
Lars Trap-Jensen and Henrik Lorentzen

BACK TO BASICS: MEANING DESCRIPTION FOR HUMAN USERS AND FOR COMPUTERS

Abstract In this article, we return to a classic lexicographical topic and address some aspects involved in the practice of defining. Digital developments have increasingly required dictionary definitions to operate independently of others if they are to be utilised in new contexts, possibly even detached from the original dictionary presentation. We examine two types of definitions where the problem is particularly obvious: morpho-semantically related words and inherited information. The first type refers to words with the same semantic core that appear in regular morphological derivations, in this context illustrated by triplets such as *pluralism*, *pluralist*, *pluralistic*. The second type is to do with senses that presuppose the definition of an earlier, usually superordinate sense, as when a culinary sense is singled out: ‘this fish used as food’. Five dictionaries are compared and analysed to uncover the tendencies and strategies followed. All five dictionaries show internal inconsistency, and while there is general consensus that the traditional paper model should be abandoned, the dictionaries do not necessarily agree on strategy and solutions.

Keywords semantics; meaning description; data design; Scandinavian dictionaries; regular polysemy; inheritance; morpho-semantics

1. Introduction

Over the past decades, digital developments have led many dictionaries to transition from print to electronic formats. In the process, the underlying data have undergone several changes to adapt to the new format. To name a few, the system of reference has been replaced by hyperlinks, abbreviations are shown in full, audio files replace or supplement phonetic notation for pronunciation, and multiword expressions are presented under each of the constituent words. In this article, we examine some aspects of definitional practice that can be seen as leftovers from the paper dictionary but have not attracted as much attention as the ones just mentioned.

The title of the article should not be taken to mean that we aim to rethink every aspect of meaning description in dictionary definitions. The goal is to examine a few limited practices that are no longer entirely appropriate, given that lexicographic resources are increasingly stored in databases that can be used for multiple purposes, not all of which are necessarily lexicographic in nature. Examples include the DANTE project (cf. Atkins et al., 2010) and the multilingual datasets used by K Dictionaries (cf. Lonke et al., 2022). One consequence of digital developments is that dictionary entries may not always be presented in full, and users may not always see the nearest alphabetical neighbour entries. For example, a user may access the dictionary data via an API to get explanations of words in running text as a service provided by an e-reader. Ideally, the user wants to see one and only one explanation: the correct definition

in the specific look-up situation. Another development is the increased demand for semantic descriptions from language technology, such as computer programs that need semantic information about the words in texts to create an automatic topic classification.

If we want the dictionary data to be prepared for uses such as these, dictionary explanations must be phrased so as to function independently of other definitions. In other words, there are reasons to consider whether the current practice should be revised in this respect. In the dictionary under primary investigation, The Danish Dictionary, we have noted two aspects of definitional practice that have repeatedly proved problematic, and they are the focus of this study.

2. Morpho-Semantically Similar Words

The first aspect we will address concerns different but closely related headwords. Derivations of words with the same semantic core often appear as alphabetical neighbours, and their descriptions are traditionally handled in a similar way: one word is treated as central, while the others explain how they are linguistically related to the core sense without repeating the entire definition (cf. Svensén, 2009, pp. 227–230).

Typical examples of this include political ideologies and religious or philosophical beliefs, which are often realised as linguistic triplets: the system of thought is treated as the core element and expressed as *-ism*, a member or follower is formed by means of *-ist*, and a corresponding adjective is formed by means of *-istic*.

An example from The Danish Dictionary and the traditional template can be illustrated by the entries *Buddhism*, *Buddhist* and *Buddhistic* (the headwords and definitions are translated from the Danish original for ease of understanding):

1. *Buddhism*: an East and Central Asian religion that originated c. 500 BCE based on Buddha's teachings that life is full of sorrow and suffering, from which one can only be freed by renouncing greed, hatred and deceit
2. *Buddhist*: a person who believes in Buddhism
3. *Buddhistic*: relating or belonging to Buddhism

In a printed dictionary, this solution has the dual advantage of saving space while simultaneously showing the relationship between morphologically and etymologically similar words. However, if the derived entry appears independently of the base word, it is a different matter, and the user is likely to feel poorly informed by this model (cf. Atkins & Rundell (2008, p. 436): "As all user research shows, it is never a good idea to require users to go to a second (or third) entry to find the information they are looking for in a first").

