Terrify and Terrific[*]

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I investigate whether there is a systematic relation in present-day English between words of the form Xify and those of the form Xific (e.g., terrify and terrific). Data gathered from the Oxford English Dictionary Online (OEDO) do not support any such relation. The same method does support positing a systematic relation among the sets Xification, Xificatory, and Xificative. More generally, the OEDO is shown to be a useful tool for investigating the morphology of patterns borrowed into English from other languages, notably French and Latin, in order to discover which apparent patterns are viable in the language.

***Keywords**: Oxford English Dictionary, morphological borrowing, productivity, French, Latin*

> *'I only took the regular course.'*
> *'What was that?'* inquired Alice.
> *'Reeling and Writhing, of course, to begin with,'* the Mock Turtle replied*; 'and then the different branches of Arithmetic — Ambition, Distraction, Uglification, and Derision.'*
> *'I never heard of "Uglification,"* Alice ventured to say. *'What is it?'*
> The Gryphon lifted up both its paws in surprise. *'What! Never heard of uglifying!'* it exclaimed. *'You know what to beautify is, I suppose?'*
> *'Yes,'* said Alice doubtfully: *'it means — to — make — anything — prettier.'*
> *'Well, then,'* the Gryphon went on, *'if you don't know what to uglify is, you **are** a simpleton.'*

1. Is there a connection between terrify and terrific?

Are the two English words *terrify* and *terrific* related in some systematic way in written Modern English? When it was first suggested to me that they were, I was surprised. Quick introspection revealed to me no connection between them besides the fact that their written forms share their first six letters. Their meanings seemed unrelated. But we have moved beyond Wundt in the last century and more. We have learned not to trust entirely our intuitions about the workings of our own minds, so perhaps my gut had deceived me. I set out to learn what I could about the answer to this question.

More generally, I asked how we might investigate empirically whether there is a likely relation between adjectives of the form Xific and verbs of the form Xify in written Modern English. As a linguist might put it, are Xific words based on Xify words in some way in the synchronic grammar of present day Written English, or even the other way round?[1] Is there a

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[1] OEDO also lists 41 verbs of the form Xefy, most of which are obsolete or very rare. OEDO lists 4 adjectives (*anti-venefic*, *benefic*, *malefic*, and *venefic*) of the form Xefic and 3 of the form Xefical, which share the same

rule of the form x_i-ify → x_i-ific or something equivalent (a suffix -ic that forms adjectives from verbs ending in -ify)?[2] One might even propose that both types are built on common roots: *terrify* and *terrific* share a root *terr-*. I will show that the two sets are in fact unrelated and that my gut was right in the first place.

What follows is an account of how I have looked at this question using only the *Oxford English Dictionary Online* (OEDO) as a resource, mostly by means of OEDO's basic built-in search tool, which is confined to the headwords of main entries.[3] For me, the initial question is entirely empirical: what evidence can we find for a productive (possibly directional) relation between the two sets of words in question, or, in principle, any two morphologically identified sets of words? Since both sets under investigation contain numerous borrowings, we need to leave open the possibility that any perceived relation is accidental: English borrowed many words of both types, so it is possible that some pairs, at least, may have been coincidental to start with (though this does not preclude a later connection). Are there enough pairs to posit a rule? How many is enough?

Remember too that written Modern English is replete with words formed with affixes 'borrowed' from French, Latin, and Greek, many more than with native affixes. All of these affixes originated in individual words adapted from these languages. A pattern became productive once enough words had entered the language for speakers to generalize a productive rule in their internal synchronic grammars (Anshen and Aronoff 1988). The specific question here is whether this is true of the putative pattern that is our topic.

More generally, I hope to convince readers that OEDO-based counting can tell us something about the structure of words in written Modern English. The OED was designed almost two centuries ago "on historical principles" and still retains a great deal of historical information. Speakers and writers of the language know nothing about the history of individual words, though. But one of the most robust results in the psychology of language over the last century (e.g., Zipf 1935, Broadbent 1967) is that people are acutely sensitive to the frequency of individual words. OEDO, in its most recent incarnation, lists the approximate frequency of every entry in the current written language (based on the Google Ngram corpus of English). I hope to show that the frequency information in OEDO can help the researcher to gain a better understanding of the morphology of the language today.[4]

Linguists are trained to seek out relations between words. We must always keep in mind, though, that even the trained linguist's perceived relation may be illusory. What we think we see must be backed up by facts. Throughout, we must also keep one criterion paramount: compositionality. For many of us, that remains the largest lesson of Chomsky's

three bases (*benefical*, *malefical*, *venefical*). All are obsolete. I take these small numbers as evidence that the three patterns Xefy, Xefic, and Xefical are all inactive in Modern English. Accordingly, I will confine the discussion to Xify and Xific.

