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Adapting Cued Speech for Welsh

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Abstract

This paper describes the adaptation of Cued Speech for use with the Welsh language. The background to the development and use of Cued Speech is briefly described, along with the ability to adapt the system for languages other than English. The phonology of Welsh is described, and it is noted that Welsh has two main varieties (northern and southern) that differ phonologically in the number of vocalic units that are used, as well as some differences in the consonantal system. The Cued Speech adaptation needed to be able to account for these dialectal differences. The large number of vocalic units in Welsh, and a number of unusual consonants resulted in modifications to the vowel positions and consonant handshapes. With the formal adaptation of Cued Welsh, deaf individuals have the opportunity to acquire access to the spoken form of the Welsh language. Readers working with Cued Speech and wishing to adapt it to new language varieties will find the example illustrated in this paper interesting and instructive.

Keywords: *Deafness, cued speech, Welsh.*

Introduction

Cued Speech

Cued Speech was devised and patented in 1966 by Dr R. Orin Cornett, Professor Emeritus in Audiology at Gallaudet University, Washington DC. Cued Speech is a combination of cues and speech designed to make spoken language clear through vision, with or without the aid of residual hearing (Cornett & Daisey, 1992). In English it utilizes eight handshapes and four hand placements (“cues”) near the mouth to supplement the normal visible manifestations of speech. This helps make speech sounds that look the same on the mouth look different from each other on the hand, and all the sounds which look alike on the hand different on the mouth. However, none look the same on both the hand and the mouth, so the deaf child can always see a difference, just as the hearing child can hear a difference, between different phonemes. Cornett and Daisey (1992) note that the basic skills of Cued Speech can be mastered in courses of between 15 and 30 hours and that fluency increases with usage. Cornett (1993) himself explains that the term “Cued Speech” refers to what the system is, not what it is used for, and that despite the word “Speech” in the name the system is not primarily a speech tool. The principle of using two

incomplete sources of information (one of which is designed to supplement and complete the other) to fuse into a whole is central to Cued Speech. So far, Cued Speech has been adapted for 65 languages and dialects, including Welsh (Pamela Beck, Manager Cued Speech Discovery, personal communication, 14 December 2007).

Motivation for a Welsh version of Cued Speech

There are approximately 437,000 deaf people in Wales, and extrapolating from the census figures of 2001, it is estimated that over 87,000 of them are from Welsh-speaking backgrounds (http://www.wcdeaf.org.uk/did_you_know.htm accessed 12 December 2007).¹ According to the Wales Council for Deaf People (Norman B Moore, Director; personal communication, 12 December 2007) there are currently no available statistics on which communication options are available to deaf children in Wales, in terms of an aural/oral approach, Sign Language, sign supported speech, fingerspelling, etc. However, in many instances communication options are limited and it was the purpose of the project described in this account to extend the range of options.

The main objective of the Cued Speech Association UK (formerly, from 1975 to 1999, The National

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Centre for Cued Speech (NCCS)) is to promote the use of Cued Speech throughout the United Kingdom. This involves promoting Cued Speech, supplying information, courses, certification and support. As the Association is national, it is integral to its function to be able to offer Cued Speech in British English, Welsh English and Welsh, Scottish English and Scots, and Northern Irish English (this last is still under development). This was the motivation for the adaptation of Cued Speech for Welsh. Wales was the last of the four countries to show an interest in Cued Speech being adapted for their language. Since its inception the NCCS and more recently the CSA UK has exhibited and lectured on Cued Speech in all these countries. In 1986 a deaf adult expressed a wish to learn to cue in Welsh but then changed his employment and was unable to follow it up. Courses were requested in Wales and these were provided in Welsh English but the Welsh educational authorities have not as yet encouraged its use in schools. The CSA UK still felt it was its duty to be prepared to provide Cued Speech for Welsh and in 2002 it was able to start on this work. A course was run at the University of Wales Institute, Cardiff, in March 2004. Those who took part were told in advance that they would be the first to use the newly adapted version, and they all agreed it was practical and sound. Part of the course offered basic instruction on how to prepare instruction material by selecting appropriate Welsh vocabulary for step-by-step instruction for teaching deaf people, their family members and professionals who serve the deaf who should wish to learn it.

