

# The characterization of concepts in a metalanguage for lexicographic semantics

[for *Arguing with Engineered Concepts* ed. by Martin Hinton & Fabrizio Macagno]

A successful lexicographic semantic description characterizes the concepts that occur in establishing the meaning of a listeme by modelling what the competent native-like speaker of the language knows. Because concepts can only be identified to a human through the medium of a natural language, the metalanguage used in the semantic definition of a natural language expression in the object language will always be equivalent to the natural language expression through which that metalanguage is interpreted. The metalanguage of a semantic theory is a demonstrably rational abstract model developed by applying the analyst's experience and intuitions to inferences drawn from occurrences of actual speech events. Each sense of a listeme is characterized by a description of the salient properties of its typical denotatum. To most effectively implement this project in conceptual engineering is to capture every possible sense of the listeme using metalanguage that is at the same time precise, compendious, and succinct. A review of several proposed lexicon/dictionary entries for the listeme *cup* reveals lacunae that are rectified in a decision procedure whose output characterizes the relevant sense of the input listeme using natural language and the procedural constructs or commands IF, ELSE, GOTO, END. The resulting lexicographic semantic description satisfies the specified success condition. Establishing the characteristics of metalanguage is crucial to the proper investigation of conceptual engineering.

Keywords: characterization, concepts, conceptual engineering, decision procedure, lexicographic semantics, metalanguage, model, natural language

## 1. The primary characteristic of a metalanguage

As pointed out by Allan 1986/2014; 2001; 2020b, human languages are the objects studied in semantics and pragmatics, consequently, the language under investigation is known as the 'object language'. The language used to describe and analyse the object language is called the 'metalanguage'. Establishing the characteristics of metalanguage is the very heart of any proper investigation of conceptual engineering as evidenced in the Cappelen-Plunkett definition of conceptual engineering:

Conceptual engineering = (i) The assessment of representational devices, (ii) reflections on and proposal for how to improve representational devices, and (iii) efforts to implement the proposed improvements. [...] What are the relevant representational devices? Possible answers

include: concepts (as they are construed in some part of psychology or philosophy<sup>1</sup>), lexical items, and the semantic values of lexical items. (Cappelen and Plunkett 2020: 3)

The topic of this essay is the characterization of concepts in lexicographic semantics, rendering the essay crucial to this Special Issue of *Topoi*, ‘Arguing with engineered concepts’.

Like any language, a metalanguage for semantics consists of a set of symbols, a set of axioms and procedures for combining them into well-formed constructions, along with a set of interpretations for the individual symbols in isolation and for the structures they enter into. The basic requirement for a metalanguage is to satisfactorily communicate the meaning of item  $e_{OL}$  – that is, any expression in the object language, whether it is a word, a phrase, or longer text – in terms of an expression “ $e_M$ ” in the metalanguage.

One important practical constraint on a metalanguage is that it needs to be understood by human beings who normally communicate in a natural language of which they have fluent native-like command. If you understood neither Polish nor Swahili there is little point in using Swahili as a metalanguage for the semantic analysis of Polish (or vice versa): thus, to say *To jest pies* means “Ni mbwa” will not be helpful. Because English is the medium for this essay, English can function as a meta-metalanguage: *To jest pies* (in Polish) means “It’s a dog”; or *To jest pies* means “Ni mbwa” in Swahili, which means “It’s a dog”. Obviously, then, the semantic metalanguage is a translation of the object language (cf. Carnap 1937: 228) and, in order for the metalanguage to be understood and used by human beings, it must be communicable in a natural language. Consequently,

Postulate 1. Any metalanguage expression “ $e_M$ ” used in the semantic definition of a natural language expression  $e_{OL}$  will always be equivalent to the natural language expression through which it is interpreted.

## **2. A theory of a natural phenomenon is always a model of it**

All theories, without exception, are abstractions from natural phenomena such as natural language. So the relation of theory to reality ‘is not analogous to that of soup to beef but rather of check number and overcoat’ (Einstein 1973: 294). In other words: theory and natural phenomena are ontologically distinct entities.

Postulate 2. Semantic theory is developed by applying the analyst’s experience and intuitions to inferences drawn from occurrences of actual speech events in order

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<sup>1</sup> Also, linguistics.

to create a demonstrably rational abstract model of their meanings, structures, and causes.

As argued in Allan 2003:

Postulate 3. There is no upper bound on the number of theories/models of natural phenomena.

Einstein correctly recognized that such models are human inventions, so that there are potentially as many models as there are human beings:

The concepts and fundamental principles which underlie [a scientific theory] are free inventions of the human intellect which cannot be justified either by the nature of that intellect or in any other fashion *a priori*. ('On the method of theoretical physics' Einstein 1973: 266)

But, of course, not all such models are equally valid:

The liberty of choice [among models ...] is of a special kind; it is not in any way similar to the liberty of a writer of fiction. Rather, it is similar to that of a man engaged in solving a well-designed word puzzle. He may, it is true, propose any word as a solution; but there is only *one* word which really solves the puzzle in all its parts. It is a matter of faith that nature – as she is perceptible to our five senses – takes the character of such a well-formulated puzzle. The successes reaped up to now by science do, it is true, give a certain encouragement for this faith. ('Physics and reality' 1973: 287)

Valid models arise through creative intuition, not pure logic:

The supreme task of the [theorist] is to arrive at those elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to these laws, only intuition resting on sympathetic understanding of experience can reach them.<sup>2</sup> ('Principles of research' Einstein 1973: 221)

The theoretical idea [...] does not arise from and independent of experience; nor can it be derived from experience by a purely logical procedure. It is produced by a creative act. ('On the generalized theory of gravitation' Einstein 1973: 334)

The essential contribution of creative intuition to scientific theory is widely recognized among philosophers of science (Bronowski 1978 Ch. 4, Katz 1981 Ch. 6, Kuhn 1970: 122f, Pirsig 1976) including Poincaré:

Pure logic could never lead us to anything but tautologies; it could create nothing new; not from it alone can any science issue. [...]o make arithmetic, as to make geometry, or to make any

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<sup>2</sup> Einstein is here writing not of deduction, as he claims, but abduction, as is clear from the next citation (Allan 2006b).

science, something else than pure logic is necessary. To designate this something else we have no word other than *intuition*.

[...]