3. Inheritance

In a printed dictionary, it is not uncommon to find a definition that presupposes the definition of another, usually superordinate sense. If the subsense simply emphasises one aspect of the general meaning, it may feel excessively cumbersome to repeat a potentially complicated explanation of the core sense (cf. discussion in Atkins & Rundell, 2008, p. 446). We call this phenomenon *inheritance*: aspects of the general sense are ‘inherited’ by other senses of the headword. Consider the following examples taken from The Danish Dictionary (as above translated from the Danish original for ease of understanding):

Ablative

- (1) a grammatical case for a noun or a noun phrase that typically expresses direction away from something, or circumstances such as place, means, manner or cause – found in languages such as Sanskrit, Latin and Finnish

1(a) a word form in **this** case

Pyramid

- (1) an Egyptian funerary monument, often of very large dimensions, built of stone and featuring a square base and four triangular sides that converge to a point at the top

1(a) a building or structure resembling **such** a funerary monument

From these examples, it is easy to see that when read detached from their contexts as aspects of a more elaborate description, the subsense definitions in 1(a) are not very useful.

Subsense definitions that follow this model are especially common with words that are prone to *regular polysemy*, which refers to the situation where a group of words within a semantic domain share a potential for ambiguity (cf. Svensén, 2009, p. 209). A case in point is *school*, which may refer to (a) a concrete building (‘the school was built of yellow bricks’), (b) the institution that is housed in the building (‘go to school’), or (c) the people who work there (‘the school decided to admit new students’). Potentially, all other words for buildings may behave like *school* in sharing these three meaning aspects. Similarly, many animals and plants can be described both as biological species and as terms for culinary items: ‘I love apples’, ‘put the chicken in the oven’ (cf. Sørensen et al., 2023). Other examples taken from The Danish Dictionary include the following:

Plaice

- (1) a 40–90 cm long flatfish with a grey-brown upper side adorned with red dots and a white underside

1(a) **this** fish used as food

Garlic

- (1) a plant with white flowers tinged with reddish or greenish hues, and white, strongly scented, and tasty bulbs that form a row of wedge-shaped side bulbs during growth

1(a) bulbs from **this** plant, used as food, herbal medicine, etc.

In the subsenses, one particular aspect is singled out whereas the core meaning itself is inherited from the superordinate sense and only referred to by means of an anaphoric expression (*this, such* etc.). This solution may work when both senses are presented and read consecutively, but is less obvious if this is not the case. And if the subsense is the only one presented to the user, it becomes completely useless (cf. Marellø, 1988).

4. Examination of Templates Used in Existing Dictionaries

Not all solutions chosen for the printed dictionary are suitable for the electronic medium and need to be reconsidered. This is something that we as editors of The Danish Dictionary have realised over the years but the practical task of revising all existing relevant entries is far from systematically carried out. Nor have we settled on exactly which solution to use instead. To help us determine this, we have carried out a comparative study involving five existing dictionaries of contemporary language: two Danish dictionaries, one Norwegian, one Swedish and one English dictionary. The first four are all dictionaries for Scandinavian languages and are well suited for comparison as the three languages are closely related. The English dictionary was included in the investigation in order to broaden the perspective. These dictionaries were selected as they all originate from printed books that have been transformed into online dictionaries and thus are likely to have gone through similar processes and considerations. The five dictionaries included in the study are as follows:

- The Danish Dictionary (*Den Danske Ordbog*, DDO): published in print 2003–2005, online since 2009
- The Danish Internet Dictionary (*Den Danske Netordbog*, DDNO): published in print under another title (*DanskOrdbogen*, 1999), revised and published online since 2003
- The Norwegian Academy Dictionary (*Det Norske Akademis Ordbok*, NAOB): published in print under another title (*Norsk Riksmålsordbok 1937–1957*, supplement 1995), retrodigitised, revised and published online since 2017
- The Swedish Dictionary (*Svensk ordbok*, SO): published in print 2009, online since 2015
- *Oxford Dictionary of English*, ODE (3 ed.): published in print 2010, online since 2015

For each of the two types of definitions, a number of lexical items were selected and analysed in order to uncover tendencies and strategies used by the five dictionaries. For type 1) the lexical items were made up of 33 triplets of the above kind, and for type 2) they were chosen as subsenses from words that could potentially be described by means of an anaphoric expression.

4.1 Investigating Morpho-Semantic Similarity

As mentioned in Section 2, many words occur in triplets following the pattern *-isme*, *-ist*, *-istisk* (in Danish), denoting political ideologies (*zionisme*, *zionist*, *zionistisk*), artistic movements (*fauvisme*, *fauvist*, *fauvistisk*), religious (*shintoisme*, *shintoiist*, *shintoiistisk*) and philosophical beliefs (*nihilisme*, *nihilist*, *nihilistisk*), or medical or psychological conditions (*autisme*, *autist*, *autistisk*), etc. For the investigation of this type, we selected 33 such triplets from The Danish Dictionary (DDO) and then compared their definitions with the corresponding words in the other dictionaries, thus potentially comprising nearly 500 definitions. However, not all the triplets had equivalents in the other dictionaries, something we did not know or check in advance.

