A Phonetic Guide to the General Service List

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This paper provides a phonetic description of the General Service List. Segmental, syllabic, and phonotactic characteristics are discussed and abundant examples are included. The data presented suggests that, in addition to lexical coverage, the General Service List also exhibits comprehensive phonetic coverage of the English language and, therefore, concrete potential for pronunciation training.

The General Service List (GSL) was created by Michael West (1953) based on previous work by Lorge and Thorndike (1938). In its original form, the GSL includes 2,000 words with frequency and semantic information. Furthermore, those senses of each word that are statistically relevant are identified and elaborated on. It should be noted that words on the GSL are considered headwords because they stand for a group of related forms (inflections and derivations), what is nowadays commonly referred to as a word family.

The GSL is perhaps best known for the coverage it provides of the English language. Specifically, almost 85% of the words in most written texts (Nation & Waring, 1997) and up to 95% of those in spoken texts (Adolphs & Schmitt, 2003; 2004) belong to word lists statistically equivalent to the GSL. The implications of this phenomenon have not been missed by language educators and researchers interested in vocabulary learning (Carter & McCarthy, 1988; Nation, 1990; Schmitt, 2000; West, 1953; Zimmerman, 1997).

The ubiquity of GSL words and their significant dominance over the entire lexicon in terms of occurrence means that, literally, most words heard and produced belong to the GSL. Consequently, educators and researchers interested in perception and production skills can benefit from a description of the GSL in terms of phonetic content and coverage.

This paper provides a phonetic characterization of a revised version of the GSL (Bauman & Culligan, 1995) which contains 2,284 words. We will employ the Midwestern North American English (MWNAE) as the transcription model (Tables 1 & 2). The phonetic representation has been adapted from the articulatory descriptions provided in Ladefoged (2004) and O'Grady et al. (1993).

We open the discussion with consonant and vowel segments. The phonetic inventory of the transcription model (MWNAE) contains 24 consonant types and 14 vowel types (including dipthongs). The question is: Do the GSL words contain instances of every consonant and vowel in the English phonetic inventory? Yes, they do. Since the 2,284 GSL words add up to 11,350 segments (4,055 vowel tokens, 7,295 consonant tokens), it comes as no surprise that all consonant and vowel segments are accounted for. Even more unusual sounds that appear in limited distribution across the English lexicon, such as /ʒ/ and /ʊ/, are present. For example, the voiced palatal fricative appears in eight GSL words (such as *measure, garage, division*) and 16 words (such as *bush, pull, could*) include the high back lax vowel.

While it is reasonable to assume that many – if not most – sets composed of any random 2,284 words would include all consonants and vowels, it is not trivial to ask if the GSL contains enough minimal pairs from which

	Front		Central	Back	
High	i		ə		u
		ɪ		ʊ	
Mid	ɛɪ				oʊ
		ɛ		ɔ	ɔɪ
Low		æ aɪ		aʊ	ɑ
	Tense	Lax		Lax	Tense

Table 1. The vowel system of MWNAE (shaded areas = +round).

Manner of Articulation		Place of Articulation						
		Bilabial	Labial-dental	Inter-dental	Alveolar	Palatal	Velar	Glottal
Plosive	–voice	p			t		k	
	+voice	b			d		g	
Fricative	–voice		f	θ	s	ʃ		h
	+voice		v	ð	z	ʒ		
Affricate	–voice					tʃ		
	+voice					dʒ		
Nasal	+voice	m			n		ŋ	
Liquid lateral	+voice				l			
Liquid retroflex	+voice				r			
Glide	+voice	w				j		

Table 2. The consonant system of MWNAE.

to deduce the entire phonetic inventory. Consonant and vowel segments are, after all, phonemic contrasts, that is, the basic elements of sound that distinguish lexical items from each other. Since a minimal pair (MP) consists of two words with distinct meanings that differ by only one segment found in the same position in each word (Ladefoged, 2001), a comprehensive collection of MPs can be used to elicit the entire phonetic inventory. In the absence of MPs, near-MPs are used to identify contrasting segments. For instance, English does not have two words that contrast (constitute a MP) voiced-voiceless interdentals, (/ð/ vs. /θ/), or voiced-voiceless palatal fricatives, (/ʒ/ vs. /ʃ/). In this situation, the near-MPs *either – author* and *azure – assure* are used to establish the voicing contrast between these pairs of segments (O'Grady, 1993). In general, phoneticians use the minimal pair test to construct the phonetic inventory of a language by compiling sets of MPs and organizing the phonemic contrasts according to articulatory features.

