Convergence and Divergence in Language Obsolescence

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Abstract

Previous research on language attrition has distinguished between internally and externally motivated change and between convergent and divergent change, with most literature focusing on speech communities that have undergone either one or the other type of change. In this paper, I argue that these types of change may coexist within the same community or even the same speaker, with the result that the obsolescing language becomes simultaneously more similar to and more different from the contact language. The results of a cross-generational acoustic study of Southeastern Pomo (Northern Hokan, Pomoan) indicate that in the domain of phonetics and phonology, the speech of the last fluent generation has converged with English in some ways and diverged from it in other ways.

Keywords: language contact, obsolescence, sound change, convergence, divergence.

1. Introduction

The study of language attrition has generally focused on characterizing how and why changes come about in an obsolescing language vis-à-vis earlier, more robust stages of the language. Change may occur as a result of external influence from a dominant language in the community or language-internal dynamics having nothing to do with the dominant language. When change is externally motivated, the obsolescing language may come to approximate features of the dominant language; conversely, external influence may cause salient features of the obsolescing language not found in

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the dominant language to be enhanced, thus further differentiating the obsolescing language from the dominant language. In short, externally motivated change may result in either convergence with or divergence from the dominant language. In a similar way, internally motivated change, by virtue of its independence from the influence of an outside language, introduces features into the obsolescing language that may happen to converge with the dominant language or to diverge from it. Whether or not the change is convergent or divergent, then, depends upon the nature of the languages involved.

Though externally motivated change and internally motivated change are often referred to in terms of a dichotomy of opposing categories, logically they are not mutually exclusive types of change. As Dorian (1993) cautions, it can be difficult to tell whether a particular change in an obsolescing language is due exclusively to external influence from a dominant language, exclusively to language-internal dynamics, or to some combination of external and internal pressures when they would both push the language in the same direction. Furthermore, it is likely for a language to be undergoing changes due to internal pressures at the same time that it is being affected separately by contact with another language.

Given that an obsolescing language may undergo externally motivated changes and internally motivated changes and that both types of change may be convergent or divergent, it stands to reason that it should be possible for an obsolescing language to show both convergent and divergent change with respect to the contact language. Nonetheless, the literature on language attrition has largely focused on cases of either one or the other, rather than on cases of both happening at the same time. In this paper, I draw on evidence from a cross-generational acoustic study of five speakers of Southeastern Pomo to argue that these types of change may indeed coexist within the same community or even the same speaker, with the result that the obsolescing language becomes simultaneously more similar to and more different from the contact language.

2. Phonological Change in Language Obsolescence

Andersen (1982: 95) identifies three main patterns of phonological change in obsolescing languages. First, fewer phonological distinctions are made overall than at more viable stages of the language. Second, phonological distinctions common to the obsolescing language and the dominant contact language tend to be preserved. Finally, phonological distinctions with a high functional load are maintained longer than those with a low functional load. The first pattern, which constitutes a loss of structure, is

most often exemplified by changes convergent with the dominant contact language, since the structure lost is usually one not found in the contact language: through the loss of structure particular to the obsolescing language, the obsolescing language becomes more similar to the contact language. Thus, convergent change is the type of change most commonly cited in the literature on language obsolescence. Examples follow.

2.1. Convergent change

Citing much of Campbell's previous work in this area, Campbell and Muntzel (1989: 186-187) describe many cases of convergent phonological change. One instance is the language Pipil (Southern Uto-Aztecan, Aztecan), whose speakers have for the most part neutralized a vowel length contrast not found in the dominant language, Spanish, leaving just short vowels. In Tuxtla Chico Mam (Mayan, Mamean), a contrast between velar and post-velar/uvular plosives, again not found in dominant Spanish, has also disappeared, leaving just velars. Goodfellow (2005: 134-138) documents several other examples of convergent phonological change in younger generations of Kwak̓wala speakers, who have lost several classes of Kwak̓wala sounds that are absent from English, either omitting them or replacing them with more familiar sounds from English. Glottalized consonants are replaced by plain pulmonic consonants; uvulars are replaced by velars; velar fricatives are omitted; and lateral affricates are replaced by /gl/ clusters.

Campbell and Muntzel (1989) describe these sorts of externally motivated changes as predictable or expected. What they have in common is the loss of structures in the obsolescing language that are not present in the dominant language. Campbell and Muntzel also enumerate several other categories of phonological change that they describe as "of uncertain predictability". These include the overgeneralization of marked features, which normally results in divergent change.

2.2. Divergent change

Campbell and Muntzel (1989: 189) cite Jumaytepeque Xinca (isolate) as one case of a marked form being overgeneralized, with the result that the language diverges further from the dominant language that does not have the marked form. In this case, Jumaytepeque Xinca has a rule glottalizing consonants in specific environments, but some speakers have lost this rule and generalized the relatively marked glottalized consonants to all environments over the relatively unmarked plain consonants. Teotepeque Pipil is another example of this kind of overgeneralization. In this case,

voiceless [l̥] used to be a word-final allophone of voiced [l], but speakers came to generalize this relatively marked segment to all environments. Campbell and Muntzel (ibid.) state that "[t]hese changes are internal to the structure of the obsolescent language in that they appear to have no direct analog in the dominant language," but Woolard (1989) counters that these sorts of divergent changes may actually be externally motivated: a marked structure not present in the dominant language is exaggerated in the obsolescing language to differentiate it from the dominant language. In this way, the divergent change may serve as a symbolic act of distancing from the dominant language by speakers who want "to emphasize their differentness from the dominant group" (Thomason 2001: 230), a motivation reminiscent of the well-known case of vowel centralization in Martha's Vineyard described by Labov (1963).