[2] OEDO lists 48 adjectives of the form Xifical, all of which are rare or obsolete, with the sole exception of *pontifical*. Accordingly, I will not consider this pattern for now, though I will return to a discussion of it later.

[3] OEDO has a separate category of lexical items that are listed within the body of an entry, including compounds, phrases, and some derivatives, for which the term *lemma* is reserved, quite idiosyncratically by the editors' admission. Technically, it is tricky to include these 'lemmas' in a search. They are therefore excluded from this article, which includes only headwords, for which I use the term *entries* since each headword heads a dictionary entry.

[4] OED has 8 frequency bands. Entries in band 1 have no frequency. Those in 2 have a frequency <0.0099 per million; 3 ranges from 0.01 to 0.099; 4 from 0.1 to 0.99; 5 from 1 to 9.9. Whether there are any morphological patterns with a mean frequency above 10 is a question for future research.

Remarks on Nominalization (1970). Whatever account we provide, it must respect Frege's principle of compositionality.

English orthography often plays tricks on us. The words *terrify* and *terrific* do look very similar, but their pronunciations are not. The first vowel of <terrify> is stressed [ɛ].[5] The first vowel of <terrific> is never stressed, it is much more variable in pronunciation, and never [ɛ]. In normal speech, <terrific> usually has a schwa in the first unstressed syllable ([təɹɪfɪk]), for good phonological reasons (it is in an unstressed open syllable). But the schwa, like its Masoretic namesake, is sometimes very short or even absent, so that the word may be disyllabic in casual speech: [tɹɪfɪk]. When the word is used emphatically, the first vowel may also be pronounced as a stressed [i(j)], resulting in [tiɹɪfɪk]. This form is especially hard to relate to [tɛɹɪfaj] by any general phonological rule. In short, the phonological relation between the two words is not simple, suggesting at least some complexity in any morphological relation.

Lexicalization of meaning always lurks in the background. The sense of <terrific> that is most closely related to that of <terrify> ('inducing terror') is rare if not entirely obsolete today. Contrast the pair *horrify* and *horrific*, whose meanings are much more closely related, or *terror* and *terrorize*.[6] The problem at hand is which pair is more typical. To relate any two words syntactically or morphologically in Modern English is to claim that there is some semantic connection between them, which is hard to justify when we consider the most common senses of both *terrify* and *terrific*. Are other pairs of the form x_i-ify/x_i-ific more closely related semantically? Again, this is an empirical question. If not, then what is the value of positing a rule?

2. Prelude: Xification, Xificative, and Xificatory

Let us start with a neighboring set of affixes. Not all English words containing the bigram <if> are as opaque in their structure as Xific adjectives and Xify verbs. Much clearer are the relations among the sets Xification, Xificative, and Xificatory. OEDO lists 309 nouns of the form Xification, from *acetification* to *twirlification*, almost as many as verbs of the form Xify.[7] Adjectives of the forms Xificative and Xificatory are much less numerous.[8] OEDO lists 28 entries of the first type and 30 of the second.[9] Almost all 58 entries are classified as rare or obsolete. Only one, *significative*, rises beyond very low frequency. Not surprisingly, it is also the only entry for which we can find a further suffixed form, *significativeness* (a lemma in

[5] Individual words are cited in italics. If I want to call attention to the written form of a word, I use angled brackets. I use X as a variable in discussing patterns, which are not italicized (e.g., Xific). For any individual word in a pattern, I use a subscript (e.g., $x_i$ific).

[6] *Terrorize* is a recent borrowing, coined in French in 1796 and used originally in the context of the Reign of Terror of the French revolution. Incidentally, *terrorist* has the same provenance.

[7] Delving into the relation between these two sets would take us too far afield.

[8] OED also lists 6 adjectives of the form Xificational: *Classificational*, *identificational*, *modificational*, *nidificational*, *quantificational*, *stratificational*. All date from no earlier than the late 1800s. We will not consider them here.

[9] Of 33 actual Xificative entries, 4 are negative forms of *significative* (*dissignificative*, *insignificative*, *non-significative*, *unsignificative* (so much for blocking!)) and one is an unassimilated French loan-word. I exclude these five, giving us a net of 28.

OED's sense).[10] The 58 entries of the forms Xificative and Xificatory are listed in APPENDIX A. APPENDIX B lists the eight pairs of Xificative and Xificatory adjectives that share a base. There does not seem to be any pattern to these pairs, suggesting that the affixes are in competition.

