Generalized linear mixed model with random effects

LatAmb: latency to approach ambiguous location in s
Facility: facility a, b, and c
BoxBeforeAmb: last location before testing with ambiguous location; positive (p) or negative (n)
Breed: warmblood, pony, and thoroughbred
Housing: group housing or box with paddock
Pos.Side: trained positive location of the box; left (l) or right (r)
Sex: mare (m) or gelding (g)
ML: motor laterality (laterality index)
SL: sensory laterality (laterality index)

Initial forelimb use (MLstart):

```
glm(formula = LatAmb ~ PosSide + BoxBeforeAmb + MLstart/(Age + Facility + Breed + housing + Sex), family = gaussian(identity), data = Datenmatrix)
```

Deviance Residuals:

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>1Q</th>
<th>Median</th>
<th>3Q</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-19.7084</td>
<td>-6.1635</td>
<td>0.9422</td>
<td>4.4886</td>
<td>25.9218</td>
</tr>
</tbody>
</table>

Coefficients:

|                  | Estimate | Std. Error | t value | Pr(>|t|) |
|------------------|----------|------------|---------|---------|
| (Intercept)      | 19.519   | 12.199     | 1.600   | 0.161   |
| PosSide[T.r]     | 10.539   | 18.094     | 0.582   | 0.581   |
| BoxBeforeAmb[T.p]| 14.282   | 13.821     | 1.033   | 0.341   |
| MLstart          | -156.998 | 121.395    | -1.293  | 0.243   |
| MLstart:Age      | 5.541    | 4.778      | 1.160   | 0.290   |
| MLstart:Facility[T.f1] | -87.303 | 96.268     | -0.907  | 0.399   |
| MLstart:Facility[T.f2] | -24.721 | 88.628     | -0.279  | 0.790   |
| MLstart:Breed[T.Thoroughbred] | 60.591  | 107.757    | 0.562   | 0.594   |
| MLstart:Breed[T.Warmblood] | 6.856   | 68.645     | 0.100   | 0.924   |
| MLstart:housing[T.group housing] | 100.889 | 111.959    | 0.901   | 0.402   |
| MLstart:Sex[T.m] | 13.059   | 40.735     | 0.321   | 0.759   |

(Dispersion parameter for gaussian family taken to be 339.5188)

Null deviance: 6291.5 on 16 degrees of freedom
Residual deviance: 2037.1 on 6 degrees of freedom
(61 observations deleted due to missingness)
AIC: 153.61
Number of Fisher Scoring iterations: 2

Simplified model with the best goodness of fit

Call:

```
glm(formula = LatAmb ~ MLstart, family = gaussian(identity), data = Datenmatrix)
```

Deviance Residuals:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-24.4113</td>
<td>-8.2052</td>
<td>-0.5927</td>
<td>8.9316</td>
<td>27.2017</td>
</tr>
</tbody>
</table>
Coefficients:

|                | Estimate | Std. Error | t value | Pr(>|t|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | 27.089   | 4.155      | 6.519   | 9.7e-06  *** |
| MLstart        | -44.858  | 12.083     | -3.713  | 0.00208 ** |

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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '. ' 1

(Dispersion parameter for gaussian family taken to be 218.5852)

Null deviance: 6291.5  on 16  degrees of freedom
Residual deviance: 3278.8  on 15  degrees of freedom
(61 observations deleted due to missingness)
AIC: 143.7

Number of Fisher Scoring iterations: 2

**Relaxed forelimb position (MLrelaxed):**

Call:
`glm(formula = LatAmb ~ PosSide + BoxBeforeAmb + MLrelaxed/(Age + Breed + Facility + housing + Sex), family = gaussian(identity), data = Datenmatrix)`

Deviance Residuals:
```
  Min       1Q    Median       3Q      Max
-23.8939  -11.8452   0.1796    5.7358   30.3379
```

Coefficients:

|                | Estimate | Std. Error | t value | Pr(>|t|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | 18.737   | 13.411     | 1.397   | 0.212    |
| PosSide[T.r]   | 11.832   | 17.116     | 0.691   | 0.515    |
| BoxBeforeAmb[T.p] | -17.632  | 17.974     | -0.981  | 0.364    |
| MLrelaxed     | 21.675   | 88.385     | 0.245   | 0.814    |
| MLrelaxed:Age | -4.991   | 4.500      | -1.109  | 0.310    |
| MLrelaxed:Breed[T.Thouroughbred] | -72.389  | 106.153    | -0.682  | 0.521    |
| MLrelaxed:Breed[T.Warmblood]    | 28.317   | 55.439     | 0.511   | 0.628    |
| MLrelaxed:Facility[T.f1]       | 80.599   | 143.591    | 0.561   | 0.595    |
| MLrelaxed:Facility[T.f2]       | 121.926  | 78.234     | 1.558   | 0.170    |
| MLrelaxed:housing[T.group housing] | -28.689  | 148.233    | -0.194  | 0.853    |
| MLrelaxed:Sex[T.m]             | -28.335  | 58.245     | -0.486  | 0.644    |

(Dispersion parameter for gaussian family taken to be 604.7097)

Null deviance: 6291.5  on 16  degrees of freedom
Residual deviance: 3628.3  on  6  degrees of freedom
(61 observations deleted due to missingness)
AIC: 163.42

