

## 5. Scanning

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Think about an eight-digit number, for example 73654967. Let us suppose for the sake of the argument this is a serial number of your computer that is recently malfunctioning. You are calling a repair service professional, who needs to know this very number to diagnose the problem. Since the repairer cannot read it off on their own, you have to dictate it over the phone. When you are looking at the number on your computer, you see the entire sequence of digits at once. But of course you cannot dictate all the digits at once over the phone. You have to spell them out in a sequence dividing the serial number into smaller “chunks.” How do you go about this?

The simplest way is to dictate every digit one by one: “seven, three, six, five...” But the repairer is getting impatient and says: “Could you speed it up a bit?” So you start from the beginning and now you break the number into two-digit chunks: “seventy three, sixty five, forty nine, sixty seven.” The repairer seems to be more satisfied, but she still asks: “Could you repeat the last but one digit? I didn’t quite get it...” Now you look at the end of the number and single out the second digit from the right: “Six.”

Let us recapitulate. During your conversation with the repair professional you “accessed” the digits of the serial number in four different ways. First, you saw the number as a single grouping of digits when you read it off your computer:

$$(i) \boxed{73654967}$$

Second, you went through the digits one by one starting from the left-hand side, when you dictated the number for the first time:

$$(ii) 7 \rightarrow 3 \rightarrow 6 \rightarrow 5 \rightarrow 4 \rightarrow 9 \rightarrow 6 \rightarrow 7$$

Third, you grouped the digits into pairs and went through the chunks one by one starting from the left-hand side, when you dictated the number for the second time.

$$(iii) 73 \rightarrow 65 \rightarrow 49 \rightarrow 67$$

Finally, you were asked to single out the penultimate digit. This time it was more convenient to start from the right-hand side, get to the second element from the end and ignore all the rest.

$$(iv) 736549\mathbf{6} \leftarrow 7$$

## 5.1. Summary and sequential scanning

This simple story illustrates different ways of **scanning** a grouping of elements. Scanning is a process of “accessing” elements of a complex entity for some purposes. When all elements of the grouping are accessed at once, as if in a single glance, like a sequence of digit seen together as a whole number in (i), cognitive grammarians talk about **summary scanning**. When the grouping is broken into smaller portions and the portions are accessed one by one in a certain sequence, like in (ii), (iii), and (iv), cognitive grammarians talk **sequential scanning**. Scanning is a cognitive ability that has serious consequences for construal and affects the way we speak about the world around use. The case studies in the remainder of this chapter serve as a handful of illustrations and should not be thought of as a complete and exhaustive list. Scanning is evident in many grammatical phenomena on all levels of linguistic organization.

### 5.1.1. Nouns and verbs

Let us begin with the topic already covered in the previous chapters: grammatical classes. Scanning may help us to understand the distinctions between count and mass nouns, as well as perfective and imperfective verbs. One way to capture the distinctions is to say that boundaries of things in nouns and endpoints of processes are:

- inside the immediate scope of construal in count nouns and perfective verbs, and
- outside the immediate scope in mass nouns and imperfective verbs.

Since things and processes are usually complex entities composed of multiple parts or stages, it makes sense to propose that when we think about them, we “access” their components in different ways. Therefore, another way of capturing the count/mass and perfective/imperfective distinctions is to specify how the complex entities are scanned. When we take into consideration the immediate scope of conception, there are essentially two options.

- A) Scanning within the immediate scope may cover the entire thing or process. That is to say that when we access the components of things and processes in a sequence within the immediate scope, we eventually access of *all* the components.
- B) Scanning within the immediate scope may *not* cover the entire thing or process. That is to say that when we access the components of things and processes in a sequence within the immediate scope, we do *not* access of the components – some components outside the immediate scope remain unscanned.

As you may have guessed, A) corresponds to count nouns and perfective verbs, while B) to mass nouns and imperfective verbs. In other words:

- a) In count nouns, the scanning of the thing within the immediate scope reaches the thing’s boundaries; in perfective verbs, the scanning of the process within the immediate scope reaches the process’s beginning and end.

