

## Derivational networks in Finnish

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### 1. General notes

Derivation in Finnish is accomplished mainly through suffixation, and prefixation is not characteristic of Finnish word-formation. Finnish has systematically avoided verbal prefixes even though it has been influenced by many languages that have them. It does, however, have certain prefix-like particles that form compounds with verbs (Bikupska 2018: 15.) Nouns and adjectives in present-day Finnish, it will be noted, may have short compounding forms (often borrowed, e.g. *anti-*, *eko-*, *etä-* ‘far’) that could also be seen as prefixes (Tyysteri 2015: 125). Possible word-formation with prefixes is excluded from the Finnish data in this research. The only clear cases would be *epätietoinen* ‘unaware’ (negative *epä-* + *tietoinen* ‘conscious, aware’ < *tietää* ‘know’) and its further derivatives, which are considered compounds in Finnish and are therefore also excluded from this data.

Finnish has almost 200 derivational types – over 100 nominal and adjectival suffixes and about 50 verbal suffixes. Pitkänen-Heikkilä (2016) describes the most common of these in English. The *Iso suomen kielioppi* (‘Comprehensive Finnish Grammar’, 2004) introduces 48 types of noun derivatives, 27 types of verb derivatives, 7 types of adverb derivatives and 15 types of adjective derivatives, excluding participles, ordinal numbers and comparison forms (Hakulinen et al. 2004: 195–196, 297–298, 365). Lauri Hakulinen (1967) lists a total of 88 denominal nominal suffixes, 46 deverbal nominal suffixes, 31 deverbal verbal suffixes and 17 denominal verbal suffixes (L. Hakulinen 1967: 246). Many Finnish derivational types do not appear in this research because certain types can only be added to certain root types, and the chosen 30 base words do not include all of them.

It is worth pointing out that complete derivational maps are very difficult to produce in Finnish. Intuition does not necessarily yield all derivatives in productive use and many are typically excluded from Finnish dictionaries (e.g. Hakulinen et al. 2004: 186). Established derivatives that appear in dictionaries tend to have some lexical meaning. Researchers seeking information on the actual usage of intuition-based derivatives may, however, find it from corpora or the Internet, e.g. by using Google search.

It should also be taken into consideration that derivational series are not always clear in suffixal derivation (e.g. Räisänen 1978, Hakulinen et al. 2004: 182). It is possible to construe the verbal derivatives *kaveta* (PROCESS ‘become narrower’), *kaventaa* (CAUSATIVE

‘make narrower’) and *kaventua* (PROCESS ‘become narrower’) for the 1<sup>st</sup> order of derivation from the adjective *kapea* ‘narrow’, for example, but the following derivational series is also feasible *kapea* > PROCESS *kaveta* > CAUSATIVE *kaventa* > ANTICAUSATIVE *kaventua*, as shown in this study.

Derivation produces new words, whereas inflection does not. The distinctions between the two are not always clear, however. In particular, denominal verbs and deverbal nouns in Finnish include many borderline cases. Finnish words with the suffix *-minen*, for example, may be categorized as infinitive forms of verbs, or they may be totally excluded from nominal forms. Most commonly, however, they can be decoded as infinitives only with regard to some special syntactic tasks, otherwise as action name derivatives (Häkkinen 1990: 102).

Given the exclusion of participles in this study, certain common semantic categories show little or no attestation in this research. For example, UNDERGOER (agent participle, e.g. *leikkaama* ‘to be cut by somebody’) does not exist, ABILITY (e.g. active and passive participles *leikkaava<sub>A</sub>* ‘cutting’ and *leikattava<sub>A</sub>* ‘cuttable’, and further derivatives STATE *leikkaavuus<sub>N</sub>* ‘piercingness’, STATE *leikattavuus<sub>N</sub>* ‘possibility to be cut’) are rare, and QUALITY (e.g. participles *leikattu<sub>A</sub>* ‘operated on; cut; sterilized’, *leikannut<sub>A</sub>*) is even more rare. I have included only the *mAtOn*-suffix that produces PRIVATIVE (*leikkaamaton<sub>A</sub>* ‘uncut’) derivatives and is the negative equivalent of the agent participle.

