A Comparative Analysis on Native and Non-Native Korean Speakers' Vowel Productions

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Abstract

This paper investigates Korean vowel spaces of native Korean speakers (NS) and non-native Korean speakers (NNS, L1: English). The vowel production of NS and NNS were compared. All the speakers recorded eight Korean cardinal vowels, which are [i], [e], [ae], [W], [A], [o], [u], and [a] three times. A preceding consonant was lenis fricative [s] sound of Korean. The participants' production was normalized by using Lobanov normalization function in the R program. Results show that NNS cannot differentiate the Korean mid-vowels and back vowels such as [A], [o], and [u]. This research can be helpful to investigate that L1 English can affect the L2 Korean learners' vowel pronunciation.

Keywords: Korean Vowels, L1 Phonetics

Word count: 5000

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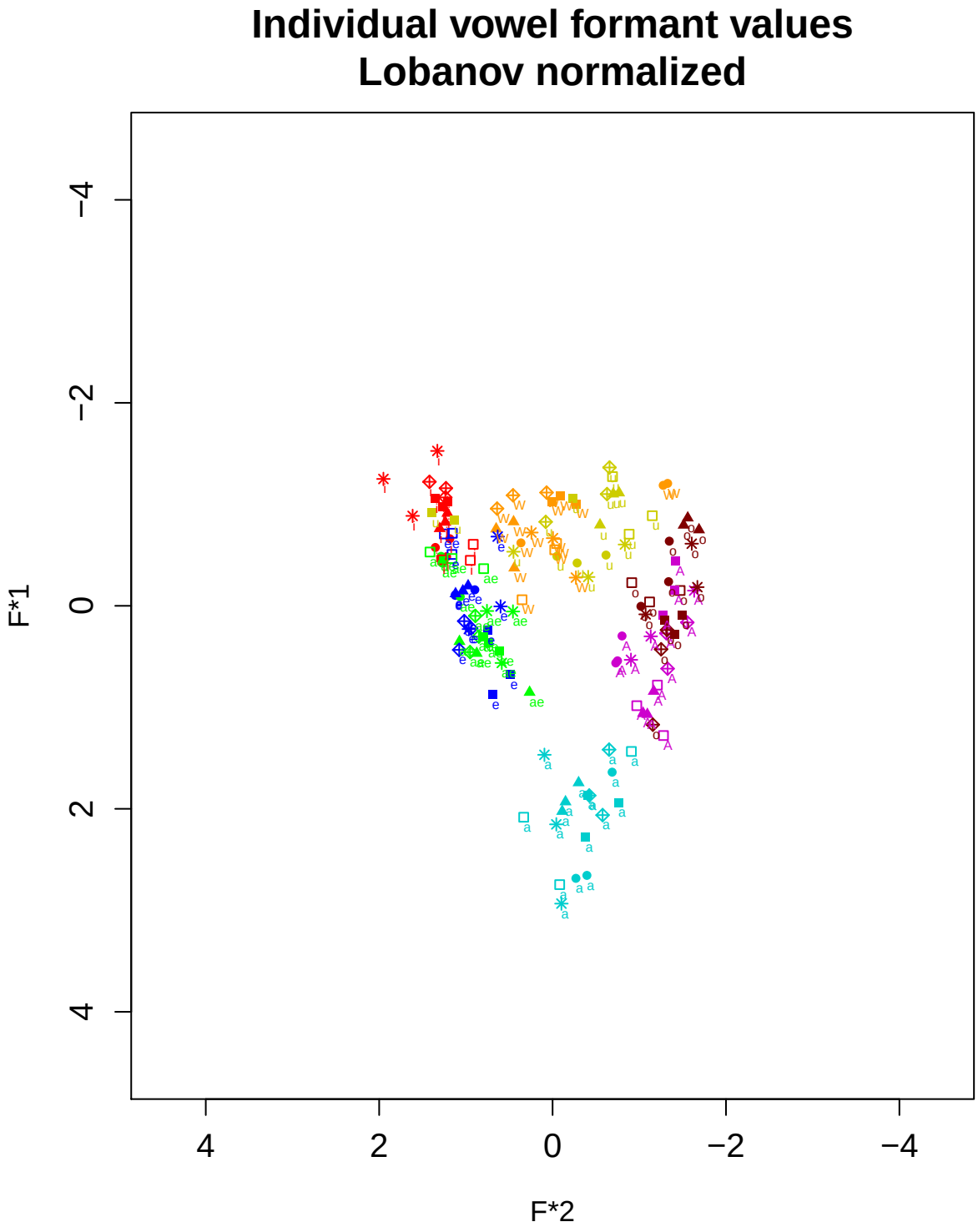
Contents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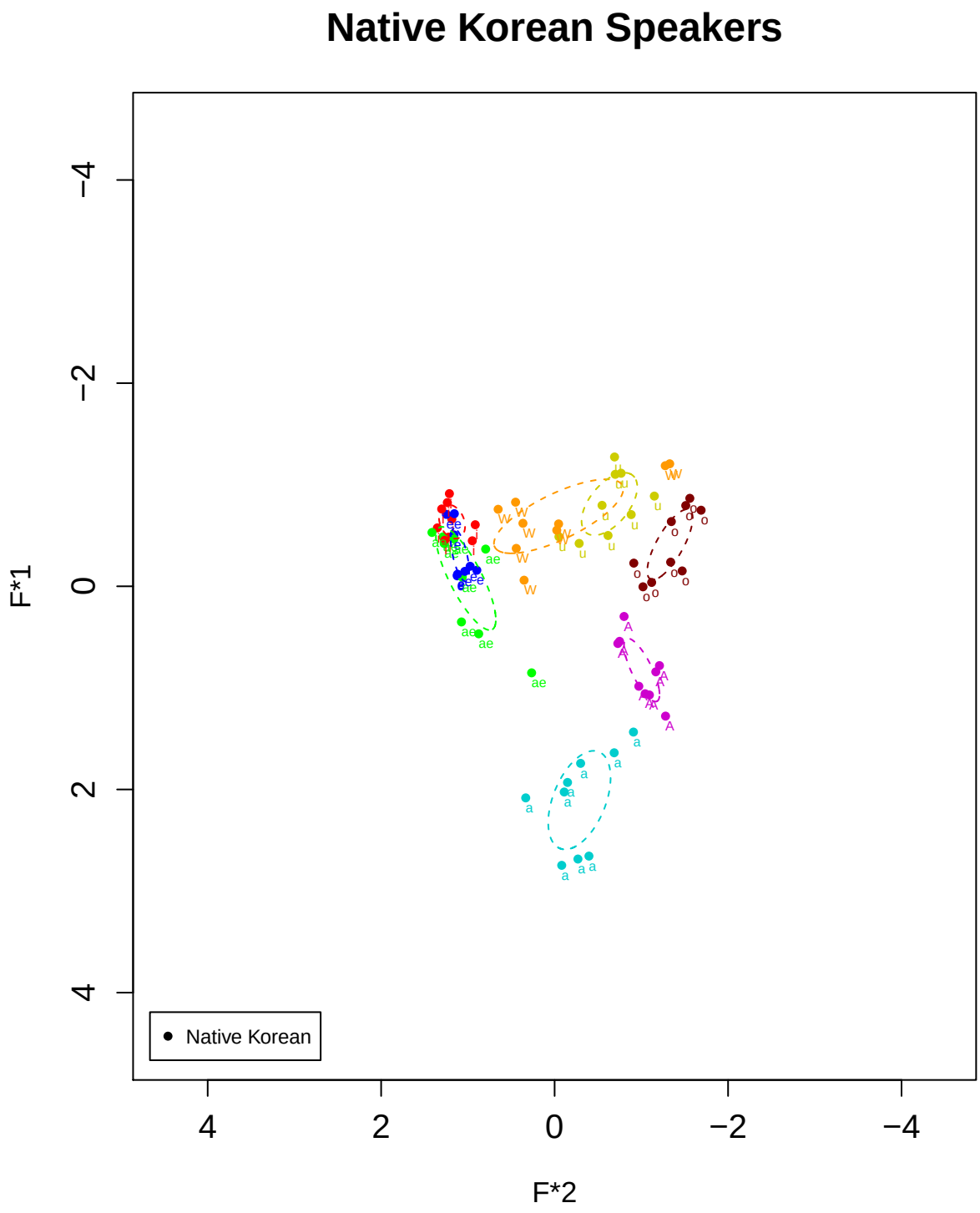
Lobanov normalized
F*1
F*2
4
2
0
−2
−4

