Author: McLeod, Sharynne
Email address:- smcleod@csu.edu.au
Year:- 2007
Title: A comparison of features of speech across 24 languages
Journal ACQuiring knowledge in speech, language and hearing
Volume: 9
Issue: 2
Pages: 74-78
ISSN: 1441-6727
Abstract: This paper provides a systematic review and comparison of the features of speech for 24 languages other than English: Jordanian Arabic, Lebanese Arabic, Cantonese, Dutch, Filipino, Finnish, French, German, Greek, Hungarian, Israeli Hebrew, Japanese, Korean, Maltese, Norwegian, Portuguese, Putonghua, Sesotho, Spanish, Thai, Turkish, Vietnamese, Welsh, and Zaptoec. Comparisons are made between the number of consonants, number of vowels/diphthongs, allowable syllable shapes, presence of consonant clusters, tones, and stress patterns. These data can be used in speech assessments and the development of appropriate intervention goals and efficacious intervention with these children from diverse language backgrounds.

A Comparison of Features of Speech Across 24 Languages

Sharynne McLeod

This paper provides a summary of the features of speech for 24 languages other than English: Jordanian Arabic, Lebanese Arabic, Cantonese, Dutch, Filipino, Finnish, French, German, Greek, Hungarian, Israeli Hebrew, Japanese, Korean, Maltese, Norwegian, Portuguese, Putonghua, Sesotho, Spanish, Thai, Turkish, Vietnamese, Welsh, and Zaptoec. Comparisons are made between the number of consonants, number of vowels/diphthongs, allowable syllable shapes, presence of consonant clusters, tones, and stress patterns. These data can be used in speech assessments and the development of appropriate intervention goals and efficacious intervention with these children from diverse language backgrounds.

Keywords:
acquisition,
assessment,
languages other than English,
speech

Throughout the world, most children accomplish the ability to speak intelligibly as a natural and effortless part of their daily lives. Some children do not, and require additional input from speech-language pathologists (SLPs). Many children seen by SLPs in English-speaking countries speak many other languages in addition to English. When SLPs conduct speech assessments with these children, it is important that they consider similarities and differences between these children's spoken languages in order to differentiate between speech impairment and features of typical speech acquisition. Additionally, understanding comparative features of languages spoken by children is facilitative in the development of appropriate intervention goals and efficacious intervention. As stated by Gildersleeve-Neumann (2005, p. 10), "Even if speech-language pathologists (SLPs) rely on others for the L1 assessment and treatment of the bilingual child, they must have a complete understanding of the child's phonological system to oversee treatment."

To illustrate the significance of understanding a child's total phonological system two examples will be provided. The first example applies to assessment, the second to intervention. If a SLP is assessing a child whose first language is Turkish and during the SLP assessment it is determined that the child is unable to produce word-initial consonant clusters in English, then it is important to know that word-initial consonant clusters are not produced in Turkish. Additionally, it is useful to know that Turkish does have word-final consonant clusters, and that there are studies regarding the age of acquisition of Turkish word-final consonant clusters and the phonological processes that affect them (e.g., Topbaş, Kopkalli-Yavuz, & Ünal, 2006). The second example comes from de Montfort Supple (1992) who described speech intervention for a 12-year-old boy from western Ireland to remediate production of [ʃa] for /s/. Although intervention successfully corrected the production of /s/, he continued to use [ʃh] as it was typical of his ambient language. In each example, understanding of all of the languages and dialects spoken by the child is essential for appropriate SLP assessment and intervention practices.

