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Noise impairs the perception of the fine structure of bird song

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It is well established that anthropogenic noise negatively affects the fitness of animals by masking vital vocal signals, and interfering with their transmission and detection. From the sender's perspective, birds are known to adapt to noise by increasing the frequency, delivery rate, and amplitude of their songs, presumably to limit the masking effect of noise. However, few field studies have investigated the receiver's perspective, and none has looked at the receiver's ability to discriminate between different songs under noisy conditions.

We tested whether song consistency, a song performance trait important in sexual selection, can be perceived under noisy conditions. To that end, we exposed male blue tits (*Cyanistes caeruleus*) to the same playback experiment in noisy and quiet settings. The aim of the experiment was to test whether the birds can discriminate between two song stimuli that differ only in their level of consistency. The blue tits showed a strong response to the playback of all songs under both quiet and noisy conditions. However, while they showed the ability to distinguish between different levels of consistency under quiet conditions, they failed to do so under noisy conditions.

This study shows that one of the mechanisms through which noise affects birds is by masking of the fine details of songs. The consequent loss of information that they convey, which plays an important role in sexual selection, can ultimately affect the fitness of birds.