THE SYSTEMATIC STRETCHING AND CONTRACTING OF IDEOPHONIC PHONOLOGY IN PASTAZA QUICHUA[1]

JANIS B. NUCKOLLS
BRIGHAM YOUNG UNIVERSITY

JOSEPH A. STANLEY
UNIVERSITY OF GEORGIA

ELIZABETH NIELSEN
UNIVERSITY OF HAWAII

ROSEANNA HOPPER
SALT LAKE CITY, UTAH

This paper analyzes systematic differences between sounds used in ideophones and sounds used in the non-ideophonic or "prosaic" lexicon of the Pastaza Quichua language of Amazonian Ecuador. We compare a digitized corpus of vocabulary items with a list of ideophones identified from field observations. We find that if a sound, syllable structure, or stress pattern is distributionally restricted in Pastaza Quichua, it is likely to be normalized and expanded within ideophones. The overall system is also stretched among ideophones by the addition of new sounds to the obstruents. These expansions are complemented by an overall contraction among sonorant sounds within ideophones. Many of the sounds and structures that expand from the prosaic into the ideophonic system are found to be statistically significant in their differences between the ideophonic and prosaic systems. We conclude that ideophonic sounds and structures add greater complexity to obstruent sounds while diminishing the use of sonorants.

[KEYWORDS: ideophones, phonology, Pastaza Quichua, typology]

1. Introduction. Ideophones are a class of expressions found in many language families (Voeltz and Kilian-Hatz 2001:3–4), though for complex extra-linguistic reasons, they are underdeveloped as a category in Standard Average European languages (Nuckolls 2004). They have been succinctly defined by Dingemanse (2011:25) as "marked words that depict sensory perceptions." They are marked because of their cross-linguistic tendencies to deviate phonologically, phontactically, morphologically, and syntactically

[1] This paper has benefited enormously from the review process. We thank Mark Dingemanse, who "came clean" as a reviewer, for providing several important suggestions. We are also grateful for the anonymous comments provided by a second reviewer. An Associate Editor of *IJAL* had many helpful suggestions, including a reference which turned out to be extraordinarily useful for evaluating our results. Dirk Elzinga helped us through a number of conceptual stumbling blocks. David Eddington gave much needed advice on statistics. Evan Manning gave invaluable assistance with our tables and figures. Many thanks to our research consultants in Ecuador: Eloisa, Faviola, Antonia, Rosa Elena, Camilla, David, Orlando, Irma, and Marcello. Finally, we are grateful to our colleague Tod Swanson for providing the research setting of the Andes and Amazon Field School, which made it possible to begin this study. Any imperfections still present in this paper are strictly our own responsibility.

[*IJAL*, vol. 82, no. 1, January 2016, pp. 95–116]

0020–7071/2016/8201–0004$10.00

from the prosaic words of their languages.[2] They are depictive because they are uttered not for the purpose of referring but with the intention of simulating a sensory perception.

An example of an ideophone which illustrates these properties may be found in the Pastaza Quichua language, from which this paper's data are drawn: [b^{h}ux] depicts the sound and movement of a sudden bursting from underwater to the surface by a freshwater dolphin. Its initial sound [b^h] is only found in ideophones. *B^{h}ux* is phonotactically unusual as well because it ends in a closed syllable, even though this language prefers final syllables that are open. *B^{h}ux* is syntactically anomalous because it may substitute for a verb, though it receives no inflectional suffixes that a Quichua verb requires. *B^{h}ux* may be foregrounded by the lengthening of its final velar fricative, which depicts the spatial expanse of its movement.[3]

Although an ideophone may deviate from its language's canonical forms, it is also necessary to explain that ideophones' deviations are not so extreme as to place them outside of their language's system. For example, a common observation is that they may add a few unusual sounds, features, or phonation practices to a language (Alpher 1994:162, Beck 2008:15, Childs 1988:171–73; 1994:181–85, Dingemanse 2011:134, Kabak and Plank 2008:2, Kaufman 1994:64, and Matisoff 1994:126), but that most ideophones feature the regular sounds of their language (Newman 2001:251). A related point is that, to the extent that unusual sounds do occur, they fill gaps in existing phonemic inventories (Diffloth 1980, Dingemanse 2012, Mithun 1982, and Newman 2001). On the other hand, the observation that ideophones allow phonotactic combinations that are rare or nonexistent in the prosaic system (Alpher 1994:162–63, Bodomo 2006:205–6, Childs 1994:184, Dhorre and Tosco 1998:127, Dingemanse 2011:135, Hamano 1994:154, Langdon 1994:95, Matisoff 1994:121, Newman 2001: 252, and Van Gijn 2010:282–83) downplays their regularity and emphasizes their deviance.

In this paper, we argue that any deviance observed in Pastaza Quichua ideophones is so thoroughly systematic that metaphors of "stretching" and "contracting" are necessary to describe their relationship with the prosaic system.[4] We use "stretching" in two different senses, to mean (1) an expansion in the use of restricted sounds, syllable types, and stress patterns and (2) the addition of new sounds. Pastaza Quichua ideophones accomplish both of these

[2] We use the term "prosaic" following Diffloth (1980:50), who opposed it to "expressive" (i.e., ideophonic) phonology to describe the unique aspects of sound systems in Mon-Khmer.

[3] The use of special intonation and gestures to foreground ideophones are also important but are outside the scope of this paper. See Nuckolls (1996) for a discussion of performative intonational foregrounding. Dingemanse (2013) treats the use of gestures with ideophones.

[4] We are indebted to Newman (2001:251), which is the first usage of the term "stretching" that we are aware of.

types of stretching in four ways. First (sense 1), they expand the use of the most uncommon prosaic sounds of the language's system. Second (sense 1), ideophones expand the use of syllable structures and stress patterns that are dispreferred by this language. Third (sense 2), ideophones add "new-ish" sounds that result from the expanded usage of a secondary articulation or a release feature onto many more sounds. Fourth (sense 2), ideophones stretch the phonological inventory by filling in gaps within the prosaic inventory, adding a small number of new sounds that are allowed by the language's existing blueprint for manner and place of articulation. In addition to these different types of stretching, ideophones also "contract" the overall system by underusing an entire class of sounds.

Section **2** provides background information on the Pastaza Quichua language. We discuss this language's ideophones, clarifying our field methods for identifying and classifying them, as well as illustrating with examples their discourse properties that have been cited as cross-linguistically typical. Our methods for counting sounds and measuring their increased and decreased use are explained. Section **3** presents the prosaic phonemic consonants and vowels, syllable structures, and stress patterns, giving some attention also to the restricted palatalized sounds and the marked phonotactic patterns in the prosaic system.

