Gelman and Hill Exercise 12.2

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This exercise can be found in Chapter 14 of the Gelman+Hill Hierarchical Model Book

12.2.1

```
allvar$newpid <- as.factor(allvar$newpid)

allvar$VDATE <- mdy(allvar$VDATE)

allvar <- allvar %>%
  filter(!is.na(CD4PCT)) %>%
  group_by(newpid) %>%
  mutate(elapsed_months = (as.numeric(VDATE - mdy("1/1/1988")))/30)


M1 <- lmer(data = allvar, CD4PCT ~ elapsed_months + (1|newpid))

summary(M1)
```

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: CD4PCT ~ elapsed_months + (1 | newpid)
##    Data: allvar
##
## REML criterion at convergence: 7921.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -4.4903 -0.4452 -0.0588  0.3719  6.6902
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  newpid   (Intercept) 136.78   11.695
##  Residual              53.39    7.307
## Number of obs: 1075, groups:  newpid, 251
##
## Fixed effects:
##                Estimate Std. Error t value
## (Intercept)    26.80973    1.08053  24.812
## elapsed_months -0.17846    0.03964  -4.502
##
## Correlation of Fixed Effects:
##             (Intr)
## elpsd_mnths -0.690
```

```
"a" %in% c("a", "b")
```

```
## [1] TRUE
```

The Coefficient for time is -0.1784641, with the average intercept across children (a fixed effects model) being 26.8097311.