2. HERITAGE LANGUAGE FEATURES AND THE YAKAMA ENGLISH DIALECT

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The english language has an "image problem" when it comes to some communities in the American West. Although English has a long history of use on tribal lands, it often resides alongside a valued heritage language. In the sociolinguistic setting that is the focus of this chapter, efforts have long been underway to revitalize Sahaptin, the endangered heritage language of the Yakama people of south-central Washington state. Because the population of native speakers is aging out, documentation and language teaching efforts are undertaken with urgency. In light of this, the entry of our research team into the community to study English has been sometimes met with surprise or appropriate critique: why study the language that is displacing Sahaptin? Community members reasonably expect that Sahaptin would be the target of a "language" study. And yet, there is also ready recognition by community members, young and old, that English has long been and is expected to remain part of the local sociolinguistic landscape. One respondent said:

> When I speak Yakama to them, I'm the only one talking. [YS50: 2824.857 sec]

And another:

> I'm one of the very few in my generation that speaks it fluently. All the others have gone off and learned English. [YT49: 3.614 sec]

First and foremost, our research aims to respect the lives and lifeways of the Yakama people. Research into Sahaptin is critical. But research into Yakama English is also important. First, it is valuable to document this part of the sociolinguistic reality of community life. Second, systematic research opens up the possibility of investigating phonetic distinctiveness in the dialect and transfer from Sahaptin. Third, it allows us to register Western speech patterns found in broader regional use. Fourth, studies investigating variation and change in Native American Englishes are few in variationist sociolinguistics, and this research addresses the problem of underrepresentation (Wolfram and Dannenberg 1999 is one important exception).

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The sociophonetic study presented below seeks to (1) describe key segmental features of Yakama English, (2) discover features that Yakama English may share with Sahaptin or other Native American dialects of English, and (3) locate features that are supraregional, that is, shared with other parts of the Western United States as discussed here and in the two preceding volumes of *Speech in the Western States* (Fridland et al. 2016, 2017). We will find that aspects of both the vowel and consonantal systems suggest that there is a way of "sounding Yakama."

Giles, Bourhis, and Taylor (1977, 308) define ethnolinguistic vitality as "that which makes a group likely to behave as a distinctive and active collective entity in intergroup situations." Crawford (2000, 63) links group cohesiveness, ethnolinguistic vitality, and cultural well-being, pointing out that language loss can destroy a sense of self-worth, limiting human potential and complicating efforts to solve social problems. In the community focused on in this chapter, Sahaptin is the variety most visibly connected to discourses of cultural preservation, history, family, and tradition. But in this complex sociolinguistic setting, a unique form of English that is at once both Pacific Northwestern and Yakama may serve as a vehicle through which local identity may be asserted (Wolfram and Dannenberg 1999). As in other minoritized communities, some Yakama speakers function in "vastly distinct social worlds where issues of ethnic, social, and professional identity may collide" (Rahman 2008, 141). Local language use includes a kind of linguistic diplomacy, that is, a speaker's selective or strategic use of linguistic resources to project a range of attitudes, stances, and social affiliations in diverse, potentially contested, or conflicted social settings (Rahman 2008).

PREVIOUS RESEARCH ON NATIVE AMERICAN VARIETIES OF ENGLISH IN THE U.S. WEST

Little dialectological research addresses the phonetics of Native American varieties of English in the Pacific Northwest. It is worth mentioning that Chinook Jargon, a trade variety based on Chinook, other Native American languages, French, and English, was employed seasonally from about 1804 into the 1870s along the Pacific Northwest coastline, including Seattle. Many Native American people, including the Yakama, spoke it (Thomas 1935; Mills 1950; Holton 2000). Accounts, however, focus on lexical forms. More directly relevant to the present study, Rowicka (2005) provides a qualitative study of heritage language transfer in the English spoken on the Quinault Indian Reservation, also in Washington State. She compares

archival data representing the speech of bilingual elders in the 1960s to that of monolingual English speakers recorded in 2001–4. She finds that Quinault English largely resembles the General American English of the region but has some notable differences. While she rejects a transfer-based explanation for most of these, she notes that several forms match patterns found across the Salishan languages. She also finds one new variable, the replacement of voiceless oral stops by glottal stops, as in "He grew u[ʔ] with a lo[ʔ]a tha[ʔ]" (317). This, she argues, may be a general feature of Native American varieties, collectively referred to as American Indian English (or AIE), rather than transfer from an ancestral language. The term AMERICAN INDIAN ENGLISH is attributed to Leap (1993) and suggests homogeneity, although Leap surveys commonalities and differences among different Indian varieties, finding both. The notion of a homogeneous AIE is controversial among Native American scholars. For example, Meek (2006, 111) cautions that "different American Indian communities use different English dialects" and that "there is no homogeneous AIE language that all American Indians speak." She calls on researchers to investigate these patterned and complex, but as yet poorly understood, linguistic systems. Two forms analyzed by Rowicka, alternation between /ɪŋ/ and /ɪn/ in unstressed *-ing* suffixes and glottal replacement of /t/, are investigated below. Wolfram and Dannenberg (1999) investigated European American, African American, and Native American interethnic contact effects in Lumbee English, which they classify as a mixed dialect that resembles other nonstandard varieties in that region, such as African American English, but remains distinctive. Their study informs our perspective on the possible influence of nonstandard varieties on Native American Englishes in the Pacific Northwest.

Several reasons exist for underrepresentation of Native American varieties of English. Three are mentioned here, for brevity. First, as Wassink (2015) points out, the early dialectological practice in the United States was to utilize NORMs (nonmobile older rural males) as research subjects, because it was presumed that they would best represent the speech of a region. In truth, this focus was not just on NORMs, but NORMs of Anglo-European descent (Wolfram and Schilling-Estes 2006). This practice had the advantage of narrowing the scope of study to groups least impacted by non-English languages and nonmainstream features. However, interethnic contact has played a role in defining American regional dialects, particularly in the Western United States, where contact has been part of regional history since times long predating European and European American arrival (Sale 1976). Second, non-White speakers have often been assumed not to use features associated with mainstream regional dialects, and their

varieties of English have been treated as special (effectively held aside from "normal" linguistic projects). For Indigenous communities, this can mean a focus on just one variety—the heritage language—when there are actually several in the local linguistic repertoire. This variety is often explored solely within an endangered language frame. This can result in concentrating on linguistic difference through a focus on nonnativeness (foreignness) or divergence from a White variety (Charity Hudley 2017) to the exclusion of other issues. A third reason regards trust. The Yakama people have endured historic trauma, including the loss of traditional tribal lands and lack of full support for Indigenous language education programs by the federal government (Hugo 2016; Jacob 2013). Misuse of data and unsanctioned sharing of cultural material by scholars from academic research institutions (Hunn 1990; Jacob 2013) has also led to hesitation to work with outside scholars.