If it were necessary for all 24 consonants and 14 vowels in MWNAE to contrast in order for each of them to be identified, we would need to find at least 264 consonant MPs and 84 vowel MPs, one MP for each possible combination. However, this is not the case. While each segment does contrast with every other segment in the inventory, only those segments that share enough articulatory features require a MP to establish their contrasting identity. The reason should be clear. Segments such as /v/ and /k/ are so dissimilar that their distinctiveness can be established without resorting to a MP. On the other hand, segments such as /d/ and /t/ share all articulatory features except voicing and, in fact, are not considered to be different segments in some languages. Therefore, MPs that differentiate similar segments are of particular interest.

Does the GSL contain enough MPs from which to deduce the entire phonetic inventory of English? Yes, it does. In fact, the GSL words form a rich set of 2,870 MPs that illustrate 222 consonant contrasts and 85 vowel contrasts, including those MPs of special relevance. There are almost 2,100 MPs formed by consonant contrasts and about 700 MPs formed by vowel contrasts. Most of the MPs are made by monosyllabic words and 961 out of the 1048 monosyllabic GSL words form at least one MP. Forty-five of them participate in more than 15 MPs each. The maximal case, the word *white*, forms 22 MPs (namely with the words *bite*, *fight*, *height*, *light*, *might*, *night*, *right*, *write*, *sight*, *tight*, *wait*, *weight*, *wet*, *what*, *wheat*, *while*, *wide*, *wife*, *wine*, *wipe*, *wire*, and *wise)*.

Nearly all of the consonant segments contrast against each other and, importantly, GSL words illustrate the crucial contrasts between very similar segments, in particular those that differ in just one articulatory feature, such as voicing. The voicing contrast between the bilabial plosives /p/ – /b/, for example, is represented by nine MPs such as *pack* – *back*, *pound* – *bound*, *push* – *bush*. The alveolar plosive voicing contrast (/d/ – /t/) is exemplified by 32 MPs including *tie* – *dye*, *tip* – *dip*, *height* – *hide*. Nine MPs serve to illustrate the voicing contrast between the velar stops /k/ – /g/ and examples include *cap* – *gap*, *card* – *guard*, *class* – *glass*. The voicing contrast that exists between the labialdental and alveolar fricatives is also established by the minimal pair test. Nine MPs, such as *belief* – *believe*, *fail* – *veil*, *life* – *live*, distinguish the labiodentals (/f/ – /v/) while five pairs serve to distinguish the alveolar fricatives (/s/ – /z/), as in *advice* – *advise*, *price* – *prize*, *rice* – *rise*.

Although the GSL words do not provide MPs that differentiate the interdental fricatives and the palatal affricates, near-MPs are present. Pairs like *breath* – *breathe*, *bath* – *bathe*, *cloth* – *clothe* serve to differentiate /θ/ and /ð/ while *catch* – *cage*, *choose* – *juice* illustrate the contrast that exists between /ʧ/ and /ʤ/.

Consonant MPs also provide evidence of the functional contrast created by a difference in place and manner of articulation. Evidence of the contrast that exists across the bilabial – alveolar – velar nasal segments (/m/ – /n/

– /ŋ/) is provided by words such as *seem* – *scene* – *sing*. The contrast between liquid lateral and retroflex segments (/r/ – /l/) is illustrated by 48 pairs of words, including examples such as *rake* – *lake*, *read* – *lead*, *royal* – *loyal*. Lastly, 15 MPs illustrate the distinction between the alveolar and palatal fricatives as in *same* – *shame*, *save* – *shave*, *self* – *shelf*.