It was challenging to find 30 real, underived words in Finnish for this data because many words that are perceived as simple words nowadays are historically derivatives. For example, *ommella* ‘sew’, is not an old underived simplex – the suffix *-ele-* is also transparent (*ompele-*). Because this project examines derivatives synchronically, I took in this word, too. As a consequence, however, the derivational map of this word does not allow for some typical first-order suffixes because the base word already has this iterative suffix. In addition, the adjectival base *kapea* ‘narrow’ is historically a derivative. The suffix *-eA* is transparent, but the root and the meaning are not, and because of this *eA*-derivatives are often categorized as simplexes (e.g. Hakanen 1973). The oldest Finnish simplex roots have two syllables and end in *a* or *ä*. The sample of 30 words also includes different words (e.g. ‘warm’ *lämmin*: *läm-pi-mä-*), but from the point of view of modern Finnish they can be examined as simplex.

The equivalent of *hold* in Finnish is *pitää*, which is a highly polysemous word. In addition to meaning ‘hold’, it also means ‘like’, ‘must’ and ‘keep’. The equivalent of *burn* is either *palaa* (intransitive) or *polttaa* (transitive). *Palaa* does not produce derivatives in most semantic categories, so the verb *polttaa* was selected.

It is impossible to find all the actual derivatives without conducting more elaborate research. Derivatives of the 1<sup>st</sup> order are often to be found in dictionaries (e.g. the frequently used Kielitoimiston sanakirja [The Dictionary of Standard Finnish]), whereas further orders should be searched for in Kielipankki (The Language Bank of Finland) corpora using Korp search, or via the internet using Google search. The verbal derivatives of the adjective *paha* ‘bad’ in the 1<sup>st</sup> order of derivation, for instance, include PROCESS *paheta* ‘get worse’, CAUSATIVE *pahoittaa* ‘make worse (somebody’s mind)’ and INCHOATIVE *pahastua* ‘become offended’, all of which appear in Kielitoimiston sanakirja. Korp search in Kielipankki yield further derivations in the ITERATIVE category, e.g. (*pahastua* >) *pahastella* in the 2<sup>st</sup> order and (*paheta* > *pahentaa* >) *pahennella* in the 3<sup>rd</sup> order. Only one of these verbs, however, (*pahoittaa* ‘make worse [somebody’s feelings]’) has a PRIVATIVE derivative (*pahoittelematon* in the 3<sup>rd</sup> order) according to an internet search, although it is intuitively clear that the two other iterative derivatives can also be combined with the privative suffix *-mAtOn* (*pahentelematon*, *pahastelematon*).

Established, lexicalized derivatives are excluded from the data, which is why some common Finnish derivative types seem to be rare. Derivatives that occur as lexicalized forms may, at the same time, block their productive use as derivatives. Many Finnish two-syllable verb roots that end in *a* or *ä* (e.g. *vetää*: *vedä-* ‘pull’,  *antaa*: *anna-* ‘give’, *kaivaa*: *kaiva-* ‘dig’), for example, produce resultative *Os*-derivatives (*vedos*, *annos*, *kaivos*). Many of these derivatives are lexicalized, however, and have special, established meanings (*vedos* ‘proof’, *annos* ‘portion’, *kaivos* ‘mine’), and are excluded from this study. Even if they are structurally transparent, they are not necessarily easy to recognize as derivatives of those roots.

## 2. Maximum derivational networks

As Table 1 shows, the typical number of derivational orders in Finnish is 3. The derivation of almost half (14) of the 30 words is in the 4<sup>th</sup> order. There are rare cases of words with derivatives in the 5<sup>th</sup> order.