Is either set, Xificative or Xificatory, derived from the much more prevalent Xification?[11] If the adjectives are productively formed from Xification nouns in a synchronic grammar, then we might expect to find an Xification noun corresponding to a large subset of the 58 adjectives, even for such unusual words as *rubrificative* or *ludificatory*. This is borne out for every item but one: *sensificatory* lacks a parallel **sensification.* Furthermore, every one of the 57 attested individual words is compositionally related to the corresponding Xification noun, even when both are rare: e.g., *testificative:testification*; *corporificative:corporification.* Despite their rarity, it is therefore reasonable and economical to posit two rules, one for Xificative adjectives and one for Xificatory adjectives, deriving both sets from Xification nouns. Their overall infrequency also supports an analysis in which most of these words are not listed as distinct entries in a speaker's mental lexicon (Stemberger and McWhinney 1986). Whether the rules are more general, deriving the supersets of Xative and Xatory adjectives from Xation nouns, or even wider in scope, deriving Xive and Xory adjectives from Xion nouns, is a much larger question. For now, the relations between Xificative or Xificatory adjectives and Xification nouns is clear and compelling. Notably, though, half of the 28 Xificative entries are obsolete and among the rest, only *qualitificative* and *significative* rise above OEDO frequency band 2. Among the 30 Xicatory entries, only 4 are obsolete and 8 are of frequency band 3 or 4. These frequency numbers jibe with the overall sense that Xificatory is the more vibrant of the two patterns. Xificative may, in fact, not be active at all in the language of our time.

Having shown that at least some sets of words containing the bigram <if> in English are likely related, we may turn to our main question, whether Xific adjectives are derived from or in any way related to Xify verbs.[12]

3. The history of -ify and -ific

Historically, -ify is borrowed from Old French <-ifi(er)>. This suffix was itself the descendant of the Latin verbal suffix -i-fic-(-ā-re). The Latin verbal suffix was converted from the adjective suffix -i-fic-(-us). The adjectival -i-fic-(-us) attaches to adjectives and nouns with the sense 'bringing/making'. It was adapted from the verb root fac 'do' accompanied by a linking vowel -i- and shows ablaut (fac > fic).[13] Also, as with many productive verbal suffixes in Latin, -fic- verbs belong to the first conjugation (with theme vowel -ā-), even though the original verb

[10] OEDO lists about 250 entries of the form Xiveness, versus only 20 of the form Xoriness. For almost all of the latter, X is not a free form (e.g., *peremptoriness*), which suggests that -ory is a closing suffix in written Modern English (Aronoff and Fuhrhop 2002).

[11] If so, they may be examples of the elusive truncation (Aronoff 1976): the suffix -ion of the Xification base has been truncated in conjunction with the addition of -ive or -ory.

[12] We find 8 pairs of adjectives that share a base: e.g., *justificative*:*justificatory*. These are listed in APPENDIX B. If we assume that the adjectival suffixes are independent of each other, then such pairs will reasonably arise by pure chance.

[13] Other Romance varieties retain the <c>. The Italian verb *magnificare*, for example, transparently contains the adjective *magnifico*. I will not explore whether the two suffixes are related synchronically in Italian or any other Modern Romance language.

facere is an irregular second-conjugation verb (theme vowel -i-). At least in Latin, then, the adjectival suffix was both structurally and historically prior to the verbal suffix. Thus, the noun *horror*, with the stem *horr-*, was the base of the adjective *horrific(us)*, which in turn was the base of the verb *horrificāre*. In French, as in all Romance languages, the adjectival suffix descended unchanged as <ique> (Italian and Spanish <-ic>) and remains in wide use to this day. The OEDO has in-depth discussions of the history of both suffixes in English (under -fy and -fic).

Incidentally, the linguist who wants to make a connection between adjectival -ific and the more common denominal adjectival suffix -ic, positing the structure -if-ic, faces a historical problem. The latter -ic, at least historically, is unrelated to -ific. We see this in the fact that -ic attaches largely to nouns. If we were to posit a rule of the form x_i-ify → x_i-ific in Modern English, we would have two homophonous -ic_A suffixes, one of which is verb-based and operates only in this very narrow domain, and the other noun-based with a wider domain. Or we would have one suffix that normally attaches to nouns, except in a very small number of cases where it attaches to verbs, but only those of the form <-ify>, and then not very productively, as we will see later. It seems safest to chalk up any apparent connection between the forms of -ific and -ic to accidental homophony and homography, as history reveals.

4. What happened in English?

What follows was gleaned entirely from OEDO. Advanced search using the wild card * in OEDO yields the following counts of Xific entries:

*ific all current	107
*ific A current	104
*ific N current	17

We conclude that <-ific> reliably marks adjectives, with only three exceptions and about 15% of adjectives having homophonous nouns. What about -ify?