As with consonant segments, GSL words form sufficient MPs to contrast vowel segments even between segments that share the majority of features – examples are the tense – lax pairs, namely /i/ – /ɪ/, /eɪ/ – /ɛ/, /oʊ/ – /ɔ/, and /u/ – /ʊ/. Sixteen MPs differentiate the high-front pair and 11 the mid-front pair as in *beat* – *bit*, *reach* – *rich* and *age* – *edge*, *date* – *debt*, respectively. The mid-back contrast is exemplified by eight MPs such as *road* – *rod*, *sew* – *saw* and the high-back distinction by 2 pairs, namely, *fool* – *full* and *pool* – *pull*.

Of particular relevance in the MWNAE dialect, there are MPs in the GSL that contrast the mid central vowel schwa, /ə/, with all but one of the other vowel segments. Evidence of this intra-systemic contrast is important because non-stressed vowels are usually reduced to schwa in MWNAE. Examples of schwa contrasting with front vowels include *hut* – *heat*, *hut* – *hit*, *hut* – *hate*, *what* – *wet*, *hut* – *hat*. Instances where schwa contrasts with back vowels include *hut* – *hot*, *lung* – *long*, *cut* – *coat*, *luck* – *look*, *shut* – *shoot* and pairs differentiating schwa and diphthongs include *shut* – *shout*, *hut* – *height*.

The description so far has characterized the GSL words in terms of individual segments. We now turn our attention to types of consonant clusters and how they combine to form syllables.

All languages abide by certain parameters (phonotactic constraints) when it comes to consonant cluster sequences and syllable shapes. These parameters pertain not only to the type of consonants involved in clusters but also to the location in a syllable where certain sequences occur (before or after the nucleus). More importantly, each language is characterized by a distinct collection of patterns. Speakers of English – or any other language – learn these patterns unconsciously and, when confronted with unknown words, are able to recognize these as belonging to English according to previous exposure to English-specific patterns of sounds. In other words, we base our decision on our understanding of language-specific phonotactic constraints. Consequently, it is important to keep in mind that learning a language implies learning its phonotactic constraints.

Phonotactic constraints are, therefore, used to describe the language-specific distributional restrictions that apply to syllable structure and its constituents, generally described in terms of the onset, nucleus, and coda. The onset refers to the consonant segments that come before the vowel or vowels (commonly called the nucleus) and the coda refers to the consonant segments that follow the nucleus. In English, onsets and codas can contain from 0 to 3 consonant segments before adding any kind of affixation.

Kreidler (1997) explains that onset cluster sequences in English are shaped by the following parameters. When two segments occur in the onset, they tend to follow the scale of sonority; the most sonorant being closest to the nucleus. Thus, an obstruent (plosive or fricative) may be followed by a sonorant consonant (liquid, glide, nasal) and a nasal may be followed by a glide as in C + (r,l), C + (w,j), C + (n,m), C^n + (w,j) sequences. Specifically, combinations of the following occur in English: (p,b,t,d,k,g,f,θ,s,ʃ,v,h) + (r,l), (t,d,k,g,θ,s,v,h) + (w,j), (s) + (n,m), and (m,n) + (w,j). Thus, bisegmental onset clusters beginning with a plosive are /pr/ – /pl/ – /pj/ – /br/ – /bl/ – /bj/ – /tr/ – /tw/ – /dr/ – /dw/ – /kr/ – /kl/ – /kw/ – /kj/ – /gr/ – /gl/ – /gw/ – /gj/; bisegmental onset clusters beginning with a fricative are /fr/ – /fl/ – /θr/ – /θw/ – /sp/ – /st/ – /sf/ – /sk/ – /sl/ – /sw/

– /sn/ – /sm/ – /ʃr/ – /vj/ – /hj/; bisegmental onset clusters beginning with a liquid or nasal are /mj/ – /nj/ – /lj/. Trisegmental onset clusters are /spr/ – /spl/ – /spj/ – /str/ – /skr/ – skl/ – /skw/ – /skj/.