Section **4** presents the ideophonically stretched and contracted system, illustrating the expanded range of sounds as well as the expanded use of restricted syllable structures and stress patterns. The dominant pattern observed is that ideophones expand the range of palatalized obstruents and make use of expressive aspiration as well. Phonotactic patterns that stretch by making greater use of restricted structures include monosyllabic CV and CVC ideophones, ideophones beginning with complex onsets, and ideophones ending with word-final stress. Ideophones also contract the overall consonantal system by significantly diminishing the use of sonorant sounds.

We conclude by summarizing our findings for Pastaza Quichua in implicational generalizations which could be sought in other ideophonically rich languages. We suggest likely sources for the increased use of palatalized obstruents. Finally, we evaluate the significance of our findings in light of typological studies of consonant systems.

2. Pastaza Quichua. Pastaza Quichua belongs to the Quechua IIB dialects that are spoken in the Eastern foothills of the Andean mountains and extend into the lowlands of Ecuador, as well as into Colombia and Northern Peru.[5] Possible hypotheses for its presence in the lowland Amazonian

[5] Ecuadorian Quichua (ISO code: que) is now officially written as *Kichwa* in materials produced by the Ecuadorian Ministry of Education. In that context, the term *Kichwa* generally refers to the standardized Kichwa Unificado, which is heavily influenced by Highland varieties. We

region of Ecuador (referred to as the Oriente) are discussed in Muysken (2000). Although speakers of Pastaza Quichua currently number in the tens of thousands, there is reason for concern about subtle cultural pressures operating especially on younger speakers, which are challenging this language's long-term prospects for survival. Our data are derived from field studies with mostly monolingual speakers originating from the Montalvo area and the adjacent community of Puka Yaku. Much of the fieldwork was conducted in these communities for Nuckolls's dissertation research. During the past fifteen years, however, due to the fact that many speakers have relocated to urban areas, our research settings have also shifted.

2.1. Pastaza Quichua ideophones. Ideophones in Pastaza Quichua are a somewhat open class of words that generally occur in an adverbial slot, immediately preceding or following a verb.[6] We consider them somewhat open because evidence from speakers' metalinguistic commentary reveals that they can be invented. One speaker explained the meaning of the ideophone *tis,* which depicted the stiffness of a body that had succumbed to rigor mortis, by recourse to the Spanish word *tieso* 'stiff, erect, straight'. Ideophones are, however, not idiosyncratic inventions coined by a single individual. They are conventionally understood by Quichua speakers so well that people are often able to supply a verb that has been omitted but understood by all as the appropriate verb to accompany a particular ideophone. See Nuckolls (2010:85) for an example. The fact that listeners understand other speakers' ideophones as linked with particular verbs attests to their conventionalization.

The matter of how to identify ideophones has been a contested issue over the years. We adopt the position that ideophones are a prototype category and cannot be defined with a list of necessary and sufficient characteristics (see Childs 1994:196 and Dingemanse 2011:2–3). Ideophones were identified from field recordings by their auditorily evident performative qualities. They stand out by their intonational contrasts from their surrounding utterances. They may be louder, softer, higher pitched, lower pitched, pronounced more slowly, or more quickly than the prosaic words that surround them.[7] Speakers also foreground ideophones by means of special phonational devices such as

retain the older spelling Quichua, both because of its long history of use and because materials written in lowland Amazonian dialects, of which this is one, have traditionally used this spelling.

[6] They may, however, replace a verb altogether, which is true of ideophones in other languages as well. See example (2) below.

[7] The interested reader may consult our Quichua ideophonic dictionary, a work in progress at <http://humdev.byu.edu/quichua/polang.html> for definitions and embedded audiovisual examples of ideophones in use. Video 2 for the ideophone *liŋ* illustrates the extreme rapidity with which ideophones may be pronounced. Videos 1 and 2 for *ɦʲaw* illustrate how ideophones may be foregrounded by higher pitch.

creakiness or breathiness, as well as by some standard performative devices that have been noted cross-linguistically, such as lengthening, reduplication, or repetition. Approximately 50 hours of recorded conversations, narratives, and songs were transcribed.[8] Ideophones were tagged in these transcriptions, and each occurrence of an ideophone token was cataloged by speaker, date, place, and genre. Each ideophone token was then assigned to an ideophone type, based on phonosemantic similarities. It is these ideophone types, then, that are the analytic focus for this study.

We have amassed over 2,300 ideophone tokens drawn from these transcriptions of casual conversations, historical legends, folktales, and myths. In order to make it onto our list, an ideophone had to be documented as having been used in two or more different contexts, with context defined broadly to include two or more narrative tellings or discourse events. As a group, Pastaza Quichua ideophones can be divided into two overlapping categories: onomatopoeic and synaesthetic.[9] Onomatopoeic ideophones depict sounds of various life-forms, including birds, snakes, frogs, insects, trees, rocks, wind, rain, and water. They can be up to four syllables long in canonical form, though most are no longer than two or three syllables. They occur with the cognitive verb *uyarina* 'to sound, be heard', the locutionary verbs *nina* 'to say', *rimana* 'to speak', as well as "light" verbs such as *rina* 'to go, appear, sound', *rana* 'to do, make', and *mana* 'to be.' Altogether we have compiled 124 ideophones for this category.

An example of an ideophone from this category, *buʃukuku*, depicts the sound of a type of hawk, which is also its name. The following example illustrates its performativity, which consists of a partially reduplicated and repeated final syllable. The example is from a traditional narrative in which the hawk appears to two children at night, telling them, through self-quotation, how it will call out to them:[10]

(1) Kuti–ʃata ɲuka buʃukuku–kuu–kuu–kuu ni–kpi . . . {ex 1.wav}
again–ADV I IDEO say–SWRF
'Again, I will say *buʃukuku–kuu–kuu–kuu*'

[8] The transcriptions comprise 877 pages altogether.

[9] The difference between onomatopoeic and synaesthetic ideophones is mainly relevant to considerations of the categories of verbs with which they occur. For the purposes of this paper, this difference is not important, since our findings about their structural patterns apply to both categories.

[10] Abbreviations used in examples are: 3 = third person, ADV = adverbial, DAT = dative case, IDEO = ideophone, PL = plural, RCP = reciprocal, and SWRF = switch-reference. This example is from author's Tape IIIA, transcript file p. 108. Altogether, we have four different versions of this story, each told by a different individual, all of whom use this ideophone with the same performative features of partial reduplication and repetition.

The second category consists of 106 ideophones that are synaesthetic. They may depict sound but only if that sound is concomitant with some kind of motion. Synaesthetic ideophones simulate various temporal qualities of motion, including its ongoing-ness, repetition, or extendedness in space. They may also depict other kinds of sensory perceptions, such as visual configurations, sudden awarenesses, or proprioceptions. A very few synaesthetic ideophones are depictive of cognitive states, such as sudden realizations, or of fine motor processes, such as involuntary twitchings or the closing of eyes. Synaesthetic ideophones occur with verbs of state, telic process, bodily process, activity and configuration, motion verbs, cognitive verbs, and light verbs. They seem to collocate most frequently, however, with motion verbs denoting actions such as coming, going, walking, running, falling, emerging, and entering (Nuckolls 2014).