- b) In mass nouns, the scanning of the thing within the immediate scope *does not* reach the thing’s boundaries; in imperfective verbs, the scanning of the process within the immediate scope *does not* reach the process’s beginning and end.

Scanning may also help to explain the process of deriving nouns from verbs (and the distinction between nominal and processual construal in general). What is the difference between the words like *to swim*, *swimming*, and *a swim*? Undoubtedly, they are very similar in meaning, since all three denote the action of locomotion in water, but their grammatical behaviors strongly suggest serious differences between them. Obviously, *to swim* is a verb: it takes verb affixes (-s for the 3rd person singular and -ing for present participle) and appears in the “verb position” within a sentence. *Swimming* and *a swim* are nouns<sup>4</sup>: the former can be used in the phrase *a lot of swimming*, where we expect a noun or a nominal phrase following *of*, and the latter sounds natural when preceded by the indefinite article *a*, which is characteristic of nouns. The fact that *swimming* does not readily take the indefinite article suggests that it is more similar to mass nouns, while *a swim* is more similar to count nouns. To account for the differences on a more technical way, we need to take a closer look at the construal behind these words. Thus, in a sentence like *I swim a lot*, the verb profiles a process developing over time. In processual construals, scanning is sequential, which means the stages of the process are accessed in a sequence; here the sequence is simply the sequence of the stages of swimming. In Figure 5.1(a) this is signaled by the fact the profiled portion of time arrow (“T”) is aligned to the dotted arrow denoting scanning (“S”).

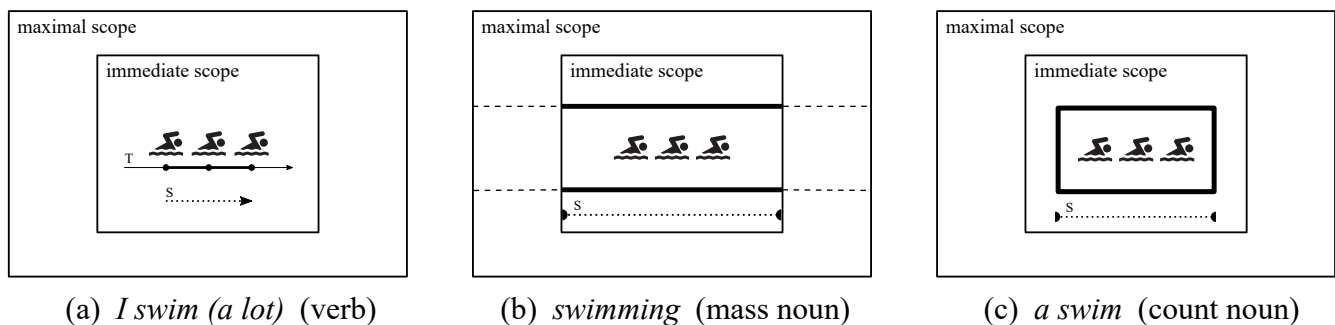


Figure 5.1: Construal behind the verb *to swim* and deverbal nouns

Turning to nominal construals, they involve summary rather than sequential scanning. The things denoted by nouns, like *swimming*, still consist of stages, but now the stages are conceptualized as a stable grouping of a sort, rather than stages developing over time. To put this point more metaphorically, all of the stages are “viewed” at once, like the digit in the number discussed at the beginning of the chapter. The lack of the time flow in the characterization of the nouns’ meaning is signaled in Figures 5.1(b) and 5.1(c) by the lack of the time arrow “T.” Notice also that the dotted lines indicating summary scanning end with the half circles as opposed to the arrowhead in Figure 5.1(a) marking sequential scanning. In Figure 5.1(c) the noun denotes a bounded thing, whose boundaries (marked by the heavy-line box) are included in the immediate scope and scanning in the immediate

<sup>4</sup> *Swimming* may also function as present participle, but at this juncture we will focus on the nominal sense.

scope covers the entire thing. Finally, in Figure 5.1(b) the noun profiles a mass noun, whose boundaries extend beyond the immediate scope and scanning does not cover the entire thing.