It is against this backdrop that we research key features of Yakama English with a view to both identifying uniquely Yakama forms as well as ones recognized as part of Western U.S. patterns. The latter include fronting of /u:/ BOOT, merger of /ɑ/~/ɔ/ BOT~BOUGHT, lowering or retraction of lax vowels /ɛ/ BET and /ɪ/ BIT, and raising in prevoiced velar contexts of /ɛg/ BEG and /æg/ BAG. Previous research has demonstrated that ethnic groupings may simultaneously display ethnolect-specific as well as supraregional vernacular norms (Hall-Lew 2009, 2013; Wong and Hall-Lew 2014; Wassink 2016a). For Chinese Americans from San Francisco's Sunset District, Hall-Lew found the BOT-BOUGHT merger in progress in apparent time. For younger speakers, BOUGHT was lowering and fronting into proximity with BOT. Elsewhere in the United States, Cantonese Americans with moderate to weak orientation toward their cultural heritage showed raised [ɔ] BOUGHT commensurate with New York dialect norms (Wong and Hall-Lew 2014). For a sample of Japanese Americans in Washington State, Wassink (2016a, 2016b) found participation in Western vowel patterns to match that of Whites. Scanlon (2019) found both African American English /aɪ/ monophthongization and PIN-PEN merger as well as raising along the F1 dimension for /æg/ BAG and /ɛg/ BEG in a sample of African Americans from the Yesler Terrace neighborhood of Seattle. Wassink (2016b) reported results for word list and reading passage data from the same set of Yakama speakers whose conversational materials are presented in this chapter, finding some raising of /ɛg/ BEG and /æg/ BAG. This was not as advanced as for the Japanese Americans and Caucasians sampled. These findings will be compared below with results for the present investigation.

BACKGROUND

THE YAKAMA NATION. Hunn (1990) and Schuster (1998) provide histories of the Native Americans of the Yakima River Basin. Members of the Lewis and Clark expedition were the first known Whites to enter the area. A treaty with the U.S. government signed on June 9, 1855, at Fort Walla Walla, with Yakama Chief Kamiakin present, created the Confederated Tribes and Bands of the Yakima Nation. Attending were the Yakama, Palouse, Pisquose, Wenatshapam, Klikatat, Klinquit, Kowwas-say-ee, Li-ay-was, Skin-pah, Wish-ham, Shyiks, Ohce-chotes, Kah-milt-pah, and Se-ap-cat, all of whom, for the purposes of the treaty, were considered one nation, under the name Yakama. The treaty stated that the reservation was intended for the exclusive use and benefit of these peoples; however, White settlers began to reside in the Yakima Valley in 1860 and were "numerous" by 1867 (Schuster 1998, 345). Hunn (1990, 279) notes that by 1914 "the best agricultural lands […] had become a checkerboard of Indian and white ownership with whites […] outnumbering resident Indians ten to one." A recent estimate by the Northwest Portland Area Indian Health Board (2016) states that "[m]ore than 8,800 people are enrolled in the Yakama confederation of tribes."

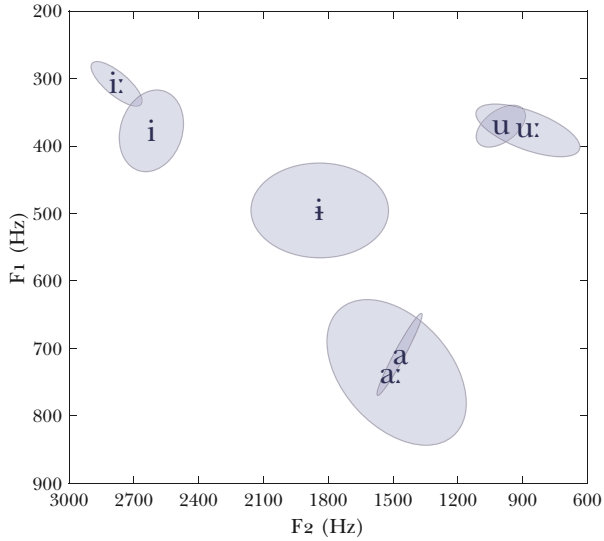
THE SAHAPTIN LANGUAGE. The academic designation for the Indigenous language of the Yakama Nation is Sahaptin, a Sahaptian language related to Nez Perce and more distantly to Klamath (DeLancey, Genetti, and Rude 1988). Rigsby (2009a, xix) traces the etymology of *Sahaptin* to the Nxaʔamxčín/Moses-Columbia Salish word *sɬáptənəxʷ* 'Nez Perce'. The name for Sahaptin in Sahaptin is *ích̓ishkin*, *ích̓ishkink*, or *ich̓ishkíin* (literally, 'by means of, speaking this (language)'). Rigsby (1965) recognized three main dialects of Sahaptin: Northeast, Northwest, and Columbia River. Yakama is the only surviving subdialect of the Northwest dialect of Sahaptin. *Yakama* (spelled with an *a*) is the preferred term and spelling for the people, and the name of the subdialect of Sahaptin.[1] Recordings by the late Ellen Saluskin describing the mid-nineteenth century treaty process indicate that competent speakers of English were scarce at that time. Between then and now, however, language shift from Sahaptin to English has occurred. Beavert and Jansen (2012) estimate the remaining number of Sahaptin speakers of any dialect at around 50, all of whom are bilingual in English.

Phoneme charts for Sahaptin appear in figures 2.1 and 2.2 (see also Rigsby and Rude 1996; Hargus 2009; Jansen 2010; Hargus and Beavert 2014). Note that in the consonantal system, ejective stops occur at sev-

FIGURE 2.1
Consonant Inventory of Yakama Sahaptin

	Bilabial	Alveolar	Post-alveolar	Palatal	Velar	Labial Velar	Uvular	Labial Uvular	Glottal
Plosive	p	t			k	k^w	q	q^w	ʔ
Affricate		t͡s	t͡ʃ						
Lateral affricate		t͡ɬ							
Ejective stop	p’	t’			k’	$k’^w$	q’	$q’^w$	
Ejective affricate		t͡s’	t͡ʃ’						
Ejective lateral affricate		t͡ɬ’							
Nasal	m	n							
Fricative		s	ʃ		x	x^w	χ	$χ^w$	h
Lateral fricative		ɬ							
Approximant	w			j			(ʁ)		
Lateral approximant		l							

FIGURE 2.2
Vowel Inventory of Yakama Sahaptin



eral places of articulation. These typically have a long voice onset time (103 ms on average) with a clear period of silence (average 43 ms) following the supraglottal release and before the glottal release and vowel onset (Hargus and Beavert 2014). Sahaptin has seven contrastive vowels: /i/, /a/, /u/, /iː/, /aː/, /uː/, and /ɨ/. Figure 2.2 is a plot of the contrastive vowels.