Example (2) illustrates a synaesthetic ideophone in a discourse context featuring *bʰux*, the first ideophone mentioned in our introduction.

(2) Kay–ma bʰuxxxx tɕi–ma bʰuxxxx bʰuxxx bʰuxxx {ex 2.wav}
Here–DAT IDEO there–DAT IDEO IDEO IDEO
'Here *bʰuxxxx* there *bʰuxxxx* (and) *bʰuxxx bʰuxxx* (they leaped)'

This example is drawn from the same narrative as (1) above. At this point in the story, several people have just transformed into dolphins. Their first act as dolphins is to burst forth from underwater. The bursts are performatively repeated to depict the pluractionality of the bursting movements. Each repetition of *bʰux* is also lengthened to depict the spatial trajectories of the dolphins' movements out of water.[11]

We turn now to our methods for evaluating the differences between ideophones and prosaic words.

3. The sounds of Pastaza Quichua and methods for counting them. In addition to our transcribed data from field studies, our analysis also uses published sources on Pastaza Quichua. We have taken Orr and Wrisley's *Vocabulario* (1981), which consists of uninflected forms, digitized it, and added all of our ideophones. We also integrated the 1,089 floral and faunal terms into the lexicon, which had been separately listed by Orr and Wrisley (1981) as an addendum. Altogether, our wordlist, including Orr and Wrisley's original lexicon, together with the floral and faunal terms and the added ideophones, totals 2,275 entries, with ideophones constituting approximately 10% of our total corpus. Our method, then, was to compare the ideophones, which are uninflected words, with the other uninflected

[11] Example is from author's Tape IIIA, transcript file p. 111.

words of Orr and Wrisley's *Vocabulario*. Using the phonetic forms we were able to do string searches for various patterns within our lexical database.[12]

Our search engine helped us evaluate the differences between the ideophonic and prosaic sound systems by letting us calculate the numbers of sounds in the two corpora and then look at how the actual numbers compare with what we would expect to find if there were no differences between the two sound systems. Our expectations of what we would find were based on the knowledge that the proportion of non-ideophonic to ideophonic lexical items is 9 to 1. We then formulated a null hypothesis, which is that there is no difference between the ideophonic and prosaic inventories regarding the distributions of sounds.

In order to test our null hypothesis, we can conduct a search of a certain sound or group of sounds to determine whether it occurs in the expected proportions in both ideophonic and prosaic inventories. For example, we can focus on nasals as a group. Our search results reveal that there are 1,347 words altogether that feature a nasal sound. Since ideophones are 10% of our corpus, we would expect, if there are no differences between the ideophonic and the prosaic corpora, that the total number of ideophonic words containing a nasal would amount to 135, which is 10% of 1,347. We would then expect the prosaic words containing a nasal to amount to 1,212, which is 90% of 1,347. What we find, instead, is that only 66 of the words containing a nasal are ideophones, and the remaining 1,281 are prosaic words. A chi-square calculation reveals that the difference between the distribution of nasals in the ideophonic and prosaic lexicon is significantly different ($\chi 2(1) = 39.195$, $p < .0001$).

3.1. The restricted prosaic sounds. We turn now to a detailed consideration of how to describe the differences between the ideophonic and prosaic sound systems. We begin first by discussing the phonemic consonants and vowels in the prosaic sound system. Tables 1 and 2 illustrate the contrastive consonants and vowels of Pastaza Quichua. Major allophones are bracketed. The ~ symbol is used for sounds in free variation. The five

[12] Our word list was written in phonetic notation and divided into two main sub-corpora, namely, the prosaic lexicon, with the floral and faunal terms now included, and the ideophonic lexicon, comprising the synesthetic and onomatopoeic ideophones. Using regular expressions, which allow for more advanced searches, the user is able to search by place of articulation and syllable structure within the corpus. This was accomplished by substituting certain key symbols for all phonemes of that type. For example, the pattern "!VS" searches for all voiced stops. The exclamation point tells the computer that the following sequence is a manner of articulation. In this case, V stands for voiced and S stands for stops. To search by syllable structure, the program identifies syllable boundaries by a series of algorithms specific to Quichua and replaces characters with either "C" or "V." After each search, the program produces an array of statistics showing numbers such as the number of total matches, matches per corpus, and what percentage of the matched words fall into the ideophonic or the prosaic corpus.

TABLE 1
THE PROSAIC CONSONANTS

	Bilabial	Dental	Alveolar	Alveolo-palatal	Palatal	Velar	Glottal
Oral Stops	p b	t d				k g	
Labialized Stops						k^{w}	
Palatalized Stops	*p^{j}	*t^{j}				*k^{j}	
Fricatives			s *z ~ dz	ɕ			h ~ ʔ
Affricates			*ts	tɕ [dʑ]			
Nasals	m [m]		n [ŋ] [n̩]		ɲ		
Laterals			ɬ		ʎ		
Taps			ɾ				
Glides	w [β]				j		

[ ] = allophone; ~ = free variant; * = marginal sound.

Ed: will center tic under m and n's throughout in 2nd proof

TABLE 2
THE PROSAIC VOWELS

	Front	Mid	Back
High	i [ɪ]		u[ʊ]
Mid			*o
Low		a[ə]	

[ ] = allophone; ~ = free variant; * = marginal sound.

starred sounds are marked as such because they are relatively uncommon in the prosaic lexicon. We proceed by discussing the sounds that are starred because they will be significant for the ideophonic system. A cursory examination of tables 1 and 2 reveals that most of the starred sounds are consonants in the class of obstruents. Only one starred sound is a vowel.

PALATALIZED STOPS: the first set of uncommon, marginal sounds relevant for our discussion of the prosaic phonological inventory consists of the palatalized stops. The palatalized voiceless velar /kʲ/ in *mi**k**ʲa* 'aunt' is the least common of this series, occurring in only two words altogether. The other word with this sound is ***k**ʲana*, the name of a type of bird. The palatalized bilabial voiceless stop /pʲ/ is only slightly more common, occurring in a total of three forms: ***p**ʲula* 'mold', *ta**p**ʲana* 'to portend', and *ra**p**ʲana* 'to twitch'. The voiceless dental stop /tʲ/ is the most prolific of this restricted series, occurring in a total of 11 forms, including ***t**ʲukana* 'to spit', ***t**ʲusina* 'to pinch', and *mu**t**ʲu* 'cut off'. We discuss these sounds again below, but for now it is enough to simply point out their extreme marginality within the prosaic lexicon.