In order to underpin decision-making regarding children who speak a number of languages, SLPs (especially those who are not conversant with the all of the languages spoken by the children they see in their clinical practice) need information regarding comparisons between English other languages. A comparative summary of the features of speech of 24 of the world's languages is provided in Appendix A. This summary includes comparisons between the numbers of consonants, vowels, diphthongs, and consonant clusters, as well as comparisons of syllable structure, tones, and stress. Additionally, it includes the number of studies regarding speech acquisition for each of these languages. The data in Appendix A have been compiled by accessing descriptions of dialects and languages from *The International Guide to Speech Acquisition* (McLeod, 2007), a comprehensive book written for SLPs and educators who work with children from a variety of linguistic and cultural backgrounds. As illustrated in Appendix A, there are many differences between languages with respect to the building blocks of speech. For example, the number of consonants in the 24 languages listed in Appendix A ranges from 13 to more than 40. The vowels (including diphthongs and triphthongs) have a greater range, from 5 to 39. The language with the largest number of vowels is Thai, with 18 vowel forms, 15–18 diphthongs, and 3 triphthongs. Even within English there is a wide range in the number of vowels and diphthongs. General American English has between 18–19 monophthongs and 3–4 diphthongs, whereas Received Pronunciation (RP), as spoken in England, only has 12 monophthongs and 8 diphthongs. This information matters when SLPs work with children speak very different languages. The impact of the structure of one language may affect a child's ability to produce features of another language.

The complexity of the syllable structure also differs significantly between languages. For example, the syllable structure of Cantonese is relatively simple compared to English. The Cantonese syllable structure is $C_{(0–1)}VC_{(0–1)}$; thus, the most complex syllable in Cantonese is consonant–vowel–consonant. In comparison, the English syllable structure is $C_{(0–3)}VC_{(0–4)}$ and the most complex syllable in English is a three-element consonant cluster – vowel – four-element consonant cluster (e.g., *strengths*). It is possible that children who speak Cantonese may have difficulties producing consonant clusters in English. Indeed, of the 24 languages in Appendix A at least 5 do not contain consonant clusters. When asking what is the impact of each of the languages spoken by a child it is important to acknowledge that phonotactic complexity of a language influences children's speech acquisition (e.g., cluster reduction, final consonant deletion, weak syllable deletion) and to consider this when assessing and planning intervention for all children with speech impairment.

The complexity of languages may also contribute to the age of acquisition of the repertoire of speech sounds for a particular

language. As previously mentioned, the syllable structure of Cantonese is relatively simple compared to English. So and Dodd (1995) demonstrate that typically developing Cantonese children have mastered acquisition of all consonants (90% criterion) by age 4;9, with seven of the 19 consonants being acquired by 2;6 years. In contrast Smit, Hand, Frelinger, Bernthal and Bird (1990) demonstrate that typically developing speakers of General American English have mastered acquisition of all consonants (90% criterion) by age 9;0. Smit et al. did not assess children under 3;0; however, they found that only five of the 24 consonants were acquired by both boys and girls at age 3;0 years. Greater evidence is needed to support the claim that the complexity of the languages contributes to the age of acquisition of the speech sounds; however, the examples provided above demonstrate the importance of considering all phonological systems spoken by a child.

In addition to consideration of the segmental aspects of language, the suprasegmental aspects of languages are important factors to understand during assessment and intervention for children who speak languages other than English. For example, tones are used in the following languages featured in Appendix A: Cantonese, Dutch (southern), Japanese, Norwegian, Putonghua, Sesotho, Thai, and Vietnamese. Cantonese uses the most tones (9) whereas the Khoisan language Sesotho (spoken in Africa) uses 2 tones as well as 40 different consonants including a click. Interestingly, Dutch as spoken in the southern area uses tones, whereas Dutch spoken in the northern area does not. While English does not use tones, difficulties with production of tones will have an impact on intelligibility in these languages and should be considered in assessment and possibly intervention.

Typical speech acquisition

"An important challenge to ethical clinical practices is the SLP's ability to use typical speech acquisition milestones using normative data from each child's ambient language" (Davis, 2007, p. 51). While some may consider there are limited sources of typical speech acquisition data for languages other than English, the fact is that there are more data than are commonly acknowledged within many English-language journals and text books. As can be seen in Appendix A, for the 23 languages other than English listed, there are at least 211 studies of typical speech acquisition. However, many of these 211 studies of typical speech acquisition are written in languages other than English, and many come from doctoral and masters dissertations in those non-English languages so are not readily accessible. For example, every one of the 18 studies on Korean speech acquisition is written in Korean (Kim & Pae, 2007). Similarly, the majority of studies about typical speech acquisition of Brazilian Portuguese, Israeli Hebrew, Hungarian, Norwegian, Turkish and Japanese are written in the focus language and have not been translated into English. *The International Guide to Speech Acquisition* (McLeod, 2007) is one resource that contains summaries of typical speech acquisition for English dialects as well as the 23 other languages included in Appendix A. When SLPs are considering speech acquisition for speakers of different languages and English dialects, it is important to consider the following, and to determine whether norms are available in the languages of the children seen within the SLP clinic:

- age of acquisition of consonants, consonant clusters, and vowels
- percent correct of consonants, consonant clusters, and vowels
- phonological processes
- intelligibility
- common mismatches
- acquisition of syllable structure
- acquisition of prosody
- acquisition of phonological awareness

In order to acquire speech, there are a number of foundational aspects that are common across all children in the world. *The International Classification of Functioning Disability and Health* (ICF) (World Health Organization, 2001) can be used as a framework for understanding these common foundations. Consideration of the ICF enables us to regard the complex interaction between body structure (hearing mechanisms, oral structures, neurology), body function (ability to perceive and produce intelligible consonants and vowels within words), and the ability to participate and communicate successfully within a child's environment. Each of these aspects of body structure, body function, activity and participation should be considered during SLP assessment and intervention with all children. Additionally, there are unique personal and environmental influences on each child.

To conclude, in order for SLPs to conduct informed, comprehensive, and efficacious speech assessments and intervention for children who speak languages other than English, it is important to compare the features of each of the languages spoken by the child. Additionally, SLPs should be aware of any normative information that may be available for each of the child's languages. Finally, consideration of body structure, body function, activity and participation, environmental and personal factors is relevant for all children, regardless of the language(s) they speak.

Acknowledgment

This paper has been reprinted from *Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse Populations*, 14(1), 2007, the peer-reviewed member publication of ASHA Special Interest Division 14, with permission from the American Speech-Language-Hearing Association.

References

Davis, B. L. (2007). Applications of typical acquisition information to understanding of speech impairment. In S. McLeod (Ed.), *The international guide to speech acquisition*. Clifton Park, NY: Thomson Delmar Learning.

de Montfort Supple, M. (1992). Sociolinguistics: The clinical perspective. In M. M. Leahy & J. Kallen (Eds.), *Interdisciplinary perspectives in speech and language pathology* (pp. 24–29). Dublin: Trinity College, Dublin.

Gildersleeve-Neumann, C. (2005). A framework for speech sound intervention in a bilingual child. *Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse Populations*, 12(2), 10–13.

Kim, M., & Pae, S. (2007). Korean speech acquisition. In S. McLeod (Ed.), *The international guide to speech acquisition*. Clifton Park, NY: Thomson Delmar Learning.

McLeod, S. (Ed.). (2007). *The international guide to speech acquisition*. Clifton Park, NY: Thomson Delmar Learning.

Smit, A. B., Hand, L., Frelinger, J. J., Bernthal, J. E., & Bird, A. (1990). The Iowa articulation norms project and its Nebraska replication. *Journal of Speech and Hearing Disorders*, *55*, 779–798.

So, L. K. H., & Dodd, B. J. (1995). The acquisition of phonology by Cantonese-speaking children. *Journal of Child Language*, *22*, 473–495.

Topbaş, S., Kopkalli-Yavuz, H., & Ünal, Ö. (2006, May/June). Reviewing sonority for word-final consonant cluster simplifications in Turkish. Paper presented at the 11th meeting of the International Clinical Phonetics and Linguistics Association, Dubrovnik, Croatia.

World Health Organization. (2001). *ICF: International classification of functioning, disability and health*. Geneva: author.

Sharynne McLeod is an associate professor in speech and language acquisition at Charles Sturt University. She is editor of *Advances in Speech-Language Pathology* and a Fellow of Speech Pathology Australia and vice president of the International Clinical Linguistics and Phonetics Association.