	1 <sup>st</sup> order	2 <sup>nd</sup> order	3 <sup>rd</sup> order	4 <sup>th</sup> order	5 <sup>th</sup> order	Σ
Nouns	33	34	21	7	2	97
Verbs	34	37	19	9	1	100
Adjectives	27	54	27	12	2	122
TOTAL	94	125	67	28	5	319

Table 1 Maximum derivational networks per order of derivation for all three word-classes

### 3. Saturation values

As tables 2–4 show, the highest mean saturation values per word-class are 57% for verbs (*leikata* ‘cut’), 52% for adjectives (*uusi* ‘new’), and 46% for nouns (*päivä* ‘day’). The lowest main values are 8% for nouns (*täi* ‘louse’), 11% for verbs (*polttaa* ‘burn’) and 13% for adjectives (*musta* ‘black’).

Nouns		Saturation value (%)	1 <sup>st</sup> order (%)	2 <sup>nd</sup> order (%)	3 <sup>rd</sup> order (%)	4 <sup>th</sup> order (%)	5 <sup>th</sup> order (%)
<i>luu</i>	‘bone’	24.74	24.24	35.29	19.05	0	0
<i>silmä</i>	‘eye’	35.05	42.42	41.18	28.57	0	0
<i>hammas</i>	‘tooth’	29.9	42.42	32.35	19.05	0	0
<i>päivä</i>	‘day’	46.39	30.3	44.12	52.38	100	100
<i>koira</i>	‘dog’	15.46	30.3	14.71	0	0	0
<i>täi</i>	‘louse’	8.25	18.18	5.88	0	0	0
<i>tuli</i>	‘fire’	25.77	24.24	32.35	23.81	14.29	0
<i>kivi</i>	‘stone’	42.27	27.27	58.82	52.38	14.29	0
<i>vesi</i>	‘water’	29.9	36.36	32.35	28.57	0	0
<i>nimi</i>	‘name’	40.21	36.36	58.82	33.33	0	0

Table 2 Saturation values per order of derivation, nouns

Table 2 shows that the highest saturation value of nouns within the 1<sup>st</sup> order is 42% (*silmä* ‘eye’ and *hammas* ‘tooth’), in the 2<sup>nd</sup> order 59% (*kivi* ‘stone’ and *nimi* ‘name’) and in the 3<sup>rd</sup> order 52% (*päivä* ‘day’ and *kivi* ‘stone’). The old Finnish noun *täi* ‘louse’ has the lowest saturation value in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> orders of derivation. The nouns *koira* ‘dog’ and *täi* ‘louse’ do not have derivation in the 3<sup>rd</sup> order, 3 nouns have derivations of the 4<sup>th</sup> order and only one (*päivä* ‘day’) has a derivation of the 5<sup>th</sup> order.

Verbs		Saturation value (%)	1 <sup>st</sup> order (%)	2 <sup>nd</sup> order (%)	3 <sup>rd</sup> order (%)	4 <sup>th</sup> order (%)	5 <sup>th</sup> order (%)
<i>leikata</i>	‘cut’	57	76.47	67.57	31.58	0	0
<i>kaivaa</i>	‘dig’	29	41.18	29.73	21.05	0	0
<i>vetää</i>	‘pull’	24	38.24	29.73	0	0	0
<i>heittää</i>	‘throw’	23	32.35	27.03	10.53	0	0
<i>antaa</i>	‘give’	21	23.53	27.03	5.26	22.22	0
<i>pitää</i>	‘hold’	34	23.53	40.54	47.37	22.22	0
<i>ommella</i>	‘sew’	19	23.53	16.22	21.05	11.11	0
<i>polttaa</i>	‘burn’	11	20.59	10.81	0	0	0
<i>juoda</i>	‘drink’	19	29.41	18.92	10.53	0	0
<i>tietää</i>	‘know’	31	23.53	16.22	47.37	77.78	100

Table 3 Saturation values per order of derivation, verbs

Table 3 shows that one verb has a 5<sup>th</sup>-order derivation (*tietää* ‘know’) and 4 have 4<sup>th</sup>-order derivations. The verb *leikata* ‘cut’ has the highest saturation values (76% and 68%) in the 1<sup>st</sup>

and 2<sup>nd</sup> orders, and in the 3<sup>rd</sup> order the highest value is 47% for *pitää* ‘hold’ and *tietää* ‘know’, whereas that of the verb *leikata* is only 32%.