FRICATIVES AND AFFRICATES: among the fricatives, we have only one starred sound, the voiced alveolar /z/ (for example, in *zambulina* 'to immerse'), which alternates freely with /dz/ and occurs in only eight prosaic words altogether, most of which have been borrowed from Spanish. Among the affricates, the voiceless alveolar /ts/ is the only starred sound in this group and it occurs in a total of 38 items within the prosaic lexicon, which is about 1.9% of the total lexicon. Examples include ***ts**ala* 'pale' and ***ts**ijana* 'to delouse'.

THE RESTRICTED PROSAIC VOWEL: table 2 also shows a marginal phoneme /o/ that occurs in only eight words, all of which have been borrowed from Spanish. Examples include ***otɕo*** 'eight' and ***o**las* 'waves'.

3.2. Prosaic stress and syllable patterns. In the prosaic lexicon, stress gravitates toward the right edge of a word, with penultimate stress as the most common; this is a dominant pattern in a variety of Quechua dialects (Adelaar 2004:206). Examples that deviate from this pattern by featuring final stress may be found in verbs inflected for the third-person plural present ending *-nawŋ*:

(3*a*) ɾi ˈnawŋ
go 3PL
'they go'

(3*b*) ɾima ˈnawŋ
speak 3PL
'they speak'

(3*c*) maka naku ˈnawŋ
hit RCP 3PL
'they fight with each other'

We turn now to a discussion of prosaic syllable structures, which consist of the following: V, VC, CV, CVC, CCV, and CVCC. The last structure, CVCC, occurs only in inflected verbs such as ***ɾi-nawŋ*** 'they go' in (3) above. Such CVCC structures never occur in uninflected prosaic forms. CCV is also uncommon as it occurs only in a few recent Spanish borrowings such as ***gɾa**bana* 'to record'. CVC syllables are unusual in word-final position because of Pastaza Quichua's preference for open rather than closed final syllables.

In this section, we have made a slight departure from our method of looking only at uninflected words from our word list. We shall see in **4.4.1** and **4.4.2** below why this departure has been necessary, as it will shed light on the apparent anomalies of ideophones' stress and syllabic patterns.

4. The ideophonically stretched system. We turn now to the ideophonically stretched system. Ideophones stretch the prosaic system in four ways that involve either an expanded use of restricted sounds or structures, or an addition of new. sounds. First, they stretch the system by using the most uncommon sounds among the obstruents and vowels. Second, they stretch the system by adding many new palatalized sounds and expressively aspirated sounds. Third, they stretch the system by filling a small number of gaps within the prosaic inventory, specifically by adding a bilabial [b^w] and a velar fricative [x]. Fourth, they stretch the system by expanding the use of syllable structures and stress patterns that are dispreferred by this language.

4.1. Uncommon sounds used in ideophones. We begin by discussing the first type of stretching, which consists of the greater use of uncommon obstruents and the /o/ vowel. Most of the sounds discussed in **4.1.1**, **4.1.2**, **4.1.3**, and **4.1.4** increase significantly in ideophones.

4.1.1. The palatalized obstruents. As stated earlier, the palatalized voiceless stops /k^j/, /p^j/, and /t^j/ are among the most marginal sounds in the prosaic lexicon. They occur in only 16 words out of 2,045. There are, however, 7 ideophones, out of a total of 230, that use these uncommon sounds. They are:

(4) ***p^{j}u*** ‘sound of a small bullet whizzing’ {pju.wav}
t^{j}ak/t^{j}as ‘sound/movement of striking something lightly’ {t^{j}ak.wav}, {t^{j}as.wav}
t^{j}api ‘moment of contact resulting in adhesion’
t^{j}uŋ ‘sound of small jar breaking resonatingly’
t^{j}un ‘sound of a hawk’
t^{j}am ‘a complete revolution of movement’
k^{j}aw ‘sound of a toucan’ {k^{j}aw.wav}

The /t^{j}/ sound is statistically more frequent among ideophones than among prosaic words.[13] The /k^{j}/ and /p^{j}/ sounds increase slightly but not enough for meaningful statistical calculations.

4.1.2. The restricted fricative /z ~ dz/. We consider next the alveolar fricative /z ~ dz/ which occurs in free variation. Some of the ideophones featuring this sound are:

(5) ***zi*ɾ ~ *dzi*ɾ** ‘frictional movement’ {dzir.wav}
***za*s ~ *dza*s** ‘quick, direct movement or action’ {dzas.wav}
***zi*ŋ ~ *dzi*ŋ** ‘a sudden awareness that causes fear’

The /z ~ dz/ sound is statistically more frequent among ideophones than among prosaic words.[14]

4.1.3. The affricate /ts/. The last of the uncommon obstruents that is found more frequently among ideophones is the alveolar affricate /ts/. Some of the ideophones featuring this sound are:

(6) ***ts*ik** ‘sound of squirrels fighting’
***ts*ak** ‘a piercing or puncture’ {tsak.wav}
***ts*apak** ‘a slapping movement/sound of waves of water’

There is statistical significance for the greater use of the /ts/ sound as well.[15]

4.1.4. The vowel /o/. The presence of the /o/ vowel increases significantly among ideophones.[16] Examples include:

(7) ***po*laŋ** ‘movement from underwater to the surface’ {polaŋ.wav}
***po*ŋ** ‘sound of hitting ground with a digging stick’
***tɕo*n** ‘a complete silence’
***to*n** ‘ sound of light tap’ {ton$_{1}$.wav}

[13] $\chi^2(1) = 17.067$, p <.0001, based on prosaic /t^{j}/: 11 observed and 15 expected, compared with ideophonic /t^{j}/: 5 observed and 1 expected.

[14] $\chi^2(1) = 44.763$, p < .0001, based on prosaic /z ~ dz/: 10 observed and 19 expected, compared with ideophonic /z ~ dz/: 11 observed and 2 expected. For our string searches, both alternates counted as the same type.

[15] $\chi^2(1) = 49.245$, p <.0001 based on prosaic /ts/: 38 observed and 15 expected, compared with ideophonic /ts/: 20 observed and 5 expected.

[16] $\chi^2(1) = 92.548$, p < .0001 based on prosaic /o/: 8 observed and 20 expected, compared with ideophonic /o/: 15 observed and 2 expected.

	Bilabial	Dental	Alveolar	Alveolo-palatal	Palatal	Velar	Glottal
Stops	**p^h** **b^h**	**t^h**				**k^h**	
	p b	t d				k g	
Palatalized	*p^j **b^j**	*t^j				*k^j **g^j**	
Labialized	**b^w**					k^w	
Fricatives			**s^h**	**$ɕ^h$**			
			s *z ~ dz	ɕ		**x**	h ~ ʔ
Palatalized			**z^j~dz^j**	**$ɕ^j$**			**h^j**
Affricates			*ts	tɕ [dz]			
Palatalized			**ts^j**	**$tɕ^j$**			

Boldface: appears only in ideophones
Increases in ideophones

FIG. 1.—The ideophonically expanded obstruents.