35



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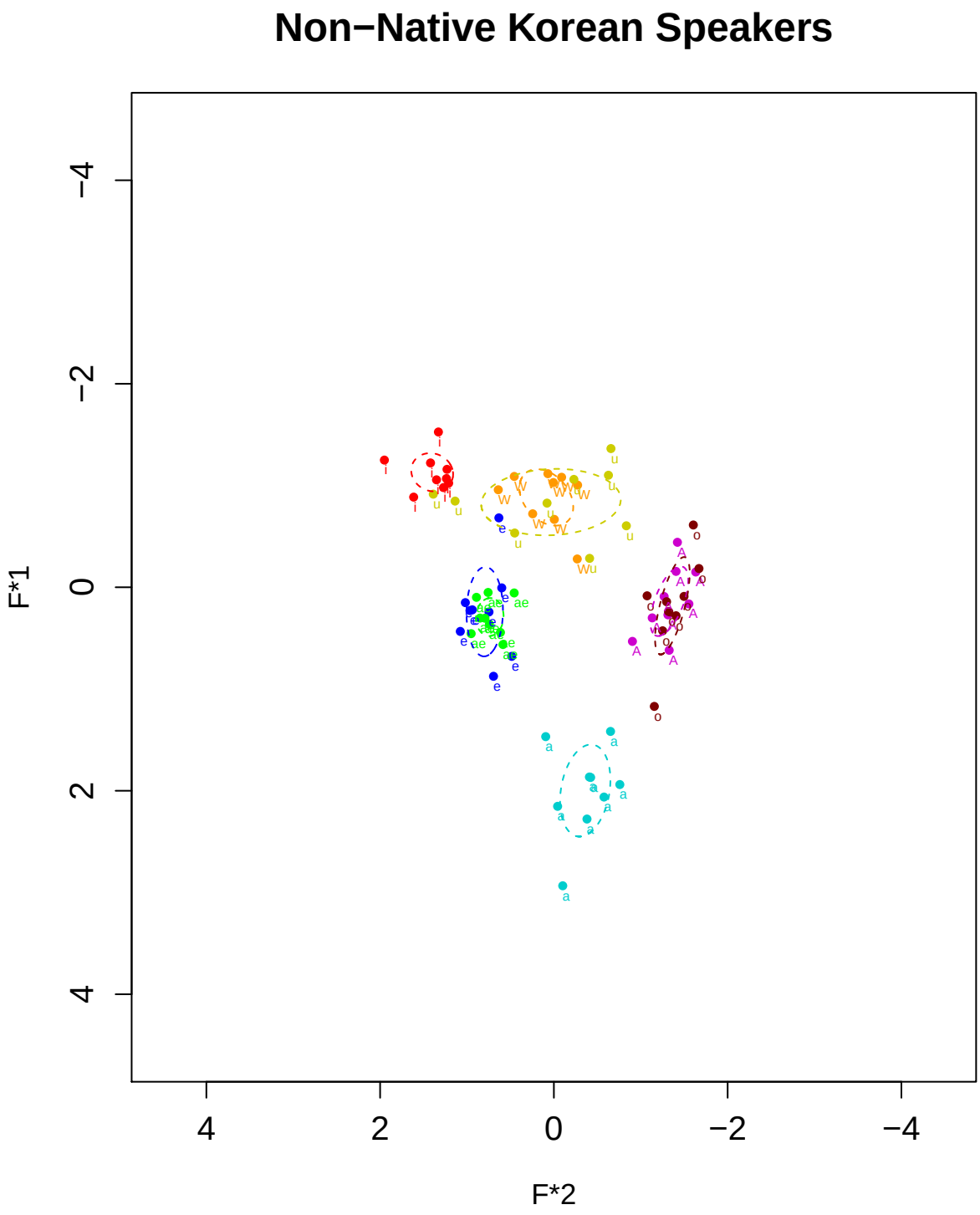
Non−Native Korean Speakers
F*1
F*2
4
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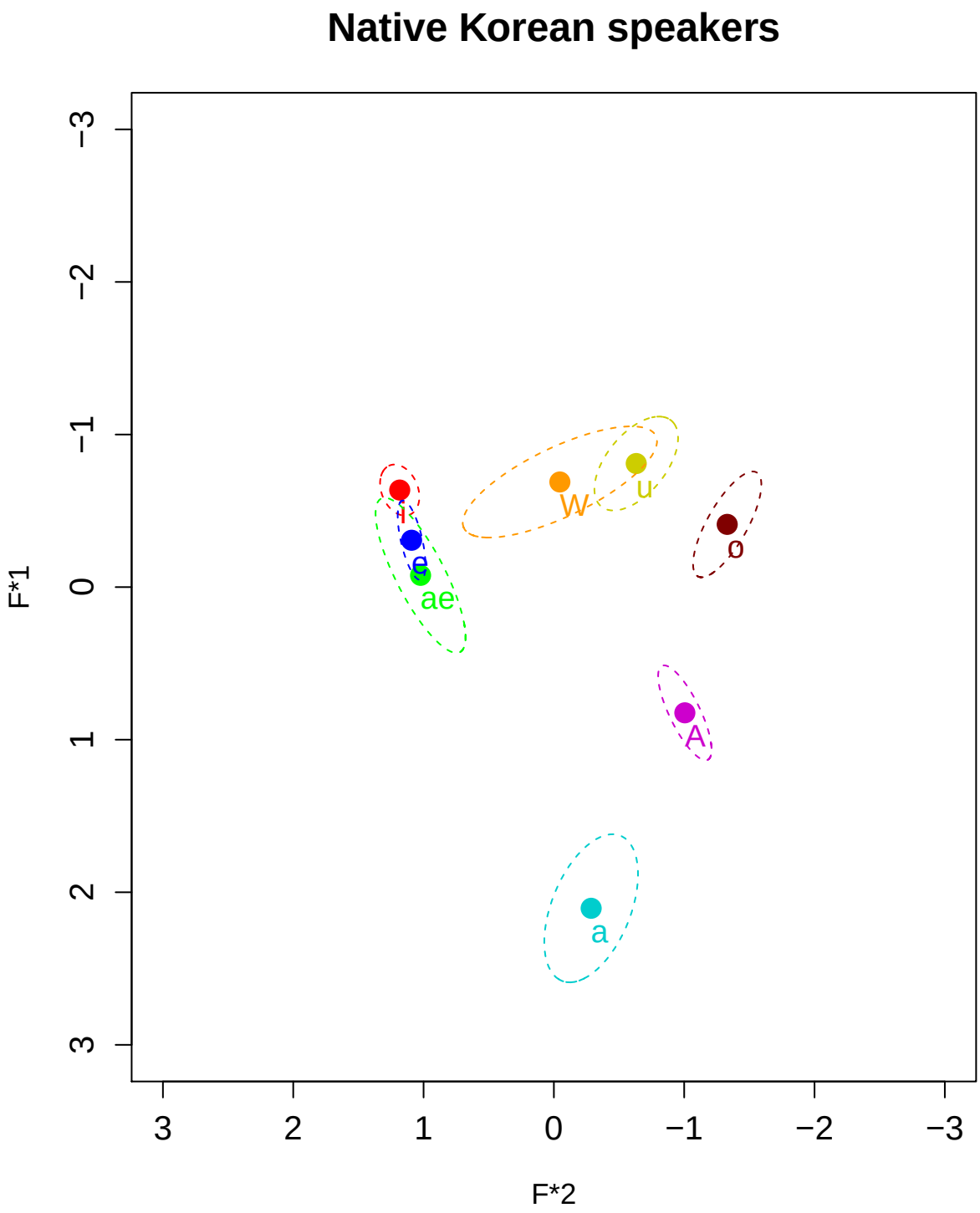