Thus, it is possible for divergent change to occur in language obsolescence. Nevertheless, convergent change remains the more commonly attested type of change, often resulting in the merger of phonemes that do not contrast in the dominant language. Given that these sorts of mergers are widely attested, it should come as no surprise that they do not form a homogeneous class. Instead, they have come to be differentiated from each other by the particular path to merger: transfer or approximation.

2.3. Transfer, approximation, and expansion in phonological merger

Trudgill and Foxcroft (1978) introduce the concepts of *transfer* and *approximation* in their analysis of vowel mergers in East Anglia. In the case of transfer, two phonemes merge via the first phoneme categorically changing to the second phoneme in more and more words containing the former phoneme; in this case, the merger is accomplished by the unidirectional transfer of one phoneme to another in a process that "involves…a form of lexical diffusion" (ibid.: 73), which is "not consistent with a result that shows an intermediate phonetic form" (Labov 1994: 321). In the case of approximation, however, two phonemes merge as their individual phonetic spaces approach (i.e. approximate) each other; here both phonemes typically shift, resulting in a merged category with a phonetic space intermediate between the original phonemes. In addition to these two merger types, Labov (1994: 321-323) adds a third type, *expansion*, in which the phonetic space of the merged category ends up spanning the phonetic spaces of both original categories.

These categories of merger figure prominently in an acoustic and articulatory study of Northern Paiute (Uto-Aztecan, Western Numic) carried out by Babel (to appear), who documents two kinds of sound change in the language. First, a three-way

laryngeal contrast is maintained in each of three generations of speakers; however, the phonetic realization of this contrast differs across generations, and in the youngest generation there is increased subphonemic variation. Second, the place of articulation of the language's sibilant shifts from a palatalized post-alveolar to a plain alveolar /s/, while a more palatalized allophone is replaced by the palato-alveolar /ʃ/ in the youngest generation. Based upon these results, Babel hypothesizes that contrasts based on timing relationships (e.g. laryngeal contrasts) are more likely to undergo sound change via approximation, while contrasts that are more categorical in nature (e.g. consonantal place contrasts) are more likely to undergo sound change via transfer. Labov (1994: 321) additionally asserts that transfer happens more often when "one form has acquired a social stigma or prestige", the less prestigious form typically transferring to the more prestigious form used in the dominant standard language.

2.4. Change in the status of phonological rules

Campbell and Muntzel (1989) review two other types of phonological change that can occur in obsolescing languages. First, variability may develop in the application of phonological rules: rules that used to be obligatory may apply optionally, show substitutions, or simply be lost. The case of optional rule application usually results in free variation between forms that have resulted from the rule and those that have escaped it. For example, consonant gradation rules in standard Finnish which voice stops in certain environments are not applied consistently in American Finnish, producing free variation between voiced and voiceless stops in environments where only voiced stops would occur in standard Finnish. Second, phonological rules may be undergeneralized or overgeneralized. In the case of Teotepeque Pipil mentioned above, a rule devoicing final sonorants has been overgeneralized for /l/, but undergeneralized for /w, j/, resulting in voiceless [l̥] and voiced [w, j] in all environments.

2.5. A case of convergent and divergent change?

A possible case of convergent and divergent change is reported by Dorian (1993), who describes a multifaceted change having to do with gender assignment. In East Sutherland Gaelic, which has masculine and feminine gender categories, there has been a change towards extending the use of the masculine pronoun /a/ 'he' in substituting for a noun (thus decreasing the use of feminine /i/ 'she'). The increase in usage of /a/ to agree with nominal antecedents parallels the generality of English *it*, and so seems to be

an externally motivated change resulting from contact with English. However, it is not the case that nominal gender assignment has weakened overall. On the contrary, the form of English which has had the greatest influence on East Sutherland Gaelic, Northeast Scots, has non-standard features that have the effect of strengthening gender assignment. Though Northeast Scots lacks grammatical gender, it makes greater use of diminutive morphology like the suffix *-ie*, which can be freely added to virtually any monosyllabic noun. Correspondingly, East Sutherland Gaelic is also characterized by relatively frequent diminutive formation, which takes the form of a suffix that indexes gender information: /-an/ for masculine nouns and /-ag/ for feminine nouns. In this way, gendered diminutive formation has the effect of boosting nominal gender assignment, counterbalancing the gender weakening effect of the novel pronoun replacement pattern.

The case of East Sutherland Gaelic thus seems to be an example of convergent and divergent change happening at the same time: the weakening of gender assignment in pronominal replacement is convergent with English, while the strengthening of gender assignment in diminutive formation is divergent from English. However, this divergent change is unlike those cited above in that it is not externally motivated. Here it is not because grammatical gender is missing in English that it becomes more robust in East Sutherland Gaelic. In fact, grammatical gender is strengthened only because of another convergent change – the increase in diminutive formation paralleling the frequency of diminutives in the contact dialect of English. In this sense, it is simply a coincidence that this change has turned out to be divergent from English. What remains to be seen, then, is whether convergent and divergent change can co-occur under the same external influences, and moreover, whether they can co-occur in the phonological domain. Below I argue that both of these situations obtain in Southeastern Pomo.