A pre-analysis of the triplets from DDO revealed both consistencies and inconsistencies in the way they are treated. For all the triplets, the *-isme* element was used as the core element and explained by a full definition. In the majority of cases (two-thirds of the triplets), the solution adopted for the *-ist* and *-istisk* elements was the same: both follow the same template, i.e., one of the four described below.

Even in case the derived members of the triplets did not use the same solution, there was a tendency for them to follow one of four possible templates:

1. the traditional paper solution where *-ist* is defined as ‘a person who follows/ believes in *-ism*’ and *-istic* as ‘denoting or concerning *-ism*’
2. the same as (1), but where the *-ism* element is a clickable link
3. a partially unfolded definition where the *-ism* element is mentioned, and usually clickable, and also given a short explanation
4. a fully unfolded definition where each headword of the triplet has a full definition that can be read independently of the others and with no mention of the core element

The four templates are illustrated in Table 1 with examples taken from DDO (in our translation; text in <...> are hyperlinks).

Table 1: Templates used for the description of morpho-semantically similar words

	<i>-ism, noun</i>	<i>-ist, noun</i>	<i>-ist(ic), adjective</i>
(1) <i>Darwin-</i>	the theory of evolution based on Charles Darwin's theories about the gradual development of plant and animal species by natural favouring of individuals with certain characteristics	a supporter of Darwinism	dealing with or relating to Darwinism
(2) <i>aut-</i>	a developmental disorder manifested by communication and language difficulties, problems with social interaction and repetitive patterns in behaviour and interests	a person who suffers from <autism>	suffering from <autism>; relating to autism
(3) <i>universal-</i>	the principle or doctrine (e.g., in religion or politics) that emphasises the precedence of the common good or the whole over the individual or the specific	a person who is a supporter of <universalism>, believing in the precedence of the common good or the whole over the individual or the specific	relating to or characteristic of <universalism>, i.e., the principle that the common good or the whole takes precedence over the individual or the specific
(4) <i>Macchiavell-</i>	a political doctrine which asserts that the State has the right to use any means to achieve its goals; amoral or reckless politics	a person who believes that an individual politician or the State has the right to use any means to achieve their goals	engaging in amoral or ruthless politics and believing that those in power have the right to use any means to achieve their goals

In the present study, we compared the 33 DDO triplets, or 99 headwords, with the corresponding entries in the other dictionaries to see if their definitions could be assigned to one of the four templates. In Appendix 1, all the triplets and their classification are listed for the interested reader.

But first a few words about the data and the methodology. Although the four templates can be seen as lying on a continuum, with one end most adapted to the paper dictionary and the other most to electronic publishing – or, put more neutrally, ranging from fully dependent to fully independent definitions – it does not make sense to quantify the findings beyond counting and ranking: a triplet that follows Template 4 is not twice as adapted to electronic publishing as one following Template 2. For this reason, and due to the limited scope of the material, we content ourselves with describing the trends we can observe in the material by simple counts.

If we turn to look at the results, let us first consider lexical coverage. As the headwords were selected from DDO, it should come as no surprise that not all of them are found in the other dictionaries. This says, of course, little about the lexical coverage of the dictionaries in general; if the original selection had been made from one of the others, the coverage would have looked correspondingly different. But for the sake of comparison, it is worth mentioning how many of the 99 words have an equivalent in the other dictionaries:

DDO: 99
 DDNO: 88
 NAOB: 90
 SO: 71
 ODE: 68

Absence of a headword can either mean (a) that no result at all is returned for a queried word, or (b) that a different entry is returned in which the queried word appears. In the first case, the user is likely to be disappointed, whereas the second seems to be used as a deliberate strategy by DDNO and ODE: a search for *shintoist* leads in both dictionaries to the entry *Shinto* where the derived word forms *Shintoism*, *Shintoist* and (in DDNO) *Shintoistic* appear. The dictionary editors may assume that the users are aware where they are and why they arrived in that entry. Especially the ODE has several examples of this strategy: *dualism*, *Fauvism*, *functionalism*, *pietism*, *behaviourism*, *Darwinism*, *multiculturalism*, *social realism*, *Zen buddhism*, *Dada* and *Shinto* are all examples of triplets which have been merged into one headword, and the corresponding person and adjective are only mentioned there as derivatives. One should also be aware that, due to English morphology, what are triplets in the Scandinavian languages are often only doublets in English: there is no independent adjective *secularistic* in ODE; instead the word form *secularist* is used both for the person (as a noun) and as a (preposed) adjective. These factors contribute to explaining the relatively low coverage in ODE.

