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Welsh Consonant Acquisition in Welsh- and English-dominant Bilingual Children

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Note: The following article was first published in volume 9 of JCLL, but due to a typesetting error, the phonetic fonts were all incorrect, rendering the article unreadable. A corrected version is reprinted here, with the editors' apologies to the authors for the error.

We report the findings of a study into first language acquisition of Welsh, examining particularly the patterns of development of the three consonants found in Welsh but absent from English /x/, /ʃ/ and /ɾ (~r/). The speakers chosen for the study also allow the investigation of development across age ranges and between males and females. We examine percentage correct usage of the target sounds across these categories and look at which effects are statistically significant. We also examine the commonest patterns of substitutions and note when these differ between groups of subjects. Finally, we consider how these findings might inform the teaching of Welsh pronunciation patterns in the second language classroom.

Introduction

The papers presented in JCLL 6 present a fascinating picture of first language acquisition in Welsh and Irish. These articles, however, deal exclusively with the acquisition of syntactic and morphological systems; the development of phonology in acquisition is not an area that been widely pursued by Celtic linguists (though, see Bellin, 1984; 1988). The first in-depth investigation of phonological acquisition in Welsh has been undertaken by the present authors and colleagues over the last several years. Some initial conclusions have already been reported (see Ball, Müller and Munro, 2001a, b, c), and the full report is available in Munro, Ball, Müller, Duckworth and Lyddy (2005). The study included only children acquiring both

Welsh and English simultaneously, but language dominance background of the children was also Welsh dominant and English dominant. What we report on here are the differing acquisition patterns of these two groups. As the English dominant children are going to resemble English learners of Welsh as a second language more closely than do the Welsh dominant children, these results may well be of use for those involved with teaching the language to older children and to adults.

The Study

The project team described in Ball et al (1998) and in Munro et al (2005) considered Welsh within a bilingual context, as many of the children acquiring Welsh are, at the same time, also mastering English. In South Wales (where the project was based) it would have been difficult to find sufficient numbers of monolingual Welsh-speaking children but even if this had been possible, it would have been unrealistic to ignore the predominant bilingual milieu.

The aims of the project, therefore, were first to provide profiles of phonological acquisition that are typical enough to be generalizable to other regions of Wales, and to present methods of analysis that are sufficiently illuminating to be utilized in similar studies on children in Wales.

Subjects were divided into five age ranges. The aim was to have 20 subjects in each group, so that groups would be large enough to allow generalizations to be made from results. Subjects were also divided, by means of a language background questionnaire (based on that of Baker 1992), into groups of Welsh-dominant bilinguals and English-dominant bilinguals. Only Welsh-dominant bilinguals were found for the youngest age group. The make-up of the five groups is shown in Table 1.

The sample collected from the subjects consisted of both elicited single words and words in context, and the sample size was 50 words per language at the single word level and the same items and others within connected speech. High quality audio recordings were made of the sample for each subject, which were transcribed by members of the project team using the International Phonetic Alphabet and, where needed, the extensions to the IPA (Duckworth et al. 1990). Interscorer reliability measures exceeded 90 percent in virtually all cases.

Group	Age range	Welsh dominant		English dominant	
		males	females	males	females
Group A	2;6 – 3;0	3	3	0	0
Group B	3;0 – 3;6	4	5	5	3
Group C	3;6 – 4;0	3	7	5	4
Group D	4;0 – 4;6	5	5	7	4
Group E	4;6 – 5;0	5	4	5	6

Table 1. *Subjects used in the project*

Results

Ball et al. (1998) and Munro et al. (2005) discuss the full results in detail, but of main interest here is the acquisition of those consonants of Welsh that have no counterparts in English, and to a lesser extent, consonants common to Welsh and to English that showed differential acquisition patterns between the two dominance groups. First, we shall consider the three consonant phonemes unique to Welsh: /x/, /ʎ/ and /ɣ~r/.¹

The voiceless dorsal fricative

Anecdotal evidence from researchers in other languages which have a voiceless dorsal fricative (such as Spanish and German) suggests that this sound is acquired before dorsal plosives and nasals, and often before anterior fricatives. The Welsh evidence supports this. Table 2 shows the percentage correct realizations of this sound by the different groups of children.

¹The Welsh dorsal fricative is variously described as velar or uvular (see Ball and Williams 2001); here we use the velar symbol for convenience. In South Wales there is no regular contrast between the voiced and voiceless trill so, following Munro et al (2005) we combine the symbols for these two into a single unit.