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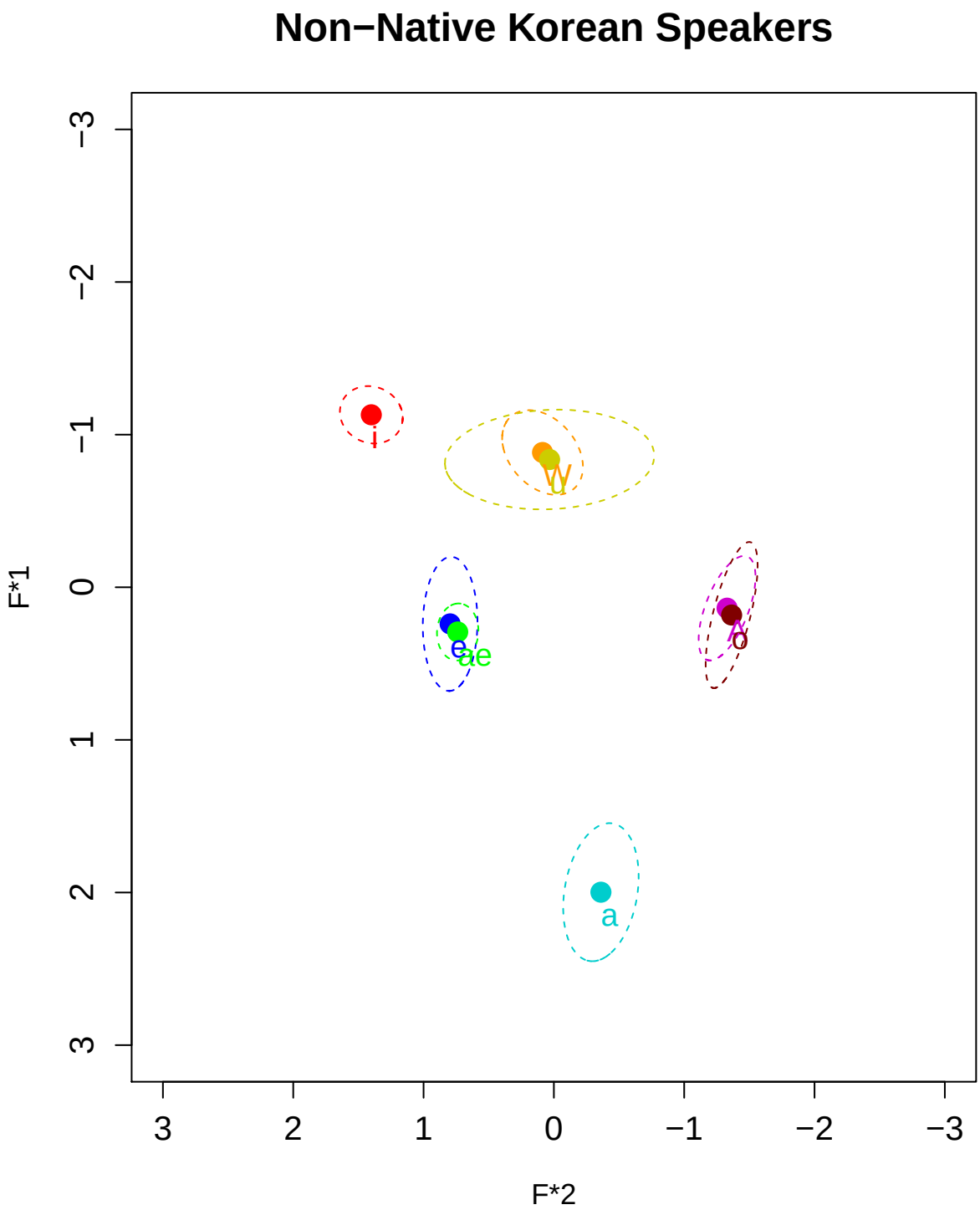
Non−Native Korean Speakers
F*1
F*2
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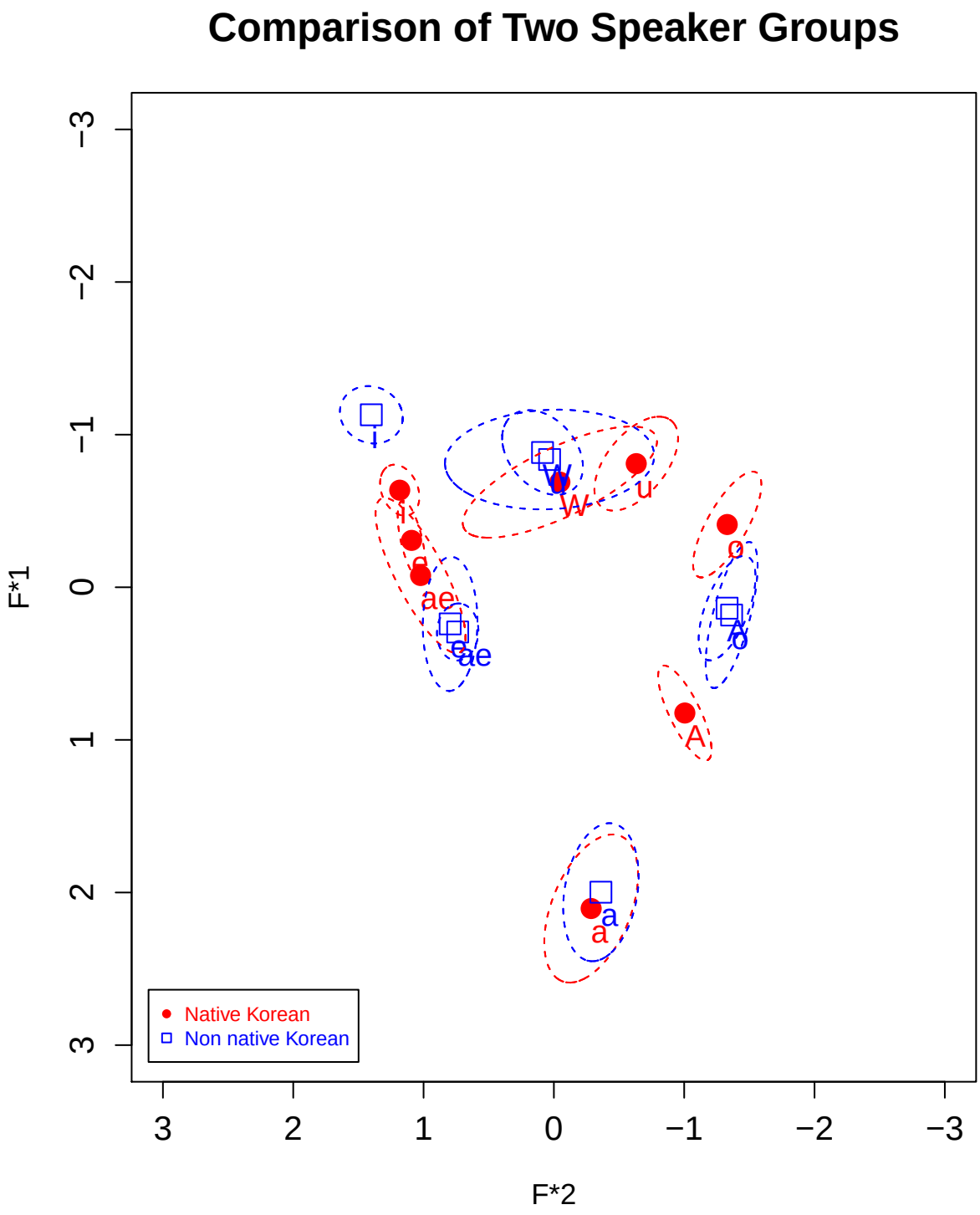
0
−1
−2
−3
i
ɯ
e
æ
ʌ
o
a