3. Background on Southeastern Pomo

3.1. Geography and dialectology

Southeastern Pomo (Northern Hokan, Pomoan), varieties of which are called Sulfur Bank Pomo, Elem Pomo, and Lower Lake Pomo, is a severely endangered language that was spoken primarily in the area around Clear Lake, East Lake, and Lower Lake in Lake County, California (Moshinsky 1974, Gordon 2005). Southeastern Pomo (hereafter, SEP) is not mutually intelligible with the other Pomo languages such as Eastern Pomo (Grekoff 1957: 5). The terms “Sulfur Bank Pomo” and “Elem Pomo”

most likely refer to one dialect spoken in the region of Sulfur Bank and Rattlesnake Island in East Lake, given that a current speaker (Speaker 2A, cf. §4.1.1) remembers this region used to be one connected land mass and refers to the dialect spoken by her father (Speaker 1B), which Moshinsky refers to as Sulfur Bank Pomo, as Elem Pomo. Sulfur Bank/Elem Pomo may differ to some extent from Lower Lake Pomo, which Speaker 2A recalls as a separate dialect. Moshinsky, however, states that "[d]ialect divergences between Sulfur Bank and Lower Lake seem to be minimal…possibly restricted to a small number of lexical differences" (ibid.: 1). It follows that any phonetic differences between these two varieties are probably subphonemic.

3.2. Inventories

Moshinsky (1974: 5) presents consonant and vowel inventories of the language as in Tables 1 and 2 (predictable and marginal segments have been placed in parentheses). The segment inventories found in independent fieldwork largely agree with the inventories posited by Moshinsky, but they also depart from them in a few significant ways. These divergences constitute some of the sound changes described below.

Table 1. Consonant inventory of Southeastern Pomo

	LABIAL	DENTAL	ALVEOLAR	PALATO(ALV.)	VELAR	POST-VELAR	GLOTTAL
STOPS	p p' b	t̪ t̪'	t t' d		k k'	q q'	ʔ
AFFRICATES			ts ts'	(tʃ tʃ')			
FRICATIVES	f		s	ʃ	x	χ	h
NASALS	m		n		(ŋ)		
LIQUIDS			ɾ l				
GLIDES	w			j			

Table 2. Vowel inventory of Southeastern Pomo

	FRONT	CENTRAL	BACK
HIGH	i		u
MID	e	(ə)	o
LOW		a	

As for suprasegmentals, Moshinsky (1974) includes stress as a contrastive feature, but others (e.g. Goodman 1992) have argued that stress is invariably stem-initial underlyingly, with late processes of epenthesis resulting in surface forms in which an initial syllable is unstressed. The Stress Placement and Pretonic Vowel Epenthesis rules that Moshinsky (1974: 19, 21) himself posits seem to indicate that he also adheres to the

non-contrastive analysis on some level. Thus, phonological stress may be regarded as a non-contrastive feature of SEP prosody.

4. Sound Change in Southeastern Pomo

4.1. Methods

4.1.1. Speakers

This study is based on recordings of four male speakers from the previous generation (Generation 1: Speakers 1A, 1B, 1C, and 1D) and recordings of one current female speaker (Generation 2: Speaker 2A). As summarized in Table 3, Speaker 1B was from Sulfur Bank, and Speaker 1C was from Upper Lake near Sulfur Bank (Moshinsky 1974: v); presumably they both spoke Sulfur Bank/Elem Pomo. Speaker 1A was a Lake Miwok speaker and not a native speaker of SEP; coming from Middletown in Lake Miwok-speaking territory, he would have been geographically closest to Lower Lake, so the variety of SEP he spoke was probably closest to Lower Lake Pomo. Speaker 1D is described by Moshinsky (ibid.) as coming from Sulfur Bank, but his niece (Speaker 2A) reports that he was from Lower Lake (like his sister and her mother, Speaker 1F) and came to Sulfur Bank by way of marriage to Speaker 1G; thus, he most likely spoke Lower Lake Pomo, too. Like Speaker 2A, all Generation 1 speakers also spoke English.

Table 3. Linguistic backgrounds of Southeastern Pomo speakers

Speaker	Gender	Origin	SEP dialect	Other languages	Year of Recording
1A	male	Middletown	Lower Lake	Lake Miwok, English	1956
1B	male	Sulfur Bank	Sulfur Bank	English	1960s
1C	male	Upper Lake	Sulfur Bank	English	1960s
1D	male	Lower Lake	Lower Lake	English	1960s
1E	male	Sulfur Bank	Sulfur Bank	E. Pomo, English	N/A
1F	female	Lower Lake	Lower Lake	English	N/A
1G	female	Sulfur Bank	Sulfur Bank	English	N/A
2A	female	Sulfur Bank	S. Bank/L. Lake	English	2006-07

Speaker 2A is one of the last fluent speakers of SEP. She is dominant in English and learned SEP at home primarily from her mother, with whom she spoke almost exclusively in SEP. According to her, the variety of SEP her mother spoke was Lower Lake Pomo, which she regards as a variety of SEP differing slightly from Sulfur Bank/Elem Pomo (cf. §3.1). Unfortunately, there are no recordings of her mother's speech, although she did serve as a consultant to linguists who worked on the language

and is therefore recorded in the field notes of Grekoff (1957) and Moshinsky (1965-1968). Speaker 2A's father, Speaker 1B, usually spoke to her in English, although she remembers hearing him speak to other people in SEP while growing up. She describes her own idiolect of SEP as somewhere in between her father's and her mother's speech.

4.1.2. Corpus construction

A corpus was constructed from archival and original recordings of these speakers to compare word forms across the two generations. First, the Generation 1 word lists were searched for overlaps between speakers using the glosses audible after each word. In the case of Speaker 1D, whose recordings do not include any glosses, overlaps were postulated based upon the SEP word forms instead of the English glosses, a process facilitated by the arrangement of much of Speaker 1D's word list into minimal pairs. The Generation 2 word list was then searched for overlaps with Generation 1, and words that overlapped were included in the corpus. Words that were missing were elicited and included if they overlapped with a Generation 1 form; otherwise, they were removed. The final result was a cross-generational corpus containing approximately 200 words shared among Speaker 2A and at least two Generation 1 speakers.