For the purposes of this study, we consider two ways in which phonological and phonetic features from Sahaptin might appear in Yakama English: either in the presence of particular segments (e.g., [ɨ], which does not occur phonemically in other varieties of Washington English) or in productive use of phonetic cues present in the heritage language. For example, the glottalic egressive airstream mechanism is productive in Sahaptin in the ejective subsystem at all places of articulation where plosives and affricates occur. In this chapter, we will find glottal replacement of /t/ to include a long, clear silent period (glottal closure) with an audible release.

METHODS

SPEAKERS. The study includes a sample of nine speakers (four female, five male), ages 31–61, whose demographics are summarized in table 2.1. Speakers were participants in the larger Pacific Northwest English (PNWE)

Study (Wassink 2015). Eight self-identify as Yakama and were raised on the Yakima Reservation. The ninth, speaker YW41, was born on the Warm Springs reservation in Oregon to a Yakama mother and a Tenino father but was raised on the Yakama Reservation. A detailed social network questionnaire was delivered to all respondents. Consideration of speakers' social network composition falls outside the scope of this article but is available elsewhere (Wassink 2016a). However, some of the prompts were used to measure respondents' connection to the local community. A social network localness score is given for each speaker in table 2.1. Modeled on the network strength scales of Milroy (1980) and Lippi-Green (1989), the score registers local ties in the key network subsectors of kinship, occupation, and voluntary association using a proportion ranging from 1.0 (indicating that all ties are locally contracted) to 0.0 (no local ties). For all speakers, at least one parent or grandparent was reservation-born, and schooling and employment were local. Nonlocal activities and close friends account for scores below 0.5. (Fuller details are provided in Wassink 2016a.) The rightmost column in table 2.1 lists languages other than English used in the home in childhood using the name of the language volunteered by the respondent. (Note that *Yakama*, *Ích ishkin*, and *Sahaptin* refer to the same language.) Only two speakers self-reported high levels of fluency in Sahaptin: speakers YT49 and YS50, both quoted in the opening to this chapter. All others claimed to have limited proficiency, describing this as the ability to use select words and phrases but not carry on conversations.[2]

TABLE 2.1
Yakama English Speaker Sample

	Sex	*Age*	*Network Localness Score*	*Place of Birth*	*Family Language*
YZ40	F	56	.50	Toppenish, Wash.	"Yakama," "Shoshone"
YS44	F	55	.42	White Swan, Wash.	"Ích ishkin"
YS45	F	55	.78	White Swan, Wash.	"Sahaptin"
YS46	F	31	.36	White Swan, Wash.	"Ích ishkin"
YS50[a]	M	61	—	Toppenish, Wash.	—
YT49	M	59	.97	Toppenish, Wash.	"Sahaptin"
YU51	M	57	.53	Sunnyside, Wash.	"Ích ishkin," "Shoshone"
YW42	M	38	.36	Wapato, Wash.	"Sahaptin (Yakama)"
YW41	M	36	.58	Madras, Ore.	"Ích ishkin"

a. While this speaker consented to be recorded for this study, his social network information is unavailable.

In addition to these speakers, there is one other consultant whose data appear in this chapter. We will refer to phonetic shapes for words from Sahaptin itself in the description of possible transfer effects. Such forms are drawn from the interview data of Virginia Beavert, recorded in previous work by the second author.

DATA ELICITATION. All recordings were made in the Yakima Valley between 2012 and 2017. Sociolinguistic interviews were conducted at the respondents' homes or those of relatives. All were invited to bring a peer conversation partner. All conversations were conducted in either dyads or triads, with the exception of speakers YW42 and YW41, who were interviewed individually. Informed consent was obtained from each respondent prior to recording.

Field recordings were made using a Samson H4 Zoom digital flash recorder, with matched X/Y unidirectional onboard microphones, using a 90° polarity pattern for better voice separation. Recordings were made using a 44.1 kHz sampling rate.

TASKS. Sessions included casual conversation, a demographic interview, a reading passage, and a word list. For the present study, only the unscripted conversations are used. (Results for the word list and reading passage materials were previously reported in Wassink 2016b and Riebold 2015.) The unscripted conversations lasted 16–57 minutes, with an average length of 39 minutes. Topics included: what it means to be a Northwesterner, family roots, local industry, cultural changes, and respondents' notions regarding regional linguistic variation. Focus on the conversational data was desired in order to represent most closely the community vernacular, minimizing the influences of reading or formality (see discussion of linguistic diplomacy, above).

Based upon the work surveyed above by Rowicka (2005), Hargus and Beavert (2014), Riebold (2015), and Wassink (2015, 2016b), as well as the authors' observations, six sets of variables were selected for study. First, /iː/, /ɪ/, /eː/, /ɛ/, /æ/, /ɑ/, /ɔ/, /ʌ/, /o/, /ʊ/, and /uː/ were analyzed to determine the basic shape of the vowel system. Second, pre-voiced-velar /æg/ BAG and /ɛg/ BEG were extracted to investigate potential raising. The third phenomenon studied was /ɔ/-/ɑ/ merger. Fourth was fronting of /uː/ (partitioned by preceding coronal or noncoronal context). Fifth, we examined glottal replacement of /t/. Finally, we examined alternation between [n] and [ŋ] in unstressed forms of *-ing*. For this variable, we also considered the possibility that the vowel is produced with greater raising and fronting toward [i] than is expected for American English varieties (Ladefoged and Johnson 2014).

DATA ANALYSIS. Conversations were transcribed manually in ELAN, version 4.8 (2014), and aligned using the Dartmouth Language Automation system (DARLA), which employs the Montreal Forced Aligner (McAuliffe et al. 2017). The resulting text grids were used for phonetic analysis in Praat (Boersma and Weenink 2014). A custom Praat script isolated variables of interest. For the main vowel analysis, only stressed vowels were extracted. Miscoded word classes or faulty alignments were corrected for targeted forms. The script presented a phone (in its word setting) to the analyst for impressionistic coding, then automatically extracted the desired acoustic parameters (see below). Stressed vowels were measured at three locations: 20%, 50%, and 80% of vowel duration.

For *-ing*, analysis of nasal segments included several steps. First, the Praat script used for stressed vowels above was modified to locate all ARPABET-transcribed words containing *-ing*. Analysis was only accomplished for those tokens containing an unstressed *-ing* suffix (e.g., a skip command allowed bypassing of monomorphemic forms like *sing*). The word was audited by the analyst (the first author), who auditorily coded the nasal as [n] or [ŋ]. The spectrogram for this word was simultaneously displayed so that the formant transitions at the end of the nasal could be visually inspected. Only those nasal tokens exhibiting velar pinch (approximation of F2 and F3 at nasal offset) were coded as [ŋ]. Thus, nasals were analyzed using a combination of impressionistic and acoustic procedures.