The 4,056 syllables (2,005 unique types) that form the GSL words contain instances of 38 out of 44 possible onset cluster types. All but one of the 18 bisegmental onset cluster types beginning with a plosive are exemplified by GSL words such as *approve*, *applaud*, *pupil*, *brain*, *blame*, *beauty*, *hatred*, *twist*, *drawer*, *cream*, *clay*, *liquid*, *cure*, *agree*, *glory*, *language*, *figure*. Most of the bisegmental cluster types that start with a fricative (12 out of 15) are exemplified by words like *frame*, *flavor*, *throw*, *despair*, *beast*, *scale*, *sweeten*, *snow*, *smoke*, *review*, *human*. Additionally, GSL words illustrate all of the bisegmental cluster types that begin with a liquid or nasal (as in *music*, *opinion*, *failure)* and six out of eight of the trisegmental combinations (as in *spring*, *splendid*, *strap*, *scrape*, *square*, *rescue)*.

It is worth noting that the missing clusters (/dw/, /θw/, /sf/, /ʃr/, /spj/, and /skl/) appear in very limited distribution across the lexicon at large. Searches through a monolingual English dictionary containing more than 150,000 entries reveal that: the cluster /dw/ is restricted to words such as *dwarf*, *Dwight*, and *dwindle*; the cluster /θw/ is found only in words related to *thwart*; the cluster /sf/ appears in words such as *sphere*, *asphalt*, *asphyxia*, and other scientific terms like *phosphate*; the cluster /ʃr/ is limited to words related to *shrimp*, *shrew*, and *shrink*; the cluster /spj/ is found in words related to *spew*; and the cluster /skl/ appears in words relating to biology and medicine such as *sclerosis*, *caiman sclerops*, and *sclera*.

Coda clusters tend to be comprised of similar constituents as onset clusters but the ordering is reversed. This tendency is also attributed to the scale of sonority which, as mentioned, states that more sonorant sounds will be closer to the nucleus. According to Kreidler (1997) constraints on

English coda clusters are outlined as follows: bisegmental codas may be comprised of 2 voiceless obstruents (including /s/ or /t/ or both), /r/ + /l/, and liquid/nasal + obstruent as well as a voiced stop + a voiced fricative; trisegmental coda clusters yield liquid/nasal + 2 voiceless obstruents (always including /s/ or /t/) as well as clusters composed of three obstruent segments. Thus, bisegmental coda clusters beginning with a plosive are /pt/ – /ps/ – /dz/ – /ts/ – /kt/ – /ks/; bisegmental clusters beginning with a fricative are /sp/ – /st/ – /sk/; bisegmental clusters beginning with a liquid retroflex are /rp/ – /rb/ – /rm/ – /rt/ – /rd/ – /rn/ – /rθ/ – /rf/ – /rv/ – /rs/ – /rz/ – /rl/ – /rʃ/ – /rtʃ/ – /rk/ – /rg/; bisegmental clusters beginning with a liquid lateral are /lp/ – /lb/ – /lm/ – /ln/ – /lt/ – /ld/ – /ln/ – /lθ/ – /lf/ – /lv/ – /ls/ – /lʃ/ – /ltʃ/ – /lʤ/ – /lk/; bisegmental coda clusters beginning with a nasal are /mp/ – /mf/ – /nt/ – /nd/ – /nθ/ – /ns/ – /nz/ – /ntʃ/ – /nʤ/ – /ŋk/; and a single bisegmental coda cluster composed of voiced stop + voiced fricative, /dz/. Trisegmental coda clusters beginning with a plosive are /dst/ – /kst/; trisegmental coda clusters beginning with a liquid are /rps/ – /rmθ/ – /rts/ – /rst/ – /rld/; trisegmental coda clusters beginning with a nasal are /mpt/ – /mps/ – /nst/ – /ŋkt/ – /ŋks/ – /ŋst/. Kreidler (1989) makes the observation that there is only one word in the entire English lexicon that has a coda consisting of three voiced segments; this one word – *world* – is included in the GSL.

The GSL words contain instances of 38 of the 50 bisegmental coda clusters and 7 of the 13 trisegmental. Examples of bisegmental codas beginning with a plosive are *adopt*, *perhaps*, *besides*, *district*, *wax*; examples of those beginning with a fricative are *boast*, *risk*; examples beginning with a liquid retroflex are *sharp*, *verb*, *charm*, *cart*, *card*, *burn*, *earth*, *observe*, *coarse*, *deserve*, *pearl*, *march*, *cork*; examples beginning with a liquid lateral are *help*, *film*, *fault*, *child*, *wealth*, *self*, *solve*, *false*, *silk*; examples beginning with a nasal are *damp*, *agent*, *band*, *month*, *dance*, *translate*, *lunch*, *orange*, *drink*. Trisegmental coda cluster types beginning with a plosive, a liquid, or nasal are exemplified by *next – warmth*, *first*, *world – prompt*, *against*, and *amongst*, respectively.

