Onomatopoeias in Modern English

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Introduction

English belongs to the Germanic branch of the Indo-European language family. It is widely spoken as a native language in north America, the United Kingdom, and Australia and used pervasively as a second language in many other locations. English morphology involves analytic and synthetic dimensions, exhibiting considerable agglutination in its word formation and analytic, single-affix, and fusional tendencies in its inflection (e.g. the comparative adjectives *more available*, *taller*, and *worse* or the finite verb forms *will go*, *goes*, and *went*). Here, I examine the incidence of onomatopoeia in the lexicon of English.

Position of onomatopoeia in the language system

Onomatopoeias are distinguished from other parts of the English lexicon by virtue of their sound-imitative origin; for instance, *boom* in (1a) differs from *truck* in (1b) insofar as *boom* has a sound-imitative origin but *truck* does not.[1] Thus, in dictionaries of English, words like *boom* that imitate sounds of the environment are variously labeled as *onomatopoeic*, *imitative*, or *echoic* in origin.[2] (The *Oxford English Dictionary* employs all three terms in classifying the origins of onomatopoeic words, but is not specific about how or whether these classifications are to be distinguished; Benczes 2019: 96-97, 182-240.) At the same time, onomatopoeias are also grouped together with other lexical items by virtue of the fact that they may function as members of the same lexical category. For instance, *boom* and *truck* are alike in (1) insofar as both are singular nouns.

(1) a. The loudness of the boom startled them.
b. The loudness of the truck startled them.

Dictionaries and corpora of English are not fully consistent in their representation of the lexical category membership of onomatopoeic words. Some sources present onomatopoeias as belonging always to a grammatical part-of-speech class; for instance, the *American Heritage Dictionary* lists *caw* and *wham* as serving only as nouns or as verbs; *splat* as serving only as a noun or as an adverb; and so on. This practice seems to gloss over the fact that onomatopoeias in English may be used in two fundamentally different ways: as secondary onomatopoeias, they may serve a specific grammatical function, but as primary onomatopoeias, they may instead serve purely as sound imitations. Secondary onomatopoeias belong to grammatical parts of speech, acting very commonly as nouns or as verbs, as in (2). Primary onomatopoeias, by contrast, do not obviously function as grammatical parts of speech, but instead serve an expressive function, either occurring on their own as sound-imitative utterances or complementing (or standing in a kind of

[1] As Benczes (2019: 101-104) emphasizes, most onomatopoeias have a phonological shape only part of which is imitative of the represented sound (or of some part of it). For instance, *bow-wow* imitates a dog barking most accurately by means of its reduplicated vocalism; a dog's bark does not, however, contain the bilabials /b/ and /w/. Highly lexicalized onomatopoeias are generally quite inaccurate as literal imitations of the sounds they represent.

[2] Because the online Corpus of Contemporary American English (https://www.english-corpora.org/coca/) does not specify the origins of the words that its lists, it naturally provides no special label for the onomatopoeic words among these.

apposition to) an accompanying verb of sound emission, as in (3). Some sources (e.g. the *Oxford English Dictionary* and the Corpus of Contemporary American English) label some onomatopoeias as interjections, an apparent acknowledgement of their possible use as primary rather than secondary onomatopoeias. Some primary onomatopoeias do involve corporeal sound symbolism,[3] and cases of this sort, such as *achoo*, *gulp*, and *ha ha*, are surely akin to non-onomatopoeic interjections such as *gee*, *yikes*, and *hello*; nevertheless, Meinard 2015 argues for the preferability of maintaining a conceptual distinction between onomatopoeias and interjections. In sum, dictionaries and corpora of English tend not to treat primary onomatopoeias as the sole members of any special lexical category distinct both from grammatical parts of speech and from interjections.

(2) *Boom* and *arf* as secondary onomatopoeias in English
- a. The cannons' booms startled them.
- b. The cannons boomed incessantly.
- c. The dogs' arfs began to bother everyone.
- d. The dogs continued to arf.

(3) *Boom* and *arf* as primary onomatopoeias in English
- a. Boom! Arf!
- b. The cannon went boom.
- c. The dog barked "arf arf".

