Model Code

```
data{
    int<lower=1> N;
    int<lower=1> N_id;
    int<lower=1> N_BU;
    real y[N];
    real MASS[N];
    real HUNG[N];
    real TEMP[N];
    int ARENA[N];
    int id[N];
    int BU[N];
    }
    parameters{
    vector[4] re_id[N_id];
    vector[3] re_b[N_BU];
    vector[9] re_ar;
    vector[4] b;
    vector[4] g;
    vector<lower=0,upper=10>[4] sd_id;
    vector<lower=0,upper=10>[3] sd_b;
    real<lower=0,upper=10> sd_ar;
    corr_matrix[4] id_cor;
    corr_matrix[3] b_cor;
    }
    model{
    vector[N] sdy;
    vector[N] muy;

    id_cor ~ lkj_corr(4);
    b_cor  ~ lkj_corr(3);
    //sd_id ~ uniform(0, 10); // prior implied in 'parameters' block
    //sd_b ~ uniform(0, 10);

    b ~ normal(0,100);
    g ~ normal(0,100);

    //setup random effect term
    re_id ~ multi_normal( rep_vector(0,4) , quad_form_diag(id_cor,sd_id));
    re_b  ~ multi_normal( rep_vector(0,3) , quad_form_diag(b_cor ,sd_b ));
    re_ar ~ normal(0, sd_ar);

    for ( i in 1:N ) {
    muy[i] <- (b[1] + re_id[id[i],1] + re_b[BU[i],1] + re_ar[ARENA[i]]) +
    (b[2] + re_id[id[i],2] + re_b[BU[i],2]) * TEMP[i] +
    (b[3] + re_id[id[i],3] + re_b[BU[i],3]) * HUNG[i] +
     b[4] * MASS[i];

    sdy[i] <- exp(g[1] + g[2]*TEMP[i] + g[3]*HUNG[i] + g[4]*MASS[i] +
                re_id[id[i],4]);
    }

    y ~ normal( muy , sdy );
    }
```

Model Output

Param	Predictor	Predictor 2	MeanEst.	Est. SD	Credibility Quantiles 2.50%	50%	97.50%
Mean Model Fixed Effects							
β_0	*int*		0.139	0.107	-0.070	0.139	0.349
β_1	**Temp.**		**0.312**	**0.038**	**0.239**	**0.311**	**0.388**
β_2	**Food Dep.**		**-0.271**	**0.040**	**-0.351**	**-0.270**	**-0.193**
β_3	**Mass**		**-0.303**	**0.097**	**-0.494**	**-0.304**	**-0.111**
Residual Model Fixed Effects							
γ_0	***int***		**-0.815**	**0.067**	**-0.947**	**-0.815**	**-0.684**
γ_1	**Temp.**		**-0.149**	**0.049**	**-0.244**	**-0.149**	**-0.053**
γ_2	**Food Dep.**		**-0.183**	**0.064**	**-0.309**	**-0.182**	**-0.058**
γ_3	Mass		-0.038	0.063	-0.163	-0.038	0.085
Among-individual Standard Deviations							
σ_0	*int*		0.746	0.076	0.614	0.740	0.910
σ_1	Temp.		0.163	0.033	0.105	0.162	0.233
σ_2	Food Dep.		0.163	0.049	0.065	0.163	0.260
ω_3	SD int		0.448	0.050	0.361	0.444	0.557
Individual Correlations							
$r_{0,1}$	*int*	Temp.	0.300	0.170	-0.047	0.305	0.616
$r_{0,2}$	*int*	Food Dep.	-0.356	0.181	-0.680	-0.365	0.026
$r_{0,3}$	***int***	**SD int**	**0.285**	**0.125**	**0.026**	**0.291**	**0.513**
$r_{1,2}$	Temp.	Food Dep.	-0.212	0.227	-0.632	-0.219	0.247
$r_{1,3}$	**Temp.**	**SD int**	**0.529**	**0.155**	**0.196**	**0.541**	**0.796**
$r_{2,3}$	Food Dep.	SD int	-0.254	0.188	-0.612	-0.257	0.125
Among-(ID*Burst) Standard Deviations							
σ_0	*int*		0.334	0.029	0.280	0.333	0.394
σ_1	Temp.		0.058	0.043	0.004	0.049	0.161
σ_2	Food Dep.		0.203	0.054	0.093	0.203	0.307
(ID*Burst) Correlations							
$r_{0,1}$	*int*	Temp.	0.058	0.322	-0.589	0.069	0.656
$r_{0,2}$	***int***	**Food Dep.**	**-0.541**	**0.149**	**-0.793**	**-0.555**	**-0.213**
$r_{1,2}$	Temp.	Food Dep.	0.061	0.338	-0.607	0.070	0.681
Arena intercept Standard Deviation							
σ	*int*		0.063	0.025	0.028	0.058	0.124