Eighteen coda sequences are not present among the GSL words. This number, however, is somewhat misleading because six of them would be found among GSL word family members (which are implicitly included in the GSL). These 6 missing coda clusters are used to construct plural/third person forms and include final voiced or voiceless alveolar fricatives – /ts/, /bz/, /rts/, /mps/, /ŋks/. Plural/third person forms of headwords such as *permit*, *rub*, *part*, *stamp*, *think* illustrate these consonant combinations. The sixth missing cluster, /ŋkt/, is illustrated by the past participle form of the GSL headword *rank*. If these six clusters are included, GSL words illustrate 51 out of 63 of the coda clusters used in English. As with the absent onset clusters, dictionary searches indicate that the remainder of the missing coda combinations occur in very limited distribution in the English lexicon as a whole.

Summing up, the question is: Does the GSL contain instances of all onset and coda consonant clusters? The majority of clusters are accounted for directly especially if implicit family members are also taken into account. We arrive at a total of 38 out of 44 (86.3%) onset clusters and 51 out of 63 (81%) coda clusters manifested throughout the GSL. In short, the range and number of consonant clusters present in the GSL are sufficient to deduce the phonotactics of English.

There is one final question: Does the GSL exhibit the range of English syllable shapes? Yes, if inflected forms are taken into consideration. In general terms, English syllables shapes are determined by they type of vowel in the nucleus – free or checked. Both types of vowels can be preceded by 0 to 3 consonants but free vowels are followed by 0 to 2 consonants and checked vowels are followed by 1 to 3 consonants (Kreidler, 1989; 1997). The GSL headwords instantiate all but one of the possible syllable shapes. The exception is the CCCVCCC shape although this shape would be illustrated by inflected forms of headwords such as the plural of *strength* which is in the GSL.

The purpose of this paper has been to present a phonetic guide to the GSL. The observations made here indicate that this set of words provides a comprehensive representation of certain aspects of the phonetics English language. In particular, all phonetic segments are exemplified by the GSL and can be deduced via minimal pair contrasts. Additionally, the diversity of consonant cluster types and syllable shapes proves sufficient to extract the phonotactic constraints of the entire language.

From a language learning perspective, this phonetic guide implies that explicit and intentional exposure to this restricted set of words alone can provide speakers with sufficient evidence from which to construct the phonetic inventory of English and from which to generate the parameters of its distributive properties.

With this in mind, we can say that the GSL provides comprehensive phonetic coverage of the English language in addition to its well-established vocabulary coverage. It all translates into an empirically and pedagogically-sound basis for use in exemplification in pronunciation training. Of crucial relevance, the use of the GSL imposes no constraints or special pedagogical demands (quite the opposite), making it a seamless addition to any established teaching method whether targeting segmental discrimination skills (Celce-Murcia, 1996; Cross, 1992; Dalton & Seidlehoffer, 1994), focusing on functional load (Catford, 1987; Derwing & Munro, 2005), illustrating suprasegmental processes (Gilbert, 1993), or working on communicative aspects that combine the segmental and beyond (Fraser, 2000; Kjellin, 1999; Morley, 1999; Neufeld, 1978).

The development of materials suitable for pronunciation (and vocabulary) training is not without difficulty. To this end, we are making available a number of resources that have proven useful to us. First of all, the GSL as well as the list of GSL MPs can be downloaded from the internet (http://www.sequencepublishing.com). Also on this site, the following software is of relevance: Ichos-GSL, an application that contains the full transcription of the GSL employed in this paper and that makes it possible to carry out relatively sophisticated classifications of GSL headwords according to phonetic and orthographic criteria; Transcripteur, an application designed to simplify the task of creating, maintaining, and managing collections of phonetic transcriptions; BVProfiler, an uncomplicated, fully automatic, vocabulary profiler; TheScribe, an application that integrates a word processor and a word list manager into a real-time vocabulary profiler engine. All these software titles are free to download and use.