Contemporary grammars tend to provide scant discussion of the status of onomatopoeias in the lexicon of English. Quirk et al. (1985: 74) make only brief reference to onomatopoeia as a productive source of novel interjections. Greenbaum (1996: 400, 469) lists onomatopoeia as one of several means for the creation of English words, but describes its role in constituting a language's vocabulary as "severely marginal." Neither Huddleston & Pullum (2002) nor Aarts (2011) makes any mention of onomatopoeia. By contrast, general discussions of the phenomenon of onomatopoeia are often based wholly or partly on English examples, e.g. Benczes (2019: Ch. 4), Bredin (1996), Hinton et al. (1994), Hrushovski (1980), Oswalt (1994), and Rhodes (1994); such discussions therefore provide some of the most detailed published accounts of the distinguishing characteristics of English onomatopoeia.

Onomatopoeias are an open class of forms in English. Speakers freely invent new onomatopoeias at will, depending on the sound to be imitated. This is famously reflected by the extraordinary variety of onomatopoeias invented for use in comic books; see, for example, the online Comic Book Sound Effect Database (www.comicbookfx.com). Even so, many onomatopoeias are learned like any other part of the language's vocabulary, a fact reflected by the very different ways in which the same sound is conventionally imitated in different languages (with English *cock-a-doodle-doo* contrasting with French *cocorico* and German *kikeriki*).

[3] According to Hinton et al. (1994: 2-3), corporeal sound symbolism "is the use of certain sounds or intonation patterns to express the internal state of the speaker, emotional or physical. This category includes involuntary, 'symptomatic' sounds such as coughing or hiccupping, and ranges through expressive intonation, expressive voice quality, and interjections." Corporeal sound symbolism is thus distinguished from imitative sound symbolism—"onomatopoeic words and phrases representing environmental sounds (e.g., *bang*, *bow-wow*, *swish*, *knock*, and *rap*)" (p.3).

Onomatopoeias are not the only sound-symbolic phenomena in English. For instance, English presents instances of synaesthetic sound symbolism,[4] the best-known example of which is the correspondence between high front vowels and small size, as in *teensy-weensy* and *itty-bitty*.[5] Similar to this is the phonetically iconic association of high vowels with high proximity and non-high vowels with low proximity, whether in the spatial dimension (*this* vs *that*, *these* vs *those*, *here* vs *there*, *near* vs *far*) or in the temporal dimension (*drink* vs *drank*, *dig* vs *dug*, *see* vs *saw*). The vocabulary of English also embodies a variety of phonaesthemes, instances of conventional sound symbolism.[6] Table 1 lists some examples of English phonaesthemes; see Benczes (2019: 69–94), Marchand (1960: Chapter 7), and Rhodes (1994), for more detailed discussion of these and other examples.

Table 1. Some English phonaesthemes

Phonaestheme	Significance	Examples
cl-	the closure of two parts	*clip, clamp, clasp, clench, clutch*
gl-	light	*gleam, glitter, glow, glimmer, glare*
sl-	sliding	*slip, slide, sled, slick, slither*
sn-	nose	*snot, sneeze, sniff, snort, snout*
st-	stoutness or rigidity	*stout, stiff, staff, stick, stump, stubby*
sw-	movement of a solid object through space or a nonsolid expanse	*swing, sway, swim, swagger, swipe, swap, sweep, swivel*
-ump	blunt mass	*bump, lump, clump, hump, rump*

Some instances of onomatopoeia themselves have a phonaesthemic component, e.g. *clap*, *slurp*, and *swish*. Moreover, some onomatopoeias present instances of phonetic iconicity that are quite systematic. For example, primary onomatopoeias often contrast with respect to the resonant quality of the sounds they represent (Rhodes 1994: 284-285; Oswalt 1994: 304-305). Thus, consider the onomatopoeias in (4), all of which contain a postvocalic nasal. These end in a voiceless stop if the resonant quality of the represented sound ends abruptly, but instead end with the nasal if the resonant quality of the represented sound persists or fades gradually. There is likewise a tendency for a higher-pitched sound to be represented by a higher vowel (Rhodes 1994: 283-284), as in the contrasting examples in (5).

(4) Resonance decay in onomatopoeias containing nasals

Gradual decay	Abrupt decay
bam	
boing	*boink*
bong	*bonk*
clang	*clank*
ping	*plink*
	whump

[4] According to Hinton et al. (1994: 4), synaesthetic sound symbolism "is the acoustic symbolization of non-acoustic phenomena", specifically "the process whereby certain vowels, consonants, and suprasegmentals are chosen to consistently represent visual, tactile, or proprioceptive properties of objects, such as size or shape."