Spectral measures were summarized and visualized using the R packages phonR (McCloy 2013), ggplot2 (Wickham 2016), and dplyr (Wickham 2011). Inferential statistical tests were conducted using lme4 (Bates et al. 2015), with *p*-values extracted using lmerTest (Kuznetsova, Brockhoff, and Christensen 2017). phonR was used for Nearey 2 vowel normalization. For the Western vowel pattern analyses, vowelsR (Kendall and Thomas 2018) was additionally used to normalize data to the Telsur-G (Labov, Ash, and Boberg 2006).[3] All packages were run under R version 3.6.0 (R Core Team, 2019-04-26).

Analysis of conversational data requires special considerations, as has been alluded to above. Background noise reduces the fidelity of recordings. Laughter and fluctuating f0 yield greater variability in field-recorded speech than that recorded in a lab. Three steps were taken to try to obtain the best possible spectral analyses. First, Mahalanobis distance, which measures the proximity of a point to its distribution, was used to determine outliers. Second, a subset of measurements was checked by a trained phonetician not involved in this project. Errors were still present following the Mahalanobis procedure, particularly for /u:/ and /ʊ/. For these classes, a random sample of forms was then extracted and measured manually. The hand-corrected forms comprise the final set analyzed for this vowel pair. For /u:/, tokens of

to, *do*, and *you*—totaling 651—were overrepresented and were thus omitted before sampling. Spectral analysis was typically accomplished over a range of 0–5500 Hz, with a standard dynamic range of 70 dB, and an 0.005 sec analysis window. However, it was sometimes necessary to lower the dynamic range for noisier signals, in which case 30–35 dB was used. Number of formants was adjusted for each speaker (5 or 6). Classification of /t/ forms as glottalized was based upon auditory assessment together with visual inspection of the spectrogram for stop closure duration and creak in flanking vowel segments.

RESULTS

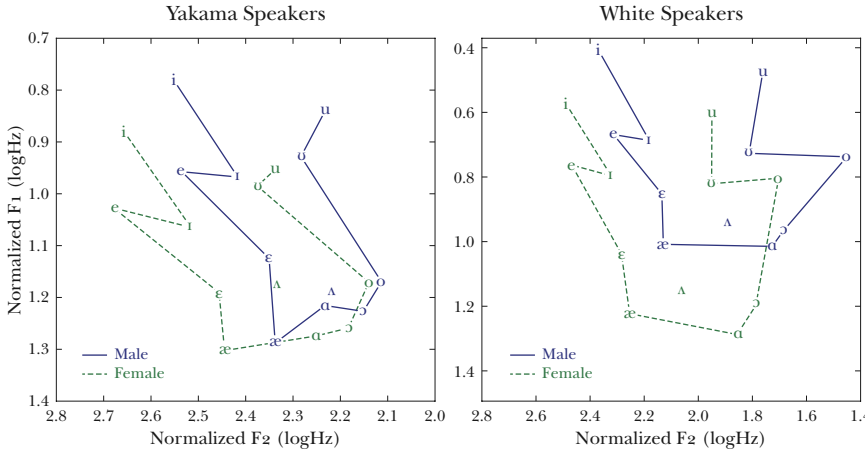
Counts for all variables appear in table 2.2. Our research questions ask whether there are (1) distinctive segmental features in Yakama English, (2) features shared with Sahaptin, or (3) Western vowel features. The large number of forms to be summarized necessitates leaving some aspects of the phonetic analysis to future reports. The hypothesis being tested for the vowel variables, including /u:/ fronting, /ɑ/-/ɔ/ merger, pre-voiced-velar raising, and lax vowel retraction, is that there is no evidence of the Western vowel features in question. Glottal replacement of /t/ and /ɪŋ/-/ɪn/ alternation are examined for alignment with previous work on Sahaptin and Native American Englishes (e.g., Leap 1993).

POSITIONING OF KEY VOWELS. Figure 2.3 displays the positions (taken at the 50% measurement point) of key vowels in F1 × F2 space, with gender groupings differentiated. The vowel space of White Seattleites from Wassink (2016b) is replotted here, axes scaled as closely to the Yakama plot as possible to allow visual comparison. The two systems show similar front peripheries and proximal /ɑ/ and /ɔ/ (although the latter are differentiated

TABLE 2.2
Counts for Each Variation, Spontaneous Speech

Variable	*n*	*Variable*	*n*
/i:/	1,727	/ɔ/	1,094
/ɪ/	2,394	/o/	1,377
/e:/	1,204	/ʊ/	71
/ɛ/	1,591	/Ku:/ (nonpostcoronal /u:/)	305
/ɛg/, /ɛŋ/	6	/Tu:/ (postcoronal /u:/)	98
/æ/	2,294	/ɪŋ/-/ɪn/ alternation	194
/æg/, /æŋ/	74	/t/ glottal replacement	3,239
/ɑ/	1,622		

FIGURE 2.3
Mean Vowel Midpoints for Yakama and White Speakers by Gender



in F2 rather than F1 for the Yakama system). We leave further analysis of /ɑ/ and /ɔ/ to later work. The Yakama F2 dimension appears compressed, exhibiting fronted /u:/ and /ʊ/. In addition, /o:/ is quite low along the back periphery. A table of the formant and duration means for the vowel categories appears in the appendix. Figure 2.4 isolates special allophonic environments and will be used below to focus the presentation of key phone classes. /u:/ is subdivided into postcoronal and nonpostcoronal classes (depicted in figure 2.3 as /Tu:/ and /Ku:/, respectively). Because presence or absence of an offglide is of interest in the discussion of back vowels /u:, o:/ below, glides (80% measurement points, indicated by arrowhead at the end of a vector) are also plotted. One general pattern apparent from the graph is that following laterals favor retraction for /o:l/, /u:l/, /ʊl/, and /æl/ (Di Paolo, Yaeger-Dror, and Wassink 2011, 87).

One way to investigate the participation of speakers in Western vowel patterns is to compare the vowel means of affected classes against class benchmarks reported by Labov, Ash, and Boberg (2006) in the *Atlas of North American English* (*ANAE*). Table 2.3 presents the means for Yakama English /u:/, /o:/, /ɛ/, /æ/, and /ɑ/ alongside their respective Telsur-G benchmarks. Caution is required in interpreting the Telsur-G comparisons. Telsur-G means represent adjusted Hertz, specifically, *z*-score normalized values for the 345 speakers analyzed for the *ANAE*, remapped onto a common geometric space centered on the overall sample grand mean. The benefit of this approach, however, is that we may judge differences in the relative positioning of dialect forms.