### 5.1.2. Participles, infinitives, and finite verb forms

A combination of scanning and profiling is also helpful in describing the meanings of participles, infinitives, and finite verb forms. In traditional linguistics the exact definitions of these terms are subject to debates. It is also far from clear, whether all of these forms can be found in all languages. As far as English is concerned, the forms can be roughly defined as follows:

- **Infinitives** are the forms of verbs that do not provide any information about grammatical person, tense, and aspect, etc.; these forms are found in dictionaries (e.g. *to break*).
- **Finite forms** serve as main verbs in sentences and they provide information about person, tense, and aspect, etc. (e.g. *Floyd broke the glass*).
- **Participles** are adjective-like words derived from verbs (e.g. *a broken glass, glass breaking Floyd*).

Even though the three types of words can be defined in terms of formal properties – they do behave similarly in sentences and accept certain affixes – just like in the case of grammatical classes, Cognitive Grammar prefers to characterize these types of words in terms of their meaning, and more specifically, in terms on the construal that they convey.

You may remember that the semantic differences between various senses of the word *yellow* are a matter imposing different profiles on the same base. This is how we are going to analyze various verb forms of the word *to break*: the differences between infinitives, participles, and finites are largely a matter of “highlighting” various parts of the process in different ways. The base is a conception of a process in which an object loses its physical integrity, as sketched in the top left corner of Figure 5.2. The other parts of the diagram depict the construals behind various verb forms resulting from imposing various profiles on this base. It should be noted that the diagrams are simplified and do not attempt to capture the entire meaning of the sentences, but only the construals behind the various forms of the verb *to break*.

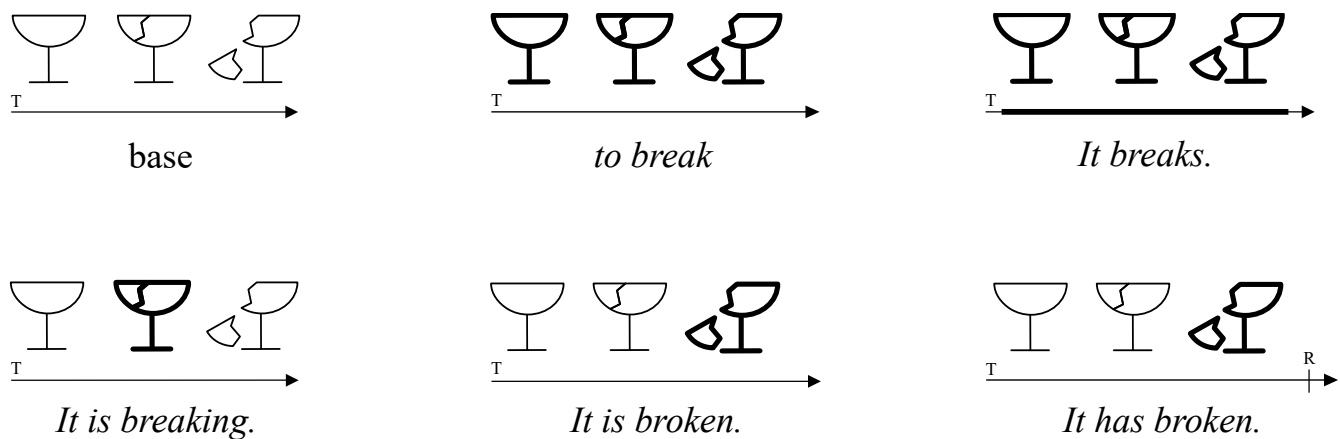


Figure 5.2: Construals behind finite and non-finite verb forms

Infinitives (upper middle part of Figure 5.2) do not involve sequential scanning over time. This means that the flow of time is not profiled and the construal is simply a sequence of stages of the denoted process. In this respect, infinitival construals are similar to the construals of nouns and English infinitives sometimes appear in syntactic positions where nouns are usually found (compare *I want a car* and *I want to sleep*). When sequential scanning is added and the flow of time becomes an important element of the profile, the verb has a finite form,<sup>5</sup> like in *It breaks* (upper right part of the diagram). This particular sentence does not offer appreciable details about the circumstances of the event, so it is typically interpreted as expressing a fairly general statement about the subject (in this case, about whatever is referred to by means of *it*).

