Statistical testing II

08/10/2018

This report presents the results from generalised additive models which test the development and background differences of infant gestures and maternal sentence counts.

1 Hold out and gives

According to a GAM model, background is not a significant predictor of HoGs counts over time. This means that according to the model there are no differences in HoGs development between backgrounds (p = 0.179).

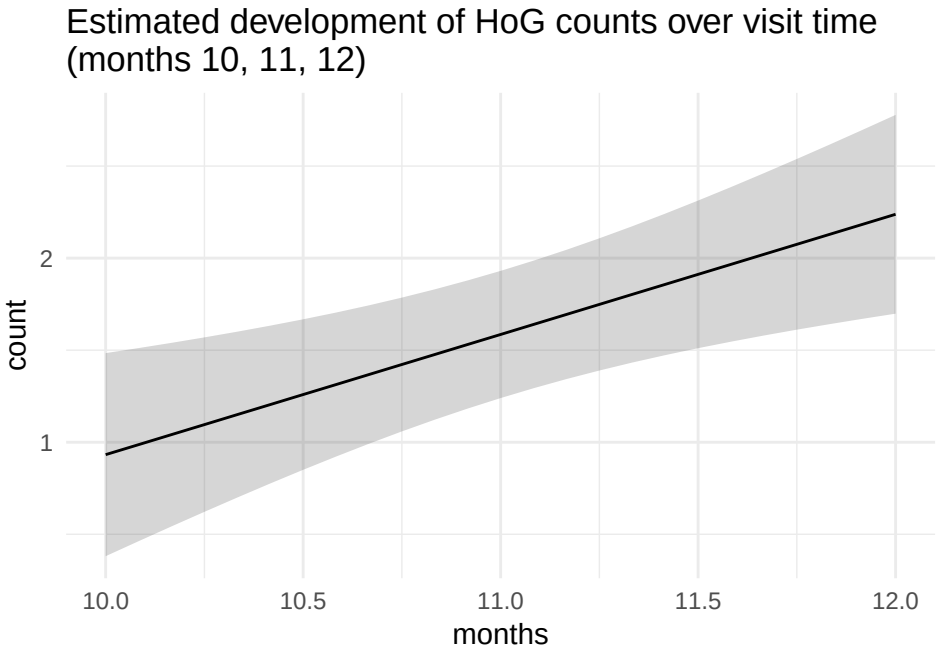
```
## hg_gam_null: count ~ s(months, k = 3) + s(months, dyad, k = 2, bs = "fs",
##     m = 1)
##
## hg_gam: count ~ back_o + s(months, k = 3) + s(months, k = 3, by = back_o) +
##     s(months, dyad, k = 2, bs = "fs", m = 1)
##
## Chi-square test of ML scores
## -----
##         Model    Score Edf Difference    Df p.value Sig.
## 1 hg_gam_null 455.7869   5
## 2      hg_gam 451.3360  11      4.451 6.000   0.179
##
## AIC difference: -2.16, model hg_gam_null has lower AIC.
```

```
## Warning in compareML(hg_gam_null, hg_gam): Only small difference in ML...
```

On the other hand, the time of visit is a significant predictor. HoG counts increase over time by an estimate of 1 HoGs every 2 months (so that at visit time 3 on average infants produce 1 more gesture than visit time 1, p = 0.015).

```
## hg_gam_2_null: count ~ s(months, dyad, k = 2, bs = "fs", m = 1)
##
## hg_gam_2: count ~ s(months, k = 3) + s(months, dyad, k = 2, bs = "fs",
##     m = 1)
##
## Chi-square test of ML scores
## -----
##           Model    Score Edf Difference    Df p.value Sig.
## 1 hg_gam_2_null 501.9866   3
## 2      hg_gam_2 497.7653   5      4.221 2.000   0.015  *
##
## AIC difference: 6.44, model hg_gam_2 has lower AIC.
```

```
## Warning in compareML(hg_gam_2_null, hg_gam_2): Only small difference in ML...
```



2 Reaches

According to GAMs, neither visit time nor background are significant predictors of reach counts (p = 0.466, p = 0.842 respectively).

```
compareML(reach_gam_null, reach_gam)
```

```
## reach_gam_null: count ~ s(months, k = 3) + s(months, dyad, k = 2, bs = "fs",
##     m = 1)
##
## reach_gam: count ~ back_o + s(months, k = 3) + s(months, k = 3, by = back_o) +
##     s(months, dyad, k = 2, bs = "fs", m = 1)
##
## Chi-square test of ML scores
## -----
##            Model    Score Edf Difference    Df p.value Sig.
## 1 reach_gam_null 381.3932   5
## 2      reach_gam 378.5803  11      2.813 6.000   0.466
##
## AIC difference: -2.61, model reach_gam_null has lower AIC.
```

```
## Warning in compareML(reach_gam_null, reach_gam): Only small difference in ML...
```

```
compareML(reach_gam_2_null, reach_gam_2)
```

```
## reach_gam_2_null: count ~ s(months, dyad, k = 2, bs = "fs", m = 1)
##
## reach_gam_2: count ~ s(months, k = 3) + s(months, dyad, k = 2, bs = "fs",
##     m = 1)
```

```
##
## Chi-square test of ML scores
## -----
##              Model    Score Edf Difference    Df p.value Sig.
## 1 reach_gam_2_null 431.9090   3
## 2      reach_gam_2 431.7369   5      0.172 2.000   0.842
##
## AIC difference: -1.66, model reach_gam_2_null has lower AIC.
```

```
## Warning in compareML(reach_gam_2_null, reach_gam_2): Only small difference in ML...
```