Correspondence to:
Associate Professor Sharynne McLeod
School of Teacher Education
Charles Sturt University
Panorama Ave, Bathurst, NSW 2795
phone: 02 6338 4463; fax: 02 6338 4417
email: smcleod@csu.edu.au

Appendix A. The building blocks of speech acquisition for 24 languages

Language	*Source**	*No. of consonants*	*No. of vowels/ diphthongs*	*Syllables*	*Consonant clusters*	*Tones*	*Stress*	*No. of studies of speech acquisition*
English: General American (GAE)	Smit (2007)	24	18–19 monophthongs + 3–4 diphthongs	$C_{(0–3)}$ $VC_{(0–4)}$	Syllable-initial & syllable-final	No	Stress-timed language	31
English: Received Pronunciation (RP)	Howard (2007)	24	12 monophthongs + 8 diphthongs	$C_{(0–3)}$ $VC_{(0–4)}$	Syllable-initial & syllable-final (no /r/ final clusters)	No	Stress-timed language	2
English: Australian	McLeod (2007)	24	12 monophthongs + 8 diphthongs	$C_{(0–3)}$ $VC_{(0–4)}$	Syllable-initial & syllable-final (no /r/ final clusters)	No	Stress-timed language	15
Jordanian Arabic	Dyson & Amayreh (2007)	28	6 monophthongs + 2 diphthongs	$C_{(1–2)}$ $V_{(1–2)}$ $C_{(0–2)}$	Mainly syllable-final	No	Syllables are light or heavy	6
Lebanese Arabic	Khattab (2007)	27	12 monophthongs + 5 diphthongs	$C_{(1–2)}$ $V_{(1–2)}$ $C_{(0–2)}$ + more syllable types are possible due to vowel elision	Yes	No	Trochaic word-stress pattern	2
Cantonese	So (2007)	19	11 monophthongs (8 are contrastive) + 11 diphthongs	(C)V(C)	Labialised velars /kw, kwh/ may be treated as clusters	Yes – 9 tones	Syllable-timed language	7
Dutch	Mennen, Levelt, & Gerrits (2007)	23	14 monophthongs + 3 diphthongs	$C_{(0–3)}$ $VC_{(0–4)}$	Syllable-initial & syllable-final	Standard Dutch – no Southern Dutch – yes	Stress-timed language	4
Filipino	Malabonga & Marinova-Todd (2007)	23	5 monophthongs + 6 diphthongs	$CVC_{(0–1)}$	None (only in borrowed words)	No	Stress used to differentiate meaning	2

Appendix A. The building blocks of speech acquisition for 24 languages (continued)

Language	*Source**	*No. of consonants*	*No. of vowels/ diphthongs*	*Syllables*	*Consonant clusters*	*Tones*	*Stress*	*No. of studies of speech acquisition*
Finnish	Kunnari & Savinainen-Makkonen (2007)	13	8 mono-phthongs + 18 diphthongs + 20 two vowel combinations	$C_{(0–2)}$ V(V/C) $C_{(0–1)}$	Rare (mainly in borrowed words)	No	Fixed stress	28
French	Rose & Wauquier-Gravelines (2007)	21	14 vowels (France) 19 vowels (Quebec)	$C^{(0–3)}$ $VC_{(0–3)}$	Syllable-initial & syllable-final	No	Stress is related to the syntactic structure of the utterance	7
German	Fox (2007)	23	15 mono-phthongs + 3 diphthongs	$C_{(0–3)}$ $VC_{(0–3)}$	Syllable-initial & syllable-final	No	Stress-timed language. Similar to English with some modifications	17
Greek	Mennen & Okalidou (2007)	31	5 mono -phthongs	$C_{(0–3)}$ $VC_{(0–1)}$	65 syllable-initial clusters (no syllable-final)	No	Main stress falls on one of the last three syllables.	7
Hungarian	Zajdó (2007)	25	14 mono-phthongs with 9 vowel qualities	$C_{(0–3)}$ $VC_{(0–3)}$	50 word-initial CC clusters, 5 word-initial CCC clusters, 150 word-final CC clusters, 18 word-final CCC clusters	No	Typically uses first-syllable stress	8
Israeli Hebrew	Ben-David & Berman (2007)	23	5 mono-phthongs + several word-final diphthongs	$C_{(0–2)}$ $VC_{(0–2)}$	Wide variety in syllable-initial & syllable-final	No	Mainly word-final stress	6
Japanese	Ota & Ueda (2007)	15	10 mono-phthongs	C(j)VVC	Two element syllable-initial /j/ clusters only	Lexical pitch accent language	No lexical stress	18
Korean	Kim & Pae (2007)	19	7 mono-phthongs + 10 diphthongs	$C_{(0–1)}$ $VC_{(0–1)}$	No syllable-initial or syllable-final only intersyllabic	No	Stress on first syllable	18
Maltese	Grech (2007)	22	11 mono-phthongs + 7 diphthongs	$C_{(0–3)}$ $VC_{(0–2)}$	Syllable-initial & syllable-final	No	Long vowels are stressed. Stress on the last syllable in multisyllabic words	3
Norwegian	Kristof fersen (2007)	22	19 vowels + 3 diphthongs	$C_{(0–3)}$ $VC_{(0–2)}$	Syllable-initial & syllable-final	Lexical tones differen-tiate meaning	Uses primary, secondary or no stress	3