Turning to participles, the present participle *breaking* as used in *It is breaking* profiles a middle stage between the beginning and the end of the process. This is why in English sentences in progressive aspects are usually interpreted as expressing actions or events progressing during the time of speaking. Since the final stage of the process is unprofiled, the sentence is silent about whether the action is finished successfully, interrupted, aborted, etc. Similarly, the sentences are also silent about the beginning of the action. More technically, the endpoints of the process are outside the immediate scope of construal. Notice that when an *-ing* form is used to denote a noun, the basic structure of the profile remains the same. For example, the already discussed *swimming* is a mass noun whose boundaries fall outside the immediate scope of construal. Thus, the “unboundedness” appears to be a central elements of the semantics of *-ing* forms, whether they are used as nouns or parts of *to be X-ing* constructions. When the *-ing* form is used as an adjective, the middle stage of the process is still relevant. This time, the stage serves as the landmark of the relation profiled by the adjective. For instance, in *(the sound of) breaking glass*, the participle profiles the relation between the glass (the trajector) and the middle stage of the action of breaking (the landmark). As already mentioned in Chapter 3, adjectives provide

<sup>5</sup> More precisely, it is not enough to add the flow of time in the construal to arrive at finite forms, since they also involve the so-called grounding. This topic will be discussed in more detail in Chapter 9.

additional information about nouns and in this case the glass is specified as undergoing the action of breaking.

Finally, past participles like *broken* profile the final stage of the process. This is perhaps most apparent in the English passive sentences like *It is broken* (middle left part of Figure 5.2). The sentence is about the state that resulted from the process of breaking, but the entire process is not profiled. Here, the entire process is evoked as the base of the construal in order to say something more about the state of the thing in question, i.e. the thing is in the “broken” state which is the final stage of the action of breaking. This facet of meaning is less apparent in English perfect sentences (e.g. *It has broken*; lower right part of the diagram), which also use past participle, but after a closer inspection it turns out that the final stage plays a crucial role in the construal, too. Sentences of this kind express actions completed before some reference point in time (marked in Figure 5.2 with “R”). In present perfect sentences, this reference point is the moment of speaking. Thus, *It has broken* means that the final stage of the process of breaking occurred before the time of speaking. Saying that the final stage of the process has already occurred is, of course, equivalent to saying that the process is completed. Past perfect sentences (e.g. *It had broken before I arrived*) differ from present perfect sentences in that the reference point is another event in the past (e.g. my arrival) rather than the moment of speaking.

Participles like *breaking* and *broken* involve summary, and not sequential, scanning. Notice the time arrow “T” in the diagrams in the bottom half of Figure 5.2 are not marked in bold, which is to signal that the flow of time and sequential scanning is absent from the construal. Of course, the whole sentences *It is breaking*, *It is broken*, and *It has broken* profile relations developing over time, but the flow of time is evoked by the main verbs of the sentences, *to be* and *to have*, and not by the participles themselves. The lack of time flow from the semantic characterization is corroborated by the fact that participles *breaking* and *broken* can function as adjectives, which (as you may remember from Chapter 3) profile atemporal relations. The construals, and consequently the meanings, of participles in progressive and perfect sentences are in fact very similar to the adjectival construals in nominal phrases. Consider the similarities in meaning between the expressions in (1):

- (1)(a) *a **breaking** glass*      (a') *A glass is **breaking**.*  
(b) *a **broken** glass*      (b') *A glass is **broken**.*

To sum up, the construals behind participles involve “accessing” specific stages of processes denoted by their respective verbs and highlighting the stages for various purposes. The English present participle (*-ing*) profiles the middle stage, for instance in order to convey that the process is in progress; the English past participle profiles the final stage, for instance to specify the state of a thing or to convey that the final stage occurred before some moment in time (in perfect sentence). Both of the cases involve summary scanning: the middle and the final stages are depicted as atemporal relations. This is what makes it possible for them to function as adjectives in nominal phrases. When used in sentences, which express processes developing through time by definition, the time flow is denoted by the main verb of the sentence rather than the participle.

