markdown_onetwo

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Hypothesis 1

Plotting

Development of Child's MLU
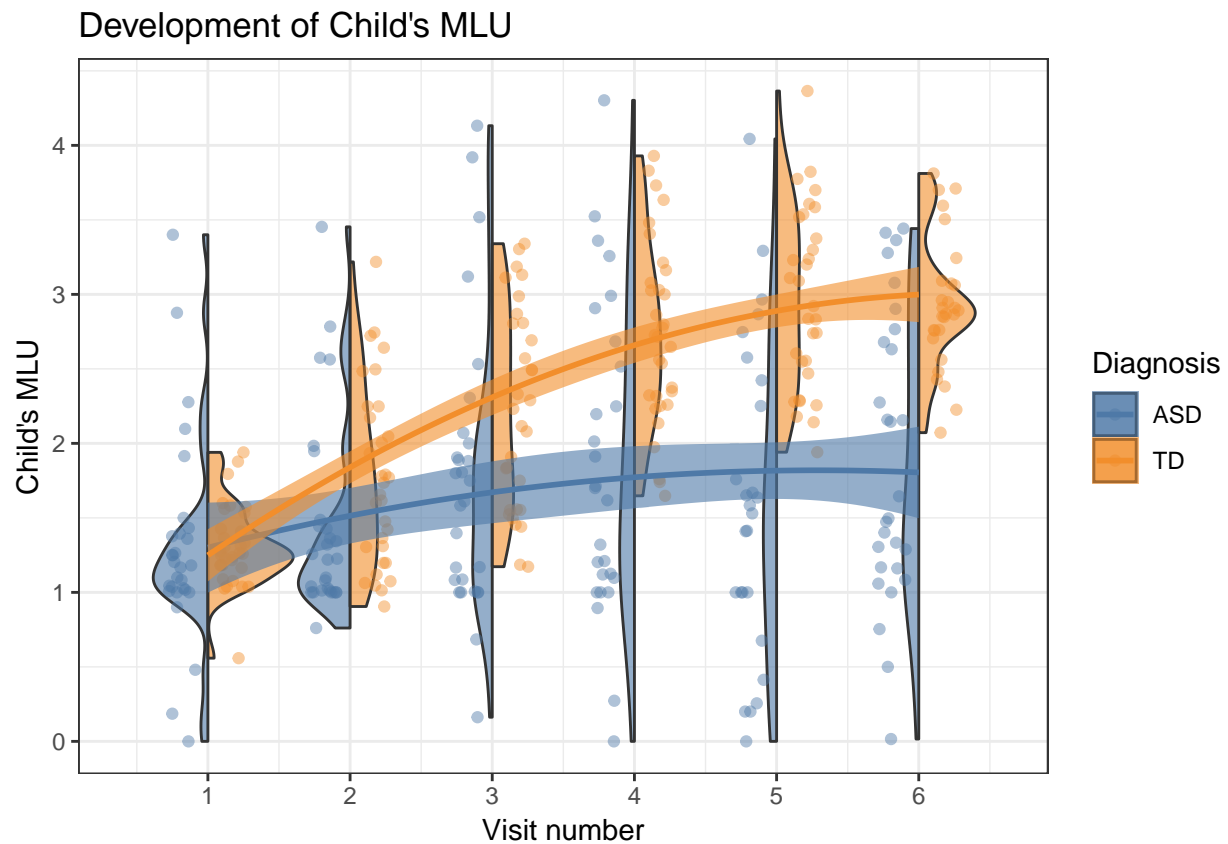
Initial model - argue for the fact that we chose to include what we did in fact include.

```
## Linear mixed model fit by maximum likelihood . t-tests use
##   Satterthwaite's method [lmerModLmerTest]
## Formula: CHI_MLU ~ VISIT * Diagnosis + (1 + VISIT | SUBJ)
##    Data: model_data
##
##      AIC      BIC   logLik deviance df.resid
##    572.5    603.4   -278.2    556.5      344
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.48470 -0.53248 -0.08812  0.44179  2.73712
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  SUBJ     (Intercept) 0.29420  0.5424
```

```
##         VISIT      0.01122  0.1059   -0.16
##  Residual           0.16063  0.4008
## Number of obs: 352, groups:  SUBJ, 61
##
## Fixed effects:
##                  Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)       1.30459     0.12273 59.16369  10.630 2.40e-15 ***
## VISIT             0.10046     0.02680 61.43159   3.749 0.000395 ***
## DiagnosisTD      -0.21693     0.16952 59.26089  -1.280 0.205658
## VISIT:DiagnosisTD 0.25331     0.03712 61.98818   6.823 4.35e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) VISIT  DgnsTD
## VISIT       -0.443
## DiagnosisTD -0.724  0.321
## VISIT:DgnTD  0.320 -0.722 -0.445

##           R2m        R2c
## [1,] 0.3571598 0.8150069
```