Comparison of Two Speaker Groups
F*1
F*2
3
2
1
0
−1
−2
−3
Native Korean
Non native Korean
i
ɨ
ɯ
u
o
ʌ
e
ɛ
ae
A
a

1.Introduction

In this paper, our group investigated Korean vowel productions of Korean native speakers (NS) and non-native Korean speakers (NNS) by analyzing acoustic features. We aimed to examine native speaker pattern of vowel formants in Korean, and to explore second language learners' patterns in comparison to those of NNSs. Our results were analyzed by using normalization and statistic functions in the R program. The results indicate that L1 (English) of the NNSs might affect their L2 Korean vowel production. It is important to know what sounds students may have trouble with and what causes the difficulty in L2 Korean acquisition Seongmoon (2003) Heoung (1965). Thus, this study is useful in terms of as well as suggesting crucial research in the second language education field.

2. Methodology

To compare the convergence and divergence of L1 Korean and L2 Korean Vowel Production, we used a one-way between-subjects design, and analyzed the collected data using two Hz-basd measurements and a phonetic measurement tool, Praat.

2.1 Participants

Using convenince sampling, we sampled six adult residents living in Eugene, Oregon; three of them were Native Koreans, and the rest were non-Native sperking Koreans. Two Native Koreans were doctoral students majoring in East Asian Lanuages and Literatures, and the other one was a Korean instructor at the University of Oregon. Non-native speakers were recruited from one of the Korean classes at the Univeresity of Oregon. Korean participants were an average of 28 in age, while the average age of the non-Korean subjects were 19.

2.2 Speech Materials

We prepared seven sentences consisting of eight Korean vowels; i,e,ae,w,ˆ,a,u. The sentences to be tested will be added at the end of the orignial paper as one of the appendice.

