**Supporting information**

**S1 Table** Change in song trait by male house wrens in response to a simulated intruder with and without noise, and to noise alone

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| --- | --- | --- | --- | --- |
| Analysis | Parameter | Estimate ± SE | t(df) | p-value |
| Change in peak frequency (Hz) – all treatmentsa | Intercept | –91.8 ± 136.5 | –0.7(104) | 0.5 |
| Treatment: intruder | 387.5 ± 107.0 | 3.6(75) | 0.0005 |
| Treatment: intruder + noise | 290.9 ± 106.8 | 2.7(75) | 0.008 |
| Breeding stage: prelaying | 216.2 ± 146.6 | 1.5(97) | 0.1 |
| Sequence | -41.5 ± 42.9 | –1.0(77) | 0.4 |
| Intruder\*prelaying | –170.6 ± 173.5 | –1.0(76) | 0.3 |
| Intruder + noise\*prelaying | –318.5 ± 174.1 | –1.8(77) | 0.07 |
| Change in song duration (s) – all treatmentsa | Intercept | 0.2 ± 0.09 | 2.5(93) | 0.01 |
| Treatment: intruder | 0.1 ± 0.06 | 2.2(79) | 0.03 |
| Treatment: intruder + noise | 0.1 ± 0.06 | 1.7(80) | 0.09 |
| Breeding stage: prelaying | –0.1 ± 0.06 | –2.1(42) | 0.04 |
| Sequence | –0.1 ± 0.03 | –3.2(80) | 0.002 |
| Change in song duration (s) – first treatment onlyb | Intercept | 0.2 ± 0.1 | 1.7(29) | 0.1 |
| Treatment: intruder | 0.1 ± 0.1 | 0.6(25) | 0.5 |
| Treatment: intruder + noise | 0.3 ± 0.2 | 1.9(28) | 0.06 |
| Breeding stage: prelaying | –0.4 ± 0.1 | –3.5(27) | 0.001 |
| Change in song rate (songs/min) – all treatmentsa | Intercept | 0.6 ± 0.7 | 0.9(129) | 0.4 |
| Treatment: intruder | 3.9 ± 0.5 | 7.3(107) | 0.0000 |
| Treatment: intruder + noise | 3.2 ± 0.5 | 5.9107) | 0.0000 |
| Breeding stage: prelaying | 1.2 ± 0.5 | –0.4(85) | 0.7 |
| Sequence | –0.6 ± 0.3 | –2.2(107) | 0.03 |
| Change in song rate (songs/min) – first treatment onlyb | Intercept | 0.6 ± 0.8 | 0.7(41) | 0.5 |
| Treatment: intruder | 3.4 ± 1.0 | 3.4(37) | 0.002 |
| Treatment: intruder + noise | 3.7 ± 2.0 | 3.8(38) | 0.0005 |
| Breeding stage: prelaying | –1.7 ± 0.8 | –2.0(37) | 0.05 |

a We first analyzed all treatments presented to males and included treatment, breeding stage, and sequence of presentation as fixed effects, male identity and song exemplar as random effects.

b For models where sequence was a significant predictor of the change in male response we eliminated the second and third treatments, and reanalyzed the model including only the first treatment presented.