Table 2: Distribution of triplets/individual definitions across template type¹

Triplets	DDO	DDNO	NAOB	SO	ODE
Template 1	10/28	3/9	6/26	2/18	0/6
Template 2	2/10	0/0	8/26	1/13	0/0
Template 3	4/10	0/0	0/1	0/0	0/0
Template 4	4/13	23/50	1/3	0/4	7/18
Total	20/61	26/59	15/56	3/35	7/24

In Table 2, two numbers are given for each cell: the first shows the number of consistent triplets, i.e., where the same template is used for both derived forms. The second is the overall number of times this template was used, irrespective of the template used for the other derived form. The findings should be read with some caution and can only be used to illustrate tendencies.

Firstly, it should be noted that determining the number of consistent triplets is not straightforward and involves some personal judgment. This is because the templates are generalisations over ideal types. In reality, the definitions may be less ‘pure’ and may use a combination of features from different templates. Consider the definitions of *Shintoist* and *Zionist* in DDO (in our translation):

¹ As only two members of a triplet can be derivations, the maximum number of definitions are 33 times 2 = 66. The difference between the maximal number and the total number listed are absent lemmas and indeterminate cases.

- (1) *Shintoist*: a person who adheres to the Japanese religion Shinto
- (2) *Zionist* (adj.): relating or belonging to the Jewish political movement <Zionism>

(1) is almost like the minimalistic definition of Template 1, and (2) is almost like the minimalistic definition of Template 2 (like Template 1 but with a clickable link). However, to both definitions a little bit of extra explanation has been added, and if one emphasises this aspect, they approximate Template 3: we are told that Shinto is a Japanese religion, and that Zionism is a Jewish political movement. Is this sufficient to say that they can function as independent definitions? We are not sure, and in Table 2 such indeterminate cases were excluded from the count.

This means that a low number of consistent triplets in Table 2 could be due to 1) inconsistent use of templates, e.g., the derived form in the sense ‘person’ follows Template 1 and the derived adjective form follows Template 2, 2) uncertainty about which template to assign (should *Shintoist* in DDO be classified as Template 1 or 3?), or 3) the headword is either absent or has only one entry, in which case consistency becomes irrelevant. If any of these conditions was met, the triplet was left out of the count in Table 2.

With these reservations in mind, it is still safe to say that DDNO is the most consistent in its solutions: out of the 33 triplets, three had only one headword (*creationism*, *secularism*, and *Shinto*), and of the 30 remaining, only three were inconsistent in their choice of template. For the remaining 27, three used the minimalistic Template 1, and as many as 24 followed Template 4, which may lead us to conclude that DDNO prefers Template 4 for this type of definition, and has almost completed its implementation. The three remaining exceptions could be a relic from an earlier phase.

On the surface, ODE is also quite consistent: all consistent triplets follow Template 4. However, the total number of consistent triplets is not very high, only seven, which may be attributed to different factors. We have already mentioned that ODE often has only one entry for the central concept with the derivatives listed there. This is the case for twelve of the triplets, and for another three, there is no headword at all. The remaining eleven are either indeterminate (six) or inconsistent (five). Thus, we must conclude that ODE prefers either the single-headword solution or a solution with Template 4, but bear in mind that a third of the material deviates from this by being either indeterminate or inconsistent.

NAOB is consistent in slightly less than half of the cases and does not seem to have a clear preference for a particular solution, apart from opting out of Template 3. It is important to note, however, that NAOB is also the oldest dictionary and therefore has a significant historical backlog to address. The quickest way to update the rather poor relic of the paper dictionary in Template 1 is to turn the core concept into a hyperlink, which could explain why NAOB seems to give preference to Template 2.

The very low number of consistent triplets in SO probably has more than one explanation. Firstly, SO is the smallest of the included dictionaries (approximately 65,000 entries) and therefore lacks some of the DDO entries. Of the investigated 99 headwords, SO only has 71, which means that the number of incomplete triplets is substantial. Among the remaining headwords, quite a few are inconsistent (nine triplets), typically using both Template 1 and Template 2 within the same triplet. Template 3 is never used, and Template 4 is only used in four individual definitions (and not consistently in any triplet). Finally, two triplets were omitted because of indeterminacy. Overall, SO is the most traditional of the four, with a preference for the minimal solution for morpho-semantic derivations, distributed more or less equally between no link and link (Templates 1 and 2).

For the sake of completeness, it must be noted that characterising DDO in the same way as the other dictionaries is not appropriate: the entries were selected from DDO in such a way that, firstly, we would get complete triplets for all the words and, secondly, that we would get a wide selection of solutions to the current problem. As they were not randomly selected, we cannot know if they are representative of all the words of this type. DDO has more than 500 headwords with *-isme*, so the selected 33 constitute just 6–7% of the total number. Suffice it to say here that since we address the problem, we are aware of it, and it is evident that there are inconsistencies in DDO, both internally in the choice within the individual triplets and more generally in the editorial choice of preferred template.