[5] See Ultan 1978 concerning the cross-linguistic recurrence of this correspondence.

[6] According to Hinton et al. (1994: 5), conventional sound symbolism is "the analogical association of certain phonemes and clusters with certain meanings"; this association "may be largely language-specific in its choice of phonetic segments."

(5) Onomatopoeias contrasting with respect to the pitch represented

Higher pitch	Lower pitch
click	*clack*
clink	*clank*, *clunk*
ding	*dong*
jingle	*jangle*
plink	*plunk*
zip	*zap*

Description of onomatopoeia

At all levels of linguistic analysis, certain kinds of differences can be found between onomatopoeias and other sorts of lexical items.

Phonology

In English, onomatopoeias are heterogeneous with respect to their adherence to the phonological regularities of the language. Some examples, such as those in (6), are fully compatible with both the inventory[7] of speech sounds employed in ordinary English words and the principles according to which these sounds ordinarily combine; some onomatopoeias, however, deviate from this inventory of sounds or from their usual phonotactic principles.

(6) *arf*, *murmur*, *tick tock*, *wham*

Vowel and consonant inventory

Some English onomatopoeias deviate from the usual consonant inventory by employing the voiceless velar fricative [x], which is not ordinarily found in English phonology. Examples are the gunshot onomatopoeia [pçxx^{w}] and the crash onomatopoeia [kx:]. (Some speakers do, however, employ [x] in pronouncing borrowed words in which [x] appears in the source language, e.g. the pronunciation [bɑx] of the composer's name *Bach*.) The onomatopoeias [m̥] or [n̥] 'sound of sniffing' are more clearly deviant, involving voiceless nasals pronounced with a pulmonic ingressive airstream, unlike any sound in the usual phonetic inventory of English. Equally deviant is the snorting pig onomatopoeia, an ingressive nasal velar fricative (or trill).

Whereas the glottal stop is merely an allophone of /t/ in ordinary English words (e.g. American English *patented* [p^{h}æʔn̩tɨd]), it sometimes appears in onomatopoeias as a nonalternating consonant, as e.g. in [ʔɛ̃ɛ̃ʔ] 'abrasive sound of a buzzer, e.g. on a televised game show, to indicate that a contestant's time is up or that their answer is wrong'. And whereas nasal vowels such as that of the noun [pæ̃n], are, in English, an effect of anticipatory assimilation, the nasal vowels in the buzzer onomatopoeia [ʔɛ̃ɛ̃ʔ] and the crying-baby onomatopoeia [wæ̃:] are not. Neither are the nasal sonorants in /m̃m̃/ 'sound of an angry cat' nor the continuous vowel in

[7] The precise makeup of the vowel and consonant inventory of American English varies dialectally. In my speech (I am a native of eastern Kansas), there are fifteen vowel phonemes and twenty-four consonant phonemes. For tabulations of the relative frequency of English phonemes in ordinary speech, see Hayden (1950) and the online blog https://cmloegcmluin.wordpress.com/2012/11/10/relative-frequencies-of-english-phonemes/.

/ə̏ə̏ə̏ə̏ə̏ə̏ə̏/, an onomatopoeia said with rising and falling pitch in imitation of the sound of an emergency vehicle's siren (of the American type).

Syllabic structure

The lexicon of English exhibits a wide variety of syllable structures, most of which are observable in onomatopoeias. For instance, the maximal onset exemplified by a verb such as *split* is found in onomatopoeias such as *splat*. Onomatopoeias do, however, sometimes deviate from the regular patterns of English syllable structure. For instance, the initial /vr/ of the car-engine onomatopoeia *vroom* is not a typical initial consonant cluster in English, nor is the rime /ɔɪŋ/ of examples such as the bouncing onomatopoeia *boing* and the uncoiling onomatopoeia *sproing* prosodically usual. Some onomatopoeias lack any resonant syllable nucleus, as in the case of the mosquito sound [bzzz], the splash sound [pʃʃʃ], and the gunshot sound [pçxx^{w}]; in this respect, these examples are unlike ordinary English words. Such cases draw attention to the scalar nature of onomatopoeia (Benczes 2019: 101-104, Kadooka 2005, Rhodes 1994), with cases ranging from more imitative, less lexicalized examples such as *bzzz* to less imitative, more lexicalized examples such as *buzz* (and its inflected forms *buzzes*, *buzzed*, *buzzing*).

