

Expected values of mean squares for a three-factor mixed model, all random effects

Source	degrees of freedom	EMS
A	$a - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\sigma_{ab}^2 + nb\sigma_{ac}^2 + nbc\sigma_a^2$
B	$b - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\sigma_{ab}^2 + na\sigma_{bc}^2 + nac\sigma_b^2$
C	$c - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2 + na\sigma_{bc}^2 + nab\sigma_c^2$
AB	$(a - 1)(b - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\sigma_{ab}^2$
AC	$(a - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2$
BC	$(b - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + na\sigma_{bc}^2$
ABC	$(a - 1)(b - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2$
Error	$abc(n - 1)$	σ_e^2

Expected values of mean squares for a three-factor mixed model, one effect fixed and two effects random

Source	degrees of freedom	EMS
A	$a - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\sigma_{ab}^2 + nb\sigma_{ac}^2 + nbc\theta_a^2$
B	$b - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\sigma_{ab}^2 + na\sigma_{bc}^2 + nac\sigma_b^2$
C	$c - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2 + na\sigma_{bc}^2 + nab\sigma_c^2$
AB	$(a - 1)(b - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\sigma_{ab}^2$
AC	$(a - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2$
BC	$(b - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + na\sigma_{bc}^2$
ABC	$(a - 1)(b - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2$
Error	$abc(n - 1)$	σ_e^2

Expected values of mean squares for a three-factor mixed model, two effects fixed and one effect random

Source	degrees of freedom	EMS
A	$a - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2 + nbc\theta_a^2$
B	$b - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + na\sigma_{bc}^2 + nac\theta_b^2$
C	$c - 1$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2 + na\sigma_{bc}^2 + nab\sigma_c^2$
AB	$(a - 1)(b - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + nc\theta_{ab}^2$
AC	$(a - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + nb\sigma_{ac}^2$
BC	$(b - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2 + na\sigma_{bc}^2$
ABC	$(a - 1)(b - 1)(c - 1)$	$\sigma_e^2 + n\sigma_{abc}^2$
Error	$abc(n - 1)$	σ_e^2