Research into Cued Speech

The majority of published research regarding the nature and/or effectiveness of Cued Speech has been conducted in French-speaking, English-speaking, or Spanish-speaking countries. Studies concerning the reception and/or processing of Cued Speech (Nichols & Ling, 1982; Alegria & Lechat, 2005), the development of language (Kipila, 1985; Torres, Moreno-Torres, & Santana, 2006), phonological awareness (LaSasso, Crain, & Leybaert, 2003, others), and other component reading processes (Santana, Torres, & Garcia, 2003; Leybaert & Alegria, 1993; Leybaert & Charlier, 1996; Transler, Leybaert, & Gombert, 1999) taken collectively, strongly suggest the efficacy of Cued Speech for providing deaf and hard of hearing children early and complete access to traditionally spoken languages for the subsequent acquisition of literacy.

Research into the reception and/or processing of Cued Speech suggests that deaf cuers are able to perceive and comprehend more information presented to them via cueing than via speechreading alone (Ling & Clarke, 1975; Clarke & Ling, 1976; Nicholls & Ling, 1982; Gregory, 1987), and that deaf people who use Cued Speech receptively are

able to perceive the discrete (i.e., mouth and hand) components of the cued message (Alegria & Lechat, 2005). It has been shown that a hearing parent naïve to Cued Speech can learn to cue at a rate and accuracy level sufficient to deliver linguistically complex information to a deaf child within 2–3 months of learning the system (Torres, Moreno-Torres, & Santana, 2006), and that cueing can provide children with access to complete language, including such function words as prepositions, often missed by deaf children from other communication backgrounds (Santana et al., 2003).

Studies into the development of language via Cued Speech suggest that deaf children of hearing parents who cue their native spoken language can develop that language according to the same milestones as hearing peers (Kipila, 1985) and that children with hearing disorders exposed to multiple languages by fluent models of those languages can develop both languages and become bilingual in a fashion similar to hearing children (Earl, 2006).

Research into the phonological awareness and development of component reading skills of deaf children indicate that those with early and consistent exposure to cueing develop a phonological representation of words in their language (LaSasso, Crain, & Leybaert, 2003), and can learn phonic generalizations for spelling in the same way as hearing children who speak the language (Alegria, Dejean, Capouillez & Leybaert, 1990; Leybaert & Charlier, 1996; Leybaert & Lechat, 2001). Deaf children with early and consistent exposure to cueing at home and at school have demonstrated word coding, memory, and reading abilities similar to hearing peers, and superior to deaf children from other communication backgrounds (Leybaert & Charlier, 1996; Wandel, 1989).

Adapting Cued Speech to other languages and dialects

Requirements for Cued Speech

In describing the process of originally devising Cued Speech for American English, Cornett detailed the requirements that his system, and any future adaptation thereof, would have to satisfy in order to be functional and useful as a means of visually disambiguating the phonemes of a spoken language (Cornett & Daisey, 1992). Those requirements are that: (1) Cued Speech must be clear, making all the essential details of the spoken language visibly evident; (2) it must be oral, so that there is consistent use of and dependence on the information visible on the mouth; (3) any information added to what is available from seeing the mouth must be compatible (in timing, significance, etc.) with what is being said; (4) the system must be learnable by a very young deaf child through the process of consistent exposure to it in the home; (5) it must be learnable by hearing

persons of average ability who are willing to make a reasonable effort to help their child; and (6) it must be usable at near-normal speaking rates, at distances of up to 20 feet (pp. 20–21).

Cornett was personally involved in the adaptation of Cued Speech to over 50 languages and major dialects, and he detailed recommended resources and procedures for adapting Cued Speech to additional languages (Cornett, 1994). The resources deemed necessary were: (1) knowledge of the basic principles of phonetics; (2) access to an authoritative book on the phonetics and phonology of the target language; (3) the assistance of several native speakers of the target language, (4) [technology] for recording and studying speech samples; (5) ability to use Cued Speech accurately; and (6) several hours per day for several weeks, for completion and trial. The recommended procedures for the adaptation were: (1) to study the phonetics of the target language; (2) to compile a complete list of phonemes of the target language; (3) to take note of allophones of various phonemes, in cases in which there may be reason for Cued Speech to distinguish between certain allophones; (4) to group the vowels into groups assigned to the hand locations and the consonants to the hand configurations (generally, it is recommended to start with the assignments used for English and make adaptations only as necessary); and (5) conduct a trial of the adaptation.

The remainder of this paper is concerned with describing one such adaptation (i.e., Welsh), with the hope of codifying and standardizing the process.

A linguistic sketch of Welsh

Welsh is a member of the Brythonic branch of the Celtic group of the Indo-European language family (see Ball & Fife, 1993). According to the 2001 census, Welsh is spoken by 575,168 people in Wales, representing 20.5% of the population over 3 (National Statistics Online, 2003). This percentage is an increase of around 2% since the 1991 census and is the first increase in speakers (both percentage and in real terms) since figures started to be collected in the late 19th century. In the capital city, Cardiff, the number of Welsh speakers has increased from

5.67% of the city's population in 1981 to 10.86% today.