Thus logic and intuition have each their necessary role. Each is indispensable. Logic, which alone can give certainty, is the instrument of demonstration; intuition is the instrument of invention. (Poincaré 1946: 214f, 219)

Different theorists create different models and the would-be user must evaluate them. Criteria for doing so are outlined above (Allan 2003: 552; Botha 1992; Chomsky 1957; 1965 and many other authors). The choice will be made by the would-be user on what seems (at that moment) the best fit for purpose. People prefer theories on similar grounds to their preference for truths. To illustrate, for Arne Naess,

[I]f, as often happens, one person judges *U* to be more precise than *T* in situation *S*, while in the same situation *S* another person judges *T* to be more precise than *U*, the only way to decide who is right is to make systematic observations of language customs in *S*. (Naess 2005: 31)

For relevance in this essay, Naess' *U* corresponds roughly to my "e<sub>M</sub>", his *T* to my e<sub>OL</sub>, and his *S* to my object language. We have to assume that Naess' 'systematic observations of language customs' either chooses the most frequent or most popular interpretation – a statistical preference for what is precise – or selects the custom of the hegemonous group as the preferred precization. Unfortunately, Naess' formula  $T \stackrel{=}{=} U$  in *S* (Naess 2005: 32) fails to clarify this issue for us. What he has done however, is to clearly establish that precization of interpretation of the meaning of *T* (or e<sub>OL</sub>) is pragmatic – dependent on context. This is exactly comparable with what is exemplified in Allan 2022; 2023b for evaluations of truth. For instance, the truth of *God exists* depends on one's Weltanschauung – theists believe it is true, atheists that it is false. The truth of  $1+1 = 10$  holds positive for a binary number system but false for a decimal number system – two different contexts and, arguably, two distinct Weltanschauungen.

### 3. Lexicographic semantic description

The focus here is the assignment of meanings to listemes.<sup>3</sup> Following Allan 2001; 2006a; 2024, a 'listeme' (the term was first used by Di Sciullo and Williams 1987) is what is listed in a lexicon or dictionary (because its meaning cannot be established compositionally<sup>4</sup>). Dictionaries, such as the *Oxford English Dictionary*, are publications created as partial

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<sup>3</sup> The assignment of meanings to constructions is ignored here but not in Allan 2001 and works cited there.

<sup>4</sup> In reality, of course, the boundary between listemes and phrases is fuzzy.

models of the mental lexicon. A ‘lexicon’ (sc. mental lexicon) is a bin for storing the meanings of those language expressions whose meaning is not properly determinable from the meanings, if any, of its constituents. Semantic representations in the lexicon (lexicographic semantic descriptions) are composed in a semantic metalanguage.

The first problem is to establish grounds for what appears in the semantic representation. Following Allan 2001; 2006a; 2024, I name a semantic representation a ‘sense’ of the listeme. As we shall see,

Postulate 4. The sense of a listeme normally corresponds to a description of the concepts that comprise the salient properties of the typical denotatum.

This postulate is wholly compatible with Sarah Sawyer’s account of conceptual engineering:

Linguistic meaning is here to be understood as linguistically encoded content rather than as reference or denotation; and concepts are to be understood as representational constituents of thoughts individuated at the level of sense rather than reference. (Sawyer 2020: 380)

The denotation of a language expression  $\alpha$  is what  $\alpha$  is normally used to refer to in some possible world, real or imagined. The ‘reference’ of a language expression is what the speaker/writer/signer is using the language expression to talk about – be it intensional, extensional, or non-existent. Information about denotata (potential referents) is stored in their encyclopaedia entries. An encyclopaedia functions as a structured data-base containing exhaustive information on many, potentially all, branches of knowledge. It is this information from which the senses of isomorphic listemes are abstracted. Such abstraction from particulars is evident in the ontogenetic development of listemes by children (Allan 2001; 2006a; 2024; Clark 1973; Gentner and Boroditsky 2001; Tomasello 2003). Dictionaries are linked with a (possibly unitary) set of encyclopedias (Allan 2006a; 2024).

#### **4. Concepts are necessarily named in natural language**

In this essay *concept* is defined minimally as “cognitive representation” which can be glossed as “mental representation of an entity, event, notion, idea.” Consider the comparatively simple concept identified by the word *two*, here symbolized TWO. The *Oxford English Dictionary* 2024 is not very enlightening about numbers: *two* is ‘equal to one and one’, *nine* is ‘One more than eight’. The concept TWO is

*duo* in Latin,  
*deux* in French,  
*dos* in Spanish,  
*zwei* in German,

貳, *èr* in Chinese,  
 اثنين, *aithnayn* in Arabic.

In addition to these words (and many others if we were to run through the world's human languages) there are a number of symbols, for instance:

II and ii in roman,  
 二 in Chinese,  
 ٢ in Arabic,  
 2 in a decimal system,  
 10 in a binary system.

The number symbols are an alternative graphological representation of the same concept as a natural language word. For Latin: *duo*, II, ii are alternative representations. The number symbols II and ii when used in the context of an English text are equivalent to English *two*. اثنين and ٢ are alternative graphological representations of Arabic *aithnayn*. It is, unfortunately, impossible to represent the concept TWO without recourse to the words or symbols of a natural language. It might seem that in a decimal number system this holds true for English *two* and 2, but what about the binary number system symbol 10? It is properly read as *one zero* and certainly not as *ten*. However, it might be translated into the more familiar and ubiquitous decimal system to be read as *two* because this word best identifies the relevant concept which identified in this essay as TWO.

Perhaps an individual person can think about concepts without this linguistic constraint, but that individual is unable to communicate their unconstrained thought to either another human being or to an AI program without recourse to natural language. We could symbolize to concept TWO or as **two'** or by using any of the symbols above, but every one of these representations is in a natural language.

Postulate 5. To be understood, concepts are necessarily symbolized using a natural language expression.

## **5. The metalanguage should be precise and compendious, and therefore both concise and succinct**

How much information is necessary to include in a complete semantic representation in a lexicon? Naess 2005 might have called this a problem of 'precization'.

*Definition of Precization (D3)*. That expression *U* is a precization of expression *T* means that all reasonable interpretations of *U* are reasonable interpretations of *T* and that there is at least one reasonable interpretation of *T* that is not a reasonable interpretation of *U*. (Naess 2005: 26–27)

Naess' definition can seemingly be reinterpreted using my terminology:

Precization: Metalanguage expression “e<sub>M</sub>” is a precization of object language expression e<sub>OL</sub> iff all reasonable interpretations of “e<sub>M</sub>” are reasonable interpretations of e<sub>OL</sub> and that there is at least one reasonable interpretation of e<sub>OL</sub> that is not a reasonable interpretation of “e<sub>M</sub>”.