Adjectives		Saturation value (%)	1 <sup>st</sup> order (%)	2 <sup>nd</sup> order (%)	3 <sup>rd</sup> order (%)	4 <sup>th</sup> order (%)	5 <sup>th</sup> order (%)
<i>kapea</i>	‘narrow’	26.23	22.22	9.26	48.15	58.33	50
<i>vanha</i>	‘old’	27.05	29.63	18.52	29.63	41.67	100
<i>suora</i>	‘straight’	19.67	18.52	20.37	29.63	0	0
<i>uusi</i>	‘new’	52.46	48.15	75.93	29.63	16.67	0
<i>pitkä</i>	‘long’	38.52	40.74	20.37	70.37	50	0
<i>lämmin</i>	‘warm’	27.87	33.33	31.48	29.63	0	0
<i>paksu</i>	‘thick’	20.49	29.63	22.22	14.81	8.33	0
<i>paha</i>	‘bad’	38.52	48.15	27.78	48.15	41.67	50
<i>ohut</i>	‘thin’	25.41	22.22	7.41	40.74	75	50
<i>musta</i>	‘black’	13.11	22.22	12.96	11.11	0	0

Table 4 Saturation values per order of derivation, adjectives

As Table 4 shows, the adjectives with the highest saturation values (48%) in the 1<sup>st</sup> order are *uusi* ‘new’ and *paha* ‘bad’; in the 2<sup>nd</sup>, the highest value is (76%) attested for *uusi*, but in the 3<sup>rd</sup> order it is 70% for *pitkä* ‘long’. The words *suora* ‘straight’, *lämmin* ‘warm’ and *musta* ‘black’ have no 4<sup>th</sup>-order derivations, yet *kapea* ‘narrow’, *vanha* ‘old’, *paha* ‘bad’ and *ohut* ‘thin’ all attest 5<sup>th</sup>-order derivations.

	1 <sup>st</sup> order	2 <sup>nd</sup> order	3 <sup>rd</sup> order	4 <sup>th</sup> order	5 <sup>th</sup> order
Nouns	31.21	35.59	28.42	12.86	10
Verbs	33.24	28.38	19.47	13.33	10
Adjectives	31.48	24.63	35.19	30	25

Table 5 Average saturation values per order of derivation for all three word-classes

As Table 5 shows, the average saturation values for all three word-classes do not differ critically in this data in the 1<sup>st</sup> order of derivation: verbs have a slightly higher average value (33%) than adjectives (31%) and nouns (31%). The average saturation value in the 2<sup>nd</sup> order is 36% for nouns, 28% for verbs, and 25% for adjectives. The differences are clearer in the later orders of derivation: adjectives have higher saturation values (35%) than nouns (28%) and verbs (19%) in the 3<sup>rd</sup> order, and adjectives have clearly higher values than nouns and verbs in the 4<sup>th</sup> and 5<sup>th</sup> orders. The reason for the big differences in average values is the lack of 3<sup>rd</sup>-order derivation in some base words.

#### 4. Orders of derivation

The maximum number of orders in the Finnish data is 5 for nouns, adjectives, and verbs. As Table 6 shows, the average number for nouns and verbs is 3.2, and 4.1 for adjectives. The low

average for nouns and verbs reflects the fact that there are also two adjectives and two verbs that attest only 2 orders (*koira* ‘dog’, *täi* ‘louse’, *vetää* ‘pull’, *polttaa* ‘burn’).