*ify V current	around 400
*ify N current	yields only one word, *salsify*, which qualifies only in spelling
*ify A current	yields no results
*ify Adv current	yields no results

We see that -ify marks verbs with total reliability and that there are almost exactly four times as many Xify verbs as Xific adjectives, a good start if we want to derive the adjectives from the verbs. Remember that, in trying to find if there were consistent relations between Xification and Xificatory or Xificative, we looked for and found pairs of the form $x_i$ification and $x_i$ificatory/ $x_i$ificative. We found only one entry, *sensificatory*, that lacked a corresponding **sensification* and concluded that there was evidence for deriving the adjectives from the nouns.

5. Is there a system?

We return to our initial question: is there evidence in OEDO of a derivational relation between words ending in -ific and -ify? We can start by asking the same question for this pair that was asked above for Xificative/Xificatory and Xification: how many and which $x_i$ific adjectives have corresponding $x_i$ify verbs and could thus be plausibly derived from the verbs?

All prefixed adjectives, such as *prescientific* or *overspecific* were omitted from consideration in the following count from OEDO, since they are plausibly derived from their unprefixed counterparts (which all of them have). This yielded 70 unprefixed adjectives of the form Xific. This number is less than one-fifth of the total number of Xify verbs, a good start if we want to derive the adjectives from the verbs. I then checked for a verb corresponding to each of the 70 unprefixed adjectives, to determine how many of these 70 could be derived from verbs at all?[14] The number is split almost down the middle: of the total 70 adjectives, 34 (49%) have corresponding verbs in -ify (indicated by Y in (1)) while 36 (51%) do not (indicated by N in (1)).[15] The count is thus dramatically different for what we found in our previous analysis of pairs of the form $x_i$ification and $x_i$ificatory/ $x_i$ificative, where all but one adjective had a corresponding putative noun base

(1) Adjectives in -ific with and without corresponding verbs in -ify:

1. *Acidific*	**Y**	**24. *Humorific***	**N**	**47. *Sanguific***	**N**
2. *Algific*	**N**	**25. *Ignific***	**Y**	48. Soporific	N
3. Aurific	Y	**26. *Infelicific***	**N**	49. Scientific	N
4. Beatific	Y	**27. *Lanific***	**N**	50. Sebific	N
5. Calcific	Y	**28. *Lapidific***	**Y**	**51. *Seminific***	**N**
6. Calorific	Y	**29. *Lucific***	**N**	**52. *Serific***	**N**
7. Chylific	Y	30. Mirific	N	53. Signific	Y
8. *Classific*	**Y**	31. Morbific	Y	**54. *Solemnific***	**Y**
9. Colorific	N	**32. *Mortific***	**Y**	55. Somnific	N
10. *Cornific*	**Y**	33. Motific	N	**56. *Sonorific***	**N**
11. *Crustific*	**N**	**34. *Mystific***	**Y**	57. Soporific	N
12. Deific	Y	35. Odorific	N	58. Specific	N
13. *Dolorific*	**N**	36. Omnific	Y	**59. *Stuporific***	**N**
14. Febrific	N	37. Optimific	N	**60. *Substantific***	**Y**
15. Felicific	Y	38. Ossific	Y	61. Sudorific	N
16. Finific	Y	39. Pacific	Y	**62. *Tabific***	**N**
17. Frigorific	Y	**40. *Petrific***	**Y**	63. Tenebrific	N
18. *Generific*	**N**	41. Pontific	Y	64. Terrific	Y
19. *Grandific*	**Y**	42. Prolific	Y	65. Torporific	N
20. *Gravific*	**N**	**43. *Pulsific***	**N**	66. Unific	Y
21. Honorific	Y	44. Rubific	Y	67. Vaporific	N
22. Horrific	Y	**45. *Sacrific***	**Y**	**68. *Virific***	**N**
23. *Humilific*	**N**	46. Salvific	N	**69. *Vivific***	**Y**

[14] Of the 70 adjectives, 34 are flagged by the Word spell-checker, so are rare. These are bolded in the list.

[15] The 34 adjectives with corresponding verbs amount to about 8% of the 400 verb entries in OEDO. Twelve of these 34 adjectives with corresponding verbs are rare enough to have been flagged by the Word spelling checker. By themselves, neither the small number nor the rarity are necessarily determining factors in any analysis.

70. *Voluptific* **N**

Let's look more closely at the 34 adjectives for which we do find a matching verb, to see what we might salvage. Which member of a given pair occurs earlier? How many pairs are plausibly related semantically? How many entries are known to be borrowed from French or Latin? APPENDIX C contains all 34 pairs, with the date of first occurrence of each entry and remarks on possible compositionality and borrowing. All pairs for which the verb occurs earlier, and the relation might be compositional, are bolded (even when both words are borrowed).

