Linguistic and Symbolic Properties of Sound Emission Verbs:
A Case Study of Birds and its Theoretical Implications

Yoshiharu KUMAGAI

1. Introduction

This study aims to explicate some linguistic and sound-symbolic properties of English verbs that serve to describe the sounds made by birds. These verbs are analyzed in terms of their syllable structures, phonemic characteristics, etymology, and morphology, to explicate the degrees of sound-symbolic and conventional patterns within sound emission verbs in English. The structure of the article is as follows. In section 2, some crucial concepts and consequences of the studies of Kumagai (2015) and (2017) are briefly described. Some formal and etymological properties of the verbs of sounds made by birds are analyzed and summarized in section 3; then, the relevance of the acoustic and perceptual properties of nuclear vowels to the sound emitters' size and other physical characteristics will be explored and discussed. Finally, we will discuss the internal structure of the syllable and propose that the nuclear vowel, which reflects the sound-symbolic property of the emitter, may also motivate the choice of consonantal segments inside the syllable.

2. Previous Studies: Verbs of Laughing and Crying

2.1. Kumagai (2015) on the Verbs of Laughing by Humans

Although verbs of laughing and crying follow the conventional codifying patterns of English, as exemplified below, the purpose of this study is, nevertheless, to detect the degree of symbolic characteristics inside the

conventional patterns of the sound emission verbs, in order to explain why there are a number of distinct verbs of laughing and crying that are similar in meaning in each category.

Kumagai (2015) investigated some phonological properties of verbs of human laughter (*cackle*, *chortle*, *chuckle*, *giggle*, *guffaw*, *snicker*, *snigger*, *tee-hee*, and *titter*). It was clear that the verbs in question are all disyllabic and that in seven out of nine examples (*cackle*, *chortle*, *chuckle*, *giggle*, *snicker*, *snigger*, and *titter*), the verbs contain a frequentative suffix (either *-le* or *-er*) which codifies the repetition of activities denoted by the verb. All nine verbs are inherently imitative, mimicking the sound of laughter in some way (including the case of *chortle*, which is a combination of *chuckle* and *snort*). The syllable structure of the seven verbs (*cackle*, *chortle*, *chuckle*, *giggle*, *snicker*, *snigger*, and *titter*) is similar in that the first syllable consists of the onset with one or two consonants, which is followed by the rhyme made up of a nuclear vowel and one or two consonants. Thus, the initial syllables of these seven verbs follow a typical pattern of English.

The nuclear vowels of the nine verbs of laughter are associated symbolically with the types of laughter and the size, age, and gender of the sound emitters. More specifically, the verbs with a front nuclear vowel such as /iː/, /ɪ/ and /æ/ (high in pitch and perceptually bright) are likely to be associated with sound emitters such as children and women, because their vocal tracts are considered to be smaller and shorter than those of adult males, and their voices are higher in pitch than adult males. Furthermore, the difference between the open-front vowel (/æ/) and the close-front vowels (/iː/ and /ɪ/) seems to reflect the age difference of female sound emitters. While *cackle* is likely to be associated with the laughter of elderly women, who typically have lower pitched voices compared to girls and younger women, verbs such as *giggle*, *snicker*, *snigger*, *tee-hee*, and *titter* all involve close-front vowels, which tend to indicate the laughter of younger women or children. Given that close vowels involve the use of a smaller vocal tract in the oral cavity than in the case of open vowels, the former are associated more readily with a higher tone of voice, which can easily make us think of sound emitters with smaller vocal tracts.

On the other hand, in the verbs that contain back vowels as a nucleus (*chortle*, *chuckle*, and *guffaw*), the correspondence between the acoustic properties of nuclear vowels and the physical traits of the sound emitters also seems to hold in a consistent manner. Since back vowels are perceptually less bright and acoustically lower in pitch than close-front and open-front vowels, it was made clear in Kumagai (2015) that those verbs with back nuclear vowels tend to be used to describe laughter by low-pitched, masculine sound emitters.

The inherent perceptual property in each nuclear vowel is argued to be related acoustically to the values of the formants from F2 and up (von Bismarck, 1974). Carlson, et al. (1975) propose the order of brightness of vowels based on the value of the second formant. Furthermore, Cutler, et al. (1990, Figure 3, p. 479) utilize this scale to argue for the relationship between male-female difference and the brightness of nuclear vowels in English first names (such as *Elizabeth* and *John*). According to this idea, nuclear vowels in verbs of laughter are ordered as in (1):

(1) Properties of Nuclear Vowels in Verbs of Laughing

Close, Front (/iː/, /ɪ/) - - - Open, Front (/æ/) - - - Open-Mid, Back (/ɑ/, /ɔ/, /ʌ/)

Bright ◄——————————————————► Less Bright (Perception)

Higher Frequency of F2 ◄——————► Lower Frequency of F2 (Acoustic Property)

Smaller (Children, Women) ◄——————► Larger (Adult Males) (Size, Age, Gender)

I argued in Kumagai (2015) that the scale illustrated in (1) reflects the different types of laughter by different types of sound emitters. Namely, front vowels are likely to signify the manner of laughter produced by females and other emitters with small vocal tracts. On the other hand, mid and back vowels tend to correspond to more masculine laughter.