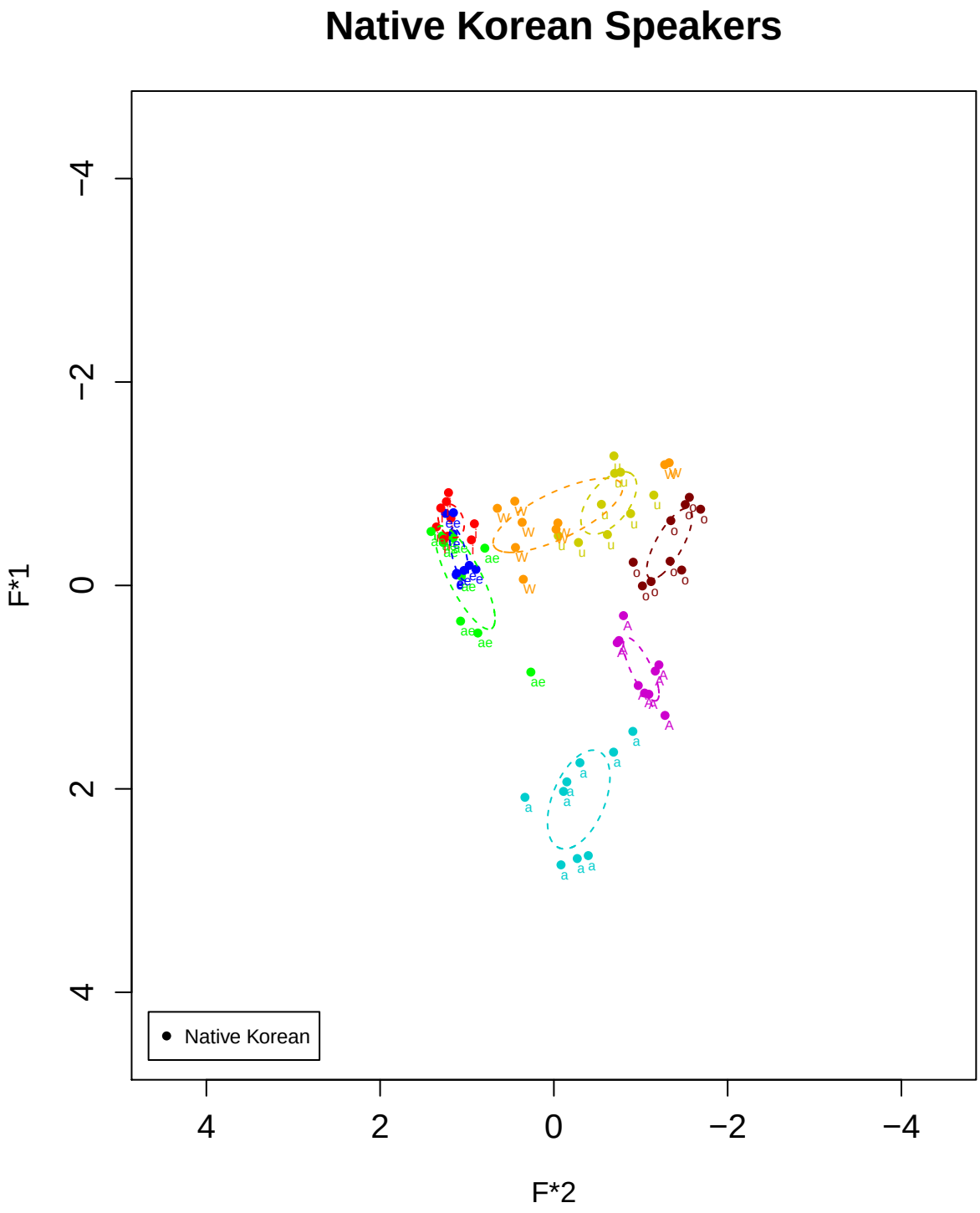
2.3 Procedure

The Korean vowles of the participants were audie-recorded. We met in the quite room individally and we had them repeat the eight sentences three times using a Praat program, which is widely used in phonetic measurements. By measuring F1 and F2 in the vowel mid-point, we intended to find vowel formant patterns.

3. Restuls and Discussion

In this section, vowel formant patterns of NSs and NNSs will be contrasted based on the obtained speech samples. First, we will report the mean ferments across three repetitions. Namely, the vowel charts all participants based on mean values will be presented and compared below. The NS vowel charts reveal several convergences and divergences among the native speakers. For instance, NS1 tends to pronounce high-back vowel [u] as a front vowel. Meanwhile, her high-mid vowel [W] also approximates a high back vowel. Another sparkling native speaker is NS3, who is the only native subject who did not demonstrate a merge of [i], [e], and [æ], marked by her clear differentiation of [e] and [æ]. In general, NS 3 produced a similar pattern with the vowel chart of Shin, Kiaer, and Cha (2012) regardless of some subtle variations. For instance, the mid-back vowel [o] in Shin et al. (2012) is realized as a high-back vowel by NS3. NS3's distinction in vowel articulation might be triggered by multiple reasons. Her standard Korean training experience for a teaching certificate in the Seoul Education office, as well as her relative shorter residence in English speaking countries, might be the causes. In the next section, we will present the vowel charts of NNS. Several shared typical L2 errors from the NNS data can be observed. First, compared to the NSs, none of the NNS participants

successfully distinguished [A] and [o]. Although English vowels contrast [A] and [o], due to their shorter duration of learning Korean (five months), they may not have fully acquired the accurate L2 pronunciation. Moreover, except for NNS 2, the other two NNSs were both confused between [W] and [u]. Since NS 1 and NS 3 are their teachers in the Korean 102 class, they might have assimilated teachers' inputs when producing the two sounds. In addition, given the apparent difference between [e] of "met" and [æ] of "mat" in English, they articulated [e] and [æ] as a merged vowel [e]. In other words, the merger consistently appeared in the NNS pronunciation because the teachers might not have fully explained the differences between [e] and [æ], or the students might not have perceived any dissimilarities between the teachers' pronunciations. Fortunately, there are noticeable native-like vowel patterns in the NNSs' data as well. Especially their accurate production of [i] and [a]. They pronounce [i] as a high front vowel and [a] as a low mid vowel. Since there are similarities between Korean vowels and English vowels– English [i] is also articulated in a high front position of the vocal tract– they managed to produce Korean vowel [i] correctly. However, [a] has different acoustic features cross-language. For instance, English does not have [a] but an [a]. While the English [a] is a low back vowel, the Korean [a] is a low mid vowel. Thus, even though Korean [a] is different from English [a], L2 learners of Korean still can articulate Korean [a] accurately. It is interesting that they pronounce [a] more native-like than other vowels, despite dissimilarities, which is a dimension worth thorough investigation in the future analysis.



