Evidence of a Near-Merger in Western Sydney Australian English Vowels

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Abstract
Research on various dialects of English has demonstrated the existence of so-called near-mergers. The present study examines the identification and discrimination of the vowels of Western Sydney Australian English, for which no such mergers have been previously documented. We find evidence for perceptual confusion of /i/-/ɛ/ (in /hVbɛ/), despite significant acoustic differences in productions of these two vowels. This meets the defining features of a near-merger.

Index terms: Australian English, near-merger, vowel perception.

1. Introduction
Australian English (AusE) is traditionally understood to have 11 monophthongs /i, ɪ, e, ɛ, a, ɑ, a, u, ʊ, o, ɒ/ and 7 diphthongs /aʊ, æʊ, ai, ei, ɔɪ, oʊ, au, ou/ [1]. Recent data from Sydney’s North Shore [2] indicate significant changes to the realisation of this inventory, but that variant of AusE maintains the total number of vowels.

Near-mergers, in which a phonological contrast maintains some reliable acoustic difference in production but becomes indiscriminable to the native listener, have been reported for a number of dialects of Australian English [3], but were not found in the more recent AusE data. They also rated goodness-of-fit from 1 (poor) to 7 (excellent). Following the identification task, participants discriminated the /i/-/ɛ/-/ı/-/ʊ/-/oʊ/-/ɛʊ/ contrasts in an AXB task.

3. Results and Discussion
3.1 Perception
Fourteen of the 18 AE vowels (/i, ɪ, e, ɛ, a, ɑ, a, u, ʊ, o, ɒ, ai, ei, ɔɪ, oʊ, au, ou/) were consistently assimilated to the intended AusE vowel category (i.e. identified as an instance of the intended category for more than 50% of tokens): $M_{\text{correct}} = 69.76\%$, $M_{\text{goodness}} = 6.05\%$, while /ɛ/ and /ɛ/ approached criterion (40.2\% and 47.69\% correct, respectively). The orthographically inconsistent /ɛ/ was systematically identified as /ɛ/ (43.52\%), but received the lowest goodness rating of all (M = 5.34\%). /ɛ/ was generally (43.52\%) identified as /ɛ/ ($M_{\text{goodness}} = 5.86\%$, and as /ɛ/ only 21.76\% of the time ($M_{\text{goodness}} = 6.15\%$). AXB results revealed good discrimination of /i/-/ɛ/-/ı/-/ʊ/-/oʊ/ and /ɛ/-/ɛ/ (74.15\%, 85.02\%, 86.03\%, respectively), but at-chance performance for /i/-/ɛ/- (54.48\%). This suggested a near-merger, so we compared the acoustic measurements for /i/-/ɛ/.

3.2. Acoustic analyses of /i/ and /ɛ/
The target vowels /i/ and /ɛ/ did not differ significantly in duration (One-way ANOVA $F(1,16) = 0.02$), while F1 and F2 (though not F3) values differed significantly only at 75% of the vowel (MANOVA F1: $F(1,16) = 11.869$, p < .01, F2: $F(1,16) = 15.880$, p < .01; see Table 1), likely as a difference in offgliding (a centralizing offglide for /ɛ/, as expected).

Table 1: Formant values at 25, 50 and 75% of /i/ and /ɛ/.

<table>
<thead>
<tr>
<th></th>
<th>/i/</th>
<th>/ɛ/</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>335</td>
<td>316</td>
</tr>
<tr>
<td>F2</td>
<td>2149</td>
<td>2123</td>
</tr>
<tr>
<td>F3</td>
<td>2695</td>
<td>2555</td>
</tr>
</tbody>
</table>

* indicates significant differences.

4. Conclusions
Whereas 18 distinct AE vowels are maintained by Sydney’s North Shore teenagers [2], young adults from Western Sydney provide evidence for a near-merger of AusE /i/-/ɛ/ in /hVbɛ/ context. Despite maintaining significant acoustic differences between /i/ and /ɛ/, native speakers of AusE were unable to correctly identify the vowel /ɛ/. Rather, they generally perceived it as an instance of /i/, and failed to reliably discriminate these two vowels in an AXB task. In AusE productions, acoustic differences between these vowels were quite limited, appearing only as a reliable F1-F2 difference in offgliding. This pattern of production and perception is consistent with descriptions of near merger.

5. References