FIGURE 2.4
Yakama English Vowel System Means Grouped by Conditioning Environment

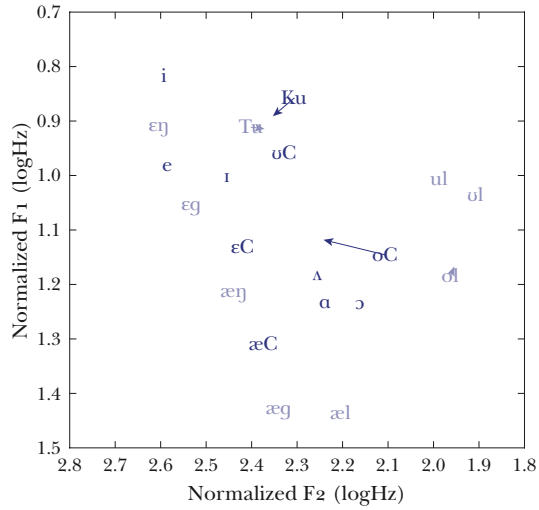


TABLE 2.3
ANAE Benchmarks and Observed Means for Corresponding Yakama Classes

Vowel	*Benchmark (ANAE)*	*Yakama English*
Postcoronal /u:/ fronting	F2 > 1550 Hz	1951.9 Hz
Nonpostcoronal /u:/ fronting	F2 > 1200 Hz	1832.3 Hz
/o:/ fronting	F2 > 1278 Hz	1584.5 Hz
/ɛ/ lowering	F1 > 650 Hz	568.5 Hz
/æ/ retraction	F2 < 1825 Hz	1951.4 Hz

/u:/ BOOT. The hypothesis that Yakama English shows no fronting of /u:/ must clearly be rejected. Yakama English postcoronal /u:/ falls far closer to the front of vowel space (1952 Hz) than does that of *ANAE* speakers from /u:/ fronting dialects (1550 Hz). Mean F2 for nonpostcoronal /u:/ follows suit (1832 Hz exceeds the benchmark of 1200 Hz). Auditory examination reveals that these forms frequently surface as high, central rounded [ʉ]. The fronting is extreme: both vowels are readily audible as high central. They also appear to be more fronted than the California pattern. Becker et al. (2016) present data for an Oregonian who shows "robust" Californian features, exhibiting a mean F2 for postcoronal /u:/ of about 1750 Hz. McLarty, Kendall, and Farrington (2016, 144), however, find fronting in their older and younger contemporary Oregonians that might be more

comparable to these Yakama data. Postcoronal and nonpostcoronal /u:/ are also significantly different from each other. A mixed effects linear regression modeling normalized F2 that includes PRECEDING PHONE as a fixed effect and SPEAKER as a random effect reveals that PRECEDING PHONE has a significant effect on F2 (table 2.4). Postcoronal forms, as expected, are fronted most. Recall that Sahaptin differentiates three degrees of fronting along high vowel space. Interestingly, Sahaptin /ɨ/ is reported by Hargus and Beavert (2014) to have an average F2 of 1785 Hz. Yakama English [ʉ] similarly lies within high central vowel space.

/o:/ BOAT. Comparison of Yakama English mean F2 for BOAT to the *ANAE* benchmark suggests fronting of /o:/ (1584 Hz exceeds the 1278 Hz benchmark). However, for all speakers, /o:/ lies further back than /u:/, /ʊ/, and /ɔ/. The only vowels with lower average F2 are prelateral, as expected. We must therefore question whether /o:/ can be considered to be fronted. /o:C/ was observed to have a slightly rising inglide, whereas gliding is negligible in /o:l/. Though plotted, offset arrows for the latter class are difficult to detect.

/ɛ/ BET. For /ɛ/ in nonprevelar contexts, we observe that the Yakama English mean of 568 Hz does not exceed the *ANAE* benchmark for F1 (650 Hz). We therefore conclude that Yakama English /ɛ/ does not display lowering as observed elsewhere along the West coast.

/ɪ/ BIT. The variable process of interest here involves lowering of the BIT vowel. However, there is no *ANAE* benchmark for reference. We may compare the Yakama mean F1 for BIT (498 Hz) to that reported for the same vowel (489 Hz) by Becker et al. (2016), whose Oregon data were also Telsur-G normalized. By this metric, it appears that the two varieties are quite similar. We also note that mean F1 is a higher value than the means (in raw Hertz) reported by Wassink (2016b) for White speakers from Seattle (women, 461 Hz; men, 401 Hz). However, visual examination of the position of /ɪ/ relative to other phonemes in the Yakama English system in figure 2.2 shows that the vowel is positioned proximally to /e/, which suggests lowering is an inappropriate conclusion to make. Further study is necessary to determine whether /ɪ/ can be taken to be lowering.

TABLE 2.4
Summary of Main Effects on /u/ F2

	Estimate	*Std. Error*	*df*	*t*	*p-value*
(Intercept)	2.38599	0.02423	10.72254	98.473	< .0001***
PrecPhoneT	0.16715	0.02437	394.99998	6.858	< .0001***

/æ/ BAT. This class includes forms in obstruent contexts but excludes the alveolar and velar nasals /n/ and /ŋ/ as well as /r/ and /l/. Pre-voiced-velar contexts /æg/ and /æŋ/ are examined below. Retraction is indicated if the observed mean F2 for Yakama English falls below the *ANAE* benchmark of 1825 Hz. At 1951 Hz, the Yakama English mean F2 for BAT does not meet this criterion. No retraction is observed, and the hypothesis that there is evidence of retraction for Yakama English BAT is thus rejected.

/ɛg/ BEG. As described above, raising (sometimes occurring together with fronting) has been observed in Washington State for /ɛ/ and /æ/ in voiced velar contexts, before /g/ and /ŋ/, but in the absence of raised /æn/.[4] Midpoint averages of F1 of /ɛg/ and /ɛŋ/ were compared to those of /ɛ/ elsewhere. The hypothesis tested was that there is no difference between the F1 means of /ɛg/, /ɛŋ/, and /ɛC/. A three-level independent variable, FOLLOWING CLASS, was created (separating /_g/ and /_ŋ/ contexts from others following consonants, with laterals and rhotics excluded). The mixed effects linear regression is summarized in table 2.5. The highly significant effect associated with the intercept, taken together with the values for the estimates of F1, indicates that normalized mean F1 for /ɛŋ/ is lower than for /ɛC/, yielding a significantly higher vowel in F1 × F2 space. The normalized mean F1 for /ɛg/ is also lower than for /ɛC/ (a higher vowel), but the difference fails to reach significance. We conclude from these results, then, that we see significant raising in /ɛŋ/ but not in /ɛg/.