However, Naess is wrong, because to give a precise definition of the complete meaning of e<sub>OL</sub> it is not necessary that e<sub>OL</sub> is ambiguous. In addition to being precise, a semantic representation should be compendious: in other words, both comprehensive and succinct. To be succinct, the semantic representation must be concise: prolixity is inappropriate. Hence,

Postulate 6 The semantic metalanguage must be at the same time precise, compendious, and succinct.

## 6. Comparing and evaluating some examples of semantic metalanguage

The following discussion relies heavily on data presented in Allan 2020a; b which examined the semantics of the English listeme *cup* as presented in four sources, the *Oxford English Dictionary 2024*, Labov 1973, Katz 1977, and Goddard 2011. I focus on only five senses of the English noun *cup*.

Like almost all dictionaries, the *Oxford English Dictionary* uses a very slightly modified natural language for a metalanguage. It is precise, compendious, and succinct (or, if you will, concise) in its rendition of each of the selected five senses of the noun *cup*.

**I.1.** A small open vessel for liquids, usually of hemispherical or hemi-spheroidal shape, with or without a handle; a drinking-vessel. The common form of cup (*e.g.* a tea-cup or coffee-cup) has no stem; but the larger and more ornamental forms (*e.g.* a wine-cup or chalice) may have a stem and foot, as also a lid or cover; in such cases *cup* is sometimes applied specifically to the concave part that receives the liquid.

[...]

**I.2.b.** An ornamental cup or other vessel offered as a prize for a race or athletic contest.

[...]

**I.4.** A natural organ or formation having the form of a drinking-cup; *e.g.* the rounded cavity or socket of certain bones, as the shoulder-blade and hip-bone; the cup-shaped hardened involucre (cupule) of an acorn (*acorn-cup*); the calyx of a flower, also the blossom itself when cup-shaped; a cup-shaped organ in certain Fungi, or on the suckers of certain Molluscs; a depression in the skin forming a rudimentary eye in certain lower animals (also *eye-cup* or *cup-eye*).

[...]

**I.6.c.** That part of a brassiere which is shaped to contain or support one of the breasts.

[...]

*North American. Sport.* A covering or shield worn by sportsmen to protect the genitals.

(*Oxford English Dictionary* 2024)

I.1 is the salient or default sense of *cup*, assigned unless the context prefers one of the other senses (see Allan 2018; 2023a for specification of context). The salient/default meaning refers to the first concept of a cup that comes to mind when the word *cup* is uttered (or, simply, cognized) outside of some particular constraining context.<sup>5</sup> I.1 is therefore the only sense of *cup* discussed in Goddard 1998; 2011; Katz 1977; Labov 1973; Wierzbicka 1984 – all of which fail to satisfy the compendious constraint in Postulate 6. Nonetheless, I shall compare the metalanguages used in these offerings.

In the early 1970s William Labov asked subjects to differentiate cups from mugs, partly on the basis of line drawings like those in Figure 1.

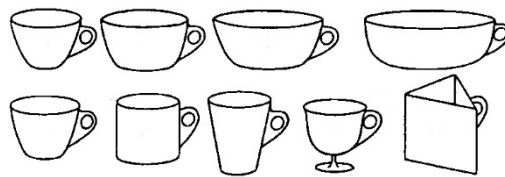


Figure 1. Line drawings of cup-like and mug-like entities

It led him to propose the following:

The term *cup* is regularly used to denote round containers with a ratio of width to depth of  $1 \pm r$  where  $r \leq r_b$ , and  $r_b = \alpha_1 + \alpha_2 + \dots + \alpha_n$  and  $\alpha_i$  is a positive quantity when the feature *i* is present and 0 otherwise.

feature 1 = with one handle

2 = made of opaque vitreous material

3 = used for consumption of food

4 = used for consumption of liquid food

5 = used for consumption of hot liquid food

6 = with a saucer

7 = tapering

8 = circular in cross-section

*Cup* is used variably to denote such containers with ratios of width to depth of  $1 \pm r$  where  $r_b \leq r \leq r_t$  with a probability of  $r_t - r / r_t - r_b$ . The quantity  $r \pm r_b$  expresses the distance from the modal value of width to height. (Labov 1973: 366f)

<sup>5</sup> When I instructed Microsoft Copilot ‘draw cup’, the output was a cup of coffee:





To properly interpret  $r_b$  and  $r_t$  (and subsequently  $r$ ) we must appeal to Labov's Figure 19 in Labov 1973: 368, Figure 2 below. This maps the invariant core and variable range as tested among seven fluent English speakers for valid identification of potential cups in Labov's more elaborate array than my Figure 1.

		Items										
		a	b	c	d	e	f	g	h	i	j	k
Speakers	1	+	+	+	+	-	-	-	-	-	-	-
	2	+	+	+	+	+	-	-	-	-	-	-
	3	+	+	+	+	+	+	-	-	-	-	-
	4	+	+	+	+	+	+	+	-	-	-	-
	5	+	+	+	+	+	+	+	+	-	-	-
	6	+	+	+	+	+	+	+	+	+	-	-
	7	+	+	+	+	+	+	+	+	+	+	-

$r_b$  is positioned below item 'd' and  $r_t$  is positioned below item 'k'. A diagonal line runs from the top-right corner of the '+' block (item 'd' for speaker 1) to the bottom-right corner of the '+' block (item 'k' for speaker 7).

Figure 2. Core and range for the denotation of *cup*

We see that all seven speakers categorise the drawn entities a–d in his array (Labov 1973: 354) as *cup* but fewer than half of them categorise items a–h as *cup*; no one finds item k to be a cup. Thus, according to Labov, the boundary,  $r$ , of what counts as a cup lies somewhere between items e and j. In other words, the denotational boundary is fuzzy and individual speakers may disagree from time to time about whether or not the label *cup* properly applies to a particular drawn item.

It is immediately obvious that Postulate 4 is confirmed: the sense of a listeme normally corresponds to a description of the concepts that comprise salient properties of the typical denotatum as depicted in drawings comparable with certain items in Figure 1. According to Labov, the salient/default sense of *cup* is conditional on

- (i) the configuration of the denotatum – features 1, 7, 8;
- (ii) the material of construction – feature 2;
- (iii) its function – features 3, 4, 5;
- (iv) a characteristic supplement – feature 6;
- (v) a fuzzy boundary feature, which is bound to the configuration expressed as the probable value of  $r_t - r/r_t - r_b$  based on samples of speaker judgment.

All five of these characteristics are relevant, but Labov limits himself to only the salient kind of *cup* – the typical American, Australian, British, European drinking vessel.