This section has demonstrated that the majority of restricted obstruents within the prosaic inventory, three out of five of them, are significantly increased among ideophones: /t^j/, /z ~ dz/, and /ts/. In addition, the one restricted vowel of the prosaic inventory, /o/, also undergoes a significant increase.

4.2. Newly palatalized sounds and expressively aspirated sounds. We turn now to a discussion of how the number of obstruent sounds is stretched by ideophones, adding many new sounds to the inventory. We first explain how palatalization spreads to more obstruents among ideophones. We then discuss the expressive aspiration of many of the obstruents. Figure 1 illustrates the expanded inventory of obstruent sounds contributed by ideophones. As there are no new sonorant sounds used in ideophones, they have not been included in this figure. Sounds appearing only in ideophones are shown in boldface in figure 1. The four starred sounds discussed above that were found to increase significantly among ideophones—/t^j/, /z ~ dz/, /ts/, and /o/—are shown with a rectangular border to indicate their greater numbers in ideophones.[17] As is evident in the figure, newly palatalized and expressively aspirated sounds almost double the inventory.

It is important, however, to emphasize the fact that the new sounds represented here do not occur in great numbers of ideophones. The majority of new sounds occur in only one, two, or three ideophones at most. Furthermore, we

[17] In the interest of conserving space, we have not reproduced the vowel chart here, since only one of the vowel sounds, /o/, increases significantly in ideophones.

are not claiming that these are contrastive sounds of this language, although some of them could eventually evolve into phonemes.

4.2.1. Newly palatalized sounds. We have already discussed the uncommon sounds in the prosaic lexicon, in **3.1**, and their statistically significant increased usage in ideophones, in **4.1.1**, **4.1.2**, and **4.1.3**. We now discuss the palatalized sounds that only occur in ideophones. The voiced stops /b/ and /g/ have palatalized versions /bʲ/ and /gʲ/ among the ideophones:

(8) ***bʲ****oŋ* 'sound of a creaking, heavy door' {bjoŋ.wav}
gʲ*awŋ* 'sound of tree trunk groaning as it falls after being chopped' {gʲawŋ.wav}
gʲ*uŋ* 'sound of a frog'

Although there are no palatalized fricatives in the prosaic lexicon, we have the alveolar /z ~ dz/ becoming palatalized/zʲ ~ dzʲ/. We also note a palatalized alveopalatal /ɕʲ/ and a palatalized glottal fricative /hʲ/. All four of these sounds are seen in the following examples:

(9) ***zʲ****u* ~ ***dzʲ****u* 'a lightly sliding movement, such as a knife grazed across a piece of fish, a dog swimming across a river, or baby moving in womb' {dzʲu.wav}
ɕʲ*uw* 'sound/movement of fishing line being pulled strongly by large fish' {ɕʲuw.wav}
hʲ*u****tʲ****uk* 'sound of the *hʲutʲu* bird'
hʲ*aw* 'sound of a *paka*, or of a snake imitating a *paka*' {hʲaw.wav}

There are no palatalized affricates in the prosaic lexicon. However, there are two new sounds found within ideophones—/tsʲ/ and /tɕʲ/:

(10) ***tsʲ****uŋ* 'sound of a fly buzzing or of an outboard motor humming' {tsʲuŋ.wav}
tsʲ*u* 'sound of fat dripping or fly buzzing'
tɕʲ*uw*, 'a clean break or fissure' {tɕʲuw.wav}

To summarize our findings on palatalized sounds in ideophones, only 3 out of 16 obstruents in the prosaic lexicon are palatalized. Among ideophones, however, a total of 8 out of 16—that is, half of them—may be palatalized.

4.2.2. Expressively aspirated sounds. Aspiration is used expressively to simulate movement through space or water, often emphasizing the turbulence of such movements. The voiceless stops /p/, /t/, and /k/ all have an expressively aspirated variant, as does the voiced bilabial stop /b/:

(11) ***pʰ****a* 'the sudden, vigorous flapping of a bird's wings' {pʰa.wav}
*tu****pʰ****u* 'movement, sound of something falling into water' {tupʰu.wav}
bʰ*ux* 'bursting from underwater to surface by a freshwater dolphin'
tʰ*ux* 'movement of an animal sailing through air' {tʰux.wav}

*pa**t**h**a**ŋ* ‘moment/sound of contact made by falling upon a solid surface, without loss of structural integrity’ {pat^{h}aŋ.wav}
***k**h**a**w* ‘thrashing underwater movement/sound of large animal’ {k^{h}aw.wav}

The fricatives /s/ and /ɕ/ may also undergo expressive aspiration:

(12) ***s**h**a*** ‘expanded movement from a center, e.g., of particles from thrown clump of dirt’ {s^{h}a.wav}
***ɕ**h**a**ka* ‘sound/motion of forceful splitting or ripping apart (e.g., of cloth, paper)’ {ɕ^{h}aka.wav}

Altogether, then, ideophones may make use of aspiration with six different obstruents.

4.3. Ideophonic sounds filling accidental gaps or occurring in unexpected positions. Figure 1 also reveals that ideophones add only a few new sounds to the inventory by filling accidental gaps. The velar fricative /x/ is one new sound filling a gap in the phonemic inventory. It occurs in ideophones that simulate extended motion through space, such as:

(13) *wa**x*** ‘the flinging movement of a snake’s tail’ {wax.wav}
*b**h**u**x*** ‘bursting movement out of water by a freshwater dolphin’

Another new sound, /b^{w}/, uses an existing secondary articulation, labialization, which complements the existing labialized velar /k^{w}/:

(14) *mb**w**i* ‘sound of a frog’

(14) also illustrates the use of /m̥/, which normally occurs only after an /h/, as in:[18]

(15) ***hm*** ‘sound of a jaguar breathing’ {hm̥.wav}

Although /m̥/before /b/ in (14) is not an example of a new position (i.e., an accidental gap) being filled in the inventory of sounds, it is mentioned here because it features /m̥/ preceding an obstruent, a position not attested in the prosaic lexicon.

Other examples of an ideophonic sound occurring in an unusual position occur below with the use of /n/ rather than the expected allophone[ŋ] found in word-final position in the prosaic lexicon:

[18] The syllabic [m̥] also occurs in the discourse marker *hm̥ hm̥*, which is uttered with a low intonation on the first token and a high intonation on the second. Following the repetition of *hm̥ hm̥*, typically, is a repetition of the original question asked, often with a brief commentary by the speaker who displays perplexity (which may be real or feigned) at not being able to answer the question. This occurrence of syllabic /m̥/ after /h/ matches the pattern of the syllabic nasal allophone [n̥], which is used in the affirmative response [hn̥da] and is almost certainly derived from *henta*, an affirmative response documented in Achuar and Shuar ceremonial dialogue by Gnerre (1986).