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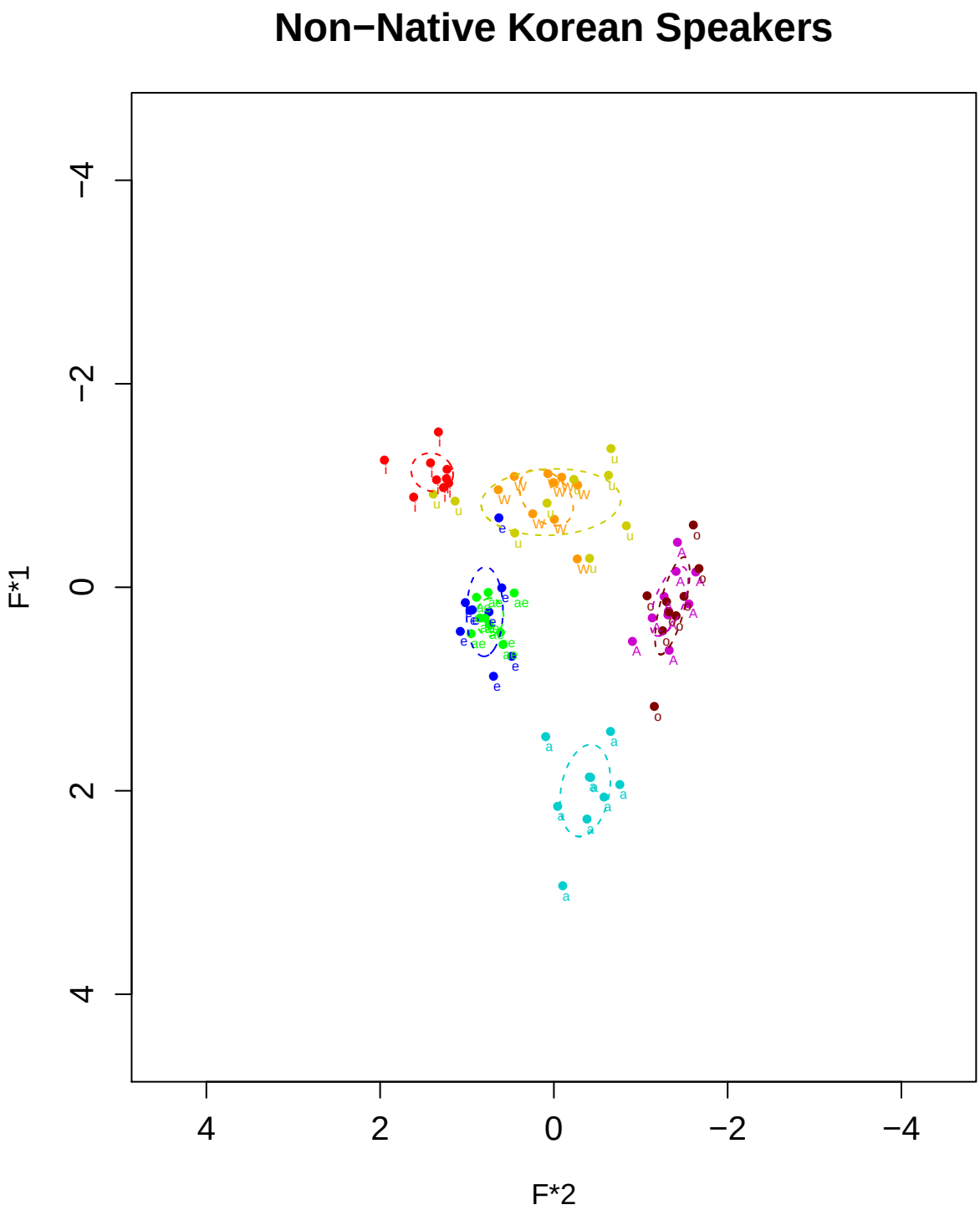

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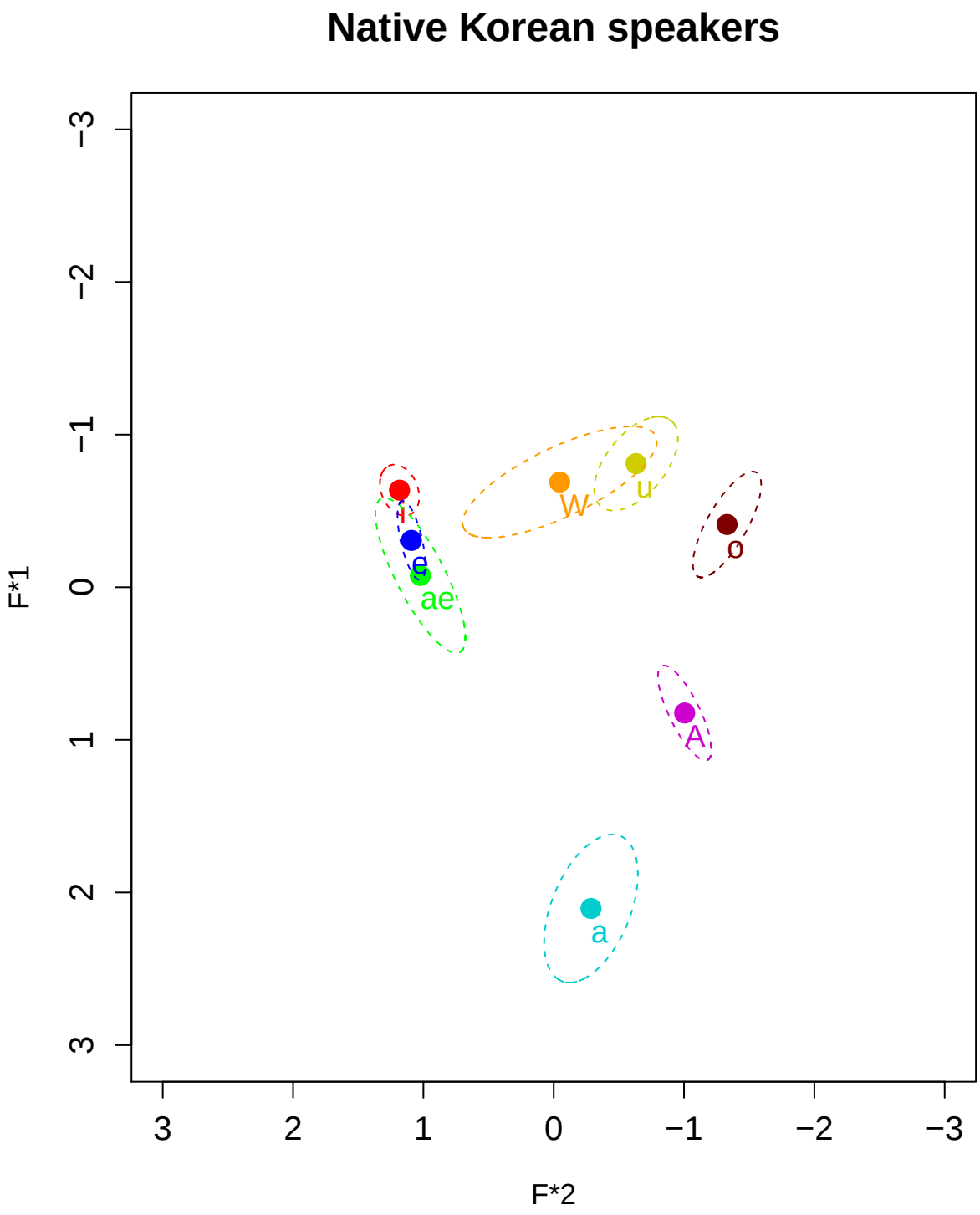