The phonology of Welsh differs from that of English in many respects (see also Jones, 1984; Ball & Williams, 2001; and with regard to speech pathology, Ball, Müller, & Munro, 2006). Table I shows the consonant phoneme system, with the monophthongs and diphthongs displayed in Figures 1–3. In comparison to English, the consonant system lacks /z/, while /z/ is peripheral in that it may be used in borrowings, but only in southern accents. At the same time, the system has the lateral fricative /l/ and the dorsal fricative /χ/ (realized as either velar or uvular), and voiced and voiceless trills /r, r^h/.

Northern standard pronunciation of Welsh will form the basis of this description as the phonological system is larger than in southern varieties. Where they differ, this will be noted. This description is based on Ball (2007).

The consonant system comprises contrastive units in the plosive, nasal, fricative, affricate, trill and approximant categories. There are six plosive phonemes: /p, b, t, d, k, g/ (orthographically *p, t, c, b, d, g*). The apical plosives are normally dental in northern varieties, but alveolar in southern (this distinction also applies to the apical nasal and lateral). There are three contrastive nasal stops: /m, n, ŋ/ (orthographically *m, n, ng*). Nasal mutation (see below) converts /p, t, k/ into /mh, nh, ŋh/ (orthographically *mh, nh, ngh*). These are normally treated as clusters, but there is evidence that some speakers may partially devoice the nasals in these instances (see Ball & Williams, 2001).

Welsh has eight contrastive fricatives: fortis-lenis pairs at the labio-dental, and dental positions, and voiceless fricatives at the alveolar, postalveolar, velar/uvular, and glottal places: /f, v, θ, ð, s, ʃ, χ, h/ (orthographically *ff/ph, f, th, dd, s, si, ch, h*). A voiced alveolar fricative may be used in some loan words from English, especially by southern speakers (e.g., *sw* /su/ ~ /zu/, “zoo”). The point of articulation of the dorsal fricative does appear to vary between velar and uvular (see Ball & Williams, 2001). This may be dialectal (northern varieties seem to use a uvular articulation more often), or an idiosyncratic feature. The glottal

Table I. The consonant phonemes of Welsh.

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Palatal	Velar	Uvular	Glottal
Plosive	p b			t d			k g		
Nasal	m			n			ŋ		
Affricate					tʃ dʒ				
Fricative		f v	θ ð	s (z)	ʃ			χ	h
Lateral fricative				ɬ					
Approximant	w					j			
Lateral Approximant				l					
Trill				r ^h r					

Note: Northern varieties have dental rather than alveolar /t, d, n/. /χ/ may be realized as [x] by some speakers. /z/ is marginal, found in borrowings in southern varieties where northern varieties replace it with /s/. /l/ is clear in southern varieties, and dark in northern.

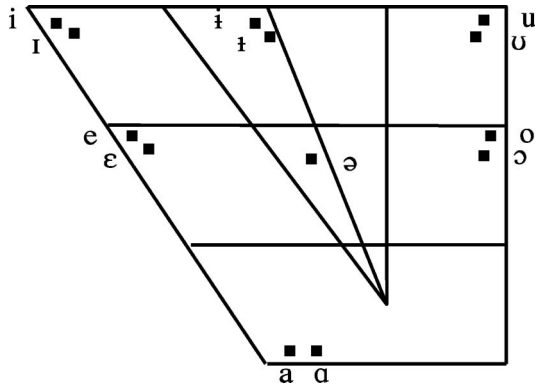


Figure 1. Main variants of the monophthong vowel phonemes of northern Welsh.

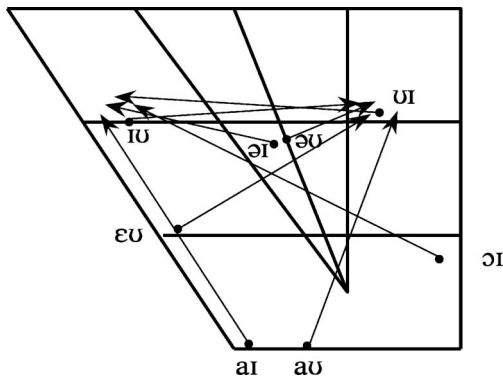


Figure 2. The closing diphthongs of Welsh.