	Welsh dominant	English dominant
A	86.5%	-----
B	81.7%	91%
C	100%	85%
D	91%	87.5%
E	100%	100%

Table 2. Percentage correct usage of /x/

As we can see, there appears to be little consistent difference between the two dominance groups, but statistical analysis reported in Munro et al (2005) found significant differences in age terms, from Groups B to E. Interestingly, there was also a significant difference between male subjects and female, with the males better at production of this sound; it is difficult to suggest reasons for such a difference. If we look at the substitutions used for /x/, we find that in final position deletion is commonest, followed by use of other fricatives (including [s], [θ], [ʃ] and [ç]), and then by [k]. A few sonorants occurred, with examples of [n], and a single use of [l]. Medial position showed very few errors, with a few examples each of [h], [k] and [r]. /x/ occurs rarely in word initial position (other than in clusters of /xw-/ which may be realized as /w-/ in southern varieties), and the few examples recorded from the subjects were all correct.

The voiceless lateral fricative

The acquisition patterns of this sound have been described in detail in Ball et al (2001a, b). Table 3 shows the usage patterns for this target by age range, language dominance and position within the

	Welsh dominant			English dominant		
	I	M	F	I	M	F
A	69%	83%	69%	-----	-----	-----
B	47%	46%	20%	46%	12%	0%
C	72%	80%	67%	51%	42%	5%
D	75%	52%	50%	68%	57%	21%
E	100%	100%	100%	81%	67%	50%

Table 3. Percentage correct usage of /x/

word.

Statistically across all subjects there is a significant effect of age with this sound but, as can be seen from Table 3, the regular progress from age range to age range seen with the English dominant subjects is less obvious with the Welsh dominant ones where an increase at one stage is often followed by a decrease at the next. Such variation may be a sign of system development, as there is the tendency for advances in phonological acquisition to be followed by short periods of increased variability in usage, perhaps because the system needs time to fully integrate new forms (see Ingram 1986, 1989).

As we might expect, there is also a statistically significant effect of language dominance, with Welsh dominant speakers in advance of English dominant ones. There was also an effect of sex, with female speakers significantly more accurate than males; the opposite finding to what we saw with /x/.

Substitution patterns differed between the language dominance groups. Welsh dominant subjects normally used a voiceless fricative. The commonest choice for Groups A and B was [s], with Group C mostly using [x], and Group D using [x] also together with [s] and [θ]. Very few examples were found of a fricative+lateral cluster except in word medial position for Groups B, C and D, where we get [xl], [sl] and [θl]. Medial position also had a range of single fricatives.

English dominant subjects showed a much greater use of fricative plus lateral in initial and medial position (but not in final position). Single fricatives are the next commonest substitution, and [xl] and [x] become increasingly the commonest variants used throughout the age ranges. A wide range of other forms are also found, including plosives, plosives plus lateral (e.g. [kl]) and approximants.

The trills

Patterns of usage of /r~r/ are also described in Ball et al (2001c). We show in Table 4 the percentage correct use of trills by the various subject groups, divided into initial, medial and final word position.

As we might expect from these results, there was a statistically significant effect with age of the speakers, and with language dominance, although no differences showed up in terms of the sex of the subjects. However, apart from the percentage correct figures, it is of interest with the rhotics, as with the lateral fricative, to look at patterns of substitutions. The rhotics showed the greatest number of

	Welsh dominant			English dominant		
	I	M	F	I	M	F
A	0%	0%	0%	-----	-----	-----
B	0%	15%	8%	5%	27%	0%
C	0%	3%	11%	4%	6%	10%
D	33%	57%	47%	26%	3%	15%
E	44%	55%	50%	25%	29%	36%

Table 4. Percentage correct usage of /r~r/

different substitutions of any consonant in the entire study, but the numbers and types of substitutions differed between the language dominance groupings as well as across the age range. The Welsh dominant subjects used 15 different realizations of /r~r/ in age range A, 15 different (including the correct form) in age range B, 16 different in C, 9 different in D, and 5 different in E. On the other hand, the English dominant children used 19 different realizations (including the correct form) in age range B, 22 in age range C, 17 in D, and 10 in E.

While many of the realizations used were common between the language dominance groups, there were differing trends. An examination of these may be useful when attempting to deal with problems with the trill consonants with second language learners. Welsh dominant subjects used overall a higher percentage of trill realizations than the English dominant ones. Word final targets are generally deleted in Groups A and B, but realization as approximant [ɹ] is commonest in the next two age groups, with the trill just overtaking the approximant in Group E. Fricative usage is also common in word final position in Groups A-C. The patterns of realization in non-final position vary through the age ranges. Approximant [ɹ] dominates throughout as the commonest form (although in Group E the trill is virtually as common in initial and medial position). However, Groups A and B (and to a lesser extent C) also showed usage of a range of liquids and glides, for example [l], [j] and [v].

