OLD	5	50	10	0	0	15	0	0	0
PLURAL/	10	0	0	45	25	70	5	5	5

COLLECTIVE

Path

<i>in/into the room</i>	5	0	0	0	0	0	25	0	0
<i>from/out of the</i>									
<i>pub/bar</i>	40	5	0	0	0	0	0	0	0
<i>home</i>	40	0	10	20	20	0	0	0	0
<i>off the pitch</i>	0	5	30	0	0	0	0	0	0
<i>along (X)</i>	0	0	5	5	25	35	10	0	5
<i>on</i>	0	0	0	0	30	0	0	0	0
<i>through ... snow</i>	0	0	0	30	0	0	0	0	0
<i>through X</i>	0	0	0	65	5	15	5	0	15
<i>up to PERSON</i>	0	0	0	0	0	0	10	60	0

TOWARDS

OPPOSITE SEX	10	0	0	0	0	0	15	5	0
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TOWARDS

AUTHORITY	0	0	0	0	0	0	0	15	0
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TOWARDS	15	25	15	10	10	5	45	80	5
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<i>away</i>	0	0	5	0	0	0	0	0	35
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AWAY	0	0	5	0	0	0	0	5	45
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UPWARDS	5	5	0	10	5	5	0	0	5
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no path	5	10	25	0	5	5	0	0	0
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Setting

INDOORS	10	30	20	0	0	5	45	10	5
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OUTSIDE	40	40	50	95	70	80	40	5	50
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COUNTRY	0	0	0	25	0	75	25	0	5
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Manner

CRUTCHES

ETC.	0	15	0	0	0	0	0	0	0
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Note: *Words in italics* correspond to the actual expressions used by the participants; CAPITALS stand for semantic categories. Thus TOWARDS is schematic for *towards, to, up to*, etc. All the figures given in the table are percentages.

4.1 *Amble and saunter*

The dictionary definitions for *amble* and *saunter* are virtually identical: according to the *New Oxford Dictionary of English*, *amble* means ‘walk or move at a slow relaxed pace’ and *saunter*, ‘walk in a slow relaxed manner, without hurry or effort’. However, an examination of the students’ sentences reveals some interesting differences. *Amble* is the only verb in the set which is used predominantly with plural or collective subjects, suggesting that this is an activity one engages in in the company of others; with *saunter*, on the other hand, the subject is virtually never plural. One nearly always ambles outside, typically in the country (*along the trail/footpath, round/across the countryside*); sauntering, in contrast, often occurs indoors. One most often ambles *along*, or *along* something, rarely *away from* or *towards* something (suggesting that one is not going anywhere in particular); but one saunters in a specific direction: *up to* someone (often a person of the opposite sex), *towards* something, or *into a room*. *Amble* is often used with optional modifiers suggesting leisurely activity: *slowly* (2), *without a care in the world* (2), *for an hour, listening to the birds and watching children at play*. *Saunter* also had some modifiers suggesting leisure (*listening to the birds, looking at shop windows*); but there were also modifiers suggesting sexual interest (*sensually*) or a ‘studied’ casualness (*cool as a cucumber in his new shades, like he had all the time in the world, nonchalantly, unconcerned that he was late yet again*). Last but not least, *amble*, but not *saunter*, appears to be associated with elderly walkers.

4.2 *Plod* and *trudge*

Like *amble*, *trudge* and *plod* are strongly associated with outdoor settings, but unlike *amble*, they tend to be used with modifiers suggesting low energy levels (*wearily*, *tiredly*, *after a hard day's work*, *after a long day at school*). The main difference between the two verbs is in the path: 65% of the sentences with *trudge* described movement *through* something (prototypically *snow*), while the most typical path for *plod* was *along* (with or without a following NP). In addition, *plod*, but not *trudge*, was often used with *on* to indicate continued activity. Another difference is in the choice of subject. All but one of the sentences with *trudge* had human subjects; and interestingly, in the one exceptional sentence, the subject was the coordinate NP *the man and dog*, with a single determiner modifying both nouns, suggesting that they are to be construed as a team. *Plod* seems to allow non-human subjects more freely, especially subjects designating large heavy animals such as elephants and donkeys.