## 5.2. Scanning in other linguistic phenomena

Scanning is ubiquitous in language, because whenever we conceptualize complex entities, we access their component parts in one way or another. In this section we will take a closer look at two more examples of of the process.

### 5.2.1. *Virtual motion*

There is something seemingly paradoxical happening in (2): the sentences use a verb denoting motion to talk about an unmoving object. In Cognitive Grammar, this phenomenon is termed **virtual motion**. Even though the path in question is perfectly motionless, we evoke the concept of movement to describe its relation between the city and the forest. But if the path is motionless, why do the sentences refer to motion in the first place? The answer to the question is complex and will topic will be discussed in more detail in Chapter 11, but at this point we may simply conclude that the verb *to run* signals sequential scanning along the path performed in the mind of the speaker. In other words, it is not the path that runs, it is the conceptualizer that mentally traces the path between the city and the forest. The difference in meaning between (2a) and (2b) is essentially the different in the direction of scanning: in (2a) the starting point of scanning is the city and the end point is the forest, while in (2b) it is the other way around. Since the road does not actually move in any direction, both of the sentences sound natural: it is entirely up to the speaker which direction of the virtual motion they choose, because nothing in the real world determines the choice between the two variants.

(2)(a) *The road **runs** from the city to the forest.*

(b) *The road **runs** from the forest to the city.*

A less apparent example of virtual motion can be found in (3) (derived from Talmy (1988b)). When you think about it, the sentence is slightly weird, because while referring to location of the houses, it uses the expression *every now and then*, which refers to occurrence of events in time.

(3) *There's a house **every now and then** through the valley.*

This can be explained by proposing that the construal behind the sentence involves sequential scanning. Even though the locations of the houses remain static, the conceptualizer accesses them one by one in a sequence, starting from some reference point ("R"). The construal is sketched in Figure 5.3. This instance of scanning can be likened to looking at the valley from a bird's-eye view, when the observer focuses first on the nearest house, then shift their gaze to another house, and so on, until all the houses are covered. We may describe it as virtual motion, because even though nothing moves in physical space, the conceptualizer "moves" with their gaze from one location to another.

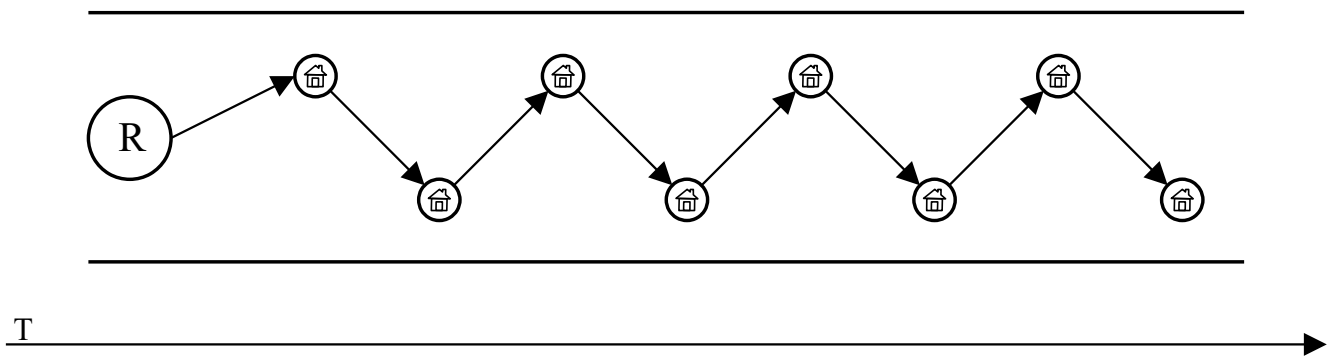


Figure 5.3: Virtual motion in (2)

