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**Perceptual sensitivity to high-frequency interaural time differences
created by rustling sounds**

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ITDs are recruited to localize sounds in azimuth. ITDs can be extracted from low-frequency sounds or from the envelopes of high-frequency, complex sounds. Studies of the latter have included amplitude-modulated or transposed tones. A recent study showed that not the degree of envelope fluctuation, as quantified by the envelope 4th moment, determines sensitivity to envelope ITDs but the envelope spectrum and with it the interaural cross-correlation function of the auditory envelopes provide a good description of envelope ITD sensitivity. Here we use a different class of high-frequency stimuli, namely noise stimuli generated with different degrees of roughness which resemble natural rustling sounds. Stimuli are generated with a Gaussian-noise carrier and an aperiodic, rectangular modulator of statistically different duty cycle. The results show that ITD sensitivity increases both with increasing roughness and increasing bandwidth of the rustling sounds. While the effect of bandwidth on ITD sensitivity is in line with previous conclusions, the effect of roughness is not. ITD sensitivity for rustling sounds elicited ITD thresholds as low as 32 μ s, i.e., considerably lower than reported in previous studies with transposed stimuli. The data show that high-frequency rustling sounds provide strong temporal localization cues which the auditory system can effectively exploit.