/æg/ BAG. A second, similar mixed-effects regression was conducted for BAG and is summarized in table 2.6. F1 for /æC/ is significantly different from /æŋ/, which has a lower mean F1 (confirming prevelar raising for that environment). Mean F1 of /æg/, on the other hand, is higher than that of /æC/ (indicating a lower vowel), although the results fail to reach significance. The conclusion, similar to that for BEG, is that /æŋ/ shows raising, while /æg/ does not. The velar nasal /ŋ/ has been described as inducing hyperraising in the phonetics literature associated with language-universal coarticulatory effects in articulation particular to low-vowel environments

TABLE 2.5
Summary of Main Effects on BEG F1

	Estimate	*Std. Error*	*df*	*t*	*p-value*
(Intercept)	494.533	17.812	8.197	27.765	< .0001***
Target-ɛg	–7.938	43.434	1233.640	–0.183	.8550
Target-ɛŋ	–187.922	96.884	1233.399	–1.940	.0526

TABLE 2.6
Summary of Main Effects on BAG F1

	Estimate	*Std. Error*	*df*	*t*	*p-value*
(Intercept)	584.396	15.381	8.477	37.996	< .0001***
Target-æg	55.544	48.352	4151.370	1.149	.2507
Target-æŋ	–44.241	11.815	4156.057	–3.745	< .0002***

(e.g., Baker, Mielke, and Archangeli 2008; Wassink and Riebold 2013; Mielke, Carignan, and Thomas 2017). Its particular behavior in this context might well be considered further evidence of this effect.

GLOTTAL REPLACEMENT OF /t/. Rowicka (2005) reports qualitative evidence that younger speakers of Quinault English replace voiceless stops, primarily /t/, with [ʔ]. This pattern appears phrase-finally and preconsonantally, as in "Can you shu[ʔ] my ga[ʔ]e?" (316). Glottally replaced forms are differentiated from unreleased word-final glottal stop [ʔ] by the presence, Rowicka claims, of an audible release, sometimes accompanied by following aspiration or a "voiceless 'echo' vowel" (317). A small subset of eligible forms of word-final /t/ was isolated to investigate glottal replacement of /t/ in Yakama English. For each speaker, tokens were taken from the first, central, and final two minutes of the recording, tokens permitting. This procedure yielded roughly 10–15 tokens per speaker, except where few were produced (in the case of speaker YT46) or many were produced (YZ40, YS50). In these cases, forms appearing within the designated windows of time were all kept.

Tokens were audited alongside the spectrogram and coded as [t] or [ʔ]. Some were audibly alveolar and had a long silent period followed by a moderate or heavily aspirated release. An example is the final /t/ in *Klickitat and*, realized as [ˈkʰlɪ.kɨˌtʰæːʰn̩] by speaker YS50, which exhibited a closure duration of 143 ms and a 16 ms release afterward, preceding nasal [n]. Closure durations for audibly released /t/ averaged 57 ms (some ranging as high as 185 ms). The primary cues to place of articulation in these phones tended to be audible in the release burst, whose center of gravity fell around the same frequency as that of /t/ in onset positions. For forms coded "glottally replaced," a long period of closure is also observed (averaging 70 ms). One example can be seen in figure 2.5, with a 37-ms closure in "Wha[ʔ] I was." For such forms, we typically observe creakiness in the vowel preceding or following the glottal variant [ʔ] (here, 73 ms of creak in the early portion of the trajectory of [ɑɪ]), together with absent or steady-state formant transitions. Sometimes, we see some voicing into closure.

FIGURE 2.5
Utterance *what I was*, Demonstrating Glottally Replacement with Long Period of Closure, Absence of Rising F2 Formant Transition, and Creaky Voicing into [ɑɪ]

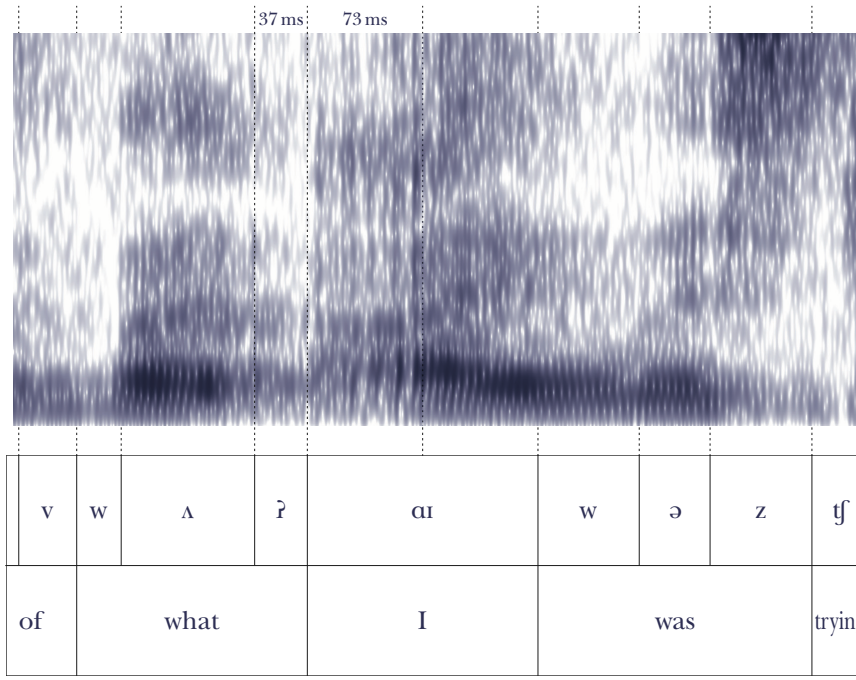


Table 2.7 presents the counts and proportions for each variant. A Student's *t*-test reveals that men employ glottal replacement of /t/ slightly more frequently than women in this corpus ($t = 6.79$; df = 1; $p < .05$). It may be worth noting here that in the process of examining forms of /t/, one glottally replaced /k/ was also discovered, in the form *LaRock* [ləɹɑʔ].

TABLE 2.7
Counts and Proportions of Variants for Analysis of Glottally Replaced /t/

Speaker	*Gender*	[t] *Count (%)*	[ʔ] *Count (%)*	*Total*
YZ40	F	19 (82.6%)	4 (17.4%)	23
YS44	F	10 (83.3%)	2 (16.7%)	12
YS45	F	5 (50.0%)	5 (50.0%)	10
YS46	F	5 (100.0%)	0 (0.0%)	5
YS50	M	16 (80.0%)	4 (20.0%)	20
YT49	M	12 (92.3%)	1 (7.7%)	13
YU51	M	9 (75.0%)	3 (25.0%)	12
YW41	M	6 (54.5%)	5 (45.5%)	11
YW42	M	9 (69.2%)	4 (30.8%)	13

Long voice onset time and audible release are also spectral cues to Sahaptin ejective stops (Grossblatt 1997; Hargus and Beavert 2014). They are most common prevocalically and before obstruents. Some examples of [t'] recorded in the Sahaptin productions of Virginia Beavert include:

[t'] [pa'ɫ'ipt'ipʃa] 'they're hopping'
[t'ɨqʷ'ɫ'ɨqʷ] 'dotted/spotted'

Thus, it seems possible that phonetic cues utilized in Yakama English glottalized /t/ may result from transfer from Sahaptin. We return to this issue in the discussion section.