Labov's metalanguage consists of natural language and a somewhat obscure mathematical formulation. Furthermore, features 1, 2, 3, 5, and 6 are irrelevant, although we shall see that similar characteristics are also found in the semantic descriptions of other lexicographers. Thus, Labov fails to be succinct, flunking Postulate 6. So, while his offering perhaps looks

more ‘scientific’ than I.1 in the *Oxford English Dictionary*, the inclusion of irrelevant material in his description renders it less concise and consequently less precise.

Consider next the ‘dictionary representation’ of *cup* given in Katz 1977: 49, with line numbering added for convenient reference.

1. Physical Object
2. Inanimate
3. Vertical Orientation
4. Upwardly concave
5. Height about equal to top diameter
6. Top diameter greater than bottom diameter
7. Artefact
8. Made to serve as a container from which to drink liquid.

Katz uses a slightly adapted standard English as his metalanguage for the salient/default sense of *cup*. It is very much simpler than Labov’s proposal, yet is adequate. The ontology of a cup, something left implicit by both the *Oxford English Dictionary* and Labov, is identified in lines 1, 2, and 7 – although 7 renders 2 redundant. Configuration is specified in 3, 4, 5, and 6. Function is given in feature 8. As in the *Oxford English Dictionary*, the material from which a cup is constructed is unspecified but is implied by 8. Katz’s description is superior to that of the *Oxford English Dictionary* 2024 and Labov 1973 in establishing the ontology of *cup*, but in other respects it is no better than the *Oxford English Dictionary* for precision and concision.

Allan 2020b discussed in detail the 830 word semantic description of *cup* presented in Wierzbicka 1984: 222-224. Allan 2020a discussed the semantics of *cup* offered in Goddard 2011, which is a revision of a similar account in Goddard 1998 that was based on Wierzbicka 1984. Goddard more closely sticks to Natural Semantic Metalanguage (NSM) (Goddard and Wierzbicka 2014; Wierzbicka 1972; 1996) than did Wierzbicka. NSM is deliberately anthropocentric and subjective, referring to the natural world of sensory experience rather than intellectualized abstractions; thus, *red* is described as the colour of blood (Wierzbicka 1980, 1990) or fire (Wierzbicka 1990, 1992) rather than as an electromagnetic wave focally around 695 nanometres in length. The vocabulary of NSM supposedly uses terms that children acquire early and that have counterparts in all languages (Goddard 1994: 12). In various places Allan has questioned such claims (Allan 2001; 2008; 2020b), but they are barely relevant to this essay, so let’s reconsider Goddard’s semantics for *cup* to which line numbers are added for convenient reference in discussion.

1. *a cup*:
- 2.

3. a. something of one kind
4. at many times people do something with something of this kind when they are drinking [m] something hot [m]
5. when someone is drinking [m] something like this, before it is inside this someone's mouth [m], it is for some time inside something of this kind
6. SIZE
7. b. things of this kind are like this:
8. – they are not big
9. – someone can hold [m] one in one hand [m]
10. PART FOR HOLDING
11. many things of this kind have a small thin [m] part on one side
12. when someone is drinking [m], this someone can hold [m] this part with the fingers [m] of one hand [m]
13. OTHER PARTS
14. the other parts are like this:
15. – the sides [m] are like the sides [m] of something round [m]
16. – they are thin [m]
17. – the top [m] part of the sides has a smooth [m] round [m] edge [m]
18. – the bottom [m] part of something of this kind is flat [m]
19. – someone can think that the bottom [m] part is small, if this someone thinks about the top [m] part at the same time
20. MATERIAL
21. things of this kind are made of [m] something hard [m]
22. this something is smooth [m]
23. USE SEQUENCE
24. c. when someone is doing something with something of this kind because this someone is drinking [m] something hot [m], it happens like this:
25. – at some time this something is in one place for some time, at this time the bottom [m] part is touching something flat [m]
26. – at this time there is something like hot [m] water [m] inside this thing
27. – it can be tea [m], it can be coffee [m], it can be something of another kind
28. – it is inside this thing because some time before someone did some things because this someone wanted it to be like this
29. – after this, someone picks up [m] this something with the fingers [m] of one hand [m]
30. – after this, this someone does something else to it with the hand [m]
31. – after this, because of this, part of the edge [m] at the top [m] of this thing touches one of this someone's lips [m] for a short time, as this someone wants
32. – during this time, this someone's fingers [m] move as this someone wants
33. – because of this, a little bit of something like hot [m] water [m] moves, as this someone wants
34. – because of this, after this it is not inside this thing anymore, it is inside this someone's mouth [m]
35. – after this, this someone puts [m] this thing down [m] on something flat [m]

36. – after this, this someone can do this a few more times
37. SAUCER
38. sometimes when someone is drinking [m] something in this way, this someone wants not to hold [m] this thing for a short time
39. when it is like this, this someone can put [m] this thing down [m] on something of another kind, in the middle [m] of this other kind of thing
40. these other things are made of [m] the same hard [m], smooth [m] stuff
41. they are round [m], they are flat [m]
42. the edge [m] of something or this kind is above the middle [m]
43. ARTEFACT STATUS
44. d. many people want to drink [m] things of some kinds like this at many times because of this, some people make [m] things of this kind (Goddard 2011: 228–229)

In addition to so-called ‘semantic primes’ such as ‘something’, ‘things’, ‘kind’, ‘many’, ‘people’, ‘times’, Goddard’s analysis includes ‘semantic molecules’, evidenced by a subsequent [m], such as ‘fingers’, ‘hand’, ‘drinking’, ‘making’ things, and being characterized as ‘hot’ or ‘hard’ (Goddard 2010).

There are four parts to Goddard’s lexicographic semantic description of *cup*: a. (2–5), identifies a cup’s primary function; b. (6–22), describes the configuration of a typical cup and the material from which it is made; c. (23–42), describes how a cup is used and what it is used for, then brings in saucers; and d. (43–44), says the cups are in wide use and many are artefacts.

Like Labov, Goddard’s a. wrongly characterizes a cup as a vessel for containing hot liquid. Perhaps that offers an implicit motivation for attaching handles to cups.

b. suggests that the configuration of a cup is motivated by its being held in the fingers of one hand (7–9), hence the need for a handle (10–12). But in fact, the entity properly denoted by *cup* may lack handles – which is the case with many Chinese, Japanese, and Middle Eastern cups for tea or coffee, and many disposable cups, also. (13–19) correctly characterize a cup is a hollow oblate hemispheroid with a flat bottom, but not concisely. Although (20–22) describe the material from which a cup is made as smooth and hard, this characterization is imprecise: what is essential is that a cup is impermeable.

c. imprecisely identifies a cup as a vessel for the drinking of hot liquid (24, 26), noting that a cup is several times raised to the lips for drinking (31, 36) and lowered onto a flat surface (25, 35). There is superfluous information here inessential to defining the ontology of the typical referent of *cup*. (37–42) might be relevant to the semantics of *saucer* but nonetheless fail to identify a saucer’s function.

d. carries superfluous information.