4.3 *Sidle* and *slink*

Both verbs refer to furtive movement, and reflecting this, they were sometimes used with subjects designating criminals (*pickpocket*, *burglar*, *robber*) and other disreputable individuals (e.g. *the horny man*). Of all the verbs in this set, *slink* was most frequently used with non-human subjects, typically *a cat*; it is this association which is presumably responsible for the connotations of smooth, gliding movement. With *sidle*, the subject was invariably human. The other significant difference is in the direction of movement. 80% of the sentences with *sidle* describe motion towards

something, prototypically *up to* a person of the opposite sex (often with implications of sexual interest), a person in authority or an unsuspecting victim. *Slink*, in contrast, was usually used to describe movement *away* or out of sight (e.g. *into the night*).

4.4 *Hobble, limp and stagger*

These three verbs all refer to an awkward, unsteady movement, but suggest different reasons for the walker's difficulties. In 50% of the elicited sentences with *hobble*, the walker was old (this is a very strong tendency, as the remaining 50% of the subjects were all pronominal); 40% of the sentences with *limp* mentioned some kind of injury, usually to the foot or leg; and 35% of the sentences with *stagger* explicitly stated that the walker was drunk. Some sentences with *hobble* also indicated that the walker used crutches, a Zimmer frame or some other means of support; although references to such aids were not very frequent in absolute terms, they are quite distinctive, since they are not associated with any of the other verbs studied.

Two of the verbs, *stagger* and *limp*, also have strong preferences for particular paths. One typically staggers *from* or *out of* a pub or bar, or *home* : these two paths together account for 80% of the path expressions in the elicited sentences with *trudge* produced by undergraduate students.⁷ For *limp*, the most common path was *off the pitch*;⁸ but the verb was also used fairly frequently without a path expression to describe a manner of walking which is characteristic of a person in the sense that it may be the result of permanent injury.

Thus, while the meanings of these three verbs partially overlap (old people can also limp or stagger, an injured person can hobble or stagger as well as limp, and so

on), they have quite distinct prototypical agents: a drunk staggering home after a night out, an injured athlete leaving the game, and an old person unsteady on his/her feet.

4.5 Discussion

The elicited sentences reveal some clear differences in usage patterns which appear to be detailed enough to allow speakers to differentiate between near-synonyms. A relevant question that arises at this juncture is how these patterns compare with those found in ‘real’ texts. A systematic comparison of the sentences produced by the participants with corpus data is beyond the scope of this paper; suffice it to say that the usage is broadly similar, although the elicited sentences tend to exaggerate patterns found in corpus texts.⁹ For example, in 60% of the elicited sentences with the verb *sidle*, the path was *up to* (a person). *Up to* is also the most frequent collocate of *sidle* in the British National Corpus, but it occurs in only 23% of the corpus sentences. Similarly, *trudge + through ... snow* was attested in 30% of the elicited sentences and only 3% of the sentences in the BNC; for *plod + on*, the relevant figures are 30% and 17% respectively; for *amble + along*, 35% and 15%. These differences are not surprising: participants gave examples of what they considered to be typical usage, while many of the BNC sentences come from literary texts, and hence the language is rather *recherché*. The fact that elicited sentences exaggerate patterns found in the corpus suggests that speakers are aware of what is typical, lending additional support to the idea that lexical representations include knowledge about collocational patterns and semantic preferences.

5. Study 2

The purpose of the second study was to determine how well knowledge of typical collocations predicts performance on other tasks tapping semantic knowledge.

5.1 Method

60 first-year undergraduate students at the University of Sheffield participated in the experiment. All were native speakers of English; none participated in Study 1.

The experiment consisted of three parts: a Definitions task, a Video Clips task, and a Cloze task. The order of the tasks was counterbalanced across participants.

5.1.1 Definitions task

In the Definitions task, participants were given a list of the 18 verbs and their dictionary definitions and asked to choose a verb that went with each definition. For example, for the verb *stride*, participants were presented with one of the following definitions: “walk with long, decisive steps in a specified direction” (*New Oxford Dictionary of English*), “walk with long regular or measured paces, as in haste, etc.” (*Collins English Dictionary and Thesaurus*), “walk with long steps, often because one is in a hurry” (*Collins COBUILD English Language Dictionary*, slightly edited), or “walk somewhere quickly with long steps” (*Cambridge International Dictionary of English*). Participants were told that the same verb could be used more than once. There were four versions of the task, each containing definitions from a different dictionary, with the definitions arranged in a different order in each version. Each

version was presented to a quarter of the participants. The task took about 5 minutes to complete. One full version of the test is given in Appendix A.