Close historical and semantic study of the 34 individual pairs finds 11 for which the verb clearly both predates the noun and can arguably be said to have served as its base. The verbs are *acidify*, *aurify*, *calcify*, *chylify*, *classify*, *cornify*, *finify*, *mystify*, *omnify*, *rubify*, and *solemnify*. Thus, only 11 out of 70 Xific entries (16%) might have been formed from their corresponding $x_i$ify verbs in real time. There are also 8 pairs (almost as many) for which the noun predates the verb: *acidific, calorific, frigorific, horrific, lapidific, ossific, pontific,* and *prolific*. In a good number of all the pairs, one or both members have been borrowed from Latin or French or both. Close study does not help our cause.

But all this is history. Our concern is the here and now. What evidence might there be here that an English learner today could glean this pattern from the data presented to them? What is most striking about all these entries in this regard is their relative infrequency. OEDO frequencies are calculated based primarily on the 2012 version of the Google Ngrams data set. "At present, we are only indicating the frequency that each word has in modern English (1970)."[16] Thus, all entries not attested on the Google Ngrams data set since 1970 are considered obsolete. Obsolete entries (including many of the Xific and Xify entries under discussion) have no frequency. They comprise about 20% of all OEDO entries. The remaining OEDO entries are divided into 8 frequency bands, with band 8 being the most frequent, comprising words that occur 1000 times per million, and band 1 containing "extremely rare words unlikely ever to appear in modern text." Among the verbs here, only *mystify* reaches frequency band 5 (between 1 and 10 occurrences per million); of the adjectives, *horrific* makes it to band 4 (between .1 and 1 occurrences), and *prolific* to band 5. Band 5 words "tend to be restricted to literate vocabulary associated with educated discourse, although such words may still be familiar within the context of that discourse" (OEDO). Words at band 4 "remain recognizable to English-speakers and are likely be used unproblematically in fiction or journalism." This dearth of even moderately frequent words means that it is highly unlikely that a child could ever learn any patterns based on the pairs in question. Only a highly educated adult might have the chance to be exposed to them.

6. Tolerance and Sufficiency

Which brings us back to the central question: whether a competent speaker of English might be likely to set up in their grammar a relation between the two sets Xify and Xific (in either direction). The low relative number of Xific entries in OEDO (70 compared to 400), together with the much smaller number of reliable directional pairs that we found (11), makes this scenario highly unlikely. How many examples would it take to establish a relation that would allow a learner to posit a rule deriving the Xific adjectives from the Xify verbs?

[16] All quotations are from OEDO.

Questions of this type (how many examples are needed and how many exceptions are tolerated for a learner to identify a pattern) are commonly posed in the study of children's acquisition of morphology. Here, the most intriguing recent proposal is Charles Yang's (2016) Tolerance/Sufficiency Principle, which provides a precise calculation based on the number of examples that a child encounters. Though usually thought of as distinct, the Tolerance Principle and the Sufficiency Principle are two sides of a coin. The Tolerance Principle determines how many exceptions a proposed rule can tolerate, while the Sufficiency Principle quantifies when a pattern is widespread enough to generalize. In both cases, the threshold for tolerance or sufficiency is correlated with the natural logarithm of the total number N of possible bases for the putative rule that the child encounters. Think of a rule R as a generalization over N items, of which M items are attested to follow R. If R is to have a chance to succeed, then the number M of attested cases of this rule must be sufficient. M is sufficient if it is greater than N divided by the natural log of N: R extends to all N items iff $N-M<N/\ln(N)$. Conversely, the Tolerance Principle is based on the number of exceptions that a putative rule encounters, as opposed to the number of attested applications: if a rule is to have a chance to succeed, then the number of exceptions to this rule must be less than N divided by the natural log of N.

Yang (2016) applied the tolerance principle to the classic case of children learning the past-tense forms of English verbs. He analyzed the 5 million words of child-directed English from CHILDES (MacWhinney 2000) and found 1022 unique past-tense verb forms. Calculating from this number, the Tolerance Principle predicts that the English 'add –ed' rule should permit up to 147 verb types with exceptional past tense forms (forms like *kept*, *brought*, and *knew*) in a class of 1022 verb lexemes. Yang's analysis found only 127 exceptional forms, 20 fewer than needed to subvert the rule. Thus, the ideal child represented by the CHILDES corpus should master the regular English past tense rule. By contrast, Yang found no irregular past tense patterns that reached the threshold. The largest, the *sing-sang* pattern, had only three verb lexemes in his corpus (*ring*, *sing*, and *spring*), while five monosyllabic Xing verbs (*bring*, *fling*, *sting*, *swing*, *wing*) showed no irregular past tense forms. The number of 'exceptions' exceeds the number of cases following the candidate rule, showing that the *sing-sang* pattern is not productive.