4.2. Convergent changes

4.2.1. Narrowing of the velar/post-velar distinction

The velar/post-velar distinction is one example of an SEP distinction that is not found in English. Moshinsky (1974) observes that velar and post-velar stops may be distinguished not only by place of articulation, but also by quality of contact, the post-velar stop being more fortis in articulation and often affricated or wholly fricated. The velar and post-velar fricatives may be cued by secondary features as well, the velar having less noise and occurring with concomitant lip spreading.

The extent to which velars and post-velars are differentiated in Generation 1 vs. Generation 2 was examined through acoustic measures of place of articulation, degree of contact, and vowel quality. The minimal pair examined was /xa/ 'fish' and /χa/ 'water'. To gauge place of articulation, the second resonance (F2) of the fricative noise was measured over the whole fricative interval, as well as the onset of the first formant (F1) in the following vowel. Measures of fricative duration and intensity were also taken as correlates of the degree of contact. Finally, the quality of the following vowel was estimated via average measures of the F1 and F2 over the whole vowel interval.

The data are summarized in Table 4. Note that the data for Speaker 1B and

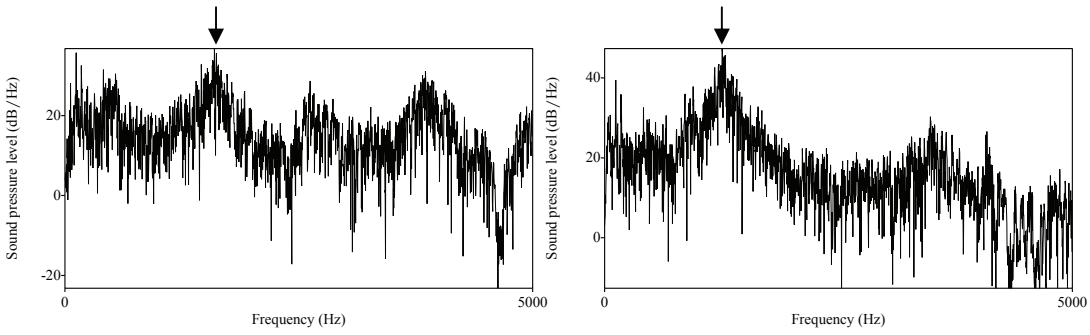
Speaker 1D represent single tokens, as only one token of each word was available. The data for Speaker 1A's /xa/ and /χa/ are averaged over 6 and 4 tokens, respectively, and the data for Speaker 2A's /xa/ and /χa/ are averaged over 14 and 10 tokens, respectively.

Table 4. Average acoustic data for /xa/ 'fish' vs. /χa/ 'water'

	Speaker 1A		Speaker 1B		Speaker 1D		Speaker 2A	
	/xa/	/χa/	/xa/	/χa/	/xa/	/χa/	/xa/	/χa/
Fricative F2 (Hz)	**1212**	**1128**	**1331**	**1066**	**1588**	**1272**	**1488**	**1417**
F1 onset (Hz)	501	519	491	597	572	560	397	378
Duration (ms)	296	253	324	244	326	381	224	258
Intensity (dB)	55.5	56.1	64.5	62.3	58.5	64.8	60.6	60.2
Average F1 (Hz)	791	813	745	816	825	891	569	548
Average F2 (Hz)	1358	1358	1351	1284	1612	1518	1547	1495

It turns out that the only significant and consistent difference between /xa/ and /χa/ lies in the F2 of the fricative noise, bolded in Table 4. For all speakers, F2 is lower in the post-velar fricative than in the velar fricative, indicating a more retracted place of articulation. This difference is statistically significant (Speaker 1A: $t(7) = 1.864$, $p = .049$; Speaker 2A: $t(20) = 2.485$, $p = .012$) and is illustrated in Figure 1, where it is clear in spectra of these fricatives that the F2 frequency in /χa/ is lower than that in /xa/.

Figure 1. Spectra of the initial fricatives in Speaker 1D's /xa/ 'fish' (L) and /χa/ 'water' (R)



Though the post-velar fricative's F2 is on average lower than the velar fricative's F2 for all speakers, the difference between the two is greater in magnitude for all three Generation 1 speakers as compared to Speaker 2A, who shows a difference of 71 Hz. In comparison, Speaker 1A shows a slightly greater difference of 84 Hz. For Speakers 1B and 1D, there are only single tokens of the velar and post-velar, so it is difficult to conclude how much overlap there is between these two categories. However, the single tokens lie much farther away from each other than 71 Hz: the difference is 265 Hz for Speaker 1B and 316 Hz for Speaker 1D. The acoustic distance between the velar and post-velar fricatives thus appears to have decreased significantly in Generation 2.

This narrowing of the velar/post-velar contrast can be most straightforwardly interpreted as an externally motivated change. There is no similar contrast between dorsals in English; consequently, this contrast is left more vulnerable to loss. It should be noted, however, that the contrast is in fact maintained in Generation 2. The distance between the categories simply decreases.

4.2.2. Narrowing of the dental/alveolar distinction

The dental/alveolar distinction is a second example of an SEP contrast that is not found in English. Moshinsky (1974) describes this contrast as an opposition between an "apico-interdental to apico-dental stop" and an "apico-alveolar to retroflexed apical stop". We can expect this sort of contrast to be realized acoustically in two main ways. First, the frequency of the most prominent peak in the stop burst will be higher for a dental than an alveolar/retroflex (Ladefoged 2005: 158-159). Second, the formants in adjacent vowels will differ due to coarticulation with consonants of different places; in particular, the frequency of the third formant (F3) will be lower next to a retroflex.

The extent to which dentals and alveolars are differentiated in Generation 1 vs. Generation 2 was thus examined through acoustic measures of the stop burst and of vowel quality. The minimal pair examined was [ʔəˈt̪ʼaṯ] 'touch' and [ʔəˈtʼat] 'ruddy duck'. The frequency of the burst peak and the intensity of the burst were measured over the whole burst interval. Formant measurements of both vowels were also taken as averages over the whole vowel interval.