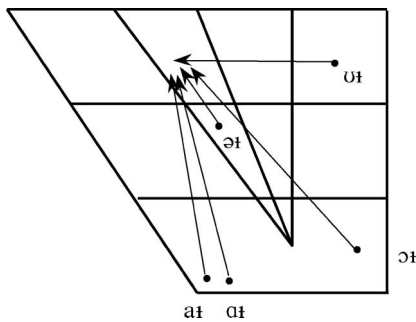


Figure 3. The centring diphthongs of northern Welsh.

fricative is often omitted in casual speech in southern varieties.

Affricates at the postalveolar position (/tʃ, dʒ/) are found in the language, but are the result of borrowings from other languages (*tsi/ts, j*) or are speech rate variants of clusters of /t/+/j/ or /d/+/j/ (e.g., /dʒaʊl/ > /djaʊl/, *diawol* “devil”).

Welsh has a series of four liquids: a voiced and a voiceless trill, a voiced lateral approximant and a voiceless lateral fricative (for the sake of symmetry we class the lateral fricative here with the lateral approximant; this is supported by morphosyntactic alternations between the two): /r, r^h l, l/ (orthographically *r, rh, l, ll*). Examples of these alternations are

rhedeg “run”, *dan redeg* “while running”; *llaw* “hand”, *ei law* “his hand” (see further below on these “initial consonant mutations”). The trills are alveolar, and normally consist of two or three contacts (tapped articulations may also occur); the voiceless trill is normally followed by aspiration, but this phoneme may be missing from southern varieties who merge it with its voiced counterpart. The phonological evidence for full contrastivity between the fortis and lenis trills is not strong. Apart from in loan words, the lenis is restricted to medial and final syllable position, while the fortis occurs only syllable initially. However, the morpho-syntactic alternations known as “soft mutation” (see below) do produce word-initial lenis trills, so in these circumstances a contrast occurs. Similarly, the voiced lateral approximant only occurs word-initially in loans (though both laterals can occur elsewhere), and again mutation can bring about initial contrastivity.

Finally, the language has two central approximants, the labial-velar /w/ and the palatal /j/ (*w, i*). Both approximants have fortis variants in certain morphosyntactic contexts (e.g., *iaith* [jaɪθ] “language” ~ *ei hiaith* [i hjaɪθ] “her language”; *wats* [watʃ] “watch” ~ *ei hwats* [i hwatʃ] “her watch”), but these are normally considered to be clusters of /h/ plus the approximant.

The vowel system is large in northern varieties, with 13 monophthongs and 13 diphthongs. Southern varieties have smaller systems, however, with a formal register probably distinguishing 11 monophthongs and 8 diphthongs. Monophthongs are normally paired in descriptions of the language into phonologically long and short vowels. The short vowels are /ɪ, ɛ, a, ɔ, ʊ, ɨ/ and the long vowels /i, e, ɑ, o, u, i/ (orthographically both sets are *i, e, a, o, w, u/y*; the circumflex is sometimes used to denote a long vowel).² There is also an unpaired mid-central vowel /ə/ (*y*) which, unlike schwa in English, can appear in stressed syllables. It should be noted that generally only northern varieties of Welsh retain the high central vowels, in southern varieties they are merged with the short and long high front vowels. Figure 1 displays the values for the monophthongs in northern varieties of Welsh.

The northern diphthong system has three sub-systems: three glides moving towards the high front position, five glides moving towards a high back position, and five moving towards a high central position (see Figures 2 and 3). This gives us /aɪ, ɔɪ, əɪ/ (*ai, oi, ei*), /ɪʊ, eʊ, aʊ, əʊ, iʊ/ (*iw, ew, aw, yw, uw/yw*) and /aɨ, aɨ, ɔɨ, ʊɨ, əɨ/ (*au, ae, oe, wy, eu*). The main distinction between the diphthongs /aɨ/ and /aɪ/ is that the latter has a longer first element than the former; likewise with /ɔɨ/ and /ɔɪ/, where the latter has a longer first element, though here the final elements are different as well.

In southern varieties, the diphthongs with a close central element replace those with a close front one.

This gives us two subsystems: four glides to a high front position and four to a high back position: /ai, oi, ui, əi/ and /u, eu, au, əu/. It should be noted, however, that in non-formal registers the northern /aɪ/ diphthong may be realized as /a/, while the northern /aɪ/ diphthong may be realized as /oi/.