To sum up the tendencies in the dictionaries examined, DDO may take comfort in the fact that it is not alone in being inconsistent in this area. Even the most consistent of the dictionaries investigated, DDNO, only used the same template in 24 (or approximately 72%) out of the 33 cases under investigation, or out of the 30 that were included in the dictionary (in which case 80%). Another finding is that none of the other dictionaries makes consistent use of Template 3. Even in the individual definitions, Template 3 is only used in eight instances outside of DDO, and they are all instances of indeterminacy. This is slightly surprising to us as we find this solution to be a good one, showing both the morphological relatedness and unfolding the semantic description in an independent definition.

4.2 Investigating Inheritance

As mentioned in Section 3, it is common, at least in paper dictionaries, that secondary or subordinate senses presuppose (inherit) elements from a sense treated earlier in the entry. In order to examine this phenomenon, we selected twenty entries from The Danish Dictionary and compared them to the equivalent entries in the other four dictionaries (see Appendix 2 for a full list). We found the entries by means of specific search patterns identifying subordinate definitions including words like *sådan* ('such'), *denne/dette* ('this') and *disse* ('these'). Such definitions make use of anaphoric reference to other parts of the dictionary entry. In order to find other solutions to the problem, these searches were supplemented by (a) queries for subordinate senses belonging to the domain *food* with hyperlinks in

their definitions and (b) queries for senses belonging to the domains *zoology* and *botany* with words like ‘food’, ‘meat’, ‘domestic animal’, ‘eat’ and ‘taste’ in their definitions. One should be aware that, just as in the previous section, this means that the twenty entries from DDO were not randomly selected. However, while any tendency found for DDO could just be a consequence of the selection procedure, this is not the case for the other dictionaries: their solutions are not dependent on DDO’s description.

We have identified four different templates or rather types of solutions used by the different dictionaries:

Table 3: Types of definitions of subordinate senses (translated from Danish except for Type 4)

Types	Definitions
Type 1 (anaphoric reference)	<i>agate</i> : piece of this mineral, for instance used as a jewel (DDO)
Type 2 (use of the headword with or without a hyperlink)	<i>lamb</i> : meat from a lamb (DDO) <i>Hamburg parsley</i> : root from the plant <Hamburg parsley>, used as a vegetable, for instance in a soup (DDO)
Type 3 (independent definition)	<i>lamb</i> : meat from a young sheep (DDNO)
Type 4 (several meanings merged into one) ²	<i>yak</i> : a large domesticated wild ox with shaggy hair, humped shoulders, and large horns, used in Tibet as a pack animal and for its milk, meat, and hide (ODE)

As suggested above, we note but do not place much importance on the fact that DDO has a strong preference for Type 1 (see Table 4), where definitions for subordinate senses include an anaphoric reference to a previous definition as in the example *agate*. The finding for DDO is trivial since the examined entries were selected exactly to illustrate this phenomenon, and most of the selected words were chosen from this type.

The other four dictionaries as a whole use the anaphoric reference considerably less but adopt other strategies. Two of the dictionaries, DDNO and NAOB, seem to have abandoned the traditional template with an anaphoric expression and do not use it at all, while ODE only does so for a single word. SO is somewhat closer to DDO, using anaphors in a few cases, but rarely employs the other types. Typically, the subsense is either absent, or the sense division handled differently.

DDNO seems to be quite fond of Type 3, independent definitions, a tendency we already saw in Section 4.1. NAOB, on the other hand, makes rather extensive use of Type 2, reference to the headword with or without link. Finally, ODE seems also to prefer mentioning the headword under the subordinate sense (Type 2) but, somewhat surprisingly, never with a link.

² Even if the subordinate senses are not singled out explicitly, the derived senses are at least hinted and may help the user understand examples such as ‘yak meat’ or ‘yak leather’.

Table 4: Distribution of types across inheritance examples

Types	DDO	DDNO	NAOB	SO	ODE
Type 1	14	0	0	4	1
Type 2	2	2	8	1	5
Type 3	0	5	0	1	4
Type 4	1	3	0	1	1
Indeterminate	3	4	5	7	5
No equivalent	--	6	7	6	4
Total	20	20	20	20	20

All in all, the picture is not very clear: the solutions are distributed across a number of possibilities with no clear general preferences. In almost a quarter of the cases, it was not possible to assign the solutions unambiguously to the four categories established here. And in just over a quarter of the cases, the other dictionaries had not registered the relevant sense from DDO, or have chosen a different sense division. As was the case for morpho-semantic similarity, SO is the most traditional of the four, with most examples using the traditional template (Type 1) with anaphoric reference, although the numbers are so small that they cannot be used statistically.