5.1.2 Cloze task

In the Cloze task, participants were presented with 18 sets of five sentences in which the verb was replaced with a blank. They were told that all five sentences in a set contained the same verb, and asked to guess what the verb was; again, the same verb could be used more than once. The 18 verbs were printed at the top of each page. A sample test item is given in (6) below; the complete test can be found in Appendix B. There were four versions of the test, each containing the same sentence sets in a different order. Each version was given to one-quarter of the participants. The test took about 15 minutes to complete.

- (6)
- a. I _____ up the stairs.
 - b. She _____ through blinding snow.
 - c. There was a stream of refugees _____ up the valley towards the border.
 - d. He _____ wearily along the path.
 - e. We _____ along the muddy track to the top of the hill.¹⁰

The sentences were drawn from examples of usage given in contemporary dictionaries.¹¹ They were thus ‘pre-processed’, in the sense that they have been selected as typical usages of the verb by the lexicographers who compiled the dictionary; and they are also likely to have been slightly edited. Using such processed examples rather than a random set of sentences from a corpus obviously makes the

task of identifying the verb considerably easier for the participants; but note that the purpose of this task was to determine how much participants know about typical collocations, not how good they are at guessing verb meanings using contextual information.

5.1.3 Video Clips Task

The Video Clips task involved matching the verbs to video clips depicting female actors walking or running in a variety of indoor and outdoor settings (e.g. a car park, a lawn, a formal garden, a large hall, and, for the verb *scramble*, a staircase).

Participants were given the following instructions:

You are about to see 18 short ‘films’, each showing people walking or running in a particular way (*strutting*, *trudging*, *pacing*, and so on). Choose the verb from the list below which best describes the way they move and write it in the appropriate blank.

Each ‘film’ begins with a number and consists of three scenes, each showing the same action. There are short pauses between scenes designed to give you time to think about your answer. Your demonstrator will alert you when the scene begins by saying ‘This is 1A’ (film 1, scene A), ‘This is 1B’ (film 1, scene B), and so on.

You can use the same verb more than once. Give only one answer for each film.

Each clip was about 10 seconds long, and there was a 20-second pause at the end of each ‘film’ during which participants wrote down their answers. The 18 verbs were printed at the top of the answer sheet. The whole test took 18 minutes. All participants completed the same version of the test.

5.2 Results and discussion

Table 2 gives information about the proportion of target responses for each verb in each condition. The figures in the table suggest that some verbs (e.g. *scurry* and *scramble*) may be easier to identify on the basis of referential information, while others (e.g. *bolt*) appear to have more distinctive collocates. Overall performance was slightly better on the Video Clips task (75% correct) than on the Definitions and Cloze tasks (63% and 67% respectively). However, such differences are not very informative, since they are to a large extent a direct consequence of the quality of the materials (the use of poor definitions or untypical examples would obviously depress performance on the relevant task) and the intrinsic difficulty of the task (e.g. in the Cloze test, participants had to compare the subjects and path and manner adjuncts in five sentences, which obviously places heavy demands on working memory).

Table 2. Proportion of target responses in each condition

Verb	Cloze	Definitions	Video clips
march	98	95	98
bolt	93	82	82
pace	92	77	90
stagger	87	77	92
limp	80	70	92

hobble	77	50	83
prance	77	43	78
scramble	73	78	90
scurry	73	80	95
strut	67	60	82
trudge	60	67	62
slink	58	52	70
amble	52	42	43
stride	52	83	78
sidle	52	38	73
plod	42	58	53
saunter	42	33	25
swagger	37	52	72
Mean	67	63	75

It is much more revealing to compare the correlations between individual participants' scores on the three tasks. As shown in Table 3, performance on the Cloze test was significantly correlated with performance on the other two tasks, but, surprisingly, there is no significant relationship between performance on the Video Clips and Definitions task.¹² In other words, given a person's Cloze score, one can predict their performance on the other two tasks; but given the Definitions or Video Clips score, one can only predict the Cloze score. Thus, the results appear to support the hypothesis that knowledge about typical collocations is psychologically more basic.