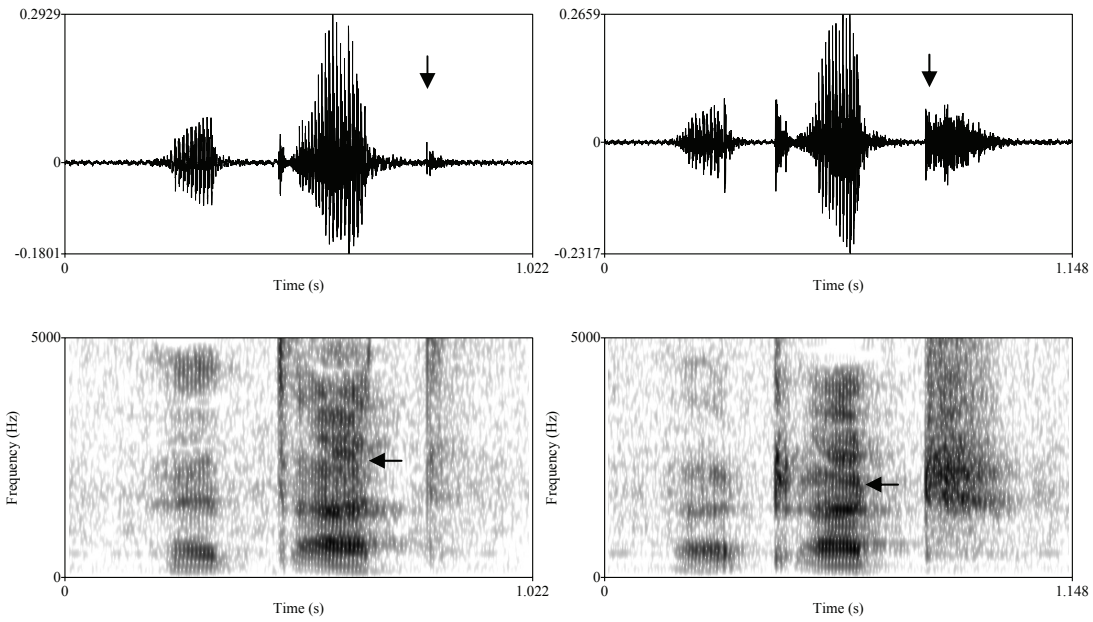
The data are summarized in Table 5. The data for Speaker 1C represent two tokens of each word; the data for Speaker 1D represent one token of each word; and the data for Speaker 2A represent three tokens of each word.

Table 5. Average acoustic data for [ʔəˈt̪ʼaṯ] 'touch' vs. [ʔəˈtʼat] 'ruddy duck'

	Speaker 1C		Speaker 1D		Speaker 2A	
	[t̪]	[t]	[t̪]	[t]	[t̪]	[t]
Intensity of ejective burst (dB)	53.6	58.5	67.3	67.1	50.6	44.6
Intensity of plosive burst (dB)	**49.9**	**58.8**	**66.4**	**71.2**	**40.0**	**42.2**
Frequency of ejective burst peak (Hz)	**4304**	**2113**	**4364**	**3422**	**4142**	**3603**
Frequency of plosive burst peak (Hz)	**4705**	**2213**	**4211**	**3831**	**4118**	**3868**
Average F1, first vowel (Hz)	540	568	755	653	603	648
Average F2, first vowel (Hz)	1587	1498	1943	1756	1623	1820
Average F3, first vowel (Hz)	2456	2331	3031	2898	2526	2833
F1 onset, second vowel (Hz)	606	586	594	549	758	784
Average F1, second vowel (Hz)	689	661	704	732	696	694
Average F2, second vowel (Hz)	1490	1527	1559	1671	1428	1654
Average F3, second vowel (Hz)	**2602**	**2401**	**2930**	**2480**	2669	2796

There are several consistent differences between [ʔəˈt̪ʼaṯ] and [ʔəˈtʼat]. First, the burst intensity of the alveolar plosive is greater than that of the dental plosive for all speakers, and the difference is significant for Speaker 1C ($t(2) = -5.084$, $p = .037$). Second, as expected, the frequency of the dental burst peak is higher than that of the alveolar burst peak for both the ejective (Speaker 1C: $t(2) = 12.010$, $p = .007$; Speaker 2A: difference approaching significance at $t(4) = 2.395$, $p = .075$) and the plosive (Speaker 1C: $t(2) = 59.091$, $p = .0003$; Speaker 2A: difference approaching significance at $t(4) = 2.298$, $p = .083$). Finally, F3 is lower in the vowel following the alveolar (Speaker 1C: $t(2) = 6.787$, $p = .021$), though not for Speaker 2A. These differences are illustrated in Figure 2. In the waveforms, it is clear that the alveolar bursts have greater intensity relative to the vowel than the dental bursts, while the spectrograms show that F3 is lower adjacent to the (retroflexed) alveolars than adjacent to the dentals.

Figure 2. Waveforms and spectrograms of Speaker 1C's [ʔəˈt̪ʼaṯ] 'touch' (L) and [ʔəˈtʼat] 'ruddy duck' (R)



As alluded to above, Speaker 2A patterns a bit differently from Speakers 1C and 1D. The intensity differences and burst peak frequency differences between her dental and alveolar stops are all substantially smaller than those achieved by Speakers 1C and 1D. For example, the burst peak frequency difference between the dental and alveolar ejectives is 539 Hz for Speaker 2A, as compared to 2191 Hz and 942 Hz for Speakers 1C and 1D, respectively. Furthermore, for F3 in the vowels, Speaker 2A's data goes in the opposite direction of Speakers 1C and 1D, the lower F3 occurring next to the dental.