### 5.2.2. *Each vs. every*

Scanning can also account for the small semantic difference between the quantifiers *each* and *every*. Quantifiers are words and expressions that specify the amount of some entity and usually go together with plural and non-plural masses (see Section 4.1). Words of this type will be covered in greater detail in Chapter 10; at this juncture, we will only focus on a subtle difference in meaning between *each* and *every*. The two words are similar in that both profile a single item from a collection of objects. Yet even though the quantifiers refer to a single item, they serve to indirectly refer to all items in the collection. For example, in (4) the singular form the noun in *every slice* indicates that the whole expression refer to one piece of pizza, but ultimately both of the sentences say something about all slices. How is this possible?

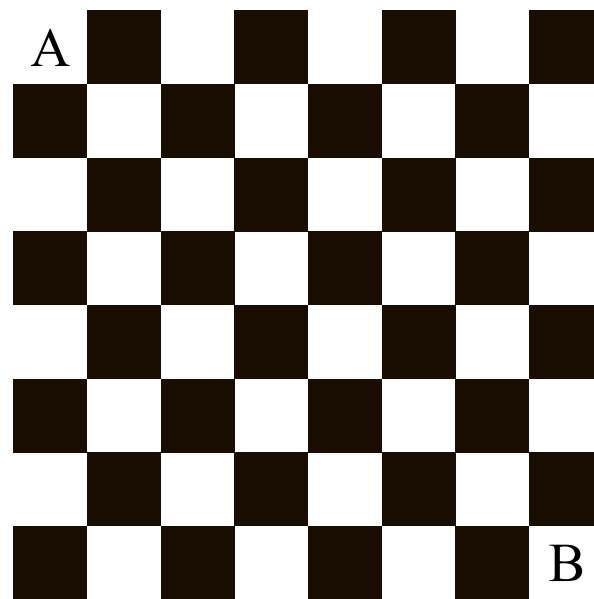
- (4)(a) *I will enjoy **every** slice of the pizza.*  
 (b) *I will enjoy **each** slice of the pizza.*

The meanings the two quantifiers involve the idea that all elements of the collection are the same in some respect; e.g. in (4) the speaker enjoys all slices of pizza equally. Since all of the items are the same in some respect, the speaker has a choice to focus on one representative element, because what is explicitly said about this element will be indirectly implied about all the others. This is what *each* and *every* have in common. The difference between then lies in how the speaker apprehends the collection. In the case of *every*, all the things in the group are apprehended simultaneously via summary scanning. The speaker could say (4a) while looking at a pizza that has just been cut into slices, but all of the pieces are still in place. In the case of *each*, the items are accessed one by one in a sequence, i.e. sequential scanning takes place. Thus, the speaker of (4b) may be looking as a sliced pizza, while imagining the action of eating the slices one by one. In general, the presence of sequential scanning in *each* creates the impression that greater emphasis is placed on individual element of the collection. This is because during particular steps in sequential scanning the respective elements are singled out as the focus of attention to a greater extent than in the case of summary scanning in *every* (cf. Langacker 2016, 146).



## Study questions

1. At one point of his novel *Roadmarks*, Roger Zelazny describes a dragon in the following way: “Its coinlike scales ranged from gold on its breast to jet upon its back, running from copper through red down the length of its tail and back across the breadth of its great vanes” (Zelazny 1979). How is scanning used in the construal behind this description?
2. Can you think of another pair of sentences, other than (4), that illustrates the difference between *each* and *every*?
3. On the chessboard below, there are several paths from point “A” to point “B.” Each path is created when the fields of the chessboard are scanned in a certain sequence. Can you propose 3 different paths leading from “A” to “B”?



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