Prosodically, onomatopoeias may involve two or more syllables (often but not always of a reduplicative character) as an iconic reflection of the repetitive nature of the sound they represent, as in (7). A seemingly related phenomenon is the incidence of iambic onomatopoeias arising from onomatopoeic monosyllables through the prefixation of *ka-* or *ker-*, as in (8); each iambic onomatopoeia is synonymous with the monosyllable from which it arises. (The *American Heritage Dictionary* identifies the *ker-* in *kerplunk* is an emphatic prefix, assigning it a probable origin in Scots English.)

(7) Phonetic iconicity in polysyllabic English onomatopoeias

achoo	(sound of sneezing)
bla bla bla	(sound of a lot of talking with trivial significance)
cha-ching	(sound of a cash register)
clap clap	(sound of applause)
clickety-clack	(sound of a train on tracks)
cock-a-doodle-doo	(sound of a rooster crowing)
ding dong	(sound of a bell pealing)
ding-a-ling	(sound of a bell jingling)
ha ha	(sound of laughter)
hiccup / *hiccough*	(sound of hiccuping)
knock knock	(sound of knocking on a door)
pew pew	(sound of a laser pistol)
ratatatat	(sound of a machine gun)
tick tick tick	(sound of a watch ticking)
tick tock	(sound of a clock ticking)
yackety yak	(sound of a lot of talking with trivial significance)

(8) Iambic onomatopoeias in *ka-* or *ker-*:

ka-blam	(sound of an explosion)
ka-boom	(sound of an explosion)

ka-ching	(sound of a cash register; cf. the reduplicative version *cha-ching* in (7))
ka-chunk	(sound of a mechanical stamper)
ka-pow	(sound of a violent blow or explosion)
ker-choo	(sound of a sneeze)
ker-plunk	(sound of something dropping heavily into water)

Suprasegmental properties of stress placement do not generally have any special role in the form of English onomatopoeias. Stress may, however, identify the prominent syllable in cases of phonetic iconicity such as those in (7); for instance, the stressed syllable in *cha-chíng* represents the second, more resonant sound in the opening of a cash register. Similarly, the onomatopoeias in (8) are invariably iambic, with stress prominence given to the monosyllables on which they are based.

Morphology and syntax

In English, primary onomatopoeias (proper sound imitations) are morphologically nearly inert: they typically exhibit no inflection and little in the way of derivation (though see again the prefixes *ka-* and *ker-* in (8)); they might be said to exhibit limited compounding in the formation of quasi-reduplicative combinations such as *ding-dong*, *cock-a-doodle-doo*, and so on. Their range of syntactic uses is similarly restricted, since they don't clearly belong to any grammatical part of speech. Secondary onomatopoeias arise by conversion from primary onomatopoeias (in this way acquiring membership in one or another grammatical part-of-speech class) and are generally themselves subject to further rules of derivation and compounding as well as to rules of inflection. They likewise generally exhibit the rich syntax typical of their part-of-speech class.

Word-formation and word classes

In English, primary onomatopoeias are integrated into the grammar of the language by simple conversion to a noun or verb, yielding such secondary onomatopoeias as the nouns *vroom* and [pʃʃʃ] in (9a,b) and the verb *crunch* in (9c).

(9) a. The engine started with a vroom.
b. The boulder hit the water with a [pʃʃʃ].
c. We expected the brick to crunch into pieces.

Once an onomatopoeia has been secondarily converted to a noun or verb, it is naturally available to rules of derivation as well as to rules of compounding, as in (10).

(10)	a.	Derivation	[V -*er*]$_{N}$:	*boomer*, *bumper*, *cracker*, *popper*
			[N -*y*]$_{Adj}$:	*crackly*, *creaky*, *crunchy*, *twangy*
			[N -*less*]$_{Adj}$:	*bumperless*
			[Adj -*ness*]$_{N}$:	*crunchiness*
			[Adj -*ly*]$_{Adv}$:	*creakily*
	b.	Compounding	[N N]$_{N}$:	*barf bag*, *oompah band*, *choo-choo train*, *popcorn*, *popcorn popper*, *firecracker*

A secondary onomatopoeia may need to take on inflections appropriate to its part-of-speech class; thus, *honk* inflects as a plural noun in (11a) and as a past-tense verb in (11b).