-ING. The final variables investigated for this project are the nasal consonant as well as the vowel produced in unstressed forms of the *-ing* suffix found in progressive verbs, such as *swimming*, *thinking*, and *gathering*. First, we ask: focusing just on the nasal realized in such forms, do we observe a difference greater than expected between the frequencies of [n] and [ŋ]? Our hypothesis is that [n] occurs more frequently than expected. A conservative threshold value of .50 was used for expected counts of [n], as there are no previous reports for this dialect upon which to base selection of a more appropriate value. We may use Shuy, Wolfram, and Riley (1967), who found that upper-working-class Detroit speakers produced the [n] variant at a rate of 50.5%. Counts for [n] and [ŋ] were obtained using the procedures described above in the data analysis section. A chi-squared test of independence indicates that [n] indeed appears more frequently than expected if the alternation produces each form about half of the time ($\chi^2 = 7.06$; df = 1; $p < .01$). A further test was conducted to investigate the robustness of the difference between the frequency of [n] for men and women (see table 2.8). An unpaired Student's *t*-test indicates that men produce significantly higher levels of [n] than women ($t = 25.6$; df = 1; $p < .001$).

Auditory analysis motivated the hypothesis that the [n] variant might be a male marker. It also motivates a further hypothesis that women might substantially raise the vowel in the suffix toward [i]. To investigate this possibility, the vowels in the *-ing* suffixes were plotted in normalized F1 × F2 space, within the context of corner vowels /i/, /æ/, and /u/, as well as stressed

TABLE 2.8
Alternation in Nasal Place of Articulation for Unstressed *-ing*

	[n] *Count*	[ŋ] *Count*	*Total*
Female	8 (32.0%)	17 (68.0%)	25
Male	72 (76.6%)	22 (23.4%)	94
TOTAL	80 (67.2%)	39 (32.8%)	119

[ɪ]. This plot appears in figure 2.6. Visual inspection shows that women tend to produce a higher, more fronted [i] with the velar variant [ŋ] of the nasal, and a lower, slightly more central vowel, [ɪ̟], in the environment of the alveolar nasal [n]. Men tend to produce lower vowels quite distinct from [i], in both nasal contexts. Their variants appear to be differentiated instead by fronting. The variant produced with the velar nasal [ŋ] is slightly audibly raised [ɪ̟], while the variant produced with the alveolar nasal [n] tends to be closer to [ɨ]. A mixed-effects linear regression for normalized F1 confirms that stressed and unstressed /ɪ/ are distinct. There is no main effect of GENDER; however, the interaction of GENDER × STRESS is significant: the difference between F1 values of stressed and unstressed *-ing* tends to be greater for women than for men. A second mixed-effects linear regression models the differences in F2. As expected, F2 is significantly different for stressed versus unstressed forms. Here, however, there is a main effect for GENDER and again a significant GENDER × STRESS interaction: men tend to retract to [ɨn]. The models are summarized in tables 2.9 and 2.10.

As an aside, one surprising finding that we will note in closing is develarization of /ŋ/ to [n] in the word *Washington*, which is produced by speaker YS45 as [wɑʃɨntən]. In Sahaptin narratives, this word sometimes appears, always pronounced with [n] as the coda to the second syllable. Recall that there is no velar nasal in the Sahaptin phoneme inventory.

FIGURE 2.6
Nearey 2 Normalized F1 and F2 for Stressed /ɪ/ versus Unstressed /ɪ/ in Verb + *-ing* Contexts for Yakama Women and Men

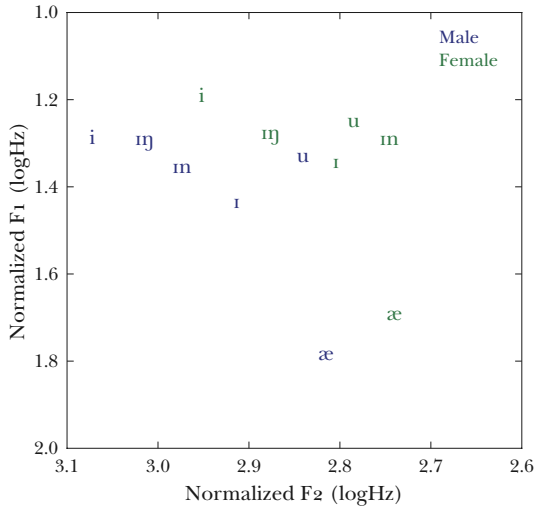


TABLE 2.9
Summary of Fixed Effects for F1 of /ɪ/ in Unstressed (-ing)

	Estimate	*Std. Error*	*df*	*t*	*p-value*
(Intercept)	1.08964	0.04155	7.69811	26.226	< .0001***
StressVing	–0.87928	0.03549	2500.72147	–24.775	< .0001***
GenderM	–0.09366	0.05470	7.22722	–1.712	.129
StressVing:GenderM	0.09850	0.04007	2500.72161	2.458	.014*

TABLE 2.10
Summary of Fixed Effects for F2 of /ɪ/ in Unstressed (-ing)

	Estimate	*Std. Error*	*df*	*t*	*p-value*
(Intercept)	2.50875	0.02023	7.33976	124.002	< .0001***
StressVing	–0.56348	0.03080	2501.36463	–18.292	< .0001***
GenderM	–0.09259	0.02596	6.60939	–3.566	.0101*
StressVing:GenderM	–0.16840	0.03478	2501.48953	–4.842	< .0001***