2.2. Kumagai (2017) on Verbs of Crying by Humans

In Kumagai (2017), the insights of Kumagai (2015) are extended to verbs of crying, in order to test the validity of the latter study against a larger amount of empirical data. First, the etymological and formal properties of

verbs of crying are examined, following the method developed in Kumagai (2015).

According to the *Longman Dictionary of Contemporary English for Advanced Learners*, crying typically involves the act of producing tears from one's eyes in addition to emitting sounds, usually because the person is unhappy or hurt. Examples of what might be classified as verbs of crying have been collected from several online dictionaries. Seventeen verbs were identified altogether. However, some of the verbs do not necessarily imply the act of shedding tears, while there are verbs that do not imply crying caused by distress or sadness. For example, the native speaker informant I consulted did not find a strong association with shedding tears in verbs such as *whimper*, *whine*, *whinge*, and *yowl*. Other verbs may describe the situation in which speakers pretend to cry or sob, or communicate discontent in order to evoke a response from others or to bring about a change to the situation in which they find themselves (e.g., *boohoo*, *snivel*, *whimper*, *whine*, *whinge*). In addition, there are some other verbs in the list, which are not used by the informant (e.g., *greet*, *keen*). As a result, the following nine verbs were identified as verbs that indicate audible, specific types of crying involving shedding tears caused by distress and sadness:

(2) Verbs of Crying
bawl, *blubber*, *lament*, *mewl*, *pule*, *sob*, *wail*, *wawl (waul)*, *weep*

Phonologically, the verbs of crying listed above are mostly monosyllabic. The disyllabic verb *blubber* involves a frequentative suffix *-er*, which codifies repetition of the activity denoted by the verb. This verb (where word-internal /b/ is ambisyllabic) and all monosyllabic words have a basic and typical English syllable structure: [[$_{\text{Onset}}$ C(C)] [$_{\text{Rhyme}}$ [$_{\text{Nucleus}}$ V(V)] [$_{\text{Coda}}$ C(C)]]]. It contains in its onset one or two consonants and the rhyme, which is made up of a nuclear vowel (either monophthong, diphthong, or long vowel) and one or two consonants following it (Lass, 1984; Taylor, 1995).

When it comes to etymology, verbs of crying do not seem to be as simple as verbs of laughter. Whereas verbs of laughter investigated in Kumagai

(2015) are all imitative in terms of etymology, the verbs of crying treated in this article contain a few examples (i.e., *sob*, *weep*) that resist such a simple characterization.

Overall, the findings in Kumagai (2017) indicate that it is difficult to relate the brightness of nuclear vowels in verbs of crying to the size, age, and gender of the emitters, in contrast to the research on verbs of laughter by Kumagai (2015). The results imply that the traits of sound-symbolism are not as easily or straightforwardly detectable in sound emission verbs as they might appear to be.

2.3. Hypothesis

I suggested (Kumagai, 2017: 31) that sound-symbolism is harder to detect in verbs of crying than in verbs of laughter because the former involve more intricate and diverse emotional motivations (e.g., sadness, anger, ache, complaint, etc.) and physical activities including shedding tears, emitting sounds, and some others. By crying, people may be trying to bring about change or be drawing the attention of interlocutors. Since animal sound emissions are external stimuli to human ears, and since we tend to think that human emotions are much more complex, verbs of animal sound emission may exhibit a rather simple distribution or behavior, as do verbs of human laughter. The following analysis will be based on this assumption. It is hypothesized that if there are many distinct verbs to indicate sound emission within a single animal sub-category (e.g., birds, as will be made clear in section 3), individual verbs exist for distinguishing different kinds of sounds. The kinds of verbs in question will be argued to correspond to the sound emitters' size and the frequency of the sound emitted. In other words, if there are many types of sound emission verbs, they may express different types of sounds by animals in each relevant category.