	Maximum	Average
Nouns	5	3.2
Verbs	5	3.2
Adjectives	5	4.1

Table 6 Maximum and average numbers of orders of derivation for all three word-classes

## 5. Derivational capacity

The derivational capacity as shown in Table 7 covers only 1<sup>st</sup>-order derivatives. The average derivational capacity in the Finnish data is between 8.5 and 11.3, even if the differences between the maximum capacities are bigger. The verb *leikata* ‘cut’ has the highest derivational capacity, with 26 1<sup>st</sup>-order derivatives. The maximum derivational capacity for nouns is 14, versus 13 for adjectives; they occur with the words *silmä* ‘eye’, *hammas* ‘tooth’ and *uusi* ‘new’. Of the verbs, *leikata* has an exceptional capacity (26), and the others have only 7–14 1<sup>st</sup>-order derivatives.

	Maximum	Average
Nouns	14	10.3
Verbs	26	11.3
Adjectives	13	8.5

Table 7 Maximum and average derivational capacities for all three word-classes

There is no significant difference in average derivational capacity between nouns, verbs and adjectives. As illustrated in Table 8, however, adjectives have higher derivational capacity than nouns and verbs in the 2<sup>nd</sup>–5<sup>th</sup> orders. The differences are clearest in the 3<sup>rd</sup> order of derivation: nouns and verbs have an average of 5.4 and 3.8 derivatives, respectively, whereas adjectives have 8.5 derivatives on average. The most prolific adjective in the 3<sup>rd</sup> order is *pitkä* ‘long’, with 19 derivatives. One verb (*tietää* ‘know’), one noun (*päivä* ‘day’) and four adjectives (*kapea* ‘narrow’, *vanha* ‘old’, *paha* ‘bad’, *ohut* ‘thin’) have 5<sup>th</sup>-order derivation (e.g. *paha* ‘bad’ > CAUSATIVE *pahoittaa*<sub>V</sub> ‘make worse (somebody’s feelings)’ > ITERATIVE *pahoitella*<sub>V</sub> > PRIVATIVE *pahoittelematon*<sub>A</sub> > STATIVE *pahoittelemattomuus*<sub>N</sub>).

	1 <sup>st</sup> order	2 <sup>nd</sup> order	3 <sup>rd</sup> order	4 <sup>th</sup> order	5 <sup>th</sup> order
Nouns	10.3	12.1	5.4	0.9	0.2
Verbs	11.3	10.1	3.8	1.2	0.1
Adjectives	8.5	13.3	8.5	3.2	0.5

Table 8 Average number of derivatives per order of derivation for all three word-classes

## 6. Correlation between semantic categories and orders of derivation

All the nouns in the 1<sup>st</sup> order produce derivatives within the semantic categories SIMILATIVE and PRIVATIVE (e.g. *kivi* > *kivimäinen* ‘stonelike’ and *kivetön* ‘without stone’), and 9 produce derivatives within the POSSESSIVE category (e.g. *kivi* > *kivellinen* ‘with stone’, gap for *päivä* ‘day’ that has a possessive suffix *-llinen* in its lexicalized use *päivällinen* ‘dinner’: I have categorized the productive use of this suffix as QUALITY: *päivällinen* ‘of the day’). The category QUALITY has 8 nouns that produce adjectives mainly with the suffix *-inen* (e.g. *kivinen* ‘stony’). In the 2<sup>nd</sup> order, the semantic category STATIVE has 1–5 derivatives in each of the 10 noun bases, as all SIMILATIVE, PRIVATIVE and QUALITY adjectives can be derived with the suffix *-UU*s (e.g. *kivimäisyys* ‘stonelikeness’, *kivettömyys* ‘lacking stones’, *kivisyys* ‘stoniness’). ACTION is also quite a common category in the 2<sup>nd</sup> order of derivation, 8 nouns being represented under this label even with 4 different derivatives (e.g. *kivi* ‘sten’ > *kivittää* ‘to stone’ > *kivitys* ‘stoning’; gaps for *koira* ‘dog’ and *täi* ‘louse’ that have no verb derivations in the 1<sup>st</sup> order).