Goddard's semantics for the default sense of *cup* is prolix and imprecise, containing a plethora of inessential information (a criticism also made of Wierzbicka 1984 in Allan 2020b). The use of NSM is reasonably consistent in Goddard 2011 whereas that is certainly not true of Wierzbicka 1984. How does it compare with the account in I.1 of the *Oxford English Dictionary*? Badly, because it is neither as concise nor precise as *Oxford English Dictionary* 2024. Because NSM has to be translated back into a natural language such as everyday English in order to be understood, the claim that it is a superior metalanguage for semantic descriptions is at best dubious and at worst bogus.

As already pointed out, the offerings from Labov, Katz, and Wierzbicka or Goddard are all limited to the salient or default sense of *cup*. We should not ignore the extended senses comprehensively identified in the *Oxford English Dictionary*. This immediately renders the *Oxford English Dictionary* version superior to all others examined so far.

## 7. An exemplary semantic description

The function of a lexicographic semantic description is to characterize the meaning of a listeme by identifying the concepts that comprise the salient features of whatever is denoted by the relevant senses of that listeme. That is the condition for its success. Any such characterization must take account of whoever is to use it. A lexicographic semantic description is a model of what the competent speaker knows, and I shall deem that the user of such a description is similarly a competent speaker of the language – exactly the kind of person who might consult the *Oxford English Dictionary*. (Less competent speakers of English might consult the *OED* but they are not its principal audience.) A competent speaker of English will already know what a cup is, so a comprehensive, concise and precise accurate description is all that is necessary, one that identifies the relevant denotation (cf. Cruse 1990: 396).

(A0)–(A10) constitute a significantly revised (corrected and improved) version of the decision procedure originally presented in Allan 2020a. The function of the procedure is to supply a metalanguage output that characterizes the concepts that give rise to the relevant sense of the object language input. It consists of a sequence of statements, the first of which (A0) identifies the input; the output will be one of (A02–A10). (A01)–(A10) are conditions introduced by the procedural construct IF. When a stated condition satisfactorily characterizes the denotatum of (A0) in full, then the procedure has identified the valid sense of the listeme, triggering the procedural construct (or command) END, which ends the procedure. If the condition fails to characterize the denotatum or satisfies only part of the sense of the listeme, the procedure continues via the construct (or command) ELSE GOTO which identifies an

additional condition to be satisfied until the END command is triggered. The ELSE construct is the contrary of IF and can be glossed “if not”.

The procedure described here is a model of a cognitive process and makes no claim to accurately describe the cognitive process itself (i.e. what goes on in the human mind and/or brain) any more than the Model S P100D diecast scale model of a Tesla car ([https://shop.tesla.com/en\\_au/product/diecast-1\\_18-scale-model-s?sku=1474951-00-A](https://shop.tesla.com/en_au/product/diecast-1_18-scale-model-s?sku=1474951-00-A)) is identical to how a real Tesla Model S car operates.

(A0) *cup* Noun

- (A01) IF something is properly called a *cup* it is a hollow hemispheroid usually with a diameter greater than or equal to its depth: GOTO (A02), ELSE GOTO (A05)
- (A02) IF the *cup* is a flat-bottomed hollow oblate hemispheroidal drinking vessel, an impermeable physical artefact (entity) with a vertical handle and a container with a capacity of about 250ml, it is a typical Western style cup for containing drinks such as tea or coffee, that is typically accompanied by a matching saucer: END, ELSE GOTO (A03)
- (A03) IF the *cup* is a flat-bottomed hollow oblate hemispheroidal drinking vessel, an impermeable physical artefact with a vertical handle and a container with a capacity of about 125ml, it is a typical Western espresso style coffee cup (demitasse) that is often accompanied by a matching saucer: END, ELSE GOTO (A04)
- (A04) IF the *cup* is a flat-bottomed hollow oblate hemispheroidal drinking vessel, an impermeable physical artefact, a container with a capacity of about 125 ml, it is a typical Chinese style tea cup and/or a typical Middle-Eastern style tea or coffee cup: END, ELSE GOTO (A05)
- (A05) IF the *cup* is a flat-bottomed hollow tapered cylindrical drinking vessel, a container which is an impermeable physical artefact having a diameter less than its depth and made of water-proof paper, plastic, polystyrene, or similar material with a capacity between approximately 250–500ml, it is a throw-away cup that typically lacks a handle and invariably lacks a saucer: END, ELSE GOTO (A06)
- (A06) IF the *cup* is an impermeable physical artefact offered as a prize for a race or athletic contest: END, ELSE GOTO (A07)

- (A07) IF the *cup* is a hollow hemispheroidal physical artefact of textile fabric that is one of a pair which constitute the principal parts of a brassiere, each cup being shaped to contain and support one of a woman's breasts<sup>6</sup>: END, ELSE GOTO (A08)
- (A08) IF the *cup* is a hollow oblate hemispheroidal physical artefact worn as a shield by sportsmen to contain and protect male genitals<sup>7</sup>: END, ELSE GOTO (A09)
- (A09) IF the *cup* is a hollow oblate hemispheroid that forms the woody seat of a naturally occurring entity that contains an acorn (its cupule), it is an acorn-cup: END, ELSE GOTO (A10)
- (A10) IF none of (A01–A09) satisfactorily resolves to END, then the denotatum is incorrectly named *cup*: END.

The primary motivation for what has become a standard for drinking cup sizes in (A01–A05) is their functionality as manipulable with a single hand by an adult human being. The typical cup's volume of about 250ml is modelled on the volume of the two human hands cupped; the demitasse volume of about 125ml is modelled on the volume of a single cupped human hand. Perhaps the standard Middle Eastern cup size of 125ml is motivated by the fact that only the cupped right-hand would be acceptable in drinking. Unfortunately, a similar speculation is unwarranted for the 125ml Chinese teacups. In any case, the fact that the cups manufactured for human use only approximate the standard cup sizes matches the fact that human hand sizes vary a great deal, with consequent variation in their cupped volume.

