

Table 1. Sound pairs used in the study that are ambiguous to a lipreader.

| Pair | Sound Pairs | Common Features | Contrasting Features |
|-------------|--------------------|------------------------|-----------------------------|
| 1 | /i/-/I/ | place; front-high | tense/lax |
| 2 | /ɑ/-/æ/ | mouth opening | place; back/front |
| 3 | /u/-/ʊ/ | place; high-back | tense/lax |
| 4 | /kɑ/-/gɑ/ | place; back-velar | unvoiced/voiced |
| 5 | /ki/-/gi/ | place; back-velar | unvoiced/voiced |
| 6 | /ku/-/gu/ | place; back-velar | unvoiced/voiced |
| 7 | /pɑ/-/bɑ/ | place; bilabial | unvoiced/voiced |
| 8 | /pɑ/-/mɑ/ | place; bilabial | manner; nasal |
| 9 | /bɑ/-/mɑ/ | place; bilabial | manner; nasal |

| | | | |
|----|------------|-----------------------------|--|
| 10 | /tɑ/-/dɑ/ | place; tip-dental | unvoiced/voiced |
| 11 | /tɑ/-/nɑ/ | place; tip-dental | manner; nasal |
| 12 | /dɑ/-/nɑ/ | place; tip-dental | manner; nasal |
| 13 | /sɑ/-/ʃɑ/ | manner; fricative | stridency; place |
| 14 | /sɑ/-/tʃɑ/ | mouth opening | manner; fricative/affricate; place |
| 15 | /sɑ/-/dʒɑ/ | mouth opening | unvoiced/voiced; place |
| 16 | /ʃɑ/-/tʃɑ/ | place; blade- prepalatal | manner; fricative/ affricate |
| 17 | /ʃɑ/-/dʒɑ/ | place; blade- prepalatal | unvoiced/voiced. manner; fricative/affricate |

| | | | |
|----|-------------|---------------|-----------------|
| 18 | /cha/-/jha/ | place; manner | unvoiced/voiced |
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Table 2. Ten bands of equal intelligibility.

| No. | Band Limits (Hz) | Mean (Hz) | Relative Intensity ($\times 10^6$) | Weighting Factor |
|------------|-----------------------------|----------------------|--|-----------------------------|
| 1 | 200-430 | 293 | 3.7566 | 1.00 |
| 2 | 430-700 | 549 | 2.9115 | 1.29 |
| 3 | 700-1000 | 837 | 0.6686 | 5.62 |
| 4 | 1000-1310 | 1145 | 0.2506 | 14.99 |
| 5 | 1310-1660 | 1475 | 0.1797 | 20.91 |
| 6 | 1660-2020 | 1831 | 0.0889 | 42.25 |
| 7 | 2020-2500 | 2247 | 0.0640 | 58.68 |
| 8 | 2500-3200 | 2828 | 0.0612 | 61.39 |

| | | | | |
|----|-----------|------|--------|-------|
| 9 | 3200-4250 | 3688 | 0.0506 | 74.29 |
| 10 | 4250-6100 | 5092 | 0.0452 | 83.19 |

Table 3. Long-term average speech spectra in one-third octave bands.

(L_p values from Byrne et al., 1994).

| Band | Center Frequency (Hz) | Band Width (Hz) | L_p (dB) | Relative Intensity ($\times 10^6$) | Relative Spectral Density |
|-------------|------------------------------|------------------------|------------------------------|--|----------------------------------|
| 1 | 200 | 46.3 | 60.3 | 1.07 | 2.31 |
| 2 | 250 | 57.9 | 60.5 | 1.12 | 1.93 |
| 3 | 315 | 72.9 | 59.1 | 0.813 | 1.12 |
| 4 | 400 | 92.6 | 62.1 | 1.62 | 1.75 |
| 5 | 500 | 116 | 62.2 | 1.66 | 1.43 |

| | | | | | |
|----|------|------|------|--------|---------|
| 6 | 630 | 146 | 60.6 | 1.15 | 0.788 |
| 7 | 800 | 185 | 56.6 | 0.457 | 0.247 |
| | | | | | |
| 8 | 1000 | 232 | 53.7 | 0.234 | 0.101 |
| 9 | 1250 | 290 | 53.0 | 0.200 | 0.0690 |
| 10 | 1600 | 371 | 52.2 | 0.166 | 0.0447 |
| 11 | 2000 | 463 | 48.7 | 0.0741 | 0.0160 |
| 12 | 2500 | 579 | 48.1 | 0.0646 | 0.0112 |
| 13 | 3150 | 729 | 47.0 | 0.0501 | 0.00687 |
| 14 | 4000 | 926 | 45.6 | 0.0363 | 0.00392 |
| 15 | 5000 | 1160 | 44.4 | 0.0275 | 0.00237 |
| 16 | 6300 | 1460 | 44.3 | 0.0269 | 0.00184 |