The data and findings upon which this phonetic guide of the GSL is based come from a study that will be published in full in due course.

References

Adolphs, S., & Schmitt, N. (2003). Lexical coverage of spoken discourse. Applied Linguistics 24, 425–438.

Adolphs, S. & Schmitt, N. (2004). Vocabulary coverage according to spoken context. In: P. Bogaards, P., Laufer, B. (Eds.), Vocabulary in a Second Language. John Benjamins Publishing, Amsterdam, pp 39–49.

Bauman, J., Culligan, B. 1995. About the General Service List. Retrieved September 21, 2006, from http://jbauman.com/aboutgsl.html.

Carter, R., McCarthy, M., 1988. Vocabulary and Language Teaching. Longman,

London.
Catford, J.C., 1987. Phonetics and the teaching of pronunciation. In: Morley, J. (Ed.) Current Perspectives on Pronunciation: Practices Anchored in Theory, TESOL, Washington, D.C., pp. 83–100.
Celce-Murcia, M., Brinton, D.M., Goodwin, J.M., 1996. Teaching Pronunciation: A Reference for Teachers of English to Speakers of Other Languages. Cambridge University Press, Cambridge.
Cross, D., 1992. A Practical Handbook of Language Teaching. Prentice Hall, London.
Dalton, C., Seidlehoffer, B., 1994. Pronunciation. Oxford University Press, Oxford.
Derwing, T.M., Munro, M., 2005. Second language accent and pronunciation teaching: A research-based approach, TESOL Quarterly 39 (3), 379–398.
Fraser, H., 2000. Tips for teaching pronunciation: Recording students' voices. ATESOL Journal, ACT and NSW.
Gilbert, J., 1993. Clear Speech: Pronunciation and Listening Comprehension in North American English (2nd ed., Teacher's Resource Book). Cambridge University Press, New York.
Kjellin, O., 1999. Accent addition: Prosody and perception facilitates second language learning. In: Fujimura, O., Joseph, B.D., Palek, B. (Eds.), Proceedings of Linguistics and Phonetics Conference '98 at Ohio State University, The Karolinum Press, Prague, pp. 373–398.
Kreidler, C., 1989. The Pronunciation of English: A Course Book in Phonology, Blackwell, Oxford.
Kreidler, C., 1997. Describing Spoken English: An Introduction, Routledge, London.
Ladefoged, P., 2001. A Course in Phonetics, fourth ed., Harcourt, Brace, Jovanovich, New York.
Ladefoged, P., 2004. Vowels and Consonants, second ed., Blackwell, Oxford.
Lorge, I., Thorndike, E.L., 1938. A Semantic Count of English Words. Teachers College, Columbia University, New York.
Morley, J. 1999. Rapid Review of Vowel & Prosodic Contexts. The University of Michigan Press, Ann Arbor.
Nation, P., 1990. Teaching and Learning Vocabulary. Newbury House, Boston.

Nation, I.S.P., 2001. Learning Vocabulary in Another Language, Cambridge Applied Linguistics Series, Cambridge University Press, Cambridge.

Nation, P., Waring, R., 1997. Vocabulary size, text coverage, and word lists. In: Schmitt, N., McCarthy, M. (Eds), 1997. Vocabulary: Description, Acquisition and Pedagogy. Cambridge University Press, Cambridge, pp. 6–19.

Neufeld, G. 1978. On the acquisition of prosodic and articulatory features in adult language learning. The Canadian Modern Language Review 34, 163–174.

O'Grady, W., Dobrovolsky, M., Aronoff, M., 1993. Contemporary Linguistics: An Introduction, second ed., St. Martin's Press. NY.

Schmitt, N., 2000. Vocabulary in Language Teaching. Cambridge University Press, Cambridge.

West, M., 1953. A General Service List of English Words. Longman, London.

Zimmerman, C.B., 1997. Historical trends in second language vocabulary instruction. In: Coady, J., Huckin, T. (Eds.), Second Language Vocabulary Acquisition. Cambridge University Press, Cambridge, pp. 5–19.