1. Below is a partially filled ANOVA table for a within-subject experiment.

	SS	df	MS	F
Treatment	150	3		
Subject	900	9		
Interaction				
Total	1320			

1.1 Complete the table (with sphericity assumption). Show your work. Obtain the p-value of the F test.

1.2 How many subjects are there? How many treatments are there?

1.3 Calculate $\hat{\omega}^2$.

1.4 Suppose the correction factor for sphericity is $\hat{\varepsilon} = 0.6$, what is the F statistic? What is its sampling distribution? Find p-value.

2. Consider a within-subject design with 30 subjects repeated measured under 3 conditions.

2.1 Suppose a computer program calculated two estimates of the correction factor ε: 0.6 and 0.75. Which is Huynh-Feld estimate and which is Greenhouse-Geisser estimate? Calculate the lower bound estimate.

2.2 What is the power of this design to detect $\omega^2 = 0.1$? Assume $\varepsilon = 0.6$ and $\rho = 0.5$. Present screenshots of WebPower.

3. In the attachment you find the data from the Brain Area experiment described in HW9. The three levels 1, 2 and 3 of Area are N, A and B brain areas. The three levels 1, 2 and 3 of Lag are 50, 100 and 150ms. Do the following using SPSS or R.

(a) obtain an interaction plot with brain region as separate lines and Lag on the x axis.

(b) obtain ANOVA table.

(c) obtain the unadjusted p-value for the interaction contrast in Problem 3 of HW9

(d) obtain unadjusted two-sided p-values for the family of 6 pairwise comparisons in the simple effects of Area (those in Problem 2 of HW9).

If you use R, be careful with the order of the levels in the cell mean model for (c) and (d). If you use SPSS, be care with the order of the two factors. For either software, you have to make it clear which p-value is for which contrast, rather than just display a table of p-values.