Like the narrowing of the velar/post-velar contrast, the narrowing of the dental/alveolar contrast here is most likely the result of external influence: the absence of a similar contrast in English leaves the native contrast more susceptible to change. Again, however, the contrast is not actually lost, but merely reduced, both in terms of the number of cues to the contrast and the magnitude of the acoustic distance effected between the two categories.

4.3. Divergent changes

4.3.1. The elimination of rhotics

Generation 2 differs from Generation 1 in that Speaker 2A's inventory contains no rhotics, whereas flaps, trills, and alveolar/retroflex approximants are not uncommon in the speech of Generation 1, as shown in Table 6 (phonetic forms are given in relatively narrow IPA transcription). Note that while some forms are clearly loanwords (e.g. [ˈperɾas] 'pears', cp. Sp. *peras* 'pears'), others, judging from their semantics, segments, and phonotactics, seem to be native SEP words rather than borrowings (e.g. [ˈkʰɪxɾa] 'leaf'; [ˈt̪'oʔɾokɪn] 'soft'). Though there are only 1-3 tokens available of each word, the appearance of rhotics is consistent across these tokens; therefore, we can be fairly certain that the forms in Table 6 contain some sort of rhotic phoneme.

Table 6. Generation 1 forms containing rhotic segments

Speaker	Phonetic form	Phonemic form	Gloss	Source[1] (file, time)
1A	ˈkʰusnɛɾu	kusneru	'cook'	7M4049A, 29:21
1B	ˈʔoɾkeθa	ʔorket̪a	'fork'	7M2054, 26:02
1B	ˈqʰolˌkʰɾas	qolkras	'to jump'	7M2054, 20:32
1B	ˈkʰsakˌmʧʰɪɾə	ksakmʧira	'Sunday'	7M2054, 28:40
1B	ˈpeɾas	peras	'pears'	7M2054, 26:51
1B	ˈkʰɪxɾa	kikra	'leaf'	7M2054, 31:02
1C	ˈkʰɪtkʰɹa	kitkra	'leaf'	7M2055, 27:04
1C	pʰɹəˈmedik	prmedik	'relative'	7M2055, 18:21
1C	ˈt'okˈɹokɪn	t'okrokin	'soft'	7M2055, 28:01
1C	ˈt'oːkɾutʃkɪt̪	t'oːkrutʃkit̪	'to choke'	7M2055, 28:05
1D	ˈk'uɹt̪'	k'urt̪	(unavailable)	7M2056A, 10:17
1D	q'əˈɹa	q'ra	(unavailable)	7M2056A, 8:15
1D	ˈsɛɹka	serka	'fence'	7M2056A, 3:42
1D	ˈt̪aɹapu	t̪arapu	'cloth, flag'	7M2056A, 1:08
1D	ˈt̪'oʔɾokɪn	t̪'okrokin	'soft'	7M2056A, 18:11
1D	ˈwuɾu	wuru	'donkey'	7M2056B, 1:03
1D	ˈχqʰoɹat̪	χqorat̪	(unavailable)	7M2056A, 15:10

[1] The source information refers to the name of the relevant audio recording on file at the Berkeley Language Center.

The fact that Speaker 2A's inventory lacks rhotics is clear from certain words she has in common with Generation 1 speakers. Table 7 lists examples of words for which a Generation 1 speaker's form contains a rhotic, while the Generation 2 form contains no rhotic. In each case, the phonetic environment is similar, yet the rhotic is conspicuously absent from the Generation 2 form.

Table 7. Comparison of rhotic vs. non-rhotic forms in Generation 1 and Generation 2

Generation 1 form (speaker)	Generation 2 form	Gloss
ˈʔo**r**keθa (1B)	ˈʔo̤tke̤ta	'fork'
ˈse**ɹ**ka (1D)	ˈsɛlka	'fence'
ˈkʰɪtkʰ**ɹ**a (1C)	ˈkʰikt'a	'leaf'

Thus, it appears that Speaker 2A's phonological inventory differs in a significant way from that of Generation 1 in having virtually eliminated rhotic segments. With regard to how this change might have come about, we can entertain two main possibilities. First, it is possible to attribute this change to external influence from English, a language in which rhotics are abundant. This subtractive change would then be complementary to the additive exaggeration of non-English features that has been reported for other obsolescing languages; however, in this case, not only would rhotics in loanwords have been eliminated to make the language less similar to English, rhotics in apparently native SEP words would also have been eliminated. Second, it is possible to attribute this change to internal forces. Rhotics carry a low functional load in SEP – they occur in only a few native words and otherwise in loanwords and fail to distinguish any minimal pairs – making them vulnerable to loss over time.

The fact that rhotics are lost in an inconsistent manner (cf. Table 7, which shows that /r/ can be replaced by [t̤], [t'], or [l]) suggests that the former analysis is probably right. This is not an ordinary conditioned sound change; instead, it appears that, whether consciously or unconsciously, rhotics have been replaced wholesale in the language by other segments that are not so saliently identified as English sounds.

4.3.2. Generalization of /d/-deletion

According to Moshinsky (1974: 25-26), SEP has a rule of d-deletion whereby /d/ is deleted preceding another consonant (e.g. /lodt/ 'my hair is falling out' → [lot]; /btedlaj/ 'women' → [btelaj]). However, it is clear from the speech of Generation 1, particularly Speaker 1C, that this was an optional rule, not an obligatory one. Table 8 lists many examples of forms containing /d/ before another consonant, indicating that /d/ was not necessarily deleted in this environment.