It is also necessary to consider the mutation system in Welsh. Mutations are phonological changes to word-initial consonants that are triggered by a range of morphosyntactic contexts. Initial consonant mutations are common to all the Celtic languages and are historical remnants of processes once triggered by phonological context, which have subsequently been lost during various sound changes. A full account of mutations and the environments that trigger them is given in Ball and Müller (1992), but we can give a brief description of them here. There are three main sets of consonants changes: soft mutation (SM) or lenition, nasal mutation (NM) or nasalization, and aspirate mutations (AM) or spirantization. Table II shows the changes in orthography and phonology. It should be noted that the reflexes of the mutation system in Welsh are all possible consonants (or consonant clusters) in Welsh. However, the SM reflexes of /l/ and /r^h/ (</l/ and </r/) do not normally occur in word-initial position (with the exceptions noted earlier).

Common triggering environments for these mutations are as follows:

SM: feminine singular noun after the article, after the numeral *un*; adjective following feminine singular noun; word following *ei* ‘his’, *dy* ‘your’ sing. (*cath* ‘cat’; *ei gath*, *dy gath* ‘his cat’, ‘your [sg] cat’); words following a range of common prepositions (*Bangor* place name; *i Fangor*, *o Fangor*, *tuag at Fangor* ‘to Bangor’, ‘from Bangor’, ‘towards Bangor’); verbs following a range of preverbal particles (e.g., marking questions, statements, negatives, e.g., *death e* ‘he came’; ‘*a ddaeth e* ‘did he come?’); items following a range of numeral forms (e.g., *dau/dwy* ‘two’, *ail* ‘second’: *yr ail gath* ‘the second cat’); adjectives following the complementizer *yn* (but not verbs: *pert* ‘pretty’, *mae’r gath yn bert* ‘the cat is pretty’); direct object of an inflected verb (but not of a periphrastic construction: *fe welais gath*

‘I saw a cat’), and adverbials of time (*doe* ‘the day before’; *ddoe* ‘yesterday’), among numerous others. *NM*: words following *fy* ‘my’ (*fy nghath* ‘my cat’); nouns following the preposition *yn* ‘in’ (*ym Mangor*); various set expressions with numerals and time expressions.

AM: words following *ei* ‘her’ (*ei chath* ‘her cat’); words following a range of prepositions (*â*, *gyda* ‘with’, *tua* ‘towards’: *gyda chath* ‘with a cat’); words following various negative particles; words following the numerals *tri* ‘three’ masc., *chwe* ‘six’ (*chew chath* ‘six cats’), and the adverb *tra* ‘very’.

A feature called pre-vocalic aspiration by Ball and Müller (1992) can also occur in some contexts, and here an /h/ is added to vowel- or glide-initial words, for example, following *ei*, *ein*, *eu* ‘her, our, their’ (*ei hafal* ‘her apple’; *ein hiaith* ‘our language’).

Devising a Welsh version of Cued Speech

Resources and requirements

As noted earlier, Cornett (1994) outlined resources and requirements for the adaptation of Cued Speech to other languages. In terms of both the resources and requirements we can note that the first author is a professor of phonetics and has authored a book on the phonetics of Welsh which also lists the phonemes of the two main varieties of the language; the second author had the assistance of Welsh speakers, is an expert on Cued Speech and had the time to trial the proposed adaptation which, as suggested by Cornett (1994) started with the recommended configurations used for English.

The challenges

There were several challenges in the design of a Cued Speech system for Welsh. First, we wished to establish a system that would be workable for speakers of both main regional varieties of the language: northern accents with the fuller vowel system, and southern varieties lacking the close central monophthongs and centering diphthongs. Further, as nearly all Welsh speakers are bilingual in

Table II. Initial consonant mutations.

Radical		Soft Mutation		Nasal Mutation		Aspirate Mutation	
orthographic	phonemic	orthographic	phonemic	orthographic	phonemic	orthographic	phonemic
p	p	b	b	mh	mh	ph	f
t	t	d	d	nh	nh	th	θ
c	k	g	g	ngh	ŋh	ch	x
b	b	f	v	m	m		
d	d	dd	ð	n	n		
g	g	deleted	--	ng	ŋ		
m	m	f	v				
ll	l	l	l				
rh	r ^h	r	r				

Note: Unfilled boxes mean that the mutation does not change the radical in these cases.

both Welsh and English, we needed a system that was as similar as possible to Cued Speech norms in English, to facilitate the switch between languages commonly encountered with bi- and multilingual speakers. This meant that consonant handshapes, and vowel positions should be the same between English and Welsh for all equivalent phonemes.

There were, however, differences between the languages as seen above that needed to be accounted for. We had, therefore, to decide upon a handshape for /ç/, and on handshapes for /ʎ/ and /ɣ^h/, and a way to link these to /l/ and /r/ respectively to mimic Welsh morphophonemics described in the description of mutation given above. In terms of vowels, we needed to decide upon Cued Speech vowel positions for the large number of close and mid unrounded monophthong phonemes in the northern dialects and to integrate these into diphthong sequences.

