**Supplementary 2.** Mixed models used in analyses to test for behavioural effects of underwater vessel noise on humpback whales. Models were linear mixed effects models (LMM) and penalized quasi-likelihood generalised liner mixed models (GLMM-PQL). Interaction of fixed effects= treatment\*phase. Random effect= (1|Individual).Weights = the duration of time for each phase e.g. more weight will be given to longer phases. Corr = to account for temporal auto-correlation within follows, the model was used with an auto-regressive structure with lag one. REML= restricted maximum likelihood estimation. † Fitted for both mother and calf.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | **Model details** | **Model** | **Error distribution** | **Link function** |
| 1 | Proportion.time.logging ~ treatment\*phase + (1|Individual), weights† | GLMM-PQL | Binomial | Logit |
| 2 | Presence.inst.beh.events (1/0) ~ treatment\*phase + (1|Individual), weights† | GLMM-PQL | Binomial | Logit |
| 3 | Respiration.rate (breaths min-1) ~ treatment\*phase + (1|Individual), method="REML"† | LMM | NA | NA |
| 4 | Mean.heading.change (degrees) ~ treatment\*phase + (1|Individual), method="REML"† | LMM | NA | NA |
| 5 | Mean.swim.speed (m s-1) ~ treatment\*phase + (1|Individual), corr, method="REML"† | LMM | NA | NA |