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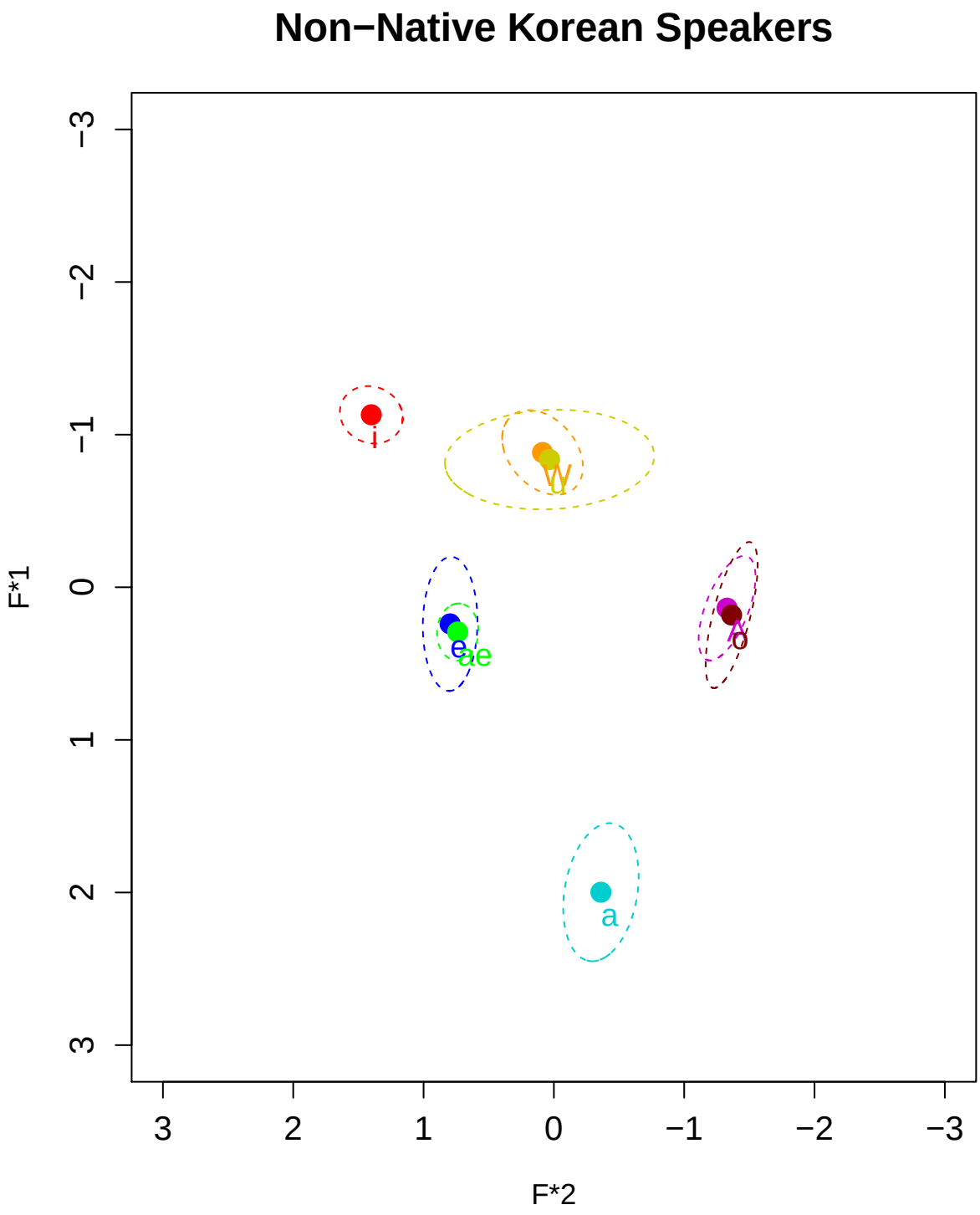

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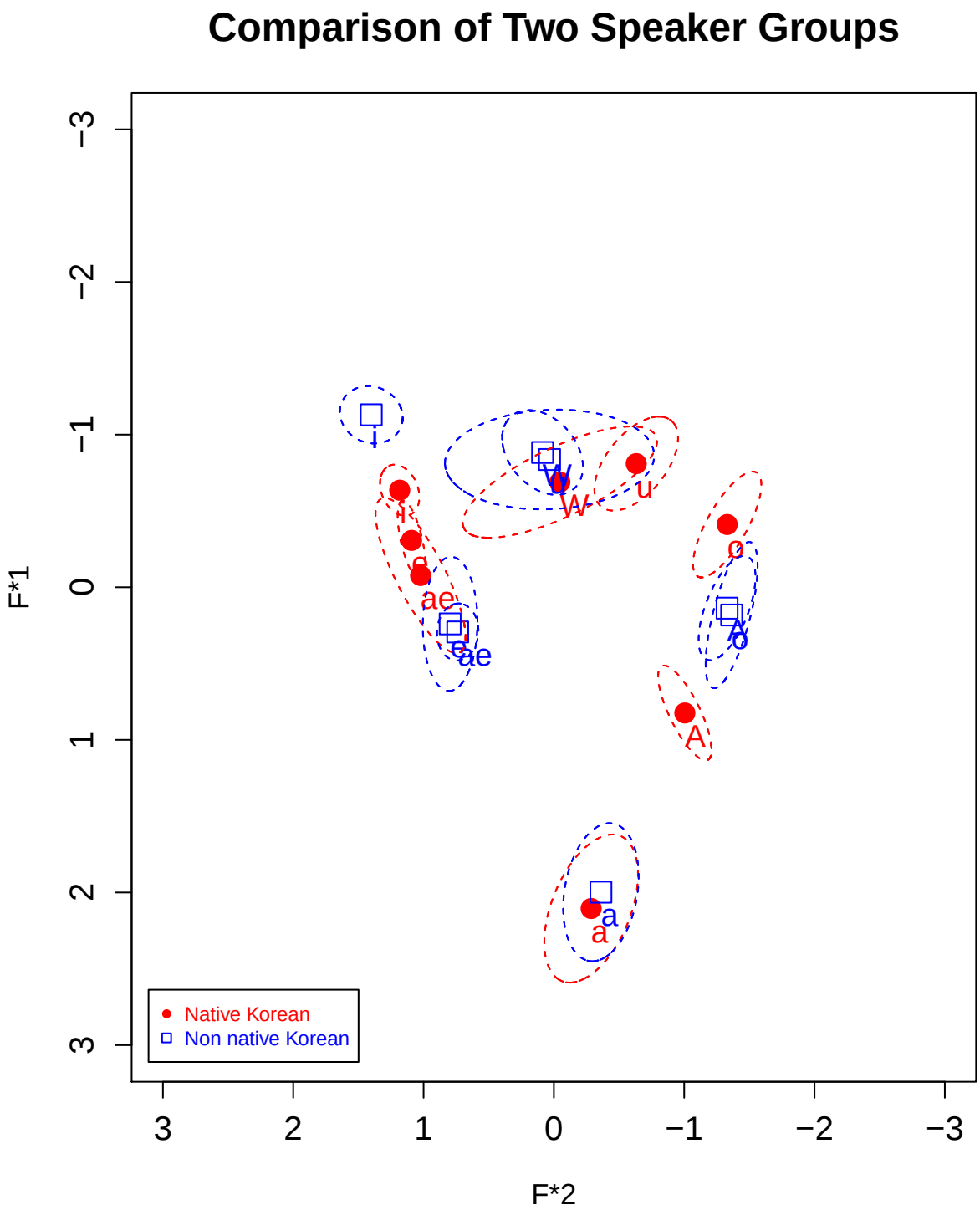
Comparison of Two Speaker Groups
F*1
F*2
3
2
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0
−1
−2
−3
Native Korean
Non native Korean
i
ɨ
ɯ
u
o
ʌ
ɑ
ae
e
A
a