The main implication arising from the mutation system for a Welsh version of Cued Speech would be the desirability of showing a connection between the fortis and lenis liquids which, as noted above, are linked via the soft mutation, at least in word-initial position.

The solutions

As noted earlier, we wished the system devised for Welsh to be consistent with those systems already devised for varieties of English and neighbouring languages within the UK. Indeed, one of the basic objectives of making an adaptation of Cued Speech is to try to place a phoneme on a similar handshape where it has been placed in previous adaptations. This is particularly desirable if the person who will be using Cued Speech in a language such as Welsh has a high probability of encountering someone who cues in a neighbouring language such as Scots.³ It also becomes easier to memorize how to cue a phoneme if it is seen to have a permanent and similar position in different adaptations. This also allows deaf cuers to become bilingual. For these reasons the back fricative /ç/ has been placed on the same handshape where it was first placed in Scottish English and Scots (for handshapes, see Appendix A). This conforms to the rule that the shape of the lip-patterns, in this case /ç/, is placed with /l, ɫ, w, ʃ/ so that all the consonant phonemes in this group look different on the lips.

The other two consonants found in Welsh but missing from English were the voiceless lateral fricative and the voiceless trill. The lateral fricative /ʎ/ was added to the same handshape used for /l/, and /ɣ^h/ was added to the same handshape as /r/. The morphophonemic link between the pairs of laterals and rhotics already described is shown by using a slight forward rotation of the wrist for the voiceless lateral and rhotic.

The vowel system was the area requiring the greatest development due, especially, to the

large number of phonemically distinct unrounded monophthongal vowels. The traditional four vowel positions in Cued Speech are (m) at the mouth; (c) on the chin; (t) at the throat; (s) at the side which also incorporates two movements of side-forward (sf) and side-down (sd). These are multiplied three times: for unrounded, open rounded and close rounded vowels. As there are seven unrounded monophthong phonemes in northern Welsh, a new position needed to be developed at the jaw (j) and it was also necessary to add new phonemes to the basic side positions of (sf) side-forward, and (sd) side-down. The use of these positions can be seen in Appendix B.

Summary of handshapes for consonants of Welsh

A chart of the handshapes for consonants is provided in Appendix A. The great majority of handshapes are, of course, those adopted for English, and Cornett (1994) describes how he established these. He utilized a combination of principles: the main one being to ensure that consonants on a single handshape differed in terms of the place of articulation. He also considered frequency of occurrence of a phoneme (placing the most frequent on handshapes easiest to make), and ease of change from one handshape to another in frequently occurring consonant clusters.

As illustrated in Appendix A, we see that handshape at the top left has a bilabial, labiodental and alveolar consonant; while that at the top right has a bilabial and an alveolar; and the next down on the left has a glottal, an alveolar, and the lenis and fortis apical trills (these last two differentiated by the forward wrist roll for the fortis trill). The handshape second down on the right has a bilabial and alveolar consonant; while third down at the left has a bilabial, postalveolar (with lip protrusion), uvular/velar, and the lenis and fortis alveolar laterals (these last two differentiated by the forward wrist roll for the fortis lateral). The handshape third down at the right has dental, postalveolar and velar consonants; the bottom left handshape has labiodental, dental, alveolar and velar consonants; and at bottom right has postalveolar, palatal and velar consonants. For each handshape, therefore, accuracy of discrimination is aided by maximum visual contrast on the mouth between those phonemes grouped by a single cue.

Summary of hand positions for the vowels of Welsh

Again, many of the positions used for Welsh vowels are the same as their English equivalents. Whereas equivalent consonants between Welsh and English are fairly close phonetically (e.g., in both languages fortis plosives are aspirated in many contexts), the equivalent vowels may differ phonetically in terms of precise quality. Nevertheless both languages share a

range of monophthongs that occupy similar phonetic spaces, though—as we have seen—northern varieties have the added high central vowel pair missing in English. This means that whereas the hand positions used for English open and close rounded vowels can also be used for Welsh open and close rounded vowels, some reorganization was needed with the spread vowels. In particular, the long and short high central vowels /i, ɨ/ had to have newly devised positions, as all other positions were already utilized for the remaining spread vowel phonemes. The short /ɨ/ is placed at the side position and distinguished from /ə/ by a movement of the hand forward instead of down. The long /i/ is placed at the new jaw position; this was deliberately chosen to be adjacent to the mouth position where /i/ is cued, thus enabling speakers of both northern and southern Welsh to relate to one another when cueing. New hand positions have been developed before, for example for certain nasal and front rounded vowels in French (see, e.g., Charlier, Capouillez, & Perrier, 1987).