Table 3. Correlations between performance on the three tasks

Tasks	Pearson's r	p value
Definitions & Video Clips	0.15	0.243

Cloze & Definitions	0.37	0.005
Cloze & Video Clips	0.37	0.004

6. Conclusion

I argued in this paper that relational words such as verbs are constructions, that is to say, units which are complex at both semantic and phonological level. Viewing verbs in this way allows us to give a unified account of how lexical knowledge is acquired and represented, and also helps to explain the otherwise puzzling fact that speakers are able to learn the meanings of new words from purely linguistic contexts. I suggested that they might be able to do this by memorising typical collocation patterns encountered in texts and generalising over them. Previous corpus-based work has shown that sets of near-synonyms have distinct patterns of collocation and colligations (Atkins 1994, Atkins and Levin 1995, Church et al. 1994, Divjak and Gries 2006, Gries and Divjak this volume), and that subjective ratings of semantic similarity are inversely correlated with discriminability of sentential contexts (Miller and Charles 1991). The two experiments described in this paper confirm that speakers have very specific knowledge about the collocations and semantic preferences of individual verbs – even very low frequency verbs which are acquired late in development, which suggests that lexically specific learning continues well into adulthood. Such knowledge appears to be quite subtle, enabling speakers to distinguish between pairs of semantically very similar words such as *amble* and *saunter*, *plod* and *trudge*, *sidle* and *slink*, and *limp* and *hobble*.

Notes

¹ It should be stressed, however, that even such relatively straightforward situations present the learner with many potential difficulties – see Bloom (2000) for an in-depth discussion.

² Note, too, that explicit definitions encountered in texts raise similar problems to dictionary definitions.

³ The correlation between scores on the vocabulary subtest of the Wechsler Adult Intelligence Scale and full-scale IQ is .82 (Wechsler 1958: 255) – higher than that of any of the other eleven subtests in this battery, and about the same as the correlations between different IQ tests, which average about .77 (Jensen 1998: 91). The correlation between scores on Raven's Progressive Matrices, a nonverbal IQ test, and the Peabody Picture Vocabulary Test, is .69 (Jensen 1998: 91).

⁴ For further research exploring the relationship between collocation and meaning, see also Church et al. 1994, Miller and Charles 1991, Divjak and Gries 2006, Gries and Divjak this volume.

⁵ The proposal is an application of Langacker's (1987) Cognitive Grammar. It is also broadly compatible with other similar frameworks such as Construction Grammar (Goldberg 1995) and Radical Construction Grammar (Croft 2001). See Langacker (2005) for an in-depth discussion of the similarities and differences between these approaches.

⁶ Ten native speakers were asked to select one or two verbs nearest in meaning to *amble*, *plod*, *sidle*, and *hobble*. At least 8 out of 10 chose *saunter*, *trudge*, *slink*, and *limp*, respectively. The link between *stagger* and *hobble* is weaker, with only two speakers choosing *stagger* as the nearest in meaning to *hobble*. These similarities are also reflected in the pattern of non-target responses observed in Study 2: members of

the four pairs of verbs (*amble/saunter*, *plod/trudge*, *sidle/slink*, and *hobble/limp*) were confused with each other much more frequently than with other verbs. The verb most frequently confused with *stagger* was *hobble*; but interestingly, the relationship was asymmetric: that is to say, speakers sometimes supplied *hobble* when the target verb was *stagger*, but never substituted *stagger* for *hobble*.

⁷ Clearly, this tells us something about the British undergraduate subculture as well as the meaning of *stagger*: one would expect that the results for this verb would be rather different if the participants were old age pensioners.

⁸ The association of *stagger* with *home* and *from/out of the pub/bar*, and of *limp* with *off the pitch* is very strong, and appears to be giving rise to emergent new senses for these verbs: *stagger* is sometimes used facetiously to refer to going home from a pub even when the walker has not consumed alcohol and is perfectly steady on his/her feet; and *limp* can be used in situations where a player abandons a game because of injury, regardless of whether he or she is actually walking with a limp as they are leaving the pitch.

⁹ Miller and Charles (1991) observe a similar pattern in their data.

¹⁰ The target verb for this set of sentences is *trudge*.

¹¹ The sentences were taken from the following dictionaries: *Cambridge International Dictionary of English*, *Casell's Modern Guide to Synonyms and Related Words*, *Collins Cobuild English Language Dictionary*, *Collins English Dictionary and Thesaurus* (electronic edition), *The Longman Lexicon of Contemporary English*, *New Oxford Dictionary of English*, *The New Shorter Oxford Dictionary on Historical Principles*, and the *die.net Online Dictionary*.