The salience of *cup* as a container for drinking tea, coffee, hot chocolate, or the like is necessarily determined by the principal function of the denotatum rather than by its shape. The slightly old-fashioned idiom *be in one's cups* meaning “drunk” obviously derives from the salience of *cup* as a drinking vessel; however, cups are rarely used for alcoholic drinks, which are normally served in glasses, (beer-)mugs, bottles, or cans. Although the typical drinking-vessel-cup is an oblate hemispheroidal container, in reality some cups are hollow

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<sup>6</sup> There is a partial overlap between the capacity/volume of the drinking cup and the bra-cup. Although bra sizes are not universally standardised, a AA cup is around 125ml and a B cup around 250ml; however, any match is complicated by the fact that band size also needs to be taken into account (McGhee and Steele 2011: 356). Like other items of clothing the configuration of the bra is determined by the configuration of the human body, consequently bra cups are paired, typically connected by a band below that circles the chest.

<sup>7</sup> Ideally it would be indicated that this is limited to American English. In a linked encyclopedia entry (see Allan 2006a; 2024) the appropriate term in other English varieties should be identified, such as that this device is known as a *box* in British and Australian English.

cylinders. Being cylindrical, they are similar to short mugs because although some mugs are (hollow) prolate hemispheroidal containers, most are shell cylinders; the principal difference between cylindrical cups and mugs is that whereas the diameter of the upper rim of the cup is approximately equal to or greater than the cup's height, the height of a mug is greater than, and often much greater than, its diameter.

There are transferred uses of *cup*: for instance, the sense (A06) gives rise to the synecdoche of, for example, a horse race (an event) at which a cup (an entity) is presented: 'The Melbourne Cup is an annual Group 1 Thoroughbred horse race held in Melbourne, Australia, at the Flemington Racecourse.'

With respect to (A07), the motivation for the bra cup metaphor is the cup's function as a breast container which, in turn, determines the configuration. Because a woman's breast is, normally a hemispheroidal protuberance, often oblate, the garment designed to contain it is necessarily a hollow hemispheroid. The English *cup* metaphor is similar to that of Italian *coppa* and Dutch *kopje* (diminutive of *kop*). The Spanish metaphor *copa* is otherwise "drinking vessel, glass". Turkish *kap* simply means "container", but the alternate *kup* is otherwise a "coupe (= dessert bowl)". The Polish metaphor *miseczka* is a diminutive of *miska* "bowl". The German *Körbchen* (diminutive of *Korb*), Czech *košíček* (diminutive of *koš*), and Hungarian *kosár* all otherwise mean "basket". The French metaphor is *bonnet* "cap". The vehicles for all these metaphors for bra cups are (oblate) hollow hemispheroidal containers that are prompted by the function, configuration, and – for French *bonnet* and perhaps Dutch *kopje*<sup>8</sup> – location. [Bra] *cup*, *coppa* [del reggiseno], *kopje* [beha], *kap* [sütyen], *kup* [bedeni], [rozmiar] *miseczka*, *bonnet* [de soutien-gorge], etc. are cognitively motivated, fit for purpose, names and not entirely arbitrary.<sup>9</sup> These metaphors all instantiate the claim by David Chalmers that *de novo* concepts arise from conceptual engineering (Chalmers 2020: 7) and:

Whenever there's a proposal about a new concept, there's also a proposal about a word for it to be attached to. (Chalmers 2020: 9)

Finally, I acknowledge that the 'END' command in (A10) is premature, being introduced at this point in the essay for brevity. There are in fact additional possible senses of *cup* such as "the rounded cavity or socket of certain bones", "the calyx of a flower", also the blossom itself when cup-shaped, a cup-shaped organ in certain fungi, or on the suckers of certain

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<sup>8</sup> *Kopje* is also slang for "head".

<sup>9</sup> Allan 2001; 2024 claims the same is true of proper names. I am grateful to APP, IA, KJ, MJ, PH, RB for information on metaphorical names for bra cups – any errors are mine.



molluscs, and a depression in the skin forming a rudimentary eye in certain lower animals (*Oxford English Dictionary* 2024).

Reviewing (A01–A09) it is obvious that the satisfaction of any particular condition is determined by the context (Allan 2018; 2023a; Gernsbacher 1990; Giora 2003; Stalnaker 1978; 2014; and many others). Inappropriate conditions may be cognitively evoked but will be suppressed. For instance, if the context is drinking, then all of conditions (A02)–(A05) are relevant and the particular condition must be determined by other contextual factors such as configuration of the denotatum of (A0); if the relevant context is a garment, then all conditions other than (A07) or (A08) will be suppressed as will one of these on the basis of gender applicability.

The metalanguage used in (A01)–(A10) relies mostly on natural (everyday) English although the process itself is an algorithmic decision procedure marked by the procedural constructs or commands IF, ELSE, GOTO, END. The conditional statements (A01)–(A10) could be presented in any sequence at all provided they retain their identifying labels. In other words, these labels could be replaced by random symbols; for example, every instance of (A08) could be replaced by (1√3%5@7ζ), every instance of (A02) by (CJwG1uWOpiY), and so forth.

Would it not be preferable instead of using natural English in (A01)–(A10) to employ some kind of quasi-formal metalanguage, for instance recasting (A01) in part as in (A01')?

(A01') If  $\forall(x)[cup(x) \rightarrow \lambda(y)[\mathbf{hollow}'(y) \wedge \mathbf{hemispheroid}'(y)](x) \wedge \text{Most}(x)[cup(x) \rightarrow \lambda(y)[\mathbf{diameter}'(y) > \mathbf{height}'(y)](x)$  then GOTO...

(A01') uses quasi-formal predicates like **hollow'** calqued on natural English and naming identifiable concepts. The quantifier Most is calqued on English *most* just as  $\forall$  is based (if not calqued) on English *all* (and  $\exists$  on English *exist*). (Quasi-)formal languages are valuable under some circumstances, but they rather obfuscate the purpose of lexicographic semantic descriptions. A direct comparison of (A01) with (A01') surely demonstrates that (A01) is just as precise and concise as (A01') and is more readily interpreted because it is much closer to a rendition in everyday natural language.

Many semanticists and lexicographers (for example Goddard 2011; Weinreich 1962; 1980; Wierzbicka 1972; 1984) would say that 'oblate hemispheroidal' is inappropriate in a semantic description because both terms are uncommon in everyday English. This is undoubtedly true, but nevertheless I would claim that 'flat-bottomed hollow oblate hemispheroidal drinking vessel' is both concise and precise and therefore appropriately succinct in this semantic description. The *Oxford English Dictionary* 2024 gives the meaning for *oblate* as 'Of a

spheroid: flattened at the poles’ and for *hemispheroidal* ‘Having the form of a hemispheroid’ and for *hemispheroid* ‘The half of a spheroid’ and for *spheroid* ‘A body approaching in shape to a sphere, *esp.* one formed by the revolution of an ellipse about one of its axes. **oblate spheroid, prolate spheroid**’ [sic]. The lexicographic semantic description is a model of semantic interpretation that seeks to identify rather than to simplify the conceptual content of the listeme.