DISCUSSION

SOUNDING YAKAMA. We now draw together the pieces of the analysis, which suggest that, on balance, Yakama English is distinctive. Speakers use the high central region of the vowel space for postcoronal and nonpostcoronal /u:/ and /ʊ/ in ways that more closely resemble the heritage language, Sahaptin, than mainstream U.S. English. The resemblance is complex: it relates to use of high central vowel space rather than phonetic matching of /u:/ phonemes (since Sahaptin does have a high, canonically back /u:/). In other words, it is possible that Yakama English speakers have mapped the White English [ʉ], the fronted variant of /u/, to Sahaptin /ɨ/ rather than to Sahaptin /u/.[5] This is an issue for future clarification. For BOAT, fronting is not observed. This is consistent with the conclusion reached for the earlier study of citation speech forms for these speakers (Wassink 2016b). In contrast with the patterns found for the Low-Back-Merger Shift vowels and for some speakers in northern Oregon, no lowering is observed for either BIT or BET, and no retraction is noted for BAT. In this regard, the patterns found for these Yakama English speakers are consistent with those of other Washington speakers reported in the first volume of this series (Wassink 2016b). The BEG pre-voiced-velar raising pattern, widely attested elsewhere in Washington for White speakers, is not advanced in the Yakama English sample. In terms of rank by height from highest to lowest along the front vowel system periphery, we found /ɛŋ/ to be higher than /ɛg/, which is in turn higher than /ɛC/. While this is the expected ranking, it is also explainable on phonetic grounds. For BAG, the observed ranking was /æŋ/ as the

highest in vowel space, followed by /æC/ and then /æg/. This finding, too, points away from advancement in the regional pattern. Both are consistent with the data from citation speech reported in Wassink (2016b), indicating less participation of Yakama English in pre-voiced-velar raising, particularly BAG. Low levels of participation in several of the Western vowel patterns offers an interesting contrast to other results reported in this volume. For example, the Reno/Sparks Native Americans (Clayton and Fridland 2020 [this volume]) were found to participate in the lax vowel retraction patterns observed for other Nevadan communities as well as in California and parts of Oregon. Here, we find that Yakama English speakers' system aligns less with that of local White speakers.

Two consonantal processes were explored here in detail: /t/ glottal replacement and alternation between /ɪŋ/ and /ɪn/ in *-ing* suffixes. Following Rowicka (2005), we investigated glottal replacement of /t/ and found that for the Yakama sample men do indeed employ [ʔ] variants of /t/ in word-final positions and at levels higher than those of the women studied. However, even when the alveolar variant of /t/ is used, it is distinctive; we found evidence of a "late release /t/," with a long period of consonant closure followed by an audible release, [tːʰ]. Rowicka (2005) proposes that the appearance of glottal replacement of voiceless stops in Quinault English and several other varieties of AIE is evidence that Native American varieties may share a nonstandard English substrate rather than shared ancestral languages. This is a possible account; however, in the case of Yakama English, it is perhaps more reasonable to first look closer to home: Sahaptin has an ejective stop series exhibiting similar phonetic characteristics. Finally, we observed the frequent occurrence of [n] in forms of the *-ing* suffix, a feature also reported for AIE (Leap 1993). While both genders produce the [n] variant, men do so at higher levels than women. In a finding that has not been reported elsewhere for AIE, to our knowledge, women produce the vowel in unstressed *-ing* forms with a target closer to [i], so that forms like *teaching* surface as [ˈtiʧ͡ʃin]. Future research will further characterize the durational characteristics of such forms.

It is interesting to note the differences between the shapes of the present conversational vowel space and that of the word list and reading passage sessions of these same speakers in Wassink (2016b). For example, /uː/ fronting is more extreme in conversation. It seems that speakers do command a wide range of stylistic variation, perhaps in part because linguistic diplomacy requires regular repositioning between different types of interlocutors and social roles within which local identities may or may not be centered. In ongoing work, we turn to deeper examination of the relationships between social mobility, social network characteristics, and style.

APPENDIX
Yakama English Vowel Class Means

				Telsur-G Normalized	
Vowel Class	*F1 (Hz)*	*F2 (Hz)*	*Duration (s)*	*F1 (Hz)*	*F2 (Hz)*
/i/	351.82	2060.92	0.087	415.63	2438.80
/ɪ/	423.50	1793.25	0.063	498.73	2116.79
/e/	412.70	2033.81	0.113	488.02	2408.23
/ɛ/	483.22	1735.74	0.066	568.48	2044.64
/ɛg/	445.23	1918.48	0.084	531.80	2290.74
/ɛŋ/	379.54	2057.80	0.030	422.20	2289.14
/æ/	580.48	1650.76	0.101	685.80	1951.44
/æg/	644.41	1590.89	0.208	762.50	1884.07
/æŋ/	525.33	1757.97	0.075	629.45	2110.96
/ɑ/	547.73	1468.55	0.081	645.03	1732.63
/ɔ/	540.62	1386.63	0.086	635.23	1627.77
/ʌ/	512.21	1485.35	0.109	607.34	1759.72
/oː/	504.34	1345.16	0.123	593.27	1584.52
/ʊ/	415.37	1630.87	0.054	491.92	1934.33
/Tuː/	379.01	1688.14	0.100	438.00	1951.99
/Kuː/	358.55	1568.08	0.101	419.14	1832.33

NOTES

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1. There have been two historical spellings of the tribal name: *Yakima* and *Yakama*. Currently tribal members refer to *The Yakama Nation*, with a strong preference for the spelling *Yakama*. Rigsby (2009b, xxii) notes that in 1994, the Yakama Tribal Council formally adopted the spelling *Yakama* and dropped *Yakima*. It was said that the new spelling more closely reflected its Indigenous Yakama language pronunciation. It was also the spelling used in the 1855 Treaty between the United States and the "Yakama Nation of Indians." However, the term *Yakima/Yakama* most likely originates outside the language. Rigsby (2009b) traced the etymology of the term to Nxaʔamxčín/Moses-Columbia Salish *yaʔáqᵊma* 'Upper Yakima Valley region (say, north of Union Gap)'. Slight variants (in sound and meaning) of this term can be found in other neighboring Interior Salish languages: Colville-Okanagan, Spokane, and Coeur D'Alene.

2. We note that none of our respondents reported attending boarding school. All lived and attended school in the Yakima Valley during the critical period. Only one had a parent who attended an off-reservation boarding school. VB lived off-reservation with another Indian family for one year, likely during her high school years. This is relevant because Leap (1993) suggests that boarding schools might have been an important location for dialect contact, bringing together speakers of different Native American varieties of English. This would appear not to apply in the case of the present respondents, although we do not have information for the grandparent generation.
3. Normalization was thus accomplished twice. Telsur-G normalization allowed comparison to other U.S. dialects. Nearey 2 normalization uses a log-mean procedure, which is generally preferred for dialect representation given that it does a potentially better job preserving the structure of the dialect's vowel space, gender-related variation, and—because it uses logarithmic scaling—critical perceptual distances. Statistical analyses are therefore performed on the Nearey-normalized data.
4. Northern Oregon appears to be aligned with California in raising and tensing of BAN (Becker et al. 2016).
5. One reviewer pointed out that this would suggest that /Tu:/ fronting was present in the variety of English most influential on the tribal community at the time that Sahaptin English was beginning to focus as a separate variety.

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