Abstract: Human sound source localization relies on acoustical cues, most importantly, the interaural differences in time and level (ITD and ILD). For reaching a unified representation of auditory space the auditory nervous system needs to combine the information provided by these two cues. In search for such a unified representation, we conducted a magnetoencephalography (MEG) experiment that took advantage of the location-specific adaptation of the auditory cortical response. In general, the attenuation caused by a preceding adaptor sound to the response elicited by a probe depends on their spatial arrangement: if the two sounds coincide, adaptation is stronger than when the locations differ. Here, we presented
adaptor–probe pairs that contained different localization cues, for instance, adaptors with \{ITD\} and probes with ILD. We found that the adaptation of the \{N1\} amplitude was location-specific across localization cues. This result can be explained by the existence of auditory cortical neurons that are sensitive to sound source location independent on which cue, \{ITD\} or ILD, provides the location information. Such neurons would form a cue-independent, unified representation of auditory space in human auditory cortex.