5. Discussion and Conclusions

For both types of definitions, the trends in the examined dictionaries are fairly weak. If we disregard DDO for methodological reasons, the strongest tendency is found for DDNO, which has more or less completely moved away from the paper tradition, with only three traditional triplets remaining out of the thirty found in the dictionary, and nine individual definitions, and having no examples with anaphoric reference in subsenses. ODE tends to follow the same path, with no triplets following the traditional template, six individual definitions, and only a single definition with anaphoric reference. NAOB shares this tendency, but only for inheritance, whereas the picture is reversed for morpho-semantic similarity: here, no less than six triplets consistently follow the traditional template and approximately half of all the definitions for derived lemmas use it. SO has few consistent triplets, but a substantial number of individual definitions follow the minimalist solution, with or without a link. Similarly, for inheritance, the traditional solution predominates, but a substantial number of lemmas and missing indeterminate cases cloud the picture.

For the morpho-semantic triplets, DDO's editors tend to prefer Template 3, which includes mention of the (clickable) *-ism* element and a partially unfolded definition. This is the least preferred solution of the four templates by the other dictionaries.

For inheritance, DDO aligns with most of the other dictionaries: the solution with anaphoric reference (Type 1) should be abandoned, even if it involves violating a traditional *faux pas*: mentioning the headword in another definition of the same word. As long as it happens in a subordinate sense, this price is worth paying. If the

word is made into a hyperlink (as in Type 2), the user has the option of looking it up in a situation where the definition occurs detached from the rest of the entry. In such a situation, Type 3 would probably work better (as it requires no other consultation) but arguably less so in the online dictionary presentation because it involves a bigger processing load for the user. Compare the difference between the two solutions:

Type 2: 1. *lamb*: a young sheep

1.a the meat from a slaughtered <lamb>, used as food

Type 3: 1. *lamb*: a young sheep

1.a the meat from a slaughtered young sheep, used as food

At the time of writing, the editors of the DDO have not yet decided which of the two solutions they prefer.

Finally, it should be noted that what we have shown here, is only the tip of the iceberg. The triplet *-ism, -ist, -istic* was chosen because it is readily understood internationally, but it is by no means the only type of morpho-semantic similarity. Derivation is, by definition, a productive process, resulting in many other doublets, triplets, etc. through suffixation. We would also like to stress that although we have checked how consistent the dictionaries are in their use of different templates, this does not necessarily constitute a qualitative assessment that a consistent solution is always better. It may well be that different solutions both within and across triplets work fine for the user in the individual case. But we do think that it is important that definitions can be read independently and without the user having to consult other definitions or entries first.

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Contact information

Lars Trap-Jensen

Society for Danish Language and Literature
ltj@dsl.dk

Henrik Lorentzen

Society for Danish Language and Literature
hl@dsl.dk

Appendix 1) Triplets and Templates

	Lemma	DDO	DDNO	NAOB	SO	ODE
1a	absurdisme	yes	yes	yes	yes	yes
1b	absurdist	yes (1)	yes (4)	yes (1)	no	yes (0)
1c	absurdistisk	yes (1)	yes (4)	yes (1)	no	yes (4)
2a	aktivisme	yes	yes	yes	yes	yes
2b	aktivist	yes (4)	yes (4)	yes (0)	yes (4)	yes (4)
2c	aktivistisk	yes (1)	yes (4)	yes (2)	no	yes (4)
3a	alkymi	yes	yes	yes	yes	yes
3b	alkymist	yes (2)	yes (4)	yes (1)	yes (1)	yes (1)
3c	alkymistisk	yes (2)	yes (4)	yes (2)	no	no
4a	autisme	yes	yes	yes	yes	yes
4b	autist	yes (2)	yes (1)	yes (2)	yes (1)	no
4c	autistisk	yes (2)	yes (1)	yes (2)	yes (1)	yes (1)
5a	behaviorisme	yes	yes	yes	yes	yes
5b	behaviorist	yes (1)	yes (4)	yes (0)	yes (1)	no (but mentioned in (a))
5c	behavioristisk	yes (1)	yes (4)	yes (1)	no	no (but mentioned in (a))
6a	calvinisme	yes	yes	yes	yes	yes
6b	calvinist	yes (1)	yes (4)	yes (2)	yes (2)	yes (0)
6c	calvinistisk	yes (1)	yes (4)	yes (2)	yes (1)	yes (0)
7a	dadaisme	yes	yes	yes	yes	yes
7b	dadaist	yes (1)	yes (4)	yes (2)	yes (2)	no (but mentioned in (a))
7c	dadaistisk	yes (1)	yes (4)	yes (2)	yes (1)	no (but mentioned in (a))
8a	darwinisme	yes	yes	yes	yes	yes
8b	darwinist	yes (1)	yes (1)	yes (2)	yes (2)	no (but mentioned in (a))
8c	darwinistisk	yes (1)	yes (1)	yes (1)	yes (2)	no (but mentioned in (a))
9a	dualisme	yes	yes	yes	yes	yes
9b	dualist	yes (2)	yes (4)	yes (1)	yes (2)	no (but mentioned in (a))
9c	dualistisk	yes (1)	yes (4)	yes (2)	yes (1)	no (but mentioned in (a))
10a	fauvisme	yes	yes	yes	yes	yes
10b	fauvist	yes (3)	yes (1)	yes (2)	no	no (but mentioned in (a))
10c	fauvistisk	yes (3)	yes (4)	yes (2)	no	no (but mentioned in (a))
11a	funktionalisme	yes	yes	yes	yes	yes
11b	funktionalist	yes (3)	yes (4)	yes (1)	yes (1)	no (but mentioned in (a))
11c	funktionalistisk	yes (3)	yes (4)	yes (1)	yes (2)	no (but mentioned in (a))
12a	kolonialisme	yes	yes	yes	yes	yes
12b	kolonialist	yes (1)	yes (4)	yes (2)	no	yes (4)
12c	kolonialistisk	yes (1)	yes (4)	yes (2)	no	yes (4)
13a	konkretisme	yes	yes	yes	yes	no
13b	konkretist	yes (1)	yes (4)	yes (2)	no	no
13c	konkretistisk	yes (1)	yes (4)	yes (2)	no	no