testing the model with interaction (mixed_model) against the one without (model_noint)

```
## Data: model_data
## Models:
## model_noint: CHI_MLU ~ VISIT + Diagnosis + (1 + VISIT | SUBJ)
## mixed_model: CHI_MLU ~ VISIT * Diagnosis + (1 + VISIT | SUBJ)
##             Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## model_noint  7 605.42 632.47 -295.71   591.42
## mixed_model  8 572.46 603.37 -278.23   556.46 34.962      1  3.363e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

plotting models with varrying higher order blabla
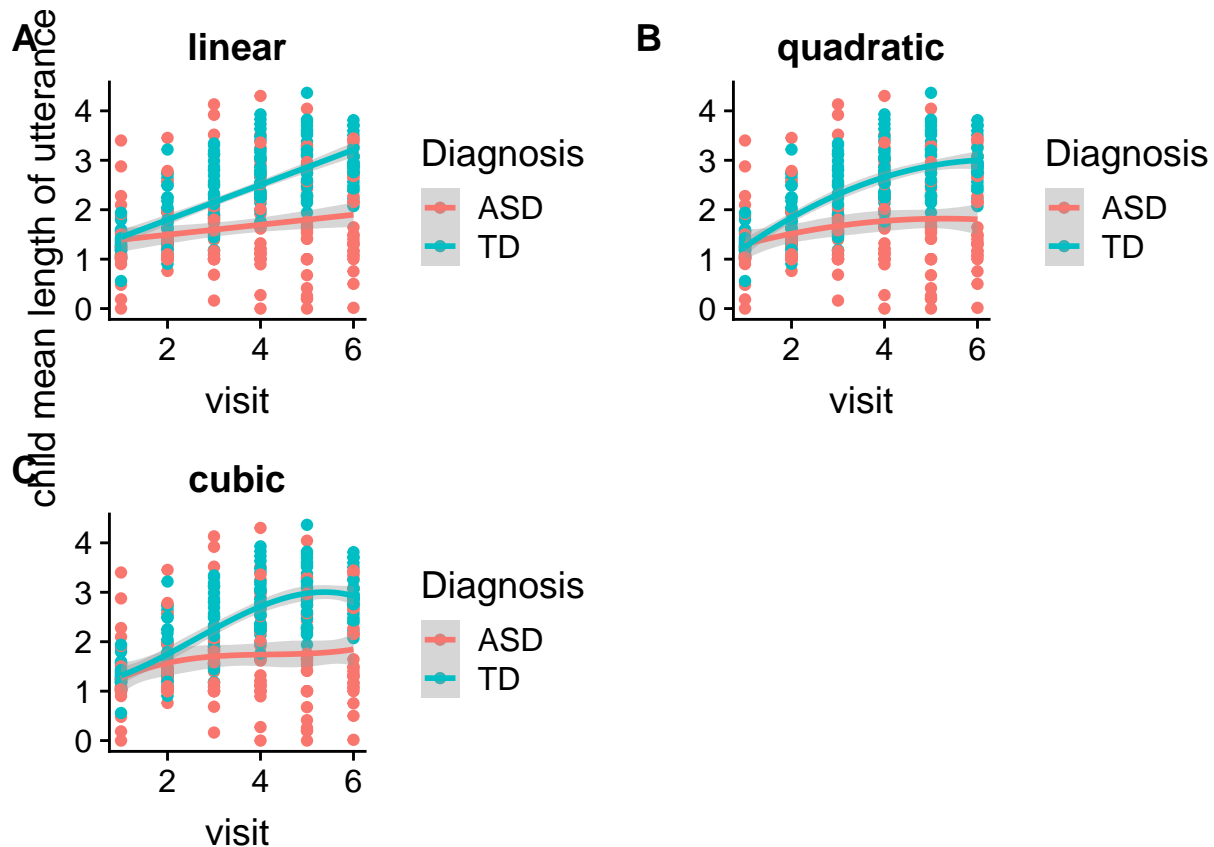
Seems like the data fits better with quadratic / cubic than linear