3. Verbs of Sounds Made by Animals

3.1. Distribution of Verbs across Different Types of Animals

Levin (1993: 212) identifies the following 67 verbs that serve to describe the sounds made by animals: *baa*, *bark*, *bay*, *bellow*, *blat*, *bleat*, *bray*, *buzz*, *cackle*, *call*, *caw*, *chatter*, *cheep*, *chirp*, *chirrup*, *chitter*, *cluck*, *coo*, *croak*, *crow*, *cuckoo*, *drone*, *gobble*, *growl*, *grunt*, *hee-haw*, *hiss*, *honk*, *hoot*, *howl*, *low*, *meow*, *mew*, *moo*, *neigh*, *oink*, *peep*, *pipe*, *purr*, *quack*, *roar*, *scrawk*, *scream*, *screech*, *sing*, *snap*, *snarl*, *snort*, *snuffle*, *squawk*, *squeak*, *squeal*, *stridulate*, *trill*, *tweet*, *twitter*, *wail*, *warble*, *whimper*, *whinny*, *whistle*, *woof*, *yap*, *yell*, *yelp*, *yip*, *yowl*. Although this article bases its analysis on the list of verbs provided by Levin, some verbs were excluded from the analysis.

First, the verbs *scream*, *wail*, and *yell* were excluded, because *scream* is assumed to describe mainly the shrill cry of a human. In addition, *wail* and *yell* seem more likely to indicate sounds made by humans rather than animals, contrary to Levin's classification. Furthermore, the verb *scrawk* was not found in any dictionary consulted, including the *Oxford English Dictionary (OED)*. Since there is no specific definition available, it was excluded from the analysis[1]. The verb *pipe* was also excluded. According to the *OED*, it means, "to utter a shrill and weak sound" like *cheep* or *peep*, and is used to refer to the sounds made by chickens and small birds. However, this use is considered obsolete, having been replaced by the verb *peep*. A native speaker informant also reported that she does not have an awareness of this word being used in reference to birds. On the other hand, the same native speaker informant added two sound emission verbs characteristic of animals that were not listed in Levin (1993): *caterwaul*, and *hoot*. Thus, 64 verbs were selected at this stage.

Table 1 shows the distribution of the sound emission verbs elicited for our analysis and comparison. We focus our attention only on the cases where a group of verbs are available which describe the sound emission by the same type of animal. The likely emitters for each verb were determined mainly by the definitions of the *Longman Dictionary of Contemporary English for*

Advanced Learners (*LD*). If there is no entry in the *LD*, information from other sources such as the *OED* and informant's suggestions were utilized. The groups of verbs are classified by the type of animal. Note that some of them (e.g., *chatter*, *croak*, *hiss*, *yowl*, etc.) cover more than one type of animal. Finally, 63 verbs have been identified for our analysis and comparison:

Table1: Types of Animal and the Number of Verbs

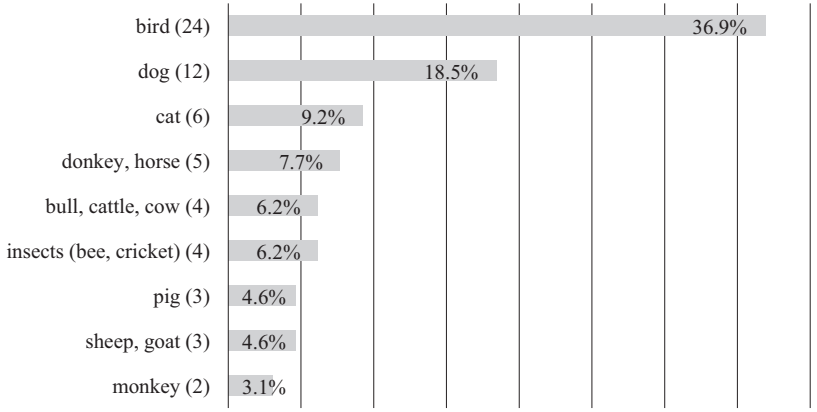

Table 2 shows some concrete examples of individual verbs that are used to describe the sounds made by animals:

Table 2: Types of Animals and Examples of Sound Emission Verbs (63)

Types of Animal	Number of Verbs	Examples of Verbs
bird	24	tweet, twitter, caw, quack, gobble, cluck, coo, hoot, etc.
dog	12	bark, bay, growl, howl, snarl, woof, yap, etc.
cat	6	hiss, meow, mew, purr, yowl, caterwaul
donkey, horse	5	bray, hee-haw, neigh, snort, whinny
insects (bee, cricket)	4	buzz, chirp, drone, stridulate
bull, cattle, cow	4	bellow, blat, low, moo
sheep, goat	3	baa, blat, bleat
pig	3	grunt, oink, squeal
monkey	2	chatter, screech

It is evident from Tables 1 and 2 that the category bird has the largest number of sound emission verbs. Following the hypothesis presented in 2.3, we will focus our attention on the verbs of sounds made by birds to see from various perspectives how different verbs can refer to the birds' sound emission.