(16) *zan ~ dza**n*** ‘sound/motion of erratic movement away from a center’
*to**n*** ‘a complete filling’ {ton$_2$.wav}
*tɕo**n*** ‘a total absence of sound’

Yet another sound, /dʑ/, which in the prosaic lexicon is an allophone of /tɕ/,occuring only after a nasal, is found in word-initial position in:

(17) ***dʑ**as* ‘sound of a bird’ {dʑas.wav}

We have shown that ideophones add a couple of new sounds by filling accidental gaps in the system. They also add to their own inventory sounds that are only allophonic in the prosaic inventory. We turn now to the use of restricted stress patterns and syllable structures.

4.4. Use of restricted stress patterns and syllable structures. Pastaza Quichua words normally receive stress on their penultimate syllables. Disyllabic ideophones deviate from this pattern by receiving stress on their final syllables:

(18) *tsa'pak* ‘a slapping movement/sound of waves of water’
po'laŋ ‘movement from underwater to the surface’ {polaŋ.wav}
ta'ras ‘sound of rustling, dried up underbrush’
a'wiŋ ‘act of opening, exposing what is covered’
t'a'pi ‘moment of contact resulting in adhesion’
c^{h}a'ka ‘sound/motion of forceful splitting or ripping apart (e.g., of cloth, paper)’
a'ki ‘movement that deviates from and returns to a central axis, often due to lack of control’
to'a ‘motion of turning over or spilling out’

We turn now to the use of restricted syllable structures found in ideophones. Ideophones feature four uncommon syllable types which occur in numbers too small for meaningful statistical calculations. These include three syllable types—CCV, CCVC, and CCVCC—all of which feature an initial obstruent followed by a sonorant, which is then followed by a vowel:

(19) CCV:
sna ‘snapping of a steel cable’ {sna.wav}
bɾu ‘sound of a frog’ {bɾu.wav}
gɾijaw ‘sound of a toucan bird’ {gɾijaw.wav}

CCVC:
tɾus ‘sound of cutting a fingernail’
ɬux ‘rupture of a tree trunk from its base’ {bɬux.wav}

CCVCC:
bɬawm ‘sound of heavy door closing resonatingly’ {bɬawm.wav}

TABLE 3
RESTRICTED SYLLABLE TYPES SIGNIFICANTLY EXPANDED IN IDEOPHONES

	Observed	Expected
Prosaic $CV_{monosyllable}$	5	28
Ideophonic $CV_{monosyllable}$	26	3
(χ^2 (1) = 195.226, p < .0001)		
Prosaic CVC	1,070	1,103
Ideophonic CVC	157	124
(χ^2 (1) = 9.770, p < .0001)		
Prosaic CVC#	319	424
Ideophonic CVC#	152	47
(χ^2 (1) = 260.577, p < .0001)		
Prosaic $CVC_{monosyllable}$	16	112
Ideophonic $CVC_{monosyllable}$	108	12
(χ^2 (1) = 850.286, p < .0001)		

As was noted in **3.2** above, the CCV onset normally occurs in the prosaic lexicon only in recent borrowings from Spanish. Yet, this onset occurs in ideophones that are not related to Spanish lexical items.

Another anomalous syllable type is the CVCC syllable shown in (20):

(20) CVCC:
zawn ~ dzawn **'***swarming movement'*
gʲawŋ 'sound of tree trunk groaning as it falls after being chopped'{gʲawŋ.wav}

We consider the CVCC syllable structure anomalous because it occurs in the prosaic lexicon only as a third-person plural inflectional ending on verbs (see **3.1.5**).

We now consider the restricted syllable types that occur in ideophones in significant numbers. The differences between ideophones' use of CV and CVC syllable structures and the prosaic lexical use of them are represented in table 3.

CV monosyllables are significantly more common in ideophones than in prosaic words. CVC syllables, whether monosyllabic or not, are significantly more common in ideophones as well. Their presence has been calculated generally, irrespective of their position in a word, as well as more specifically, for their presence in word-final position and for their occurrence as monosyllables.[19]

[19] A quick glance at some of the raw numbers may seem to indicate that ideophones have fewer CVC structures than prosaic words. For example, the prosaic CVC has 1,070 examples

	Bilabial	Dental	Alveolar	Alveolo-palatal	Palatal	Velar	Glottal
Nasals	m		n [ŋ]		ɲ		
Laterals			ɬ		ʎ		
Taps	ɾ		ɾ				
Glides	w				j		

Increases in ideophones Decreases in ideophones

FIG. 2.—The ideophonically contracted sonorants.

4.5. The contraction of sonorants within ideophones. The expansion in the number of obstruent sounds in ideophones is complemented by a contraction in the frequency of most sonorants. Each category of sonorant has at least one member that decreases in frequency: the nasals /m/ and /n/, the lateral /ʎ/, the tap /ɾ/, and the glide /j/ are all significantly less common in ideophones. The tendency for sonorant sounds to diminish in frequency is taken to an extreme by the palatal nasal /ɲ/, which disappears completely from ideophones. Figure 2 shows the diminished sonorants with a shaded background. The /w/ and /ɬ/ phonemes are shown normally because their decrease is not enough to be significant. The [ŋ] is shown with a rectangular border because it is the only sonorant to increase significantly among ideophones.[20]

To understand how measurably different the sonorants' frequencies are, we present in table 4 the statistically significant chi-square figures for the sonorants that contract among ideophones.

With the exception of /ŋ/, which increases significantly among ideophones, there is a strong tendency for sonorant sounds to be underrepresented in ideophones. We do not claim to know why the sonorant sounds are used significantly less often in ideophones. It is possible that their contraction is compensatory and is adjusting the overall system, which the obstruents have augmented.

compared to the ideophonic CVC of only 157. Also, the prosaic CVC# has 319 compared with only 152 ideophonic CVC#. However, when we consider that ideophones comprise only about 10% of our total corpus, their necessarily smaller numbers make sense. Ultimately, what matters are their proportions, which are captured as significant by the chi-square calculations.

[20] χ^2 (1) = 43.907, p < .0001, based on prosaic [ŋ]: 104 observed and 129 expected, compared with ideophonic [ŋ]: 41 observed and 16 expected. To calculate *ŋ*, we searched for all word-final *n* sounds in the prosaic lexicon, since all word-final *n*'s change to [ŋ]. For ideophones, however, we had to count all words with [ŋ] in word-final position, but not those with final [n], since speakers do not always change word-final [n] to [ŋ] in the ideophonic lexicon.