14a	kreationisme	yes	yes	no	yes	yes
14b	kreationist	yes (1)	no (but mentioned in (a))	no	yes (1)	yes (4)
14c	kreationistisk	yes (1)	no (but mentioned in (a))	no	yes (1)	yes (4)
15a	machiavellisme	yes	yes	no	yes	no
15b	machiavellist	yes (4)	yes (4)	no	no	no
15c	machiavellistisk	yes (4)	yes (4)	no	yes (4)	no
16a	maoisme	yes	yes	yes	yes	yes
16b	maoist	yes (3)	yes (1)	yes (1)	no	yes (0)
16c	maoistisk	yes (2)	yes (1)	yes (1)	no	yes (0)
17a	modernisme	yes	yes	yes	yes	yes
17b	modernist	yes (0)	yes (4)	yes (2)	yes (0)	yes (0)
17c	modernistisk	yes (0)	yes (4)	yes (1)	yes (0)	yes (0)
18a	multikulturalisme	yes	yes	yes	yes	yes
18b	multikulturalist	yes (4)	yes (4)	yes (1)	no	no (but mentioned in (a))
18c	multikulturalistisk	yes (4)	yes (4)	yes (2)	no	no (but mentioned in (a))
19a	nynazisme	yes	yes	yes	yes	no (but mentioned in (a))
19b	nynazist	yes (1)	yes (4)	yes (2)	yes (2)	yes
19c	nynazistisk	yes (1)	yes (4)	yes (2)	no	yes (1)
20a	nihilisme	yes	yes	yes	yes	yes
20b	nihilist	yes (1)	yes (1)	yes (1)	yes (2)	yes (4)
20c	nihilistisk	yes (1)	yes (4)	yes (2)	yes (1)	yes (4)
21a	pietisme	yes	yes	yes	yes	yes
21b	pietist	yes (4)	yes (4)	yes (2)	yes (1)	no (but mentioned in (a))
21c	pietistisk	yes (0)	yes (4)	yes (2)	yes (2)	no (but mentioned in (a))
22a	pluralisme	yes	yes	yes	yes	yes
22b	pluralist	yes (2)	yes (4)	yes (1)	no	yes (4)
22c	pluralistisk	yes (1)	yes (4)	yes (1)	yes (4)	yes (4)
23a	relativisme	yes	yes	yes	yes	yes
23b	relativist	yes (4)	yes (4)	yes (1)	yes (1)	no (but mentioned in (a))
23c	relativistisk	yes (4)	yes (4)	yes (0)	yes (2)	yes (1)
24a	royalisme	yes	yes	yes	yes	no (but mentioned in (a))
24b	royalist	yes (4)	yes (4)	yes (4)	yes (4)	yes
24c	royalistisk	yes (4)	yes (4)	yes (4)	yes (0)	yes (4)
25a	salafisme	yes	yes	yes	yes	yes (as Salafi)
25b	salafist	yes (3)	yes (4)	yes (1)	yes (2)	no (but mentioned in (a))
25c	salafistisk	yes (3)	no (but mentioned in (a))	yes (1)	no	no (but mentioned in (a))
26a	sekularisme	yes	yes	yes	no	yes
26b	sekularist	yes (4)	no	no	no	yes (4)
26c	sekularistisk	yes (2)	no	no	no	yes (4)
27a	shintoisme	yes	yes	yes	yes	yes (as Shinto)
27b	shintoist	yes (0)	no (but mentioned in (a))	yes (1)	no	no (but mentioned in (a))
27c	shintoistisk	yes (1)	no (but mentioned in (a))	yes (2)	no	no