3.2. Phonological and Etymological Properties of the Verbs of Sounds Made by Birds

Table 3 summarizes some etymological, phonemic, and syllabic properties of the verbs in question. Etymological information is based on the description found in either the *LD*, the *OED*, or *the Kenkysha Dictionary of English Etymology*. The word "yes" indicates that a positive description is found in any of the above-mentioned sources regarding the imitative origin of the word in question:

Table 3: Phonological and Etymological Properties of the Sound Emission Verbs of Birds (24)

Verb	Imitative Origin?	No. of Syllables	Linear Order of Phonemes
cackle	yes	2	/CVC/ + /kᵊl/[2]
caw	yes	1	/CVV/
chatter	yes	2	/CVC/ + /təʳ/
cheep	yes	1	/CVVC/
chirp	yes	1	/CVVCC/
chirrup	yes	2	/CVVC/ + /əp/
chitter	yes	2	/CVC/ + /təʳ/
cluck	yes	1	/CCVC/
coo	yes	1	/CVV/
croak	yes	1	/CCVVC/
crow	yes	1	/CCVV/
cuckoo	yes	2	/CVC/ + /ku:/
gobble	yes	2	/CVC/ + /bᵊl/
honk	yes	1	/CVCC/
hoot	yes	1	/CVVC/
peep	yes	1	/CVVC/

quack	yes	1	/CCVC/
sing	no	1	/CVC/
squawk	yes	1	/CCCVVC/
trill	yes	1	/CCVC/
tweet	yes	1	/CCVVC/
twitter	yes	2	/CCVC/ + /tə^{r}/
warble	no	2	/CVV/ + /b^{ə}l/
whistle	yes	2	/CCVC/ + /s^{ə}l/

Many of the verbs listed above are monosyllabic (15/24). Many of the disyllabic verbs listed above such as *chatter*, *chitter*, *twitter*, *cackle*, and *whistle* involve a frequentative suffix *-er* or *-le*, which indicates the repetition of activities denoted by each verb[3]. Thus, the initial syllable of these verbs and most of the monosyllabic words other than *caw*, *coo*, and *cuckoo* have the following syllable structure: [[$_{\text{Onset}}$ C(C)(C)] [$_{\text{Rhyme}}$ [$_{\text{Nucleus}}$ V(V)] [$_{\text{Coda}}$ C(C)]]]. Namely, it contains in its onset one to three consonants, and the rhyme, which is made up of a nuclear vowel (either monophthong, diphthong, or long vowel) and one or two consonants following it.

Therefore, the verbs of sounds made by birds are consistent with the conventional codifying patterns of English. However, since the purpose of this study is to detect symbolic characteristics behind the conventional patterns of these verbs, we will discuss why there are as many distinct verbs as there are.

3.3. Nuclear Vowels of Sound Emission Verbs: Evidence for Sound Symbolism

The verbs illustrated in Table 3 will be re-classified to investigate the relevance of vowels to the sound-symbolic nature of these verbs, based on the acoustic and perceptual properties of the nuclear vowel and likely sound emitters. These pieces of information are based on the definition in the *LD*, reports by the American-English informant, and if necessary, the definition in the *OED*. For diphthongs, only the first element is considered.

3.3.1. Verbs with Front Nuclear Vowels

Table 4 summarizes the sound emission verbs with front vowels as their nuclei. *AC* stands for the comments by the American informant. The likely sound emitters and their acoustic and perceptual properties are also provided in the table:

Table 4: Verbs of Sounds Made by Birds with Front Nuclear Vowels (12)

Verb	Nuclear Vowel	Likely Sound Emitters	Acoustic, Perceptual, and Physical Properties of Sound Emitters
cheep	Close, Front /i:/	young bird (LD) baby chicken (chick), sparrow (AC)	weak high noise (LD) small and often associated with baby bird (AC)
peep	/i:/	young bird (LD) baby chicken (chick) or other small birds (AC)	short high sound (LD) young and very small (AC)
tweet	/i:/	small bird (LD) sparrows or other small birds (AC)	short high sound (LD) small bird, quite similar to *chirp*, can be associated with a baby bird begging for food (AC)
chirrup	/ɪ/	bird (LD) sparrow or other small birds (AC)	evidently formed from *chirp*, by trilling the *r*, and developing an additional syllable, to indicate a corresponding variation of sound (OED) can be associated with small birds, and to a lesser extent with medium-sized birds, very similar to *chirp* (AC)
chitter	/ɪ/	bird (OED) small and medium-sized birds (AC)	a parallel form to *chatter*, expressing a more attenuated action of the same kind, a short series of sharp thin sounds (OED) very similar to *chatter* - except that *chatter* to me sounds as though it might be a bit lower in tone, where *chitter* is a bit higher (AC)
sing	/ɪ/	bird (LD) thrush, wren, robin, finch (AC)	high musical sounds (LD) can be associated with somewhat smaller birds (AC)

