

## SAS Program:

*\*First make a "spaghetti plot" of the raw data vs Years in Study. (You could also make ones vs. Age at Visit or Duration of Illness at Visit);*

```
Goptions dev=emf  ftext='Arial'  htext=1  gsfname=grafout
nofileonly  hsize=6  in  vsize= 5  in  ;
```

```
Filename grafout '(the path to the file directory goes here)';
```

### Proc Sort;

```
By  Subject_ID  Years_in_Study  ;
```

### Proc gplot data= (SAS data set name goes here) ;

```
Plot  Dep_Var*Years_in_Study=Subject_ID  /  nolegend
      haxis= ... to ...  by ...  vaxis= ... to ...  by ...  ;
```

```
Symbol  value=circle  interpol=join  repeat=5000(any arbitrarily
high number);
```

```
Title  'Spaghetti Plot of Raw Longitudinal Data.....';
```

*\*Run the Random effects analysis;*

*\*The terms with asterisks are interactions of Group with the linear and quadratic terms for years in the study;*

*\*Both the linear and quadratic terms for years in study are indicated as random effects in the Random statement. If the variance of the quadratic term is nonsignificant, it will be dropped from the random statement, and subsequently also if the linear term is not significant;*

*\*Type=un specifies an "unstructured" covariance matrix of the random terms. If the covariances of the random terms are not significant, an uncorrelated covariance matrix will be specified with Type=vc (variance components);*

### Proc Mixed covtest noclprint data=(data set name goes here) ;

```
Class  Subject_ID  Group  ;
```

```
Model  Dep_Var =
```

```
      Education
```

```
      Age_Baseline  Dur_Baseline
```

```
      Years_in_Study  Years_in_Study_Sq
```

```
      Group
```

```
      Group*Years_in_Study  Group*Years_in_Study_Sq /  s  ;
```

```
Random  Intercept  Years_in_Study  Years_in_Study_Sq
```

```
      /  Subject=Subject_ID(Group)  Type=un  Gcorr  ;
```

```
Title  'Random Effects Longitudinal Analysis.....';
```