(11) a. The taxi tore down the street with a series of honks.
b. The taxi honked at the truck.

In order to show such additional morphology, a secondary onomatopoeia must conform reasonably well to the phonotactics of English. Thus, consider the secondary onomatopoeias in (12a) and (13a). Although neither *vroom* nor [pçxx^{w}] corresponds perfectly to the phonotactics of English, *vroom* comes closer to doing so; *vrooms* in (12b) is therefore acceptable as a plural noun. By contrast, the anomalous phonotactics of the gunshot onomatopoeia [pçxx^{w}] keeps it from taking on nominal morphology, excluding plural forms such as *[pçxx^{w}]*s* in (13b).

(12) a. The car turned the corner with a vroom.
b. The car turned the corners with a series of vrooms.
(13) a. The rifle went off with a [pçxx^{w}].
b. *The rifles went off with a series of [pçxx^{w}]s.

In general, morphological markings added to converted onomatopoeias tend to be affixal in English; thus, while *sing* inflects for past tense by ablaut (as *sang*), the secondary onomatopoeia *ding* inflects for past tense by suffixation (as in *The bells dinged repeatedly*).

Syntax

Primary onomatopoeias tend to exhibit rather simple syntax, generally appearing as free utterances (as in (14a)) or as the complement of (or in a kind of apposition to) a preceding verb of sound emission (as in (14b-d)). As the examples in (14c,d) suggest, the verb *go* often serves as an all-purpose verb of sound production/emission for use with primary onomatopoeias (Rhodes 1994: 281; Oswalt 1994:302).

(14) a. Pow!
b. The baby cried [wæ̃ː], and we all stopped talking.
c. The rifle went pow, and everyone ducked.
d. The rifle went [pçxx^{w}], and everyone ducked.

As an effect of conversion, a secondary onomatopoeia exhibits the syntax appropriate to its part of speech; for example, *vroom* and [pʃʃʃ] show the indefinite article in (9a,b) and *crunch* shows the infinitive marker *to* in (9c).

Semantics

Onomatopoeias represent a diverse variety of sound types, and the semantic relations between primary onomatopoeias and their secondary counterparts are surprisingly varied.

Overview

Semantically, English onomatopoeias are very diverse. Some English onomatopoeias are directly associated with a particular kind of sound source: *caw* is associated with crows and ravens, *cha-ching* is associated with ringing cash registers. Onomatopoeias of this kind include natural sounds from inanimate sources (*pitter-patter*, *whoosh*); natural sounds from animate sources, including corporeal sounds (*bzzz*, *sniff*) and vocalizations (*cock-a-doodle-doo*, *ribbit*); and sounds of human artifacts (*vroom*, *tick-tock*). But not all English onomatopoeias are directly linked to a narrowly identifiable kind of sound source; many imitate sounds of collision, compression, expansion, or friction in a comparatively generic fashion, indeterminate both with respect to the particular objects involved and with respect to the possible involvement of human or animal agency. *Pow* simply imitates the sound of a local, powerful collision or expansion (a fist hitting a jaw, a gun firing, a bomb exploding); *crunch* imitates the sound of an object fracturing some mass (teeth fracturing a cracker) or impinging on an already fractured mass (footsteps on gravel); *splat* imitates the sound of one object impacting another with a smack (a tomato hitting a forehead, boots landing in a puddle); and so on. Given the productivity with which novel onomatopoeias may be invented on the spot, virtually any salient sound seems available for imitation in English, granting that some sounds are more successfully imitated than others.

Semantic relations

Other generalizations pertain to the semantic contrast between secondary onomatopoeias and their primary counterparts (Oswalt 1994: 302-303). Primary onomatopoeias are proper sound imitations; *vroom*, for example, imitates the sound of a roaring engine. But once *vroom* is converted to a verb, it may take on additional content. The verb *vroom* may simply denote the emission of a vrooming sound, as in (15a), but it may also denote rapid motion driven by a vrooming engine, as in (15b).

(15) a. The engine vroomed loudly.
b. The taxi vroomed recklessly around the corner.

In some cases, a secondary onomatopoeia denotes the kind of thing that produces the sound represented by the corresponding primary onomatopoeia. For instance, the second onomatopoeia *cuckoo* denotes the bird whose sound is denoted by the corresponding primary onomatopoeia;[8] in children's speech, *choo-choo* denotes the vehicle whose sound is denoted by the primary onomatopoeia *choo-choo*.