114

4. Conclusion

In summary, our analysis indicates that even native Korean speakers may have different vowel formant patterns due to their various duration of living in foreign countries and native language phonetic training. Additionally, teachers' classroom input may play an essential role in L2 sound acquisition. For instance, the NNS in this study demonstrated a confusion between vowel [W] and [u]. Furthermore, despite the dissimilarities between the participants' L1 and L2, the learners still can have relatively more native-like articulations of [a]. We speculate that the teacher's demo pronunciation and explicit instruction are critical for this achievement. In the meantime, the vowels [e] and [æ] extracted from the current data are controversial. Since the merger of [e] and [æ] is progressing in Standard Seoul Korean, how to teach the articulations of these two sounds needs to be discussed in the future.

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5. Apendix

speaker	vowel/frame	context	F1	F2	F3	gl F1	gl F2	gl F3
NS1	i	s	493.2375	2751.1464	NA	NA	NA	NA
NS1	i	s	507.5334	2865.6353	NA	NA	NA	NA
NS1	i	s	522.4271	2776.4157	NA	NA	NA	NA
NS1	e	s	585.4128	2708.4025	NA	NA	NA	NA
NS1	e	s	584.2901	2706.7544	NA	NA	NA	NA
NS1	e	s	576.3157	2553.8634	NA	NA	NA	NA
NS1	ae	s	521.9904	2820.2192	NA	NA	NA	NA
NS1	ae	s	532.9491	2809.9055	NA	NA	NA	NA
NS1	ae	s	587.5074	2668.7089	NA	NA	NA	NA
NS1	W	s	406.3744	1063.7681	NA	NA	NA	NA
NS1	W	s	403.2908	1029.0942	NA	NA	NA	NA
NS1	W	s	500.0833	2189.0697	NA	NA	NA	NA
NS1	A	s	651.3945	1389.8223	NA	NA	NA	NA
NS1	A	s	695.3000	1439.2194	NA	NA	NA	NA
NS1	A	s	691.9308	1425.3407	NA	NA	NA	NA
NS1	a	s	1040.9052	1666.9375	NA	NA	NA	NA
NS1	a	s	872.9430	1467.5644	NA	NA	NA	NA
NS1	a	s	1045.7113	1754.2864	NA	NA	NA	NA
NS1	u	s	532.7743	1744.8213	NA	NA	NA	NA
NS1	u	s	521.8414	1904.3388	NA	NA	NA	NA
NS1	u	s	519.8707	1516.3195	NA	NA	NA	NA
NS1	o	s	497.1905	1015.9893	NA	NA	NA	NA
NS1	o	s	603.1489	1240.2403	NA	NA	NA	NA
NS1	o	s	563.1774	1021.5937	NA	NA	NA	NA
NS2	i	s	484.5754	2530.1916	NA	NA	NA	NA
NS2	i	s	506.4917	2749.4107	NA	NA	NA	NA
NS2	i	s	507.1835	2551.5501	NA	NA	NA	NA
NS2	e	s	469.0207	2680.1408	NA	NA	NA	NA

speaker	vowel/frame	context	F1	F2	F3	gl F1	gl F2	gl F3
NNS1	i	s	347.0051	2656.345	NA	NA	NA	NA
NNS1	i	s	399.5299	2514.290	NA	NA	NA	NA
NNS1	i	s	307.0789	2393.816	NA	NA	NA	NA
NNS1	e	s	560.6831	2240.837	NA	NA	NA	NA
NNS1	e	s	528.4257	2086.393	NA	NA	NA	NA
NNS1	e	s	429.0911	2100.116	NA	NA	NA	NA
NNS1	ae	s	534.9859	2152.606	NA	NA	NA	NA
NNS1	ae	s	609.0134	2080.387	NA	NA	NA	NA
NNS1	ae	s	535.6872	2026.094	NA	NA	NA	NA
NNS1	W	s	487.4876	1719.508	NA	NA	NA	NA
NNS1	W	s	423.2244	1936.019	NA	NA	NA	NA
NNS1	W	s	431.3064	1830.811	NA	NA	NA	NA
NNS1	A	s	604.5336	1451.755	NA	NA	NA	NA
NNS1	A	s	505.9047	1144.177	NA	NA	NA	NA
NNS1	A	s	571.0737	1355.492	NA	NA	NA	NA
NNS1	a	s	951.4490	1789.920	NA	NA	NA	NA
NNS1	a	s	838.7338	1815.066	NA	NA	NA	NA
NNS1	a	s	739.6891	1872.772	NA	NA	NA	NA
NNS1	u	s	440.4063	1481.121	NA	NA	NA	NA
NNS1	u	s	486.5747	1659.796	NA	NA	NA	NA
NNS1	u	s	450.5802	2023.228	NA	NA	NA	NA
NNS1	o	s	539.7927	1380.349	NA	NA	NA	NA
NNS1	o	s	501.0599	1128.311	NA	NA	NA	NA
NNS1	o	s	439.2177	1155.855	NA	NA	NA	NA
NNS2	i	s	361.5158	2606.105	NA	NA	NA	NA
NNS2	i	s	345.7214	2602.082	NA	NA	NA	NA
NNS2	i	s	334.6823	2699.489	NA	NA	NA	NA
NNS2	e	s	623.4945	2523.746	NA	NA	NA	NA
NNS2	e	s	586.4021	2453.109	NA	NA	NA	NA

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