```
## Data: model_data
## Models:
## m_linear: CHI_MLU ~ VISIT * Diagnosis + (1 + VISIT | SUBJ)
## m_quadratic: CHI_MLU ~ (VISIT + I(VISIT^2)) * Diagnosis + (1 + VISIT + I(VISIT^2) |
## m_quadratic:      SUBJ)
## m_cubic: CHI_MLU ~ (VISIT + I(VISIT^2) + I(VISIT^3)) * Diagnosis + (1 +
## m_cubic:      VISIT + I(VISIT^2) + I(VISIT^3) | SUBJ)
##              Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m_linear      8 572.46 603.37 -278.23   556.46
## m_quadratic  13 518.47 568.70 -246.23   492.47 63.993      5  1.812e-12 ***
## m_cubic      19 505.99 579.40 -234.00   467.99 24.478      6  0.0004265 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

quadratic chosen because lowest BIC and interpretability

```
##              R2m       R2c
## [1,] 0.3731101 0.8861587
```

other r-squared values at github.

[report results]

Hypothesis 2

```
## Data: model_data
```

```
## Models:
## mot_linear: MOT_MLU ~ VISIT * Diagnosis + (1 + VISIT | SUBJ)
## mot_quadratic: MOT_MLU ~ (VISIT + I(VISIT^2)) * Diagnosis + (1 + VISIT + I(VISIT^2) |
## mot_quadratic:      SUBJ)
## mot_cubic: MOT_MLU ~ (VISIT + I(VISIT^2) + I(VISIT^3)) * Diagnosis + (1 +
## mot_cubic:      VISIT + I(VISIT^2) + I(VISIT^3) | SUBJ)
##                Df    AIC    BIC  logLik deviance   Chisq Chi Df Pr(>Chisq)
## mot_linear      8 513.48 544.39 -248.74   497.48
## mot_quadratic  13 508.35 558.58 -241.18   482.35 15.1319      5   0.009813
## mot_cubic      19 519.85 593.25 -240.92   481.85  0.5041      6   0.997788
##
## mot_linear
## mot_quadratic **
## mot_cubic
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##           R2m       R2c
## [1,] 0.2360461 0.6998688
```

[report results]

exercise 4 output of the best model (explain how we got here baby)

```
## Type III Analysis of Variance Table with Satterthwaite's method
##                 Sum Sq Mean Sq NumDF  DenDF F value    Pr(>F)
## VISIT           6.9038  6.9038     1 62.149  57.993 1.817e-10 ***
## I(VISIT^2)      2.3566  2.3566     1 62.305  19.795 3.630e-05 ***
## Diagnosis       1.7736  1.7736     1 60.914  14.898 0.0002769 ***
## verbalIQ_1      9.7705  9.7705     1 60.358  82.073 7.442e-13 ***
## VISIT:Diagnosis 5.6920  5.6920     1 62.072  47.814 3.004e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

r-squared for the best model

```
##           R2m       R2c
## [1,] 0.5903426 0.8475177
```