## 8. In conclusion

A semantic ameliorator will, in an ameliorative spirit, assess semantic concepts. (Cappelen 2020: 132)

Quod erat demonstrandum. Demonstrated in Section 1 and confirmed throughout the essay is that a metalanguage expression used in the semantic definition of a natural language expression in the target language will always be equivalent to a natural language expression through which the metalanguage is interpreted. Section 2 argued that to capture the meaning of a language expression in the object language, the metalanguage of a semantic theory is developed by applying the analyst’s experience and intuitions to inferences drawn from occurrences of actual speech events in order to create a demonstrably rational abstract model of the meanings of listemes and of the constructions they enter into. An iconic example of conceptual engineering. Section 3 postulated that the sense of a listeme normally corresponds to a description of the concepts comprising the salient properties of the typical denotatum. The function of a lexicographic semantic description is to characterize the meaning of a listeme by modelling what the competent speaker of the language knows. The meaning should be identifiable for all possible contexts in which the listeme can occur. Another example of conceptual engineering. Section 4 demonstrated that concepts can only be denoted using terms from a natural language; this inescapable fact further justifies the use of natural language as a metalanguage for semantics. Section 5 postulated the requirement that a semantic metalanguage must be at the same time precise, compendious, and succinct. Section 6 reviewed specifications of the semantics of the English listeme *cup* in Labov 1973, Katz 1977, and Goddard 2011 finding that all of them (and Wierzbicka 1984) limit themselves to the salient/default sense of *cup*. This renders the *Oxford English Dictionary* 2024 superior because it includes all the additional senses. Section 7 presented a decision procedure to supply an output that characterizes the relevant sense of the input listeme using the procedural constructs or commands IF, ELSE, GOTO, END. The procedure progresses through a number of conditions each of which seeks to identify a potential sense of the listeme by identifying the concepts specific to that particular sense using natural language as a metalanguage. This essay has sought to demonstrate that a compendious, precise and

succinct lexicographic semantic description couched in a natural language such as English can properly characterize the concepts that occur in establishing the meaning of a listeme by modelling what the competent speaker of the language knows about the meaning of that listeme. Hopefully, this essay has supplied an answer to the question posed by Cappelen and Plunkett:

How important is it to have a correct description of our representational devices before we do conceptual engineering? We've described the aim of conceptual engineering as that of assessing and ameliorating concepts and other representational devices. How important is it to have a correct descriptive account of those devices in order to do the engineering project well?

(Cappelen and Plunkett 2020: 14)

Establishing the characteristics of metalanguage is crucial to the proper investigation of conceptual engineering.

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## References

- Allan, Keith. 1986/2014. *Linguistic Meaning*. 2 vols. London: Routledge and Kegan Paul. (Reprint edn, Beijing: World Publishing Corporation, 1991. Reissued in one volume as Routledge Library Editions: Linguistics Volume 8, 2014.).
- Allan, Keith. 2001. *Natural Language Semantics*. Oxford & Malden MA: Blackwell.
- Allan, Keith. 2003. Linguistic metatheory. *Language Sciences* 25: 533–60.  
[https://doi.org/http://dx.doi.org/10.1016/S0388-0001\(03\)00032-9](https://doi.org/http://dx.doi.org/10.1016/S0388-0001(03)00032-9).
- Allan, Keith. 2006a. Dictionaries and encyclopedias (relationship). In *Encyclopedia of Languages and Linguistics*. 2nd edn, ed. by E. Keith Brown. 14 vols. Oxford: Elsevier. Pp. 3: 573-77.
- Allan, Keith. 2006b. Inference: abduction, induction, and deduction. In *Encyclopedia of Languages and Linguistics*. 2nd edn, ed. by E. Keith Brown. 14 vols. Oxford: Elsevier. Pp. 5: 651-54.
- Allan, Keith. 2008. Review of Peeters, Bert (ed.). 2006. *Semantic Primes and Universal Grammar: Empirical evidence from the Romance languages*. Amsterdam/Philadelphia: John Benjamins [Studies in Language Companion Series, Vol. 81] xvi+374 pp. (ISBN 90 272 3091 9). *Studies in Language* 32: 445-454. <https://doi.org/10.1075/sl.32.2.08all>.

- Allan, Keith. 2018. Getting a grip on context as a determinant of meaning. In *Further Advances in Pragmatics and Philosophy. Part 1. From Theory to Practice*, ed. by Alessandro Capone, Marco Carapezza and Franco Lo Piparo. Cham: Springer. Pp. 177-201. [https://doi.org/10.1007/978-3-319-72173-6\\_9](https://doi.org/10.1007/978-3-319-72173-6_9).
- Allan, Keith. 2020a. On cups. In *Dynamic Language Changes: Looking Within and Across Languages* ed. by Keith Allan. Singapore: Springer Nature. Pp. 125-137. <http://users.monash.edu.au/~kallan/papers/oncups.pdf>. [https://doi.org/10.1007/978-981-15-6430-7\\_8](https://doi.org/10.1007/978-981-15-6430-7_8).
- Allan, Keith. 2020b. On the semantics of *cup*. In *Meaning, Life and Culture: In conversation with Anna Wierzbicka*, ed. by Helen Bromhead and Zhengdao Ye. Canberra: ANU Press. Pp. 441-460. <https://doi.org/http://doi.org/10.22459/MLC.2020.23>.
- Allan, Keith. 2022. Truth is what the context makes of it (La verdad es lo que el contexto hace de ella). *Claridades: Revista de Filosofía* 14 (2): 15-33. <https://doi.org/10.24310/Claridadescrf.v14i2.13620>.
- Allan, Keith. 2023a. The interdependence of common ground and context. In *Common Ground in First Language and Intercultural Interaction*, ed. by Istvan Kecskes. Berlin: De Gruyter. Pp. 7-24. <https://doi.org/10.1515/9783110766752-002>.
- Allan, Keith. 2023b. Why truth is necessarily pragmatic. *Intercultural Pragmatics* 20 (3): 251-267. <https://doi.org/10.1515/ip-2023-3003>.
- Allan, Keith. 2024. The semantics and pragmatics of names and naming. In *Philosophy, Cognition and Pragmatics*, ed. by Alessandro Capone, Pietro Perconti and Roberto Graci. Cham: Springer.
- Botha, Rudolf P. 1992. *Twentieth Century Conceptions of Language: The Metaphysics Market*. Oxford: Basil Blackwell.
- Bronowski, Jacob. 1978. *The Origins of Knowledge and Imagination*. New Haven: Yale University Press.
- Cappelen, Herman. 2020. Conceptual Engineering: The Master Argument. In *Conceptual Engineering and Conceptual Ethics*, ed. by Alexis Burgess, Herman Cappelen and David Plunkett. Oxford: Oxford University Press. Pp. 132-151. <https://doi.org/10.1093/oso/9780198801856.003.0007>.
- Cappelen, Herman and David Plunkett. 2020. A guided tour of conceptual engineering and conceptual ethics. In *Conceptual Engineering and Conceptual Ethics*, ed. by Alexis

