# ATCR Lab Repeated Measures 1 – Lab Key

1. Lowess plot is about as straight as it could be. So treat as linear.
2. It appears statistically significant. But mother's age is increasing along with birth order. So could be confounding.
3. Now we can easily calculate the differences between the last and first birthweights and conduct a t-test.

   ```
   . generate bwdiff=bweight5-bweight1
   . ttest bwdiff=0
   ```

   How would you expect this to compare to the regression, given that we are ignoring the three intermediate births? How does it compare with regard to p-value for the test of birth order?

   Ans: We'd ordinarily expect that the t-test, which discards information, would be less precise and give a smaller t-statistic. In this case it doesn't (t=4.2 for t-test versus t=3.6 for regression). We are seeing the effect of ignoring the clustering, which the paired t-test takes advantage of (by looking at within person differences)

4. Here is a regression of birth weight on birth order, taking account of the clustering on mom:

   ```
   . xtmixed bweight birthord || momid:
   ```

   How does the p-value compare to the t-test and the regression? Does it make sense?

   Ans: The statistic for testing the coefficient is larger (z=4.7 as compared to t=4.2 or 3.6 before) and hence has a smaller p-value. This would be expected because it accounts for the clustering (which improves precision) and uses all the data (which also improves precision). Note that the size of the coefficient is largely the same, it is the standard error that has decreased.

5. How does this compare to the descriptive statistics?

   Ans: It gives exactly the same estimates and gives a formal statistical comparison of the differences. Not statistically significant (p=0.17).

6. Why did we need to include the interaction? How does this compare to the t-test?

   Ans: Since we are interested in the difference in the change over time between men and women that is the interaction of time and sex. The interaction effect is exactly the same as the difference in the change scores, with the same p-value.

7. How does this compare?

   Ans: Whether you analyze the 12 month value or the change score, the sex effect is the same (this is true in general). Adjusting for the baseline value is not a good idea when the baseline values are not equal or expected to be equal. The analysis can no longer be interpreted as an analysis of the change in pain over time, which was the original question. An exception is a randomized trial where values should be the same at baseline. In such a case, the adjustment is innocuous to the overall estimates and may increase the power.