Appendix A. The building blocks of speech acquisition for 24 languages (continued)

Language	*Source**	*No. of consonants*	*No. of vowels/ diphthongs*	*Syllables*	*Consonant clusters*	*Tones*	*Stress*	*No. of studies of speech* acquisition
Portuguese	Yava_ & Mota (2007)	19	12 mono-phthongs + 14 diphthongs	$C_{(0–2)}$ $VC_{(0–2)}$	Syllable-initial	No	Stress usually falls on the penultimate syllable	18
Putonghua	Hua (2007)	22	9 mono-phthongs + 9 diphthongs + 4 triphthongs	$C_{(0–1)}$ $VC_{(0–1)}$	None	Yes – 4 tones	Weak stress is an essential prosodic feature	11
Sesotho	Demuth (2007)	40 (including 1 click)	9 mono-phthongs	(C)(G)V; mostly CV	Syllable-initial with glides	Yes – 2 tones	Lengthen the penultimate syllable of a phonological phrase	8
Spanish	Goldstein (2007)	18	5 mono-phthongs	$C_{(0–2)}$ $VC_{(0–2)}$	A large number of syllable-initial clusters and abutting pairs	No	Syllable-timed language. Stress placed on the penultimate syllable of words ending in vowels and on final syllable in other words	12
Thai	Lorwatan apongsa & Maroonroge (2007)	44 consonant forms & 21 consonant sounds	18 vowel forms + 15–18 diphthongs + 3 triphthongs	CV, VC, CVV, CVC	15 syllable-initial clusters	Yes – 5 tones	Syllable-timed language	3
Turkish	Topba_ (2007)	21	8 mono-phthongs	$C_{(0–1)}$ $VC_{(0–2)}$	Syllable-final	No	Syllable-timed language. Stress usually falls on the last syllable	14
Vietnamese	Hwa-Froelich (2007)	24	11 mono-phthongs + diphthongs + triphthongs	$C_{(0–1)}$ $w_{(0–1)}$ $V_{(1–2)}$ $C_{(0–1)}$	None	Yes – 6 tones	Three stress levels: loud, medium and weak	0
Welsh	Munro, Ball, & Müller (2007)	25	North: 13 mono-phthongs + 13 diphthongs South: 11 monophthongs + 8 diphthongs	$C_{(0–3)}$ $VC_{(0–2)}$	Syllable-initial & syllable-final	No	Word stress is regularly on the penult	3
Zaptoec	Stemberger & Lee (2007)	28	6 mono-phthongs + 9 diphthongs	Min-imum = V Max imum = CCGV-VVCG	Syllable-initial. Syllable-final consist of consonant + glide	Yes – 4 tones	The root-final syllable is generally stressed	4

* The source of the data for each row of this Appendix comes from a chapter written by the acknowledged author. Their chapters appear in the following book: McLeod, S. (Ed.). (2007). The international guide to speech acquisition. Clifton Park, NY: Thomson Delmar Learning. Full referencing details for each chapter were not included in order to conserve space, but can be obtained from: smcleod@csu.edu.au or http://tinyurl.com/3d8mw2