TABLE 4
SONORANTS SIGNIFICANTLY CONTRACTED IN IDEOPHONES

	Observed	Expected
Prosaic /m/	478	441
Ideophonic /m/	12	49
(χ^2 (1) = 31.043, p < .0001)		
Prosaic /n/	855	782
Ideophonic /n/	14	87
(χ^2 (1) = 68.067, p < .0001)		
Prosaic /ʎ/	195	178
Ideophonic /ʎ/	3	20
(χ^2 (1) = 16.074, p < .0001)		
Prosaic /ɾ/	601	569
Ideophonic /ɾ/	31	63
(χ^2 (1) = 18.054, p < .0001)		
Prosaic /j/	402	376
Ideophonic /j/	16	42
(χ^2 (1) = 17.893, p < .0001)		

5. Discussion and conclusions. Before concluding, we want to discuss the possibility that the significant differences between ideophones and prosaic words might also be found when comparing other classes of words. If we found that other classes of words were also significantly different from each other, then that would suggest that class differences rather than ideophones themselves might be responsible for the stretching and contracting we have observed.

To test for this possibility, we compared the occurrence of sonorants in the prosaic lexicon among two different classes of prosaic words: verbs and non-verbs. Table 5 below displays all of the sonorants which are not significantly different in prosaic verbs and prosaic non-verbs.

The only sonorants that are significantly different between prosaic verbs and non-verbs are /m/ and /n/.[21] The majority of sonorant sounds, six out of eight, are not significantly different when compared with prosaic verbs and non-verbs. We conclude, therefore, that the significant differences between ideophones and the prosaic lexicon have, for the most part, to do with the nature of ideophones as a class.

[21] For /m/: χ^2 (1) = 5.093, p < .0001, based on prosaic verbs with /m/: 79 observed, 99 expected, compared with prosaic non-verbs with /m/: 400 observed, 380 expected. For /n/: χ^2 (1) = 22.012, p < .0001, based on prosaic verbs with /n/: 59 observed, 101 expected, compared with prosaic non-verbs with /n/: 430 observed, 388 expected.

TABLE 5
SONORANTS IN PROSAIC VERBS AND NON-VERBS

	Observed	Expected
Prosaic verbs with /ɲ/	15	19
Prosaic nonverbs with /ɲ/	27	23
(χ^2 (1) = 1.538, p < .0001: not significant)		
Prosaic verbs with /ɬ/	32	39
Prosaic nonverbs with /ɬ/	57	50
(χ^2 (1) = 2.236, p < .0001: not significant)		
Prosaic verbs with /lʲ/	40	40
Prosaic nonverbs with /lʲ/	50	50
(χ^2 (1) = 0.000, p < .0001: not significant)		
Prosaic verbs with /ɾ/	130	125
Prosaic nonverbs with /ɾ/	471	476
(χ^2 (1) = 0.253, p < .0001: not significant)		
Prosaic verbs with /w/	43	52
Prosaic nonverbs with /w/	75	66
(χ^2 (1) = 2.785, p < .0001: not significant)		
Prosaic verbs with /j/	98	83
Prosaic nonverbs with /j/	304	319
(χ^2 (1) = 3.416, p < .0001: not quite significant)		

We have argued here that ideophones systematically expand and contract the sound system of Pastaza Quichua. One consequence of this expansion is made evident by the greater use of what is marginal in the prosaic lexicon: if a sound, syllable structure, or stress pattern is distributionally restricted in Pastaza Quichua, it is likely to be normalized and expanded within ideophones. Most of the uncommon, restricted obstruent sounds of Pastaza Quichua have been shown to occur within ideophones with significantly greater frequency: /tʲ/, /z ~ dz/, and /ts/. We also observed the significantly greater use of the restricted /o/ vowel and the greater overall use of CVC syllables and CV monosyllabic structures within ideophones.

One structure that occurs among ideophones, the CVCC syllable, is not restricted if we consider a corpus of actually occurring discourse, since it is commonly used for third-person plural inflectional endings of verbs.

Word-final stress is also restricted in Pastaza Quichua to one domain of the prosaic vocabulary: verbs inflected for the third-person plural suffix *-nawŋ*. Among disyllabic ideophones, however, word-final stress is the norm.

We have also argued that the overall system is stretched among ideophones by the addition of new sounds to the class of obstruents. There are a couple

of new sounds that fill accidental gaps: [x] and [b^w]. Newly aspirated sounds are also found: [p^h], [b^h], [t^h], [k^h], [s^h], and [$ɕ^h$], as well as newly palatalized sounds: [b^j], [g^j], [z^j ~dz^j], [$ɕ^j$], [h^j], [ts^j], and [$tɕ^j$].

A question specific to Quichua linguistics is the matter of the source of the palatalized obstruents. Why has this particular secondary articulation been used by Pastaza Quichua speakers for ideophones? We offer the tentative suggestion that palatalization as a secondary articulation for ideophonic segments may be due to the influence of other languages that have been in contact with Amazonian Quichua. The most likely candidates for influencing Pastaza Quichua would be the Achuar and Zaparoan languages, both of which are reported to have palatalization occurring on consonants as a phonological process. According to Fast Mowitz, Warkentin de Fast, and Fast Warkentin (1996:15), palatalization occurs on obstruents in Achuar when a preceding syllable features the high front vowel /i/. A similar process is reported for Shuar by Adelaar (2004:434). For the Zaparoan language, Payne (1984:138) states that a process of metathesis occurs when a /j/ is followed by a consonant and that the resulting sound is a palatalized consonant.

It is possible, then, that speakers of Pastaza Quichua have borrowed palatalized sounds from these languages and adapted them for expressive purposes. A convincing hypothesis about the borrowing of ejectives and aspirates from Jaqi/Aru languages for expressive purposes has been suggested for Southern Peruvian Quechua by Mannheim (1991:179), who constructs a complex argument based on sociohistorical and linguistic evidence. Regarding possible influences from other languages on ideophonic structures, we may also consider the CCV onsets, the initial /z/ sound, and the greater use of the /o/ vowel in ideophones as probably resulting from Spanish language influence.

Our findings are of typological interest in light of Lindblom and Maddieson (1988), who postulate a continuum of increasing articulatory complexity underlying the development of consonantal inventories. They outline three degrees of complexity, consisting of basic level 1, elaborated level 2, and complex level 3 classes of obstruents. Many of the new sounds and structures in Pastaza Quichua's stretched inventory occupy Lindblom and Maddieson's (1988:67) level 2 elaborated tier: the newly palatalized sounds, the newly aspirated sounds, and the labialized [b^w]. The significantly increased presence of CVC syllables also contributes to the greater structural complexity of ideophones (Maddieson 2005:54.) One general problem suggested by these findings is the matter of why, given the increased complexity of ideophonic sounds, do Pastaza Quichua speakers "invest" further in ideophones, through performative lengthening, reduplication, and repetition, as well as intonational and gestural depiction? A specific topic for future research to arise from this study, however, is the matter of whether further comparative work involving detailed scrutiny of ideophones in other languages will reveal more pervasive patterns of the kind of systematic variation identified here.