Here, I will be using the tolerance/sufficiency principle in a slightly different and novel way, focusing on those putatively derived forms that have **no** base: $x_i$ific adjectives for which there is no corresponding $x_i$ify verb. What proportion of attested $x_i$ific adjectives must have a related $x_i$ify verb to be sufficient to posit a rule deriving Xific adjectives from Xify verbs? The natural log of 70 (the number of Xific words in OEDO) is about 4.25, so there should be no more than 70/4.25 or about 16 exceptions to the putative rule if the rule is to be viable, where what we are calling 'exceptions' are adjectives of the form $x_i$ific that have no corresponding verb $x_i$ify at all. The actual number of such exceptions (36/70) is more than twice the threshold and exceeds the number of rule-following words. Put in Yang's terms, the putative rule does not have a sufficient proportion of applications to be viable. By this criterion, it is highly unlikely that Xific adjectives are productively formed from Xify verbs and that there is a rule relating Xify and Xific in Modern English. The learner fares even worse when faced with the fact that we identified only 11 out of 70 instances where $x_i$ific might plausibly be derived from $x_i$ify. The number of putative rule-followers is much too small for an imaginary child to formulate a rule if they follow the Tolerance/Sufficiency Principle. I conclude that it is highly

improbable that a Modern English learner would posit a rule deriving Xific adjectives from Xify verbs.[17]

Compare the adjectives of the forms Xificative and Xificatory that we discussed above. Looking first at the 30 Xificatory adjectives, we found only one lacking an Xification base (*identificatory*). The natural log of 30 is 3.4. 3.4/30 equals 11, meaning that the putative rule could tolerate up to 11 such gaps. We found none of the 28 Xificative adjectives without an Xification base. The Tolerance/Sufficiency Principle supports both rules when applied in this admittedly novel fashion.

7. Terrifical and twisterrific

OEDO has 48 entries of the form Xifical, from *algifical* to *vivifical*. They are apparently formed on the pattern of the more than 2000 words containing the English double adjective marker -ic-al, such as *technological* or *geographical*. This double affix, consisting of the Greek-derived -ic followed by the Latin-derived -al, is peculiar to English. All these Xifical words (except for *pontifical*) must accordingly have been (and were) coined in English. The presence of the additional -al in these words might thus seem to provide support for an analysis of -fic as -f-ic in English.

History proves otherwise. The Xifical pattern had a very short life: all but four of the 48 OEDO entries were coined between 1500 and 1700, and half of these 44 between 1650 and 1700. None of the individual coined Xifical words had anything but a brief florescence either, with almost none of them ever used after 1700. With the sole exception of *pontifical*, all the entries are listed in OEDO as either obsolete or rare. More than a few of them are "Apparently only attested in dictionaries or glossaries." In fact, *pontifical* turns out to be the exception that tests the rule: it is an ancient Latin word whose base is *pontifex* 'high priest'. OEDO provides the etymology *pons + fex* for the original Latin word, but notes that "this may represent merely a folk etymology." Regardless of its origin, it is clear that *pontifical* does not fall into the set of Xifical words.

Apparently, these Xifical words were all coined consciously, mostly within a very short time span, by analogy to the robust peculiarly native Xical pattern (2200 entries in OEDO) but the analogy did not work, the pattern could not hold. Such OEDO citations as "essentificall thingliness" or "myracle so mirificall" are indicative of the special tinge attached to these words. None of them ever settled into the language. Thus, rather than providing support for a connection between Xify and Xific, the set of Xifical words casts new doubt on it.

The sequence Xificant leads to similar results. OEDO lists 11 adjective entries of this form. The single word *significant* and its derivatives (*consignificant, insignificant,* etc.) comprise 7 of them. The remaining 4 are all borrowed from Latin and are obsolete or rare: *edificant, laetificant, petrificant, vivificant*. There is no pattern here. Only a zealot would search for one.

We must always be wary of conscious coinages, especially of learned and facetious terms, even though some of these terms may enter the written language. To give just one well-worn example, the English word *quality* descends from the Latin word *qualitas 'whatness'*, coined by Cicero as the translation of the Greek word ποιότης "quod ipsum apud Graecos non est vulgi verbum, sed, philosophorum" [which itself among Greeks is not a term of common

[17] See Payne (to appear) for a similar application of the principle to children's acquisition of inflection.

people, but of philosophers] as Cicero noted on first using the word. The Greek word in turn was coined by Plato, who remarked on his first use that it was ἀλλόκοτον ὄνομα [[an] unusual word]. Facetious words can be similarly coined. As it happens, OEDO lists a suffix *-rific*, derived from *terrific*, with cited examples: *twisterrific*, *brillerific*, *splatterific*, *mambo-rific*, *slapperific*, *yog-rific*. None of these have corresponding -Xify verbs. All of them were clearly coined in jest, although OEDO goes so far as to list the sequence as a suffix, which it does not do for -ifical.