Number of Fisher Scoring iterations: 2

**Simplified model with the best goodness of fit**

Call:
`glm(formula = LatAmb ~ MLrelaxed, family = gaussian(identity), data = Datenmatrix)`
Deviance Residuals:
  Min 1Q Median 3Q Max
-15.280 -10.191 -9.438 -1.028 42.896

Coefficients:
  Estimate Std. Error t value Pr(>|t|)
(Intercept) 18.27 5.63 3.246 0.00543 **
MLrelaxed 5.01 13.21 0.379 0.70978
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 415.4507)

Null deviance: 6291.5 on 16 degrees of freedom
Residual deviance: 6231.8 on 15 degrees of freedom
(61 observations deleted due to missingness)
AIC: 154.62

Number of Fisher Scoring iterations: 2

**Task related forelimb position (MLbox):**

Call:
glm(formula = LatAmb ~ PosSide + BoxBeforeAmb + MLbox/(Sex + housing + Facility + Breed + Age), family = gaussian(identity), data = Datenmatrix)

Deviance Residuals:
  Min 1Q Median 3Q Max
-16.9130 -5.7045 0.2229 4.9464 27.4710

Coefficients:
  Estimate Std. Error t value Pr(>|t|)
(Intercept) 25.913 9.571 2.707 0.0352 *
PosSide[T.r] 3.113 10.250 0.304 0.7716
BoxBeforeAmb[T.p] -22.437 13.700 -1.638 0.1526
MLbox -229.231 140.779 -1.628 0.1546
MLbox:Sex[T.m] 408.932 171.137 2.389 0.0541
MLbox:housing[T.group housing] -313.324 207.044 -1.513 0.1810
MLbox:Facility[T.f1] 257.044 196.064 1.311 0.2378
MLbox:Facility[T.f2] 288.342 188.371 1.531 0.1767
MLbox:Breed[T.Thoroughbred] -468.070 229.614 -2.039 0.0876
MLbox:Breed[T.Warmblood] 180.220 139.136 1.295 0.2428
MLbox:Age 1.513 7.744 0.195 0.8516
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 322.9118)

Null deviance: 6291.5 on 16 degrees of freedom
Residual deviance: 1937.5 on 6 degrees of freedom
(61 observations deleted due to missingness)
AIC: 152.75
Number of Fisher Scoring iterations: 2
Simplified model with the best goodness of fit

Call:
glm(formula = LatAmb ~ MLbox, family = gaussian(identity), data = Datenmatrix)

Deviance Residuals:
  Min       1Q   Median       3Q      Max
-17.561   -11.128    -7.712    -0.362    40.232

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 21.128      5.349    3.95  0.00128 **
MLbox      -15.295     18.644  -0.82  0.42486
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for gaussian family taken to be 401.4253)

Null deviance: 6291.5  on 16  degrees of freedom
Residual deviance: 6021.4  on 15  degrees of freedom
(61 observations deleted due to missingness)
AIC: 154.03

Number of Fisher Scoring iterations: 2

Sensory laterality

Call:
glm(formula = LatAmb ~ BoxBeforeAmb + PosSide + SL/(Sex + housing + Facility + Breed + Age), family = gaussian(identity), data = Datenmatrix)

Deviance Residuals:
  Min       1Q   Median       3Q      Max
-20.891   -2.226    0.958    5.185   18.954

Coefficients:
         Estimate Std. Error t value Pr(>|t|)
(Intercept)  18.512      8.051   2.299   0.0611
BoxBeforeAmb[T.p]  -16.591     12.878  -1.288   0.2451
PosSide[T.r]            3.316    11.099   0.299   0.7752
SL              49.811     98.999   0.503   0.6328
SL:Sex[T.m]          -112.856    66.097  -1.707   0.1386
SL:housing[T.group housing]  72.000   115.301   0.624   0.5553
SL:Facility[T.f1]    -155.273   100.962  -1.538   0.1750
SL:Facility[T.f2]     -78.376    44.225  -1.772   0.1267
SL:Breed[T.Thouroughbred]  137.191  141.769   0.968   0.3706
SL:Breed[T.Warmblood] -64.578    74.220  -0.870   0.4177
SL:Age                2.529      3.187   0.794   0.4577
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for gaussian family taken to be 224.4657)

Null deviance: 6291.5  on 16  degrees of freedom
Residual deviance: 1346.8  on  6  degrees of freedom
(61 observations deleted due to missingness)
AIC: 146.57

Number of Fisher Scoring iterations: 2

**Simplified model with the best goodness of fit**

Call:
`glm(formula = LatAmb ~ SL/(Facility), family = gaussian(identity),
    data = Datenmatrix)`

Deviance Residuals:
```
  Min       1Q   Median       3Q      Max
-23.639  -7.606   -4.575    6.328   33.378
```

Coefficients:
```
                     Estimate  Std. Error   t value  Pr(>|t|)
(Intercept)         17.61       4.33   4.066  0.00134 **
SL                  15.09      15.08   1.001  0.33508
SL:Facility[T.f1]  -96.24      35.29  -2.727  0.01728 *
SL:Facility[T.f2]  -53.92      27.60  -1.954  0.07256
```

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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 267.899)

Null deviance: 6291.5  on 16  degrees of freedom
Residual deviance: 3482.7  on 13  degrees of freedom
(61 observations deleted due to missingness)
AIC: 148.72

Number of Fisher Scoring iterations: 2