Table 8. Generation 1 forms containing -dC- sequences

Speaker	Form	Gloss	Source (file, time)
1A	ˈtʰi**d**l̩e	‘noon’	7M4049A, 14:29
1A	ˈtʰi**d**l̩eˌjukin	‘before noon’	7M4049A, 14:00
1A	ˈtʰɪ**d**l̩ebə̆ˌtonə̆wa	‘afternoon’	7M4049A, 13:49
1C	ʔəˈkʰu**d**l̩	‘ridge’	7M2055, 15:43
1C	ˈk’ʔi**d**l̩	‘meadowlark’	7M2055, 10:54
1C	ˈmkʰu**d**l̩	‘log’	7M2055, 26:22
1C	ˈmxu**d**l̩xa	‘to put out to dry’	7M2055, 23:14
1C	ˈq’oʃi**d**l̩	‘toad’	7M2055, 19:33
1C	ˈq’ʂi**d**l̩bu	‘little finger’	7M2055, 20:49
1D	ˈq̓’oʃi**d**l̩	‘toad’	7M2056A, 10:31

Furthermore, it appears that d-deletion could apply optionally within the same speaker, resulting in free variation between forms that maintained pre-consonantal /d/ and those that deleted it. Table 9 lists examples of this variation from Speaker 1C. In each case, one token of the word contains /d/, while the other does not, and the form with d-deletion occurs as either the first or second token.

Table 9. Free variation in Speaker 1C between forms with and without pre-consonantal /d/

Token 1	Token 2	Gloss	Source (file, time)
kʰəˈʔi**d**l̩	kʰəˈʔil	‘yellow’	7M2055, 16:10
kʰəˈʔo**d**l̩	kʰəˈʔol	‘honeybee’	7M2055, 26:58
ˈkʰfi**d**n̩	ˈkʰfin	‘mistletoe’	7M2055, 17:19
ˈqʰtʰil	ˈqʰtʰi**d**l̩	‘to lock’	7M2055, 27:30

What was once an optional rule has become obligatory for Speaker 2A. There are no instances of pre-consonantal /d/ in her speech, which can be seen most clearly in words she has in common with Generation 1 speakers. Table 10 shows that for words in which the Generation 1 form either has a pre-consonantal /d/ or alternates between having the /d/ and deleting it, Speaker 2A’s form invariably deletes the /d/.

Table 10. Comparison between Generations 1 and 2 with respect to pre-consonantal /d/

Generation 1 form (speaker)	Generation 2 form	Gloss
ˈtʰi**d**l̩e (1A)	ˈt̪ʰɪlɛ	‘noon’
kʰəˈʔi**d**l̩ ~ kʰəˈʔil (1C)	kʰəˈʔilt̪’o	‘yellow’
ˈk’ʔi**d**l̩ (1C)	kʰəˈʔil	‘meadowlark’
jʊ**d**l (1F, 1G)[2]	jul	‘snow’
ˈkʰʔo**d**l̩ (1C)	kʰʔol	‘honeybee’
ˈkʰtʰi**d**l̩ (1C)	kʰtʰil	‘to lock’
ˈkʰfi**d**l̩ (1C)	kʰfil	‘poison’
ˈmxu**d**l̩xa (1C)	ˈmxulka	‘to put out to dry’

[2] These data for Speakers 1F and 1G are from the field notes of Grekoff (1957: 19, 80).

In short, Speaker 2A has generalized an optional rule, obligatorily deleting /d/ before another consonant – a change in the status of the rule that seems to be internally motivated. Influence from English is unlikely to be responsible for this change, as there is no comparable ban on pre-consonantal /d/ in English (cf. words such as *addle*, *paddle*, *madden*, *redden*, *ridden*, *fiddle*, *riddle*, *coddle*, *cuddle*, *idle*, *sidle*, etc.); moreover, there is no clear analog in English to the d-deletion rule that has been generalized.

5. Discussion

To summarize, data collected in four cross-generational case studies of SEP phonetics and phonology suggest that convergent change and divergent change can exist simultaneously within the same speaker. On the one hand, the narrowing of the velar/post-velar contrast and the narrowing of the dental/alveolar contrast are convergent with English and likely due to this external influence. On the other hand, the elimination of rhotics from the consonant inventory and the generalization of a SEP-specific d-deletion rule are divergent from English. The elimination of rhotics seems also to be a reaction to external influence from English, while the generalization of d-deletion is probably the result of language-internal factors.

Before discussing these results further, we should more firmly establish their validity. How sure can we be that the phonetic and phonological differences found are due to diachronic change rather than simply correlated with gender or dialect? First, we can be fairly certain that the patterns found cannot be attributed to dialectal differences, at least in large part. The Generation 1 speakers come from both major dialect groups, yet the differences found between Generation 1 and Generation 2 are not correlated with this variable. It is not the case, for instance, that the Lower Lake speaker, Speaker 1D, also happened to lack rhotics like Speaker 2A, or that the Sulfur Bank speakers all patterned together with or against Speaker 2A in a particular dimension.

We cannot be so sure about gender. It is an unfortunate fact that all of the recordings available of Generation 1 speakers are of males, while the only Generation 2 speaker is female. It is possible that Speaker 2A patterns differently from Generation 1 speakers because females and males say things differently in SEP. Nonetheless, gender differences cannot be responsible for the generalization of d-deletion. In this case, data from other female speakers (1F and 1G) pattern with the Generation 1 male speakers, not with the Generation 2 female speaker. Moreover, estimates of vocal tract size from vowel formant measurements suggest that the much greater distances between

categories achieved by the Generation 1 male speakers cannot be solely due to physiological differences between speakers. Thus, the data collected in this study cannot be written off entirely to gender effects, either.