Such cases are comparatively simple: vrooming engines are usually associated with rapid speed, and cuckoos and trains are associated with distinctive sounds. In such cases, the relation between the secondary onomatopoeia and its primary correspondent is essentially metonymic. But a secondary onomatopoeia may take on an additional, special meaning that is divorced in some way from the sound of the primary onomatopoeia from which it derives. In the examples in Table 2, the derived, secondary onomatopoeia is polysemous. It may directly reflect the sound

[8] In English, a good many bird names derive metonymically from primary onomatopoeias. Some of these are complicated by an attempt to render the imitated sound as a similar-sounding expression of ordinary English, as in the case of names such as *bobwhite*, *chuck-will's-widow*, *killdeer*, and *whippoorwill*.

imitated by the corresponding primary onomatopoeia; but it may additionally involve the sound of the corresponding primary onomatopoeia in at most a metaphorical sense. A real-estate boom may possess the sudden intensity of a sonic boom, but doesn't involve its sound. A dumb cluck may exhibit the perceived low intelligence of a chicken without actually sounding like one. The snideness of a sarcastic crack may possess the abruptness or the sharpness of a whip's crack without literally involving its sound. In this way, each of the primary onomatopoeias in Table 2 has a polysemous secondary onomatopoeia one of whose meanings evokes the sound of the primary onomatopoeia more or less directly (*boom* in *sonic boom*), but another of whose meanings has an essentially metaphorical connection to that sound (*boom* in *real estate boom*).[9]

Table 2. Special meanings associated with some secondary onomatopoeias

Form	As primary onomatopoeia	As secondary onomatopoeia
boom	'deep, explosive sound'	'swift, widespread development'
buzz	'sound of an insect flying'	'drug-induced euphoria'
cluck	'sound of a chicken'	'stupid person'
crack	'abrupt, sharp sound'	'snide remark'
ding	'high-pitched sound of metal or glass being struck'	'small nick or dent, e.g. on a car'
drip	'sound of a drop of liquid falling'	'insipid or unpleasant individual'
jingle	'continuous resonant musical sound'	'musical advertising slogan
rumble	'deep continuous unorganized sound'	'gang fight'
tweet	'sound of a songbird'	'message sent on Twitter'
twitter	'continous birdlike sound'	'commercial website for disseminating short messages'
whack	'sound of a sharp, swift blow'	'to murder'
zoom	'humming sound of something moving rapidly'	'to cause an image to grow larger on a screen or through a lens'

Conclusion

English onomatopoeias are diverse, and are perhaps best characterized as a special word class whose members may be primary (functioning purely as sound imitations) or secondary (functioning as members of larger part-of-speech classes and expressing meanings related more or less closely to the sound denoted in their primary use). In general, secondary onomatopoeias conform to the syntactic patterns typical of the part-of-speech class to which they belong.

[9] On occasion, English speakers use a primary onomatopoeia to draw a metaphorical comparison to the source of the sound imitated by that onomatopoeia. For instance, uttering the angry cat onomatopoeia /ĩĩĩ/ in response to a mean comment labels that comment a "catty" remark (A: *What an ugly coat!* B (with raised eyebrows): /ĩĩĩ/*!*). Similarly, uttering the chicken onomatopoeia *buck buck* labels someone salient as cowardly (A: *They decided to get out of there as quickly as possible*; B: *buck buck!*). These are not analogous to the metaphoric uses of secondary onomatopoeias in Table 2, which reflect special semantics; rather, they embody a pragmatic use to which primary onomatopoeias may be put—a use in which their usual sound-imitative semantics is preserved, e.g. as a way of evoking a compared animal.

Whether primary or secondary, onomatopoeias may exhibit greater or lesser degrees of conformity to the phonological regularities usual for the English lexicon, and secondary onomatopoeias may exhibit greater or lesser degrees of integration into the broader morphology of English. Thus, English onomatopoeias might be seen as embodying three dimensions of typological contrast—those of semantic proximity, phonological conformity, and morphological integration. These three dimensions are exemplified in (16)-(19) with the splash onomatopoeia [pʃʃʃ], the engine onomatopoeia *vroom*, the crow onomatopoeia *caw*, and the explosion onomatopoeia *boom*.