3 Points

Background is not a significant predictor of reach gestures development ($p = 0.715$).

```
compareML(point_gam_null, point_gam)
```

```
## point_gam_null: count ~ s(months, k = 3) + s(months, dyad, k = 2, bs = "fs",
##     m = 1)
##
## point_gam: count ~ back_o + s(months, k = 3) + s(months, k = 3, by = back_o) +
##     s(months, dyad, k = 2, bs = "fs", m = 1)
##
## Chi-square test of ML scores
## -----
##            Model    Score Edf Difference    Df p.value Sig.
## 1 point_gam_null 328.9262   5
## 2      point_gam 327.0671  11      1.859 6.000   0.715
##
## AIC difference: -7.17, model point_gam_null has lower AIC.
```

```
## Warning in compareML(point_gam_null, point_gam): Only small difference in ML...
```

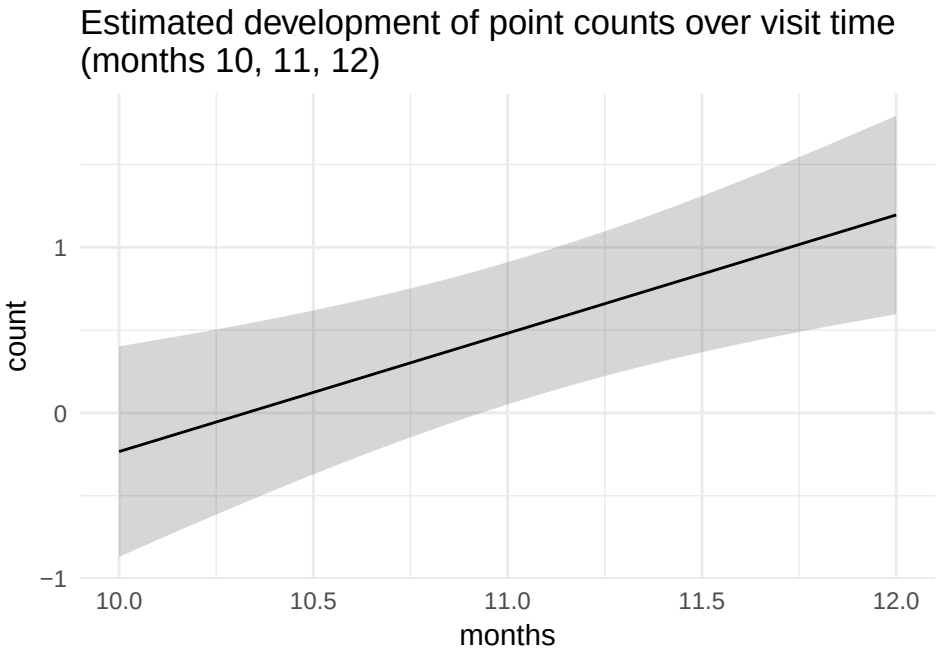
Visit time is a significant predictor of reaches development ($p = 0.011$), and reaches counts increase over time by an estimate of 1 reach every 2 months (so that at visit time 3 on average infants produce 1 more gesture than visit time 1).

```
compareML(point_gam_2_null, point_gam_2)
```

```
## point_gam_2_null: count ~ s(months, dyad, k = 2, bs = "fs", m = 1)
##
## point_gam_2: count ~ s(months, k = 3) + s(months, dyad, k = 2, bs = "fs",
##     m = 1)
##
## Chi-square test of ML scores
## -----
##              Model    Score Edf Difference    Df p.value Sig.
## 1 point_gam_2_null 333.4348   3
## 2      point_gam_2 328.9262   5      4.509 2.000   0.011   *
```

```
##
## AIC difference: 9.35, model point_gam_2 has lower AIC.
```

```
## Warning in compareML(point_gam_2_null, point_gam_2): Only small difference in ML...
```



4 Maternal utterances and contingent talks

Background nor visit time are significant predictors of the development of counts over time of maternal utterances and contingent talks.

5 Summary

Background is not a significant predictor in any of the models. Visit time is a significant predictor for hold out and gives, and pointing gestures, but not for reach gestures, nor maternal counts. In general, there is an increase of 1 HoG/pointing between visit time 1 and 3.