A chart of the cued diphthongs for Welsh appears in Appendix C. The diphthongs are cued by a glide of the hand from the position of the first element of the diphthong to that of the second. In certain instances, both elements will be cued at the same position. In Welsh this occurs with the diphthongs /ui/ and /wi/. In these cases the cues are made by a small tapping movement at the throat in time with the utterance of each element of the diphthong; changes in mouth shape will distinguish between these two phonemes. Two of the centring diphthongs of northern Welsh cannot be made with a glide of the hand as both elements use the same position; neither can the tapping motion be employed because the position is away from the face (using the side position). For /ɑɨ/ the cue for /ɑ/ moves slightly forward and back, and the movement is repeated for /ɨ/; for /əɨ/ the cue for /ə/ moves slightly downwards and back, followed by a slight forward and back movement for /ɨ/.

Conclusion

This description of the adaptation of Cued Speech to the Welsh language demonstrates that Cued Speech can be adapted to other languages by people other than its inventor, provided its basic principles are not violated. The phonology of Welsh, similar in many respects to that of English, has proved an interesting example, with its system of initial consonant mutation and the large number of vowel phonemes in the northern variety. With this adaptation of Cued Speech to the Welsh language, deaf and hard of hearing individuals in Wales can gain clear and complete visual access to the phonology, morphology, semantics, and syntax of the language, and have the opportunity to develop native competence in it. They will also be able to utilize the sociolinguistic

device of code-switching between English and Welsh. It is hoped that future adaptations of Cued Speech to other languages will follow suit, toward a standardization, and perhaps systemization, of the process for adapting Cued Speech to any traditionally spoken language.

Notes

1. We use “deaf” here to refer to all those with audiological deafness, including those who consider themselves part of a cultural and linguistic minority.
2. ɨ is a symbol used to denote a lax, unrounded, close, central vowel.
3. Scots, or Lallans (= lowlands), is the descendant of the Anglic dialects spoken in lowland Scotland. Scottish English is standard English spoken with a Scottish accent. The two forms are described in Johnston (2007).

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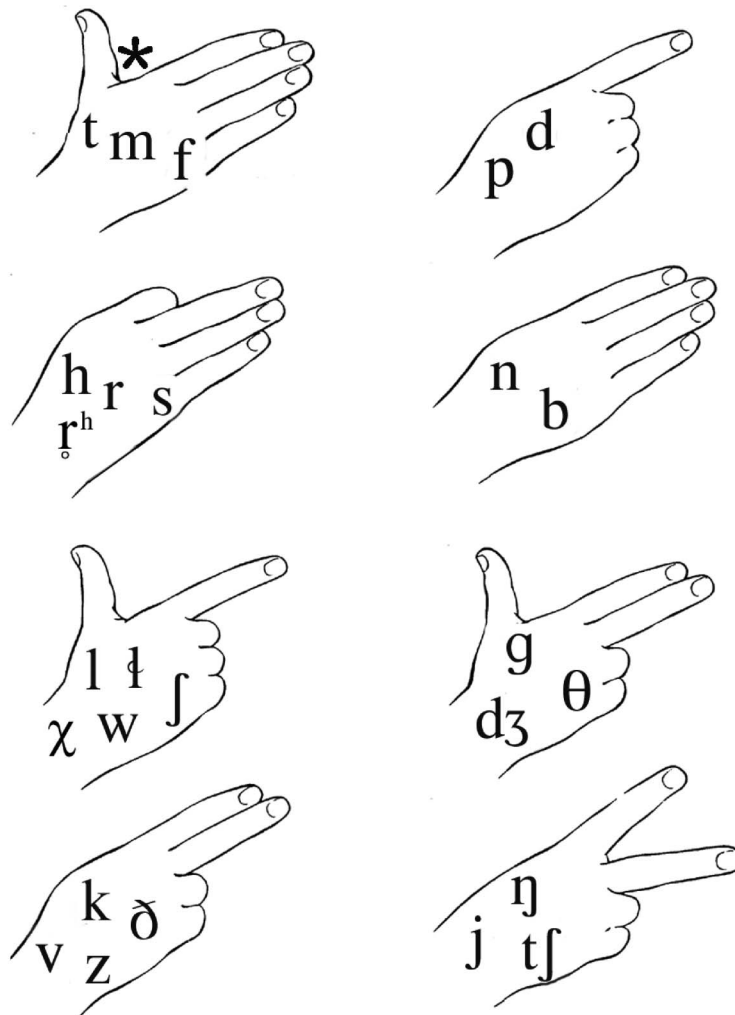
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Appendix A

Cued Speech handshapes for groups of consonant phonemes in southern and northern Welsh.