More specifically, we might want to re-consider the divergent changes presented in §4.3. For example, there are two possible explanations for the presence of rhotics in Generation 1 and their absence in Generation 2. In the first scenario, (i) rhotics were not originally in the inventory, (ii) there was individual variation with respect to (innovative) rhotic realizations of certain words, and (iii) the Generation 1 speakers analyzed here all happened to have rhotic forms. In this case, the absence of rhotics in Generation 2 would be an "original" state rather than the result of sound change; the apparently consistent presence of rhotics in Generation 1 would then be an artifact of sample size. In the second scenario, (i) rhotics were originally in the inventory or entered it early on due to language contact, and (ii) they were then lost in Generation 2.

Two points favor the second, simpler analysis. First, whether or not rhotics were restricted to loanwords, they must have been fairly common for Moshinsky (1974) to include them in his consonant inventory, a fact that casts some doubt on the idea that there were many Generation 1 speakers who lacked rhotics entirely. Second, assuming that such speakers were common in Generation 1, it becomes highly improbable that of the four speakers on the recordings, not one would turn out to be one of these rhotic-less speakers, especially considering the fact that they were from different dialect regions.

One might return to the gender issue to counter that (i) rhotics might not have been a standard part of the inventory, (ii) female speakers tend to conform more to the standard variety of a language, and (iii) Speaker 2A is female. This is a possibility that we cannot fully discount due to the unavailability of recordings of other female SEP speakers. However, it is clear from the data that rhotics appear in native SEP words and not just in loanwords that have not been fully integrated into SEP phonology.

In fact, comparative evidence from other Pomo languages heightens the probability that there were indeed original rhotics in SEP. McLendon (1973) includes rhotics in the inventories of Northeastern Pomo as well as Eastern Pomo, the Pomo language most closely related to SEP, and one correspondence set she cites in particular suggests an alternation between /r/ and /l/ – the Pomo words for 'leaf'. The forms in all seven Pomo languages as cited by McLendon are summarized in Table 11 below.

Table 11. Comparison of Pomo forms for 'leaf' (McLendon 1973: 79)

Proto Pomo	Kashaya Pomo	Northern Pomo	Central Pomo	Northeastern Pomo	Eastern Pomo	Southeastern Pomo
*siʔt'ál	siʔt'al	siṭ'ál	st'ál	túʔt'a	siːt'ál	kiqt'a

McLendon (1973: 79) notes that the "lack of a reflex for *-l in [Northeastern Pomo] and [Southeastern Pomo] perhaps indicates that this *-l was a separate, segmentable morpheme in Proto Pomo", but it appears *-l might actually have had a reflex in SEP – namely, a rhotic. Compare the forms in Table 11 with the Generation 1 SEP forms for 'leaf': [kixɾa] (Speaker 1B) and [kitkɹa] (Speaker 1C). If this *l ~ r correspondence is legitimate, it further strengthens the argument for original rhotics in SEP.

As for the other case of divergent change, the generalization of d-deletion raises interesting questions about the stability of truly free variation. Campbell and Muntzel (1989) mention examples of previously obligatory rules becoming optional in obsolescence and resulting in free variation, but they do not present any cases of optional rules becoming obligatory ones. The former situation fits well into the notion of an obsolescing language being imperfectly learned in that it is subtractive: a language structure is forgotten or omitted. The latter situation, on the other hand, is additive: a rule of ambiguous status is regularized such that it can be applied all the time.

Of course, the generalization of d-deletion is a perfect example of an optional rule becoming obligatory. It seems the factors leading to this change might not be internal to the language so much as universal across languages. In many ways, truly free variation is a difficult problem for learners predisposed to associating a difference in sound to a difference in meaning. How do they cope with a difference in sound when they cannot associate it with a difference in meaning? One solution is just to eliminate the difference in sound: take account of all the variants, pick one, and stick to it. Perhaps this sort of motivation underlies the generalization of the SEP rule.

The findings of Hudson Kam and Newport (2005) lend support to this hypothesis. In this study, adults and young children were compared with respect to how they acquired unpredictable grammatical variability in an artificial language. Hudson Kam and Newport found that adult learners of the artificial language reproduced the pattern of variability they were exposed to in the input. However, many of the child learners, rather than reproducing the variability of the input like the adults, instead regularized the language. Thus, children's predisposition to constructing a grammar of regular patterns – often cited as a driving force behind the formation of creole languages – may account for the generalization of d-deletion seen in Generation 2.

With regard to the convergent changes discussed above, it remains a question what route to merger the narrowing of SEP contrasts is following. Babel (to appear) presents a case of place contrasts undergoing merger via complete and rather rapid transfer in Northern Paiute, but in the case of SEP, the change appears to be slower and more gradient. Both the velar/post-velar and dental/alveolar contrasts are actually

maintained despite being lessened in degree. What seems clear is that the road to merger in the case of SEP is not one of transfer as claimed by Babel for Northern Paiute, but rather one of approximation, since there indeed seems to be an intermediate phonetic form in this case. The dental/alveolar contrast, for instance, is diminished by way of the retroflexed alveolars of Generation 1 approaching the dentals by becoming non-retroflex in Generation 2. On the other hand, the dentals themselves maintain robust dental contact and do not move back in place of articulation, so it seems that if the two categories were to fully merge in the future, the result would be a merged category with approximately the same phonetic space as the dentals.

6. Conclusion

In contrast to previous linguistic studies focusing on the occurrence of either convergent or divergent change in obsolescing languages, this paper has argued, using phonetic and phonological evidence from Southeastern Pomo, that it is possible for these different types of change to occur simultaneously within the same speaker, resulting in the obsolescing language both converging with and diverging from the contact language under the same sort of external influence. Though these findings are based on data from one language, they suggest that the case of simultaneous convergent and divergent change is likely to be more common than the literature reflects.

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