4aSC10. Formant shift in nasalization of vowels. Takayuki Arai (Dept. of Elec. and Electron. Eng., Sophia Univ., Tokyo, Japan and Res. Lab. of Electron., MIT, Cambridge, MA 02139)

We measured the formant shifts of a vowel in the context of a nasal and investigated whether human perception is able to compensate for such shifts. According to the acoustic theory, nasal coupling causes a modification on the spectrum, including formant frequency shift. The first goal of this study is to confirm that the formant frequencies actually shift due to nasalization. Based on several measurements of formant frequencies of various vowels in nasal contexts, we confirmed that the first formant ($F1$) tends to shift in a more central direction when nasalized. In English, vowels should be perceived as the same phoneme regardless of nasalization. In other words, listeners might have the capability to compensate for such formant shifts. The second goal of this study is to eximine this compensation effect by a perceptual experiment. For stimuli, we synthesized a nonnasal vowel $V0$ that has the same formant frequencies as a nasalized vowel $V1$. A continuum was also synthesized between $V0$ and the nonnasalized version of $V1$. Results show $V1$ is more correctly identified than $V0$, which suggests the existence of the compensation effect.