trill	/ɪ/	bird (LD) warbler, sparrow, thrush (AC)	short repeated high sound (LD) can be associated with smaller birds, fairly high pitched and wavering (AC)
twitter	/ɪ/	bird (LD) sparrows and other small birds (AC)	a lot of short high sounds (LD) can be associated with small birds, similar to tweeting - perhaps a mix of a trill and a tweet (AC)
whistle	/ɪ/	bird (LD) warbler (AC)	high musical sound (LD) small to medium-sized birds (AC)
cackle	Open, Front /æ/	chicken (LD) a hen, or less often a goose (AC)	a loud high sound (LD) cackling is done by medium-sized birds as it is a fairly robust sound (AC)
chatter	/æ/	bird, monkey (LD) sparrows and other small birds (AC)	short high sounds (LD) more connected with small birds (AC)
quack	/æ/	duck (LD) duck (AC)	the sound that ducks make (LD) associated with ducks, so medium-sized birds (AC)

The front vowels are likely to be perceived as bright sounds, which may correspond to small birds. In fact, all the imitative verbs with the close, front nuclear vowels (/i:/ and /ɪ/) are relevant to the sound emission made by young and/or small birds, which are, due to the size of their vocal tracts, highly likely to emit high sounds. Even the non-imitative verb *sing* that follows these verbs in the table seems to correspond to small birds, according to the description in the *LD* and the report by AC, although this may be merely an accident. As the front vowel becomes open, as in *cackle* and *quack*, sound emitters may gradually change to medium-sized birds. Still, the sounds made by the birds seem to be high in frequency. These tendencies are parallel to the relationship between the front nuclear vowels and the relative size of the vocal tracts of the sound emitters in the verbs of human laughter (Kumagai, 2015: 32–35).

3.3.2. Verbs with Central and Back Nuclear Vowels

Let us turn our attention to less bright vowels with a lower F2 frequency.

Table 5 illustrates the relevant verbs in descending order of F2 frequencies:

Table 5: Verbs of Sounds Made by Birds with Central and Back Nuclear Vowels (12)

Verb	Nuclear Vowel	Likely Sound Emitters	Acoustic, Perceptual, and Physical Properties of Sound Emitters
caw	Open, Back /ɑ:/	crow (LD) a crow, rook or raven (AC)	the loud sound made by some types of bird, especially crows (LD) fairly large, aggressive and territorial (AC)
gobble	/ɑ:/	turkey (LD) turkey (AC)	a sound like a turkey (LD) associated with large birds (turkeys) (AC)
honk	/ɑ:/	goose (LD) goose (AC)	a loud noise by a goose (LD) associated with geese, so fairly large-sized birds (AC)
squawk	/ɑ:/	bird (LD) goose, duck, owl (AC)	a loud sharp angry sound (LD) associated with medium-sized birds, but small and large birds also squawk when they are threatened or surprised (AC)
chirp	Open-Mid, Central /ɜ˞/	bird, insect (LD) sparrow or other small birds, as well as crickets (AC)	short high sounds (LD) associated with the sounds made by small birds, and perhaps a bit with medium-size birds as well (AC)
warble	Open-Mid, Back /ɔ:/	bird (LD) warbler (AC)	to sing with a high continuous but quickly changing sound (LD) associated with small birds, continuous singing with frequent variation in notes (AC)
cluck	Open-Mid, Back /ʌ/	chicken (LD) chicken (hen) (AC)	a short low sound (LD) associated only with hens (AC)
croak	Close-Mid, Back /oʊ/	frog, crow (LD) frogs, but sometimes used in reference to crows (AC)	a deep low sound (LD) if used in reference to a large bird such as a crow, to croak may well be very similar to squawk - but perhaps slightly lower pitched, can be associated with surprise or aggression (AC)

crow	/oʊ/	cock (LD) rooster (AC)	a loud high sound (LD) associated with roosters only, so medium-size birds (AC)
coo	Close, Back /u:/	dove (LD) pigeon or dove (AC)	a low soft cry (LD) associated with medium-sized birds such as pigeons or doves, somewhat pleasant and unassertive sound (AC)
cuckoo	/u:/	cuckoo (LD) cuckoo (AC)	a sound that sounds like its name (LD) associated with the medium-sized cuckoo bird (AC)
hoot	/u:/	owl (LD) owl, loon, hoot (AC)	a long ‘oo’ sound (LD) owls, loons and perhaps some types of doves make a hooting sound (AC)