¹² Note that the correlation coefficients are fairly low. This is probably due to the fact that the participants only had partial knowledge of the meanings of the verbs, and

therefore had to resort to guessing on some trials; hence, the data are quite noisy. If the test contained more familiar verbs, one would expect higher overall scores and a significant correlation between performance on the Video Clips and Definitions task; however, the relationship between the Cloze test and the other two tests should still be stronger.

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Appendix A: Definition task (Version A)

Choose the word that best matches the definition and write it in the blank. You can use the same verb more than once.

HOBBLE SAUNTER SCURRY SCRAMBLE STAGGER STRIDE

SWAGGER BOLT

TRUDGE STRUT LIMP MARCH PACE PLOD PRANCE SIDLE

SLINK AMBLE

1. _____: move hurriedly with small quick steps
2. _____: walk or more at a slow relaxed pace
3. _____: make one's way quickly or awkwardly up a steep gradient or over rough ground by using one's hands as well as one's feet
4. _____: walk in an awkward way, typically because of pain from injury
5. _____: walk with a stiff, erect, and apparently arrogant or conceited gait
6. _____: walk at a steady and consistent speed, especially without a particular destination and as an expression of one's anxiety or annoyance
7. _____: walk in a furtive, unobtrusive, or timid manner, especially sideways or obliquely
8. _____: walk slowly and with heavy steps, typically because of exhaustion or harsh conditions
9. _____: walk or move unsteadily, as if about to fall

10. _____: walk or behave in a very confident and typically arrogant or aggressive way
11. _____: walk with long, decisive steps in a specified direction
12. _____: walk in a military manner with a regular measured tread
13. _____: walk with difficulty, typically because of a damaged or stiff leg or foot
14. _____: move smoothly and quietly with gliding steps, in a stealthy or sensuous manner
15. _____: walk doggedly and slowly with heavy steps
16. _____: walk in a slow relaxed manner, without hurry or effort
17. _____: move with high springy steps; walk or move around with ostentatious, exaggerated movements
18. _____: run away suddenly out of control

Note: This version of the test contains definitions from the *New Oxford Dictionary of English*. The target responses are as follows: 1, scurry; 2, amble; 3, scramble; 4, hobble; 5, strut; 6, pace; 7, sidle; 8, trudge; 9, stagger; 10, swagger; 11, stride; 12, march; 13, limp; 14, slink; 15, plod; 16, saunter; 17, prance; 18, bolt.

Appendix B: Sentence completion task (Version A)

Below are 18 sets of sentences from which the verb has been removed. The sentences in each set originally contained one of the verbs from the list below. Can you guess what it is? Read all the sentences in the box first, then write your answer in the first blank, and continue to the next set.

Note: The sentences may require different forms of the verb (e.g. *amble*, *ambles*, *ambling*, *ambled*). You can use the same verb more than once.

AMBLE BOLT HOBBLE LIMP MARCH PACE PLOD PRANCE
SAUNTER SCURRY SIDLE SLINK SCRAMBLE STAGGER STRIDE
STRUT SWAGGER TRUDGE

1. Missing verb = _____

The pig _____ into the undergrowth.

Pedestrians _____ for cover.

She _____ about the house picking up her children's toys where they had left them.

The mouse _____ across the floor and disappeared through a hole in the wall.

The noise of the explosion sent the villagers _____ back into their homes.

2. Missing verb = _____

The male bird _____ in front of the female.

The winner _____ forward to receive his prize.

This honour entitled her to _____ in front of the marching band at football games.

A peacock was _____ on the lawn.

The boys were _____ around trying to get the attention of a group of girls who were nearby.

3. Missing verb = _____

He _____ to his feet, swaying a little.

When he _____ in, they thought he was drunk till they saw the knife in his back.

We managed to _____ back up to the deck.

As we went into the bar, a drunken man _____ out the door.

Every morning she would wake up at 7 a.m. and _____ half-awake into the bathroom to get washed.

4. Missing verb = _____

I _____ up the stairs.

She _____ through blinding snow.

There was a stream of refugees _____ up the valley towards the border.

He _____ wearily along the path.

We _____ along the muddy track to the top of the hill.

5. Missing verb = _____

I _____ round the country roads for an hour.

He _____ into the foyer.