8. <-ific> and <-ic>

The Modern English language of the OEDO is written. Berg and Aronoff (2017) show that one of the peculiar properties that sets written Modern English apart from almost all other written languages is that many suffixes have developed consistent and unique spellings over the course of time.[18] These dedicated spellings are even baked into the practice of linguists, who routinely write PLURAL -s and PAST TENSE -ed, oblivious of the fact that they are using the conventional spelling for these suffixes rather than the linguistically motivated representation: [-z] and [-d]. One of the suffixes that Berg and Aronoff analyze in detail is adjectival <-ic>. 97% of all 646 polysyllabic words ending in orthographic <ic> listed in the English portion of the CELEX lexical database (Baayen et al. 1995) are adjectives. By comparison, of the 38 words in CELEX that end in unstressed [ɪk] not spelled <ic> (e.g., *derrick*), only one (*elegiac*) is an adjective. Put simply final <ic> is reserved for adjectives. This is true for the <ic> of <ific> as well. Historically, this purely adjectival <ic> pattern emerged only after 1750. Before then, there were many spellings of final unstressed [ɪk], and no correlation with lexical category. Is this uniform Modern spelling evidence that <ific> is a complex suffix <if-ic>, as implied by the analysis that bases it in <-ify>? Only if we believe that the collective creators of Modern English spelling had privileged access to the system of the language. We see from spellings like <-s> and <-ed>, in which the presence of the silent <e> in one written form and its absence in the other are linguistically unmotivated, that the writing system doesn't always get everything right (Berg et al. 2014). A simpler conclusion is that final <ic> spelling is more like a part-of-speech tag than a linguistic representation, a way of marking all these words as adjectives rather than as sharing the same suffix. A slightly more theoretical perspective would follow Saussure (1959). Anderson and Saussure (2018) contrast Ferdinand de Saussure's perspective on morphology with that of his younger brother René. While René set out a framework that closely resembles the morpheme-based views of structuralist linguists and their descendants, Ferdinand held a more nuanced view, rooted in his concept of motivation. On this view, morphologically complex words could be partially motivated by their structural relation with other similarly complex words. On this view, the final sequence [ɪk]/<ic> is a word ending that partially motivates the adjectives that contain it.

[18] Each of the six suffixes that Berg and Aronoff studied became consistent and unique at a different time, <-ic> being the last.

9. Future research

A detailed analysis of the entries in OEDO does not support a relation between *terrific* and *terrify* or of other pairs of $x_i$ific and $x_i$ify adjectives and verbs. At this point, we might move on to a behavioral test, perhaps a lexical decision test or a priming test. Caution is in order here, because of the low frequency of all the entries in question and their domain of usage. Many are listed in OEDO as obsolete, hence almost entirely unlikely to be recognized by any Modern English speaker. Obsolete words have a current frequency of zero by definition and comprise almost 20% of all OEDO entries. Almost all the rest of the entries that we are considering fall into the lowest OEDO frequency bands, 1 – 5, all with fewer than 10 occurrences per million words. Most entries are less frequent than 1 per million. Many words in this range are at least "restricted to literate vocabulary associated with literate discourse" (band 5), or "remain recognizable to English-speakers" (band 4). But bands 3 – 1, those below one per ten million, comprise together 83% of the entries in OEDO and almost all the non-obsolete words that we have been discussing fall into these bands. While the 20% of entries that fall into band 3 "are not overly opaque or obscure'" the 63% in bands 2 and 1 "would be unknown to most people" or "unlikely ever to appear in Modern text." The fact that almost all the words of interest to us will most likely be unrecognizable to most living English speakers presents a challenge to any experiment that involves word recognition.

One consolation that we have found along the way is that adjectives of the forms Xificative and Xificatory are almost certain to have a corresponding Xification noun entry and are also more likely to be closely related in their senses to their corresponding Xification entries. We would expect to find a priming effect for these pairs, in contrast to $x_i$ify/$x_i$ific pairs. An experiment that contained items from both sets might hold some promise.

10. Conclusion

In a recent article, Andrea Sims and I (Aronoff and Sims 2023) contrast two ways of thinking about linguistic morphology: one rooted in the traditional structuralist stance, that complex words are built out of atomic meaningful elements, and one that gives pride of place not to the elements (morphemes) but to the relations among morphological entities, both complex and simple. In the current work, I have analyzed in some detail the relations among the members of a structured list of morphologically complex lexemes (OEDO entries), to see what if anything the list itself can reveal not only about the relations among these lexemes but, in some cases, about the absence of relations. I have shown that, in some instances at least, the structure that we have been trained to look for, and which we may believe we see, is merely apparent.

