

Productivity, Frequency, and Level-Ordering

Paul Kiparsky

Some morphological theories place a significant explanatory burden on productivity, an inherently frequentistic and gradient property of morphological processes. I present conceptual and empirical arguments that this theoretical function is better served by the structurally defined, discrete and categorical property of default status.

First, whereas productivity can only be determined on empirical grounds, the default status of a process is in large measure predictable from a general principle, namely that a default process has less contextual restrictions than any of its competitors. This holds even for cases where the default is relatively infrequent. On structural grounds, the default plural of German is *-s*, but it occurs in less than 5% of plural nouns (Yang 2016), a low level of productivity by the criterion of type-frequency.

Secondly, defaults furnish an empirically more accurate criterion than productivity. As an example, consider Haspelmath's (2002: 203, Haspelmath and Sims 2010: 227) claim that "most integrated [stem-level] affixes in English are quite unproductive anyway, so it seems unnecessary to invoke a level ordering architecture in order to explain why they do not attach to words derived with neutral [word-level] affixes." I tested this proposal by measuring the productivity of 14 of the most common English derivational suffixes, seven belonging to the stem level on morphological and phonological grounds, and seven to the word level. Using Haspelmath's (2002: 110) two operationalizable criteria, type frequency and diachronic productivity, I counted how many OED headwords are formed with them, and how many of them first occur in 1900 or later.

(1)	<i>Stem-level suffixes ("integrated")</i>				<i>Word-level suffixes ("neutral")</i>			
	Total	1900-			Total	1900-		
-ic, A.	7397	1750	24%	-age, N.	1229	150	12%	
-ite, N.	3088	610	20%	-dom, N.	326	35	10%	
-ity, N.	2994	418	14%	-less, A.	1793	111	6%	
-al, A.	7204	874	12%	-ish, A.	1347	85	6%	
-ive, A.	2151	176	8%	-hood, N.	314	15	5%	
-ance, N.	880	62	7%	-ness, N.	4290	230	5%	
-ous, A.	5376	172	3%	-like, A.	403	20	5%	

Overall, the commonest stem-level derivational suffixes score *higher* than the commonest word-level derivational suffixes on both measures of productivity (which in any case do not correlate with each other). This finding undercuts productivity-based explanations for why stem affixes do not attach outside word affixes. But it is easy to show that the stem-level suffixes in (1) are subject to more stringent selectional restrictions, both morphological and phonological, than the word-level suffixes.

H&S even deny the productivity of stem-level suffixes altogether: "Even the most common suffix, *-ity* [actually the third most common], cannot in general be used with new bases (cf. **chivalrosity*, **naturality*, *?*effectivity*)..." These words actually confirm *-ity*'s productivity. *Naturality* has become established in mathematics and in new age circles.¹ *Effectivity*, long sidelined by *efficacy*, *efficiency*, and *effectiveness*, has carved out niches in engineering, computer science, sociology, and

¹<https://arxiv.org/abs/math/0102060>, <https://arxiv.org/abs/1607.06603>, <https://en.wikiversity.org/wiki/Naturality>, <https://en.oxforddictionaries.com/definition/naturality>, <https://twitter.com/naturalityclub>.

management.² Only **chivalrosity* is unacceptable, obviously because it is blocked by *chivalry*, like **gloriosity* is blocked by *glory* (Aronoff 1976, Embick 2015).³ In general, a theory that sorts affixes into competitor sets with defaults predicts level-ordering effects, including affix ordering, better than any productivity account and indeed better than any other single overall generalization in the literature.

A more fundamental methodological point is that using frequency as a diagnostic of morphological productivity requires relativization to the domain in which the morphological process is formally and semantically licit. Productive morphological processes can be rare in use (Miller 2014: 15 ff.), and their frequency can depend on competition with other morphological processes. English has more words ending in *-th* than words ending in any other derivational suffix, because *-th* forms infinitely many ordinals and fractions, e.g. *999th*, *1,234,567th*, *googolth*, *googolplexth*, *centillionth*, *umptillionth*, *gazillionth*; it is totally productive but not all that frequent in texts.

Theories as diverse as Minimalist Morphology and Distributed Morphology hold that morphology is not about descriptive generalizations over textually attested vocabulary but about possible words — much as syntax is not just about actually uttered sentences but about possible sentences.⁴ The actual vocabulary of a language constitutes data for the theory of morphology, not its subject matter. From this perspective, productivity cannot explain morphological structure; it is itself an explanandum. And it should be obvious that genuine explanations of vocabulary usage must involve not only morphology but also cultural history and the social sciences.

As an example, consider the suffix combination *-oid-ize*. It is first attested in *spheroidize* (1912); since then robotics and science fiction have engendered *androidize*, *humanoidize*, and others. While still scarce, words in *-oid-ize* are morphologically well-formed, and semantically interpretable if you know the meaning of the base, even by speakers who have never encountered any of them. Indeed, they were arguably morphologically well-formed potential words (“accidental gaps” in the lexicon) before they were ever used, in that they are compatible with level-ordering and no selectional constraint excludes them.

References

- Aronoff, Mark, 1976. *Word Formation in Generative Grammar*. Cambridge, Mass.: MIT Press.
- Embick, David, 2015. *The Morpheme*. Boston/Berlin: de Gruyter.
- Haspelmath, Martin, 2002. *Understanding Morphology*. London: Routledge.
- Haspelmath, Martin and Andrea Sims, 2010. *Understanding Morphology*. London: Routledge.
- Mathesius, Vilém, 1964 [1911]. On the potentiality of the phenomena of language. In Josef Vachek (ed.), *A Prague School Reader in Linguistics*. Bloomington, Indiana: IUP. Translation of O potenciálnosti jevů jazykových (1911).
- Miller, D. Gary, 2014. *English Lexicogenesis*. Oxford: Oxford University Press.
- Pitkänen, Kaarina, 2005. Suomen kielen suurin rikkaus ja ihanin ominaisuus: Elias Lönnrotin johto-oppia. *Virittäjä*, pp. 52–82.
- Yang, Charles, 2016. *The Price of Linguistic Productivity: How Children Learn to Break the Rules of Language*. Cambridge, MA: MIT Press.

²<http://beyondplm.com/2011/05/03/plm-erp-and-managing-of-effectivity/>, <http://link.springer.com/article/10.1007/s10058-006-0012-1>, https://docs.oracle.com/cd/E18727_01/doc.121/e14320/T432549CHDEHEED.htm

³The suggestion that “only speakers with some kind of philological education would form such words” (Haspelmath 2002: 205) is withdrawn in Haspelmath and Sims 2010.

⁴This echoes the views of Mathesius 1964 [1911] on the potentiality of words, and the analytic practice of grammarians like Pāṇini. The ca. 200,000 entries of Lönnrot’s Finnish dictionary (1880) include not only words harvested from literature and dialects, but a treasury of potential words methodically generated by derivational morphology, many of which have since then come into use (Pitkänen 2005).