All the verbs in the 1<sup>st</sup> order produce derivatives within the semantic categories ACTION, AGENT and PRIVATIVE (e.g. *leikkaus* ‘cutting, surgical operation’; *leikkaaja* ‘cutter’; *leikkaamaton* ‘uncut’). In the 2<sup>nd</sup> order, the semantic category STATIVE has 10 verbs that produce property names (e.g. *leikkaamattomuus* ‘having not been cut’ [lit. ‘uncutness’]), ACTION and AGENT have 8 verbs that produce action and agent names (e.g. *leikkely* ‘cutting, dissecting’, *leikkauttaja* ‘one who has something cut’; gaps for *ommella* ‘sew’ and *tietää* ‘know’).

There is a strong correlation in Finnish adjectives between the 1<sup>st</sup> order of derivation and the semantic categories STATE, PROCESS, ATTENUATIVE and MANNER. All these categories have 1–3 derivatives in any of the 10 adjectival bases of the sample (e.g. *paha* ‘bad’ > STATE *pahuus* ‘badness’; PROCESS *paheta* ‘get worse’, ATTENUATIVE *pahahko* ‘fairly bad’ and MANNER *pahasti* ‘badly’). An equally strong correlation is also present in the 2<sup>nd</sup> order of derivation and the semantic categories PRIVATIVE and ACTION, as well as between the 3<sup>rd</sup> order of derivation and the semantic category ACTION. These categories in the 2<sup>nd</sup> order have 1–12 derivatives (e.g. *pahuudeton*<sub>A</sub> ‘without badness’, *paheksunta*<sub>N</sub> ‘thinking ill of somebody, disapproval’), and ACTION in the 3<sup>rd</sup> order has 1–4 derivatives (e.g. *pahastuttaminen*<sub>N</sub>



‘offending, displeasing’, *pahoittelu*<sub>N</sub> ‘expression of regret’) in each of the 10 adjectival bases of the sample.

## 7. Semantic categories with blocking effects

Blocking effects in Finnish are typically morphological, and hence are also extensive, i.e. *-UUs* that produces property names and *-sti* that produces adverbs block further derivation in this data. Thus, the semantic categories STATIVE (10 nouns in the 2<sup>nd</sup> order, e.g. *päivittäisyys*<sub>N</sub> ‘dailiness’, *koiramaisuus*<sub>N</sub> ‘dog likeness’) and MANNER (6 nouns in the 2<sup>nd</sup> order, e.g. *hampaattomasti*<sub>ADV</sub> ‘without teeth, toothlessly’, *kivisesti*<sub>ADV</sub> ‘stonily’) block further derivation. With verbs, too, the semantic category STATIVE (10 verbs in the 2<sup>nd</sup> order and 7 verbs in the 3<sup>rd</sup> order, e.g. *leikkaamattomuus*<sub>N</sub> ‘having not cut; having not been cut’) blocks further derivation. In addition, further derivation of adjectives is not possible in the categories STATIVE (e.g. 10 adjectives in the 1<sup>st</sup> order such as *vanhuus*<sub>N</sub> ‘old age’, and 9 in the 3<sup>rd</sup> order such as *uudistamattomuus*<sub>N</sub> ‘being unreconstructed’) and MANNER (10 adjectives in the 1<sup>st</sup> order such as *pahasti*<sub>ADV</sub> ‘badly’ and 5 in the 2<sup>nd</sup> order such as *lämpimähkösti*<sub>ADV</sub> ‘rather warmly’).

Although adverbs ending *-sti* can usually be formed from adjectives, on the semantic level not all adjectives are suitable for expressing manner or quantity. Examples of these include adjectives that express color, age, shape or size and indicate a permanent and inherent property (e.g. *?sinisesti* ‘blue-ly’, *?vanhasti* ‘old-ly’, *\*kolmivuotiaasti* ‘three-year-old-ly’) (Hakulinen et al. 2004: 367–368). However, some of such derivatives are recorded in metaphorical use in this data: *mustasti* ‘black-ly’, *paksusti* ‘thick-ly’, *vanhasti* ‘old-ly, oldish’.