English dominant subjects, as we have seen, had a much lower rate of use of the target trill. They also used deletion as a common strategy in word final position. Also common in this position were approximant [ɹ] and fricatives. Liquid and glide usage in final position was found with Groups C and D (this usage died away markedly by Group D with the Welsh dominant subjects). By Group E, the commonest variant was the approximant, with the trilled form

second: the reverse of what we found with the Welsh dominant speakers. In non-final position, the approximant [ɹ] was by far the commonest realization, and there was considerably less variation than that found with the Welsh dominant speakers. As we noted in the previous sub-section, such variation may be a sign of system development (see Ingram 1986, 1989). This ties in well with our results as the Welsh dominant speakers are clearly developing towards the full acquisition of the trill, whereas the English dominant ones still have some way to go.

Other consonants

As we noted earlier, there were some consonants of Welsh, common also to English, that showed differential abilities between the language dominance groups. Dominance effects were found with the velars /g/ and /ŋ/, where the Welsh dominant subjects performed significantly better than the English dominant ones. Likewise, with the fricatives /v, θ, ð/ Welsh dominant subjects outperform English dominant ones. Welsh target /w/ and /j/ also demonstrate this dominance effect.

Discussion

The dorsal fricative

The results with the dorsal fricative would suggest that this consonant at least should present few difficulties to second language learners of Welsh. However, while evidence from first language acquisition would support this view, English-speaking adult learners do not always follow this pattern. Indeed, there is a common pattern of use of [k] for target [x]. Nevertheless, the evidence from phonological acquisition suggests that this may well be a consonant that second language learners will find relatively easy to acquire as long as the continuant nature of the sound is emphasized.

The lateral fricative

The patterns of usage with this sound showed a clear distinction between the two language dominance groups. In terms of substitutions, the main difference appears to be that English dominant subjects deconstructed the lateral fricative into its two components: lateral and fricative; producing often a velar fricative followed by a non-fricative voiced lateral. The Welsh dominant subjects, on the other hand, use a single fricative, thus implying an understanding of the single nature of the target sound. (The common use of the velar fricative is explained in terms of acoustic similarity in Ball et al 2001b.)

English second language learners often use a cluster as an

attempt at /t/, such as [k], [θ] etc. Using the comparison of the language dominance groups from this study it would appear that a profitable strategy with learners would be to concentrate on reinforcing the singleton nature of the sound, and discourage its separation into fricative and lateral components, and thus its realization as a cluster.

The trills

That trilled consonants might cause difficulties to children developing their phonologies is not surprising, as fine motor control is needed to produce the required articulator movements and aerodynamic conditions. Further, the use of the approximant [ɹ] can be understood as interference from English, as this is the form of English /r/ used in most varieties of Welsh English. The choice of liquids reflects the continuant nature of the trill, while fricatives (especially the commonly found [ð]) reflect some of the acoustic characteristics of the trill (for more details see Ball et al 2001c). First language English learners of Welsh often have difficulties with trill production (leaving aside the ability to distinguish a voiced from a voiceless trill). These difficulties partly reflect interference from the approximant used for English /r/, and partly the motoric difficulty referred to above. The evidence from our study suggests that this is the Welsh consonant that takes longest to be acquired: assuming a 75% correct level as is standard in acquisition studies, we see that even the Welsh dominant children had not fully acquired the trill by age 5. In second language situations, therefore, we might be more tolerant of substitutions for the trills in the early stages of the learning process than we would be of /x/ → [k] changes.

Other consonants

The dominance effects found with the velars /g/ and /ŋ/ are presumably connected with the greater frequency of occurrence (and therefore higher functional load) of these sounds in Welsh than in English (/ŋ/, for example, can occur in word initial position as a reflex of the nasal mutation). Likewise, a greater frequency of occurrence probably explains the effect with /v/ and /θ/. More problematic are the results with /w/ and /j/. Functional load may explain the effect with /w/ (especially due to the wide use of /w-/ for /xw-/), but this is unlikely to explain /j/.

Clearly, these dominance effects, while interesting, will not be greatly important in the second language context, as the consonants common to both languages will present no problems to the

English-speaking learner of Welsh.

Conclusion

Studies of bilingual acquisition can only inform adult second language learning to a small extent. Nevertheless, this comparison of language dominance groups acquiring the non-English consonants of Welsh has given us some insights into potential problems in the second language classroom. We should expect the dorsal fricative to be easier to acquire than either the lateral fricative or the trills; we should work against the tendency to uncouple the lateral and fricative aspects of /t/; and we should expect a common strategy of using the approximant instead of the trilled rhotics. Above these considerations, of course, is the knowledge that these sounds are all acquired eventually by first language speakers (whatever their language dominance characteristics). We can do no less for our students than ensure that they too acquire the target pronunciations of these sounds.

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