The present study investigated the relative contribution of talker-specific and accent-general learning to the perceptual adaptation of accented speech. Adult native English-speaking listeners were asked to transcribe Korean-accented English words in a brief, high variability perceptual learning paradigm. During training, listeners transcribed individual words produced by six Korean-accented speakers and were given feedback on their transcription performance. Controls were either trained with native English speakers or were given no training. At test, listeners were presented with Korean-accented speech produced by both familiar and unfamiliar talkers. The results suggest that listeners learned accent-general properties of nonnative speech. Listeners showed better transcription performance for both familiar and unfamiliar accented talkers relative to English and no training controls. However, talker-specific properties such as individual talker familiarity and baseline intelligibility also influenced transcription performance at test. These findings suggest that although listeners are sensitive to multiple sources of variation in speech, they appear to engage in accent-general perceptual adaptation to non-native speech.