## 8. Typical combinations of semantic categories

Koivisto (2013) introduced Finnish derivation series using examples in which as many as 5 suffixes are attested, which according to Koivisto is the maximum number of consecutive suffixes in a root. Such complex derivatives are often difficult to understand, however, and are used rarely (Koivisto 2013: 180, 186).

Every verb derivative can be further derived with the suffix *-mAtOn*, which produces privative adjectives, and further with the suffix *-UUs*, which produces property names (e.g. from all 10 verbs, *leikata* ‘cut’ > PRIVATIVE *leikkaamaton*<sub>A</sub> ‘uncut’ > STATIVE *leikkaamattomuus*<sub>N</sub> ‘having not cut; having not been cut’). All 10 adjectives and 8 nouns



(blocks with *täi* ‘louse’ and *koira* ‘dog’) in the sample of Finnish data have verb derivatives of the 1<sup>st</sup> order of derivation (semantic categories CAUSATIVE and/or PROCESS). Thus, typical combinations are CAUSATIVE-PRIVATIVE-STATIVE (e.g. *päivä* ‘day’ > CAUSATIVE *päivätä<sub>v</sub>* ‘date’ > PRIVATIVE *päiväämätön<sub>A</sub>* ‘undated’ > STATIVE *päiväämättömyys<sub>N</sub>* ‘undatedness’) and PROCESS-PRIVATIVE-STATIVE (e.g. *musta* ‘black’ > PROCESS *mustua<sub>v</sub>* ‘become black’ > PRIVATIVE *mustumaton<sub>A</sub>* ‘impossible to be blackened’ > STATIVE *mustumattomuus<sub>N</sub>* ‘being impossible to be blackened’). In addition, a typical combination for adjective bases is the verbal series PROCESS-CAUSATIVE-ANTICAUSATIVE (10 PROCESS in the 1<sup>st</sup> order, a further 9 CAUSATIVE in the 2<sup>nd</sup> order, and 5 ANTICAUSATIVE in the 3<sup>rd</sup> order of derivation, e.g. *paha* ‘bad’ > PROCESS *paheta<sub>v</sub>* ‘get worse’ > CAUSATIVE *pahentaa<sub>v</sub>* ‘make worse’ > ANTICAUSATIVE *pahentua<sub>v</sub>* ‘get worse’).

In addition, it is possible to derive action and agent names from all verbs. Typical combinations are CAUSATIVE-ACTION and CAUSATIVE-AGENT, as well as PROCESS-ACTION and PROCESS-PATIENT. For example, 8 nouns, 10 adjectives and 8 verbs have action names in the 2<sup>nd</sup> step, whereas 6 nouns, 7 adjectives and 8 verbs have agent names in the 2<sup>nd</sup> step as they have verbal derivatives in the 1<sup>st</sup> step (e.g. *nimi* ‘name’ > CAUSATIVE *nimittää<sub>v</sub>* ‘nominate’ > ACTION *nimitys<sub>N</sub>* ‘nomination’; *nimi* ‘name’ > CAUSATIVE *nimetä<sub>v</sub>* ‘to name’ > AGENT *nimeäjä<sub>N</sub>* ‘who gives the name’; *leikata* ‘cut’ > CAUSATIVE *leikkauttaa<sub>v</sub>* ‘to have something cut by somebody’ > ACTION *leikkauttaminen<sub>N</sub>* ‘having something cut by somebody’; *tuli* ‘fire’ > CAUSATIVE *tulittaa<sub>v</sub>* ‘to fire, shoot’ > AGENT *tulittaja<sub>N</sub>* ‘who fires’).