The pony _____ down the lane.

He _____ nonchalantly over to the phone.

She was just _____ along, going nowhere in particular.

AMBLE BOLT HOBBLE LIMP MARCH PACE PLOD PRANCE
SAUNTER SCURRY SIDLE SLINK SCRAMBLE STAGGER STRIDE
STRUT SWAGGER TRUDGE

6. Missing verb = _____

He _____ off during Saturday's game.

The wounded soldier _____ along the road.

Two of the dogs were _____ badly.

Three minutes into the match, Jackson _____ off the pitch with a serious ankle injury.

Leaning on the old fashioned ebony cane she _____ across the floor.

7. Missing verb = _____

He was _____ around on crutches.

He _____ along as best he could.

The old man _____ past them.

Civilians and soldiers with missing legs _____ on crutches are a common sight.

The last time I saw Rachel she was _____ around with a stick, having injured her ankle skiing.

8. Missing verb = _____

There were a lot of people waiting to _____ aboard the small boat.

She _____ up the hillside and over the rocks.

We were _____ through the thick undergrowth when we suddenly came across a fast-flowing stream.

As the burning plane landed, the terrified passengers _____ for the door.

After waiting for over an hour, they _____ madly to get the best seats.

9. Missing verb = _____

Members of the Royal British Legion _____ past the Cenotaph.

They _____ through Norway.

Play a band and they begin to _____ .

The soldiers _____ 90 miles in three days.

She _____ into my office demanding to know why I hadn't written my report.

10. Missing verb = _____

The pony was _____ around the paddock.

She _____ around the lounge impersonating her favourite pop stars.

When it was Vic's turn, he _____ about, lifting his knees high.

It's pathetic to see fifty-year-old pop stars _____ around on stage as if they were still teenagers.

I wish you children would settle down and stop _____ about.

11. Missing verb = _____

He _____ across the road.

He _____ confidently across the hall.

He _____ over the stream.

The soldiers _____ across the street with bazookas on their shoulders.

Clipboard in hand, she _____ purposefully up to the doors.

12. Missing verb = _____

We _____ up and down in exasperation.

She began to _____ round the office.

Alistair _____ up and down nervously, waiting for word from the surgeon.

By the time I arrived at the station, my father was already _____ up and down.

I hate to see animals _____ up and down in their cages.

AMBLE BOLT HOBBLE LIMP MARCH PACE PLOD PRANCE
SAUNTER SCURRY SIDLE SLINK SCRAMBLE STAGGER STRIDE
STRUT SWAGGER TRUDGE

13. Missing verb = _____

The fox came _____ through the bracken.

All the staff have _____ off home.

I _____ away to my room, to brood in front of the fire.

The dog _____ out of the room with its tail between the legs.

He _____ away into the night.

14. Missing verb = _____

Look at that Charlie _____ down the street in his new suit!

The lord and his lady got up and _____ out.

They _____ into the room.

A group of young men _____ about outside the bar.

He _____ down the street after winning the fight.

15. Missing verb = _____

I _____ up to her.

She stammered some apology as she _____ towards the door.

A man _____ up to me and asked if I wanted a ticket for the match.

Tom _____ over to the pretty girl in the bar and asked if he could buy her a drink.

She _____ past him, pretending that she had not seen him.

16. Missing verb = _____

We _____ back up the hill.

The old man _____ along, hardly able to lift each foot.

We _____ wearily up the road carrying our heavy sacks.

We _____ through the mud.

Isn't it boring being a police officer, _____ along the streets all day?

17. Missing verb = _____

Adam _____ into the room.

All afternoon he _____ up and down, looking at the shops and the people.

He was whistling as he _____ along the beach.

He _____ by, looking very pleased with himself.

The children _____ down Sloane Street, loitering at the shop windows.

18. Missing verb = _____

She _____ for the door.

Passengers clearly overheard his shouted warning to the control room and they all _____ into the next carriage.

Frightened by the car horn, the horse _____ .

He _____ blindly towards his father's fallen goat.

I was terrified that the horse would _____ and I would not know how to stop it.

Target responses: 1, scurry; 2, strut; 3, stagger; 4, trudge; 5, amble; 6, limp; 7, hobble; 8, scramble; 9, march; 10, prance; 11, stride; 12, pace; 13, slink; 14, swagger; 15, sidle; 16, plod; 17, saunter; 18, bolt.