REFERENCES

ADELAAR, WILLEM F. H. 2004. The Languages of the Andes. With Pieter C. Muysken. Cambridge: Cambridge University Press.

ALPHER, BARRY. 1994. Yir-Yoront ideophones. Sound Symbolism, ed. Leanne Hinton, Joanna Nichols, and John J. Ohala, pp. 161–77. Cambridge: Cambridge University Press.

BECK, DAVID. 2008. Ideophones, adverbs, and predicate qualification in Upper Necaxa Totonac. IJAL 74:1–46.

BODOMO, ADAMS. 2006. The structure of Iieophones in African and Asian languages: The case of Dagaare and Cantonese. Selected Proceedings of the Thirty-fifth Annual Conference on African Linguistics, ed. John Mugane et al., pp. 203–13. Somerville, Mass.: Cascadilla Proceedings Project.

CHILDS, G. TUCKER. 1988. The phonology of Kisi ideophones. Journal of African Languages and Linguistics 10:165–90.

_____ . 1994. African ideophones. Sound Symbolism, ed. Leanne Hinton, Joanna Nichols, and John J. Ohala, pp. 178–204. Cambridge: Cambridge University Press.

DIFFLOTH, GERARD. 1980. Expressive phonology and prosaic phonology in Mon-Khmer. Studies in Mon-Khmer and Thai Phonology and Phonetics in Honor of E. Henderson, ed. Theraphan Thongkum et al., pp 49–59. Bangkok: Chulalonghorn University Press.

DHOORRE, CABDULQAADIR SALAAD, AND MAURO TOSCO. 1998. 111 Somali ideophones. Journal of African Cultural Studies 11:125–56.

DINGEMANSE, MARK. 2011. The meaning and use of ideophones in Siwu. Ph.D. dissertation, Radboud University, Nijmegen.

_____ . 2012. Advances in the cross-linguistic study of ideophones. Language and Linguistics Compass 6:654–72.

_____ . 2013. Ideophones and gesture in everyday speech. Gesture 13:143–65.

FAST MOWITZ, GERHARD; RUBY WARKENTIN DE FAST; AND DANIEL FAST WARKENTIN. 1996. Diccionario Achuar–Shiwar–Castellano. Serie Linguistica Peruana no. 36, ed. Mary Ruth Wise. Yarinacocha, Pucallpa: Instituto Lingüístico de Verano.

GNERRE, MAURICIO. 1986. The decline of dialogue: Ceremonial and mythological discourse among the Shuar and Achuar of Eastern Ecuador. Native South American Discourse, ed. Joel Sherzer and Greg Urban, pp. 307–41. Berlin: Mouton de Gruyter.

HAMANO, SHOKO. 1994. Palatalization in Japanese sound symbolism. Sound Symbolism, ed. Leanne Hinton, Joanna Nichols, and John J. Ohala, pp. 148–57. Cambridge: Cambridge University Press.

KABAK, BARIS, AND FRANS PLANK. 2008. The role of phonology in word class distinctions. Ms., Bogaziçi Üniversitesi, Istanbul.

KAUFMAN, TERRENCE. 1994. Symbolism and change in the sound system of Huastec. Sound Symbolism, ed. Leanne Hinton, Joanna Nichols, and John J. Ohala, pp. 63–75. Cambridge: Cambridge University Press.

LANGDON, MARGARET. 1994. Noise words in Guarani. Sound Symbolism, ed. Leanne Hinton, Joanna Nichols, and John J. Ohala, pp. 94–103. Cambridge: Cambridge University Press.

LINDBLOM, BJORN, AND IAN MADDIESON. 1988. Phonetic universals in consonant systems. Language, Speech and Mind: Studies in Honour of Victoria A. Fromkin, ed. Larry M. Hyman and C. N. Li, pp. 63–78.. London: Routledge.

MADDIESON, IAN. 2005. Syllable structure. World Atlas of Language Structures, ed. Martin Haspelmath et al., pp. 54–55. Oxford: Oxford University Press.

MANNHEIM, BRUCE. 1991. The Language of the Inka since the European Invasion. Austin: University of Texas Press.

MATISOFF, JAMES A. 1994. Tone, intonation and sound symbolism in Lahu: Loading the syllabic canon. Sound Symbolism, ed. Leanne Hinton, Joanna Nichols, and John J. Ohala, pp. 115–29. Cambridge: Cambridge University Press.

MITHUN, MARIANNE. 1982. The synchronic and diachronic behavior of plops, squeaks, croaks, sighs, and moans. IJAL 48:49–58.

MUYSKEN, PIETER. 2000. Semantic transparency in Lowland Ecuadorian Quechua morphosyntax. Linguistics 38:973–88.

NEWMAN, PAUL. 2001. Are ideophones really as weird and extra systematic as linguists make them out to be? Ideophones, ed. F. K. Erhard Voeltz and Christa Kilian-Hatz, pp. 251–58. Amsterdam: John Benjamins.

NUCKOLLS, JANIS B. 1996. Sounds Like Life: Sound Symbolic Grammar, Performance, and Cognition in Pastaza Quechua. New York: Oxford University Press.

_____ . 2004. To be or not to be ideophonically impoverished. Proceedings of the Eleventh Annual Symposium about Language and Society, University of Texas, Austin; Texas Linguistic Forum 47:131–42.

_____ . 2010. Lessons from a Quechua Strongwoman: Ideophony, Dialogue, and Perspective. Tucson: University of Arizona Press.

_____ . 2014. Ideophones' challenges for typological linguistics: The case of Pastaza Quichua. Ideophones: Between Grammar and Poetry, Special Issue of Pragmatics and Society, ed. Rusty Barrett, Katherine Lahti, and Anthony Webster, pp. 335–40. Amsterdam: John Benjamins.

ORR, CAROLYN, AND BETSY WRISLEY. 1981. Vocabulario Quichua del Oriente. Quito: Instituto Lingüístico de Verano and El Ministerio de Educacion y Cultura.

PAYNE, DORIS. 1984. Evidence for a Yaguan–Zaparoan connection. Working Papers of the Summer Institute of Linguistics and the University of North Dakota, no. 28. pp. 131–56. Dallas: SIL International.

VAN GIJN, RIK. 2010. Yurakare middle voice and ideophones. Studies in Language 34:273–97.

VOELTZ, F. K. ERHARD, AND CHRISTA KILIAN-HATZ, eds. Ideophones. Typological Studies in Language, no. 44. Amsterdam: John Benjamins.