It seems clear that the sound emitters of the vowels in Table 5 are mostly medium-sized or large birds, and the acoustic/perceptual properties are highly likely to correspond to low and loud sounds, in contrast to the sound emitters in the verbs with front nuclear vowels, as illustrated in Table 4. Another interesting point is that the vowels in Table 5 involve more long vowels or diphthongs as their nuclei. Although the front vowels in Table 4 have only 3 long vowels out of 12 cases, the mid and back vowels in Table 5 contain as many as 8 long vowels and 2 diphthongs out of 12. This reminds us of Marchand’s (1960: 316, 7.16) remark, who suggests, “the volume and length of a sound are expressed by a lengthened vowel or diphthong.” This characterization seems to be true for the sound emission verbs in Table 5, which contains many examples of birds that emit louder and/or longer sounds than the birds illustrated in Table 4.

The tendencies in Table 5 can be summarized as follows. The verbs with a brighter nucleus (i.e., /ɑ:/) within Table 5 are likely to characterize loud and aggressive sounds made by medium-sized or rather large birds. As the nucleus becomes less bright (i.e., from open to close, back vowels), as in /u:/, the verbs tend to refer to low, non-assertive, and long sounds made by medium to large-sized birds. These tendencies seem to be parallel to the

relationship between the back nuclear vowels and the relative size of the vocal tracts of the sound emitters in verbs of human laughter, although close, back vowels (/ʊ/ and /u:/), do not appear as the nucleus of verbs of human laughter (Kumagai, 2015: 32–35).

One clear exception is *chirp*. Although its nuclear vowel is less bright than /ɑ:/ (Cutler, et al., 1990: 479, Figure 3), this verb is in fact related to *chirrup* in terms of etymology and meaning, as defined in the *LD* and the *OED*. Thus, the phonological property of the nuclear vowel conflicts with its semantic property. In addition, the verb *warble* does not symbolize medium-sized or large birds, although this verb involves /ɑ:/ as its nucleus. According to the *LD*, it is used to "sing with a high continuous but quickly changing sound." This fact might be due to its non-imitative origin, as was illustrated in Table 3.

3.4. Consonants inside the Stressed Syllable: Attraction by Nucleus

The consonants used in the sound emission verbs of birds may reveal some intriguing properties. We will investigate the types of consonants inside the sound emission verbs in Tables 4 and 5 in terms of their articulatory properties and their relation to the nucleus.

All the initial consonants of the verbs in Table 4 are voiceless. Likewise, the initial consonants in the verbs in Table 5 are overwhelmingly (10 cases out of 12) voiceless, except *warble* and *gobble*. Another important tendency is that the places of articulation of these initial consonants tend to be either labial or coronal if the nuclear vowel is a front, close one. This indicates that these consonants are, like the nucleus, articulated in a relatively front space. For the front vowels such as /ɪ/ and /i:/, the preceding consonants are highly likely to be articulated in either the bi-labial (/p/), alveolar (/t/, and /s/) or palate-alveolar (/tʃ/) position. The only exception is /h/ (i.e., *whistle*), which involves a glottal fricative. What follows is a semi-vowel /w/, which involves a double articulation (i.e., bi-labial and palatal). As the nucleus changes to an open and less bright vowel (i.e., /æ/) the preceding consonant includes a dorsal consonant /k/, as in *cackle*, and *quack*, in which the tongue position moves backward, if we compare these words with *peep*, *twitter*, and *chitter*.

Let us discuss the verbs in Table 5, which allegedly describe the sounds of larger and sometimes more aggressive birds. Out of 12 cases, 7 verbs involve dorsal initial consonants /k/ or /g/ (*caw*, *gobble*, *cluck*, *croak*, *crow*, *coo*, and *cuckoo*) and 2 verbs have the glottal fricative /h/ in their initial positions (*honk* and *hoot*), although *cluck*, *croak*, and *crow* use either alveolar or lateral approximants immediately before the nucleus. In the case of the non-imitative word *warble*, the initial segment is occupied by /w/, which involves both bi-labial and palatal articulations. Recall that the nuclear vowels in Table 5 are all mid to back, less bright vowels. Thus, with the exception of *squawk*[4] and *chirp*, the initial consonants tend to be articulated in a rather backward space, as if they are attracted by the following nucleus.

Next, let us focus our attention on the final segment of the stressed syllable. For the verbs in Table 4, with front nuclear vowels, the rhyme always involves a consonant in the coda (e.g., *cheep*, *tweet*, *chit-ter*, *whis-tle*, *chir-rup*, *trill*, etc.), while the verbs in Table 5 contain 3 verbs that do not involve any syllable-final consonant (*caw*, *crow*, and *coo*).