(16) a. [pʃʃʃ]
b. Primary function: *The boulder went* [pʃʃʃ]$_1$.
c. Secondary function: *The boulder fell with a loud* [pʃʃʃ]$_2$.
d. Semantic proximity of [pʃʃʃ]$_2$ to [pʃʃʃ]$_1$: **high**
e. Phonological conformity of [pʃʃʃ]: **low** ([pʃʃʃ] has no syllable nucleus)
f. Morphological integration of [pʃʃʃ]$_2$: **low** (no plural *[pʃʃʃ]*s*)

(17) a. *vroom*
b. Primary function: *The engine went vroom*$_1$.
c. Secondary function: *The engine started with a loud vroom*$_2$.
d. Semantic proximity of *vroom*$_2$ to *vroom*$_1$: **high**
e. Phonological conformity of *vroom*: **low** (initial *vr*)
f. Morphological integration of *vroom*$_2$: **high** (plural *vrooms*)

(18) a. *caw*
b. Primary function: *The crow went caw*$_1$.
c. Secondary function: *The crow flew off with a loud caw*$_2$.
d. Semantic proximity of *caw*$_2$ to *caw*$_1$: **high**
e. Phonological conformity of *caw*: **high** (cf. *caught, law*)
f. Morphological integration of *caw*$_2$: **high** (plural *caws*)

(19) a. *boom*
b. Primary function: *The bomb went boom*$_1$.
c. Secondary function: *The bomb exploded with a loud boom*$_2$.
The real estate business boom$_2'$ *ended.*
d. Semantic proximity of *boom*$_2$ to *boom*$_1$: **high**
Semantic proximity of *boom*$_2'$ to *boom*$_1$: **low**
e. Phonological conformity of *boom*: **high** (cf. *boot*, *room*)
f. Morphological integration of *boom*$_2$/*boom*$_2'$: **high** (plural *booms*)

While primary onomatopoeias exhibit only a low degree of integration into the grammar of English (often occurring as extrasyntactic utterances and generally lacking inflectional or derivational morphology), it would be misleading to describe English onomatopoeias over all as uniformly extra-systemic. Secondary onomatopoeias clearly function as members of grammatical part-of-speech classes, with respect to both their syntax (*the cannons began to boom*) and, to varying extents, their morphology (*the cannons boomed*), and even primary onomatopoeias sometimes appear in distinctive syntactic combinations (as in *the cannons went boom*).

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Appendix: Representative English onomatopoeias

	onomatopoeia	**meaning of primary onomatopoeia**
1	*splash*	'sound made by something striking or falling into liquid'
2	*pitter-patter*	'sound of rain, a repetitive pattering sound'
3	*whoosh*	'sound of a swift movement or flow of air or water'
4	*swish*	'sound of an object moving through air or water'
5	*creak*	'a harsh scraping or squeaking sound, e.g. that of a rusty gate'
6	*rustle*	'a succession of light crisp sounds'
7	*pop*	'sound of a short, sharp collision or explosion; sound of a fire crackling'
8	*crackle*	'a succession of slight sharp snapping noises'
9	*arf*	'sound of a dog barking'
10	*meow*	'cat vocalization'
11	*cock-a-doodle-doo*	'call of a rooster, usually in the morning'
12	*coo*	'distinctive vocalization of doves and pigeons'
13	*ribbit*	'frog vocalization'
14	*hiss*	'sibilant sound produced by a snake or a leaky air hose'
15	*buzz*	'sound of a flying insect'
16	/bzzz/	'sound of a flying insect'
17	*caw*	'call of a crow or raven'
18	*buck buck*	'sound of a chicken clucking'
19	*ha ha*	'sound of laughter'
20	/wæ̃:/	'sound of a baby crying'
21	*clap clap*	'sound of hands clapping'
22	*slurp*	'a sucking noise while eating or drinking'
23	*twang*	'sound of a guitar'
24	*toot*	'sound of a horn'
25	*vroom*	'sound of a car's roaring engine'
26	*choo-choo*	'sound of a train (steam engine)'
27	*dring*	'sound of a telephone ringing'
28	*cha-ching*, *ka-ching*	'sound of a cash register'
29	*boom*	'deep, hollow sound of a collision or explosion or of thunder'
30	/pçxx^{w}/	'sound of a gun firing'
31	*ding*	'high-pitched sound of metal or glass being struck with more subsequent resonance than *clink*'
32	*tick tock*	'sound of a clock'