28a	socialrealisme	yes	yes	yes	yes	yes
28b	socialrealist	yes (4)	yes (4)	no	no	no
28c	socialrealistisk	yes (1)	yes (4)	yes (1)	yes (1)	no
29a	stalinisme	yes	yes	yes	yes	yes
29b	stalinist	yes (3)	yes (4)	yes (1)	yes (2)	yes (0)
29c	stalinistisk	yes (1)	yes (4)	yes (1)	yes (1)	yes (0)
30a	surrealisme	yes	yes	yes	yes	yes
30b	surrealist	yes (2)	yes (4)	yes (0)	no	yes (4)
30c	surrealistisk	yes (1)	yes (4)	yes (1)	yes (1)	yes (4)
31a	universalisme	yes	yes	yes	yes	yes
31b	universalist	yes (3)	yes (4)	yes (2)	yes (1)	yes (4)
31c	universalistisk	yes (3)	yes (4)	yes (1)	yes (2)	yes (1)
32a	zenbuddhisme	yes	yes	yes	yes	yes
32b	zenbuddhist	yes (1)	yes (4)	yes (2)	no	no
32c	zenbuddhistisk	yes (2)	yes (1)	yes (1)	no	no
33a	zionisme	yes	yes	yes	yes	yes
33b	zionist	yes (4)	yes (4)	yes (3)	yes (1)	yes (4)
33c	zionistisk	yes (0)	yes (4)	yes (4)	no	yes (1)

Templates:

1. indeterminate
2. minimalist definition: a person who supports x
3. minimalist definition with link: a person who supports <x>minimalist definition with a link and short explanation of the link: a person who supports <x>, the belief that y
4. fully expanded definition: a person who believes that life is meaningless and rejects all religious and moral principles

Appendix 2) Inheritance and Types

	Lemma	Inherited sense	DDO	DDNO	NAOB	SO	ODE
1	ablativ	wordform in this case	yes (1)	no equivalent	no equivalent	no equivalent	yes (3)
2	afgrøde	yield from this cultivation	yes (1)	no equivalent	yes (2)	yes (3)	yes (3)
3	afsender	this person's name and address	yes (1)	yes (2)	no equivalent	no equivalent	no equivalent
4	agat	piece of this mineral	yes (1)	yes (4)	yes (2)	indeterminate	indeterminate
5	ambitiøs	indicating that someone has such a wish	yes (1)	no equivalent	no equivalent	indeterminate	yes (3)
6	gulerod	root from this plant, used as vegetable	yes (1)	indeterminate	yes (2)	yes (1)	yes (1)
7	kalv	a) meat from a calf; b) skin from a calf	indeterminate	indeterminate	indeterminate	indeterminate	indeterminate
8	lam	meat from a lamb	yes (2)	yes (3)	indeterminate	indeterminate	yes (2)
9	lama	textile made from llama wool	indeterminate	indeterminate	indeterminate	indeterminate	indeterminate
10	persillerod	root from the plant Hamburg parsley	yes (2)	yes (4)	indeterminate	no equivalent	no equivalent
11	pyramide	building formed like such a monument	yes (1)	yes (3)	yes (2)	yes (1)	yes (2)
12	pædagogik	subject where this domain is taught	yes (1)	yes (3)	no equivalent	indeterminate	yes (3)
13	raclette	cheese used for this type of food	yes (1)	yes (3)	yes (2)	no equivalent	no equivalent
14	radise	root from this plant	yes (1)	no equivalent	indeterminate	indeterminate	yes (2)
15	rastafari	follower of this movement	yes (1)	yes (2)	yes (2)	yes (2)	yes (2)
16	shiraz	wine made from this grape	yes (1)	indeterminate	no equivalent	no equivalent	indeterminate
17	skole	pupils and employees of such an institution	yes (1)	yes (3)	indeterminate	yes (1)	yes (2)
18	sortkommen	seeds from the plant Nigella	indeterminate	no equivalent	no equivalent	no equivalent	no equivalent
19	torsk	this fish used as food	yes (1)	no equivalent	yes (2)	yes (1)	indeterminate
20	yak	domestic ox with long hair kept as a domestic animal	yes (4)	yes (4)	no equivalent	yes (4)	yes (4)

Types:

1. anaphoric reference to a previous sense
2. use of the headword with or without a hyperlink
3. independent definition
4. several meanings merged into one