The final consonants in the initial stressed syllable in the verbs of Table 4 tend to involve voiceless segments, where 2 cases involve a bi-labial (*cheep*, and *peep*) and 5 an alveolar (*tweet*, *chit-ter*, *twit-ter*, *whis-tle*, and *chat-ter*) segment, indicating that the consonants are articulated in the front space, as in the syllable-initial consonants. For the voiced final segments (*chir-rup*, *trill*, and *sing*), two of them involve alveolar segments. Note, however, that the verb *sing* is a non-imitative word. When the nucleus changes into the open and less bright vowel, the final segments include the dorsal segments, as in *cack-le* and *quack*.

On the other hand, the verbs in Table 5 contain 9 instances (out of 12) that involve syllable-final consonants. Out of these 9, there are 7 instances of voiceless final segments (*honk*, *squawk*, *chirp*, *cluck*, *croak*, *cuck-oo* and *hoot*) and 2 instances of voiced consonants (*gob-ble* and *war-ble*). The voiceless syllable-final consonants tend to involve dorsal segments (*honk*, *squawk*, *cluck*, *croak*, and *cuck-oo*). 4 instances seem to resist the above-mentioned tendency: *gob-ble*, *chirp*, *hoot*, and *war-ble*). However, the verb *chirp* should be classified as belonging to the verbs of emission of smaller

birds in terms not only of its etymology and its strong relation with *chirrup* but also of the distribution of initial and final consonants. Recall that the verb *warble* is a non-imitative word. If we exclude these two instances, only 2 instances (*gobble* and *hoot*) out of 7 remain unexplained.

Finally, let us compare the initial and final consonants. Both segments may be identical (e.g., *peep*, *tweet*, *twit-ter*, *cack-le*, and *quack* for the verbs in Table 4; *cluck*, *croak*, and *cuck-oo* for those in Table 5), or similar in terms of the place of articulation (e.g., *chir-rup*, *chit-ter*, *trill*, and *chat-ter* for the verbs in Table 4; *honk* and *squawk* for those in Table 5 (see note 4 for the treatment of *squawk*)).

Thus, the segments in the syllable-initial and syllable-final positions of the sound emission verbs may not be distributed in a completely arbitrary manner. Although these consonantal segments themselves may not be characterized as sound-symbolic, the nuclear vowel, which we could say does reflect the sound emitter's physical characteristics, seems to influence or motivate the choice of its preceding and following segments.

4. Discussion and Concluding Remarks

Like the verbs of human laughter but unlike the verbs of human crying, the verbs of sounds made by birds can be characterized systematically in terms of the brightness of the nuclear vowels. Let us try to generalize the way in which the segments are constituted in these verbs. The segments of the stressed syllable can roughly be represented as (3), with irrelevant details omitted. The symbols C_1 and C_2 stand for the initial and final consonant in the syllable, respectively. *V* stands for the nuclear vowel:

(3) Syllable Structure of Birds' Sound Emission Verbs
$[_{\text{Syllable}}\ [_{\text{Onset}}\ C_1]\ [_{\text{Rhyme}}\ [_{\text{Nucleus}}\ V]\ [_{\text{Coda}}\ C_2]]]$
where
(i) V tends to be front if the verb refers to smaller birds, and central to back if it refers to large ones
(ii) C_1 and C_2 tend to be voiceless

(iii) The place of articulation of C_1 and C_2 may be close to the tongue position of V
(iv) C_1 and C_2 may be identical, or similar in terms of the place of articulation

The property (i) is clearly sound-symbolic. The intrinsic acoustic nature (F2) and its perceptual effect (brightness) of the nuclear vowel reflect arguably the size and other related physical properties of the sound emitters. Furthermore, this study proposes that some consistent characteristics can be detected in the phonotactics of the stressed syllables, as generalized in (ii) to (iv). The selection of the vowel is considered here to be crucial in determining the size and other physical properties of birds. We can say that the sound-symbolic traits of the vowel may influence or attract the choice of the preceding and following consonants.

The tendency of the consonant to be voiceless may not be directly relevant to the physical properties of the birds, because selection of voiceless segments is extended to the majority of verbs. Rather, the choice of voiceless segments seems more phonological; it may serve to highlight the sonority of the nucleus. Considering the tendency exemplified in (iv), we may infer that the choice of consonants may not be arbitrary; it may reflect a motivation to codify the sound emission of (at least) animals in a consistent and classifiable manner. In the sound emission verbs of birds, both the sound-symbolic properties (i.e., the exploitation of a vowel's intrinsic character and its percolation to the neighboring segments) and the phonological properties (i.e., conformation to the English syllable structure and highlighting the sonority of the nucleus) seem to be competing against each other, where the former properties are partly codified into the latter.