APPENDIX A
OEDO entries of the form Xificative and Xificatory

1. Amplificatory
2. Certificatory
3. Chylificatory
4. Clarificatory
5. Classificatory
6. Edificatory
7. Edificatory
8. Exemplificatory
9. Identificatory
10. Indemnificatory
11. Justificatory
12. ludificatory
13. Modificatory
14. Mystificatory
15. Ossificatory
16. Pacificatory
17. Purificatory
18. Qualificatory
19. Ratificatory
20. Rectificatory
21. Reificatory
22. Self-justificatory
23. Sensificatory
24. Significatory
25. Simplificatory
26. Stultificatory
27. Testificatory
28. Verificatory
29. Versificatory
30. Vitrificatory
31. Albificative
32. Consignificative
33. Corporificative
34. Significative
35. Edificative
36. Exemplificative
37. Felicificative
38. Fructificative
39. Justificative
40. magnificative
41. modificative
42. mollificative
43. mordificative
44. mortificative
45. mundificative
46. notificative
47. personificative
48. purificative
49. qualificative
50. rectificative
51. rubificative
52. rubrificative
53. sanctificative
54. sanguinificative
55. signification
56. specificative
57. verificative
58. vivificative

APPENDIX B
Pairs of the form Xificative and Xificatory

1.	Edificative	edificatory
2.	Exemplificative	exemplificatory
3.	Justificative	justificatory
4.	Purificative	purificatory
5.	Qualificative	qualificatory
6.	Rectificative	rectificatory
7.	Significative	significatory
8.	Verificative	verificatory

APPENDIX C
Pairs of the form $x_i$ify and $x_i$ific

-ify verb with first citation and source	-ific adjective with first citation and source	Plausibly related	Remarks
1. Acidify (1783) F	**Acidific (1835) F**	Y	Both technical
2. Aurify (1652) F	**Aurific (1667) F**	Y	Both rare and obsolete
3. Beatify (1535) F	Beatific (1649) L	N	Unrelated in sense, both borrowed
4. Calcify (1851) F	**Calcific (1869) E**	Y	A is rare, V can be intr. and tr.
5. Calorify (1841) E	Calorific (1686) F	N	V is humorous A predates
6. Chylify (1663) F	**Chylific (1836) E**	y	Clear case, A has technical sense
7. Classify (1776) L/F	**Classific (1799) L**	Y	Clear case, A is rare
8. Cornify (1611)	**Cornific (1727)**	Y	Clear case, A found in dictionaries only
9. Deify (1340) L	Deific (1490) L	N	A = 'divine', both borrowed
10. Felicify (1683) L	Felicific (1865) L	N	V is rare and obsolete; both borrowed
11. Finify (1586) E	**Finific (1834)**	N	V is obs. and ironic 'trick up' N is unrelated 'limiting', root is L fin
12. Frigorify (1851) E	Frigorific (1668) F	?	A predates
13. Grandify (1665) F	Grandific (1727) L	N	V is rare, A 'grandiose'
14. Honorify (1606) L	Honorific (1650) L/F	N	Both borrowed from L
15. Horrify (1791) L	Horrific (1653) L/F	Y and N	Both borrowed, A predates
16. Ignify (1586) L	Ignific (1747) L/F	Y	Both rare and borrowed
17. Lapidify (1657) F	Lapidific (1646) F	N	Both obsolete, A predates
18. Morbify (1623) L	Morbific (1652) F	N	Both rare or obs. or archaic, both borrowed from L
19. Mortify (1382)	Mortific (1651)	N	Both borrowed from F and L
20. Mystify (1806) F	**Mystific (1849) E**	Y	Clear case, A is rare, 1 cit.
21. Omnify (1622) E	**Omnific (1667) E**	y	Clear case, V is rare
22. Ossify (1670) E	Ossific (1638)	N	A predates
23. Pacify (1474) L/F	Pacific (1500) F/L	N	Both borrowed from F and L
24. Petrify (1425) F/L	Petrific (1667) L	N	
25. Pontify (1883) F	Pontific (1609) E	N	Verb is depreciative, cf. pontificate, A predates
26. Prolify (1660) L	Prolific (1635) F/L	N	V is obs. rare, A predates
27. Rubify (1404)	**Rubific (1701)**	Y	Clear case
28. Sacrify (1325)	Sacrific (1727)	?N	Both rare
29. Signify (1275) F/L	Signific (1923)	N	A is technical
30. Solemnify (1780) E	**Solemnific (1823)**	N	One example of A, 'isolated use'
31. Substantify (1605) L	Substantific (1634) F/L	N	Both borrowed
32. Terrify (1536) F/L	Terrific (1667) L	Y	Original sense is rare, both borrowed
33. Unify (1502) L	Unific (1788) L	N	A is rare, both borrowed L
34. Vivify (1545) F/L	Vivific (1551) F/L	N	Both borrowed from F and L

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