- Burgess, Herman Cappelen and David Plunkett. Oxford: Oxford University Press. Pp. 1-26. <https://doi.org/10.1093/oso/9780198801856.003.0001>.
- Carnap, Rudolf. 1937. *Logical Syntax of Language*. London: Routledge and Kegan Paul.
- Chalmers, David J. 2020. What is conceptual engineering and what should it be? *Inquiry* 63: 1-18. <https://doi.org/10.1080/0020174X.2020.1817141>.
- Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.
- Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge MA: MIT Press.
- Clark, Eve V. 1973. What's in a word? On the child's acquisition of semantics in his first language. In *Cognitive Development and the Acquisition of Language*, ed. by Timothy E. Moore. New York: Academic Press. Pp. 65–110.
- Cruse, D. Alan. 1990. Prototype theory and lexical semantics. In *Meanings and Prototypes: Studies in Linguistic Categorization*, ed. by Savas L. Tsohatzidis. London: Routledge. Pp. 382–402.
- Di Sciullo, Anna-Maria and Edwin Williams. 1987. *On the Definition of Word*. Cambridge MA: MIT Press.
- Einstein, Albert. 1973. *Ideas and Opinions*. Laurel edn. New York: Dell. [First published 1954].
- Gentner, Dedre and Lera Boroditsky. 2001. Individuation, relativity and early word learning. In *Language Acquisition and Conceptual Development* ed. by Melissa Bowerman and Stephen Levinson. Cambridge: Cambridge University Press. Pp. 215-256.
- Gernsbacher, Morton Ann. 1990. *Language Comprehension as Structure Building*. Hillsdale NJ: Lawrence Erlbaum.
- Giora, Rachel. 2003. *On Our Mind: Salience, Context, and Figurative Language*. New York: Oxford University Press.
- Goddard, Cliff. 1994. Semantic theory and semantic universals. In *Semantic and Lexical Universals: Theory and Empirical Findings*, ed. by Cliff Goddard and Anna Wierzbicka. Amsterdam: John Benjamins. Pp. 7–29.
- Goddard, Cliff. 1998. *Semantic Analysis: A Practical Introduction*. Oxford: Oxford University Press.

- Goddard, Cliff. 2010. Semantic molecules and semantic complexity (with special reference to “environmental” molecules). *Review of Cognitive Linguistics* 8: 123-155.  
<https://doi.org/10.1075/ml.8.1.05god>.
- Goddard, Cliff. 2011. *Semantic Analysis: A Practical Introduction. Second Edition*. Oxford: Oxford University Press.
- Goddard, Cliff and Anna Wierzbicka. 2014. *Words and Meanings. Lexical Semantics Across Domains, Languages, and Cultures*. Oxford: Oxford University Press.
- Katz, Jerrold J. 1981. *Language and Other Abstract Objects*. Totowa: Rowman and Littlefield.
- Katz, Jerrold J. 1977. A proper theory of names. *Philosophical Studies* 31: 1–80.
- Kuhn, Thomas S. 1970. *The Structure of Scientific Revolutions*. 2nd edn. Chicago: Chicago University Press.
- Labov, William. 1973. The boundaries of words and their meanings. In *New Ways of Analyzing Variation in English*, ed. by Charles-J. Bailey and Roger Shuy. Washington D.C.: Georgetown University Press. Pp. 340–73.
- Mcghee, Deirdre E. and Julie Steele, R. 2011. Breast volume and bra size. *International Journal of Clothing Science and Technology* 23: 351-360.  
<https://doi.org/10.1108/09556221111166284>.
- Naess, Arne. 2005. Precization and definition. In *The Selected Works of Arne Naess*, ed. by Alan Drengson. VII. Dordrecht: Springer. Pp. 25-54. [https://doi.org/10.1007/978-1-4020-4519-6\\_40](https://doi.org/10.1007/978-1-4020-4519-6_40).
- Oxford English Dictionary* 2024 <http://www.oed.com/>
- Pirsig, Robert M. 1976. *Zen and the Art of Motorcycle Maintenance*. London: Corgi.
- Poincaré, Henri. 1946. *The Foundations of Science: Science and Hypothesis, The Value of Science, Science and Method*. Transl. by George B. Halstead. Lancaster PA: The Science Press.
- Sawyer, Sarah. 2020. Talk and thought. In *Conceptual Engineering and Conceptual Ethics*, ed. by Alexis Burgess, Herman Cappelen and David Plunkett. Oxford: Oxford University Press. Pp. 379-395. <https://doi.org/10.1093/oso/9780198801856.003.0018>.
- Stalnaker, Robert C. 1978. On the representation of context. *Journal of Logic, Language and Information* 7: 3-19. [Reprinted in Robert C. Stalnaker *Context and Content*. Oxford: Oxford University Press. Pp. 96-113.]

- Stalnaker, Robert C. 2014. *Context*. Oxford: Oxford University Press.
- Tomasello, Michael. 2003. *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.
- Weinreich, Uriel. 1962. Lexicographic definition in descriptive semantics. In *Problems in Lexicography: Report of the Conference on Lexicography held at Indiana University November 11-12, 1960*, ed. by Fred W. Householder and Sol Saporta. Bloomington: Indiana University Research Center in Anthropology, Folklore and Linguistics. Pp. 25-43. [Reprinted in *Weinreich on Semantics*, ed. by William Labov and Beatrice S. Weinreich. Philadelphia: University of Pennsylvania Press, 1980: 295-314.].
- Weinreich, Uriel. 1980. *Weinreich on Semantics*. Ed. by William Labov and Beatrice S. Weinreich. Philadelphia: University of Pennsylvania Press.
- Wierzbicka, Anna. 1972. *Semantic Primitives*. Berlin: Athenaum.
- Wierzbicka, Anna. 1984. Cups and mugs: lexicography and conceptual analysis. *Australian Journal of Linguistics* 4: 257–81.
- Wierzbicka, Anna. 1996. *Semantics: Primes and Universals*. Oxford: Oxford University Press.