Notes

1 I thank Andrea Carlson for providing the following example involving *scrawk*. However, the word was excluded from the present analysis since information on this word is far from satisfactory:

(i) Hundreds of little birds were blown into windows and adobe walls and killed, and, trailed by the everpresent scrawking magpies pecking at its mangy tail, the ugly yellow, snake-eating cat that both Seferino Pacheco and Joe Mondragon had begun calling Cleofes after the legendary Cleofes Apodaca, had a field day trotting from house to house, feasting on all the little dead birds with broken necks. (https://findwords.info/term/scrawk)

2 In *cackle*, *chatter*, *chitter*, *cuckoo*, *gobble*, *twitter* and *whistle*, ambisyllabicity (i.e., the final consonant in the first syllable is acting also as the initial consonant in the second syllable) is indicated by duplicating the relevant consonant at the beginning of the second syllable.

3 According to the *OED*, the verb *gobble*, whose meaning is "to swallow hurriedly in large mouthfuls, especially in a noisy fashion" is assumed to be made up of a morpheme *gob-* and the frequentative suffix *-le*. The word in question in this article (i.e., the sound made by a turkey) is homophonous with this and may in some way be connected in meaning. In addition, the verb *warble* is considered as a non-imitative word, and there is no evidence in the dictionaries consulted to show that it uses the frequentative suffix *-le*. However, Marchand (1960: 315, 7.12) mentions that the word-final segment /l/ in *warble* symbolizes the concept of "prolongation" or "continuation." This implies that even in non-imitative words some traits of sound symbolism may be embedded within them.

4 See Giegerich (1992: 147ff.) who holds the view that we should take the second segment /k/ as the initial element of the "core" syllable and regard the external segment /s/ as *appendix*. His argument is motivated by the fact that the segment /s/ is higher in sonority than the following one, which contradicts the definition of syllable as a peak in sonority. If we take this position, the second segment /k/ is regarded as the syllable-initial segment. This implies that even in *squawk* the choice of the "core" syllabic initial dorsal segment /k/ may be attracted by the nucleus in terms of the place of articulation.

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愛知県立大学外国語学部紀要第50号（言語・文学編）

英語における音放出動詞の音韻的及び象徴的特性
鳥の鳴き声を表す動詞の事例研究と理論的意味合い

熊　谷　吉　治

Kumagai (2015) では、「笑い」を表す動詞の核母音が持つ周波数の高さや「明るさ」という聴覚的特徴が、当該動詞と共起する主語の物理的特性と関連があること、つまり、明るい核母音を持つ動詞は体格が小さく、年齢が若く、男性よりも女性を指し示す傾向があることを示した。一方、Kumagai (2017) では「泣き」を表す動詞を調査したが、笑いを表す動詞のような一貫性のある傾向は見いだせなかった。泣く行為には、笑う行為よりも複雑な心理的要因や身体的行動、さらにはコミュニケーション上の目的が絡んでいる可能性があると考えられるため、本研究では人間にとって外的な音声刺激を例にとって、音放出動詞の象徴性を分析した。

Levin (1993) に基づいて動物が発する音を表す動詞をリストアップした所、鳥の鳴き声を表す動詞が際立って多いことから、当該動詞に焦点を絞り、語源や音節構造、放出主体などを辞書や米語母語話者の判断に基づいて整理した。その結果、笑いを表す動詞と同じように、前母音（周波数が高く、明るい母音）では、小さいサイズの鳥の鳴き声を表す傾向が強く、前母音でも開口度が上がり周波数が低くなると、対応するサイズが大きくなる傾向にあった。一方、後母音（周波数が低く、明るさの度合いが低い母音）は、比較的大きなサイズの鳥の鳴き声を表す傾向が強かった。

本研究では、母音の性質のみならず、それを取り囲む子音にも一定の傾向があることが示唆された。前母音を核とする音節では、頭子音と尾子音の調音点が口腔内の前側になりやすいが、後母音を核とする場合、頭子音と尾子音の調音点は口腔内の後ろ側になりやすいこと、頭子音も尾子音も無声子音が使われやすく、母音の聞こえ度を高める働きがあると考えられること、頭子音と尾子音には同一、ないしは類似した音素が現れやすいことがわかった。

以上から、鳥の鳴き声を写し取った動詞では、音象徴的要因が核母音に反映され、さらに前後の子音に影響を与えている可能性が示唆される。個々の語は英語の音韻構造に忠実で適格な音素配列を示すが、音素選択は恣意的とは言い切れないと考えられる。