## 9. Multiple occurrences of semantic categories

Causative verbs are productive in Finnish, and many can be derived further for the meaning of commission: such derivatives can be called curatives. For example, all the 10 adjectives in the sample have causative verbs in the 1<sup>st</sup> or 2<sup>nd</sup> order of derivation, and they all have new causative (curative) verbs in the 2<sup>nd</sup> or 3<sup>rd</sup> order. It is a typical Finnish CAUSATIVE-CAUSATIVE combination, for example, *lämmin* ‘warm’ > *lämmittää<sub>v</sub>* ‘to warm, heat’ > *lämmityttää<sub>v</sub>* ‘to have something (e.g. house) heated’, *pitkä* ‘long’ > *pitkittää<sub>v</sub>* ‘prolong, lengthen’ > *pitkityttää<sub>v</sub>* ‘to have something (e.g. time) lengthened’, *ohut* ‘thin’ > *ohentaa<sub>v</sub>* ‘to thin, dilute’ > *ohennuttaa<sub>v</sub>* ‘to have something (e.g. hair) thinned’.

## 10. The reversibility of semantic categories

Certain semantic categories may occur multiple times in series of derivations in which consecutive adjective and adverb suffixes are possible, and also in the opposite order. For example, MANNER-QUALITY and QUALITY-MANNER are possible even in the same series, e.g. *pitkä* ‘long’ > MANNER *pitkittäin*<sub>ADV</sub> ‘lengthwise’ > QUALITY *pitkittäinen*<sub>A</sub> ‘longitudinal’ > MANNER *pitkittäisesti*<sub>ADV</sub> ‘longitudinally’. The adverbs *pitkittäin* and *pitkittäisesti* are almost synonymous, however. This is, however, a unique case. There is also a noun that attests to the MANNER-QUALITY series (*silmä* ‘eye’ > MANNER *silmäkkäin*<sub>ADV</sub> ‘eyeball to eyeball’ > QUALITY *silmäkkäinen*<sub>A</sub>), but it cannot be derived further to MANNER (*silmäkkäisesti*<sub>ADV</sub> is a potential and possible Finnish word, but I did not find any occurrences of it).

## 11. Conclusions

The average number of derivational orders ranges between 3.2 to 4.1 in the Finnish data. As Koivisto (2013: 186) claims, it also is possible to form longer combinations with suffixes, but very long formations may well be difficult to use and understand. There are 3 nouns, 4 verbs and 7 adjectives that have 4<sup>th</sup>-order derivations, and 1 noun, 1 verb and 4 adjectives that have 5<sup>th</sup>-order derivations. Adjectives yield the richest derivational maps, 10 base words producing 354 derivatives: the most productive base is *uusi* ‘new’ with 64 derivatives. The count of derivatives among the 10 nouns is 288, the most productive being *päivä* ‘day’ with 44. With regard to verbs the derivational map produces 268 derivatives, and *leikata* ‘cut’ is the most productive with 57.

In sum, the derivatives of 30 Finnish base words are assigned to 31 different semantic categories based on the data used for this study. The most frequent categories are ACTION, AGENT, PATIENT, QUALITY, POSSESSIVE, SIMILATIVE, ATTENUATIVE, DURATIVE, PRIVATIVE, PROCESS, CAUSATIVE, ITERATIVE, STATE and MANNER. Some categories are used rather seldom: these include ENTITY, DEMINUTIVE, REFLEXIVE, SUBITIVE, INSTRUMENTATIVE, ANTICAUSATIVE, EXPERIENCER, LOCATION, AUGMENTATIVE, RESULTATIVE and COLLECTIVE. Derivatives in the ABILITY, INCHOATIVE, OCCUPATION, FEMININE, RELATIONAL and TEMPORAL categories are the rarest in this data. In some cases the reason for the low frequency (ABILITY, INCHOATIVE, RESULTATIVE) or total absence (UNDERGOER) is that the chosen base words do not represent all possible semantic and morphological types, and because of the exclusion of participles. Although the abundance of deverbal verbal suffixes (e.g. categories DURATIVE, ITERATIVE, REFLEXIVE, SUBITIVE) are considered one of the distinguishing features of Finnish compared to Indo-European languages (e.g. Karlsson 2015: 278), they are not strongly

emphasized in this data. Possibly this is, however, reflected in Table 5, which shows the highest saturation for verbs in the 1<sup>st</sup> order of derivation, for nouns in the 2<sup>nd</sup> order and for adjectives in the 3<sup>rd</sup> order.

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