Cued Speech handshapes for consonant phonemes in Welsh



* this handshape is also used for cueing each vowel sound in isolation.
 /ɫ/ and /r^h/ are distinguished from /l/ and /r/ respectively by a rotation of the wrist.

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Appendix B

Cued Speech vowel positions in Welsh, giving both northern and southern vowels.

Cued Speech monophthong positions in Welsh,
giving both northern and southern monophthongs

(ck) at the cheek; (m) at the mouth; (c) on the chin; (j) at the jaw, (t) at the throat; (s) at the side

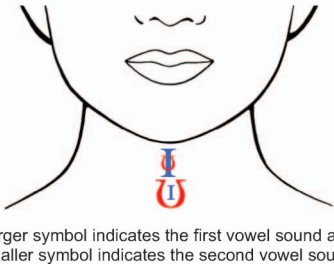
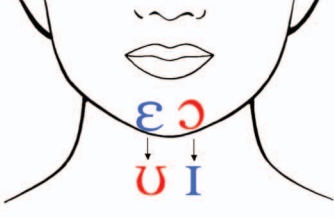
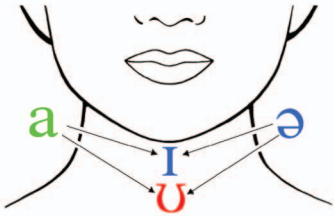
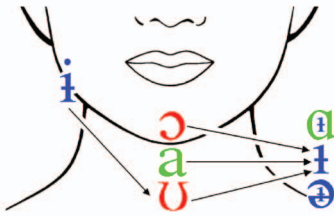
vowel sounds for which the lips are	spread: Group 1		(ck) e	sêr, hen, pêl stars, old, ball
			(m) i	ti, mis, tri you (sg), month, three
			(c) ε	pen, llech, merch head, slate, girl
			(j) i	tŷ, un, dyn house, one, man
			(t) I	dim, nid, ticed any/none, not, ticket
			(s) t	pump, hyn, mynd forward five, this, to go
			(s) ε	ydw, yn, nyrs down am, in, nurse
	close-rounded: Group 2		(ck)	
			(m)	
			(c) u	cwn, mwg, drws dogs, smoke, door
			(t) U	cwm, cwpan, twr valley, cup, heap
			(s) O	tôn, dôl, to forward tune, meadow, roof
	open-rounded: Group 3		(ck)	
			(m)	
			(c) o	ton, ffon, poced wave, stick, pocket
(t) a			mam, tan, at mother, under/until, towards	
(s) a			tad, tân, cath forward father, fire, cat	

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Appendix C

Cued Speech diphthong positions in Welsh, giving both northern and southern diphthongs.

Cueing positions of the diphthongs for both southern and northern Welsh

<p>The cues are made by a small tapping movement at the throat in time with the utterance of each vowel sound, i.e. two taps.</p>	<p>Group 1 cued at the throat position</p>		<p>IU <i>lliw</i> colour</p> <p>UI <i>mwyr</i> more</p>
<p>In the second and third groups the hand must glide from the position of the first vowel sound to the position of the second vowel sound. The glide must be in synchronisation with the voice</p>	<p>Group 2 cued from the chin to the throat</p>		<p>EO <i>llew</i> lion</p> <p>OI <i>troi</i> turn</p>
	<p>Group 3 cued from the side to the throat</p>		<p>aI <i>llai</i> less</p> <p>aU <i>llaw</i> hand</p> <p>əI <i>tei</i> tie</p> <p>əU <i>bywyd</i> life</p>
<p>aI: the cue for /a/ moves slightly forward and back, and the movement is repeated for /ɪ/</p> <p>əI: the cue for /ə/ moves slightly downwards and back, followed by a slight forward and back movement for /ɪ/.</p>	<p>Group 4 the centring diphthongs of northern Welsh excluding those in Group 3</p>		<p>iU <i>yw</i> is</p> <p>aI <i>cae</i> field</p> <p>əI <i>coed</i> wood</p> <p>UI <i>mwyr</i> more</p> <p>əI <i>neu</i> or</p> <p>aI <i>cau</i> close</p>

All cues are made with either the right hand or the left. The diagrams show the sounds on one side or the other for visual clarity.

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