Appendix 7.1

Calculating the Trimmed *t* (t_{tk}) statistic

The one-sample, or correlated scores, case. With a single group of scores, or difference scores, the trimmed mean is calculated as follows.

1. First reorder the scores from lowest to highest; this can be done in most statistical packages. For example, in SPSS, from the main menu select *Data*, then *Sort Cases*, then select the dependent variable.
2. Remove the highest and lowest *k* scores and calculate the mean of the remaining $n - 2k$ scores. Call this *trimmed mean* $\overline{T}$.
3. Set the lowest *k* scores equal to the lowest remaining score and the highest *k* scores equal to the remaining highest score. These 2*k* scores, together with the remaining (unchanged) scores, comprise the Winsorized data set.
4. Calculate the mean of the Winsorized data set to obtain a *Winsorized mean*, $\overline{W}$.
5. Calculate a *Winsorized sum of squares,* SS_{wk}, by subtracting each of the *n* values in the Winsorized set from the Winsorized mean, squaring these deviations, and summing.
6. The *standard error of the trimmed mean,* SE_{wk}, is

$$SE_{wk} = \sqrt{\frac{SS_{wk}}{(n-2k)(n-2k-1)}}$$

7. The trimmed *t* statistic is $t_{tk} = \overline{T}/SE_{wk}$ and is distributed on $n - 2k - 1$ df.

If you perform the usual *t* test on W using a statistical software program, the resulting SE will have involved division of SS_{wk} by $(n)(n - 1)$. To obtain SE_{wk}, multiply the usual *SE* by $\sqrt{(n)(n-1)}$ and divide by $\sqrt{(n-2k)(n-2k-1)}$.

An important question is what *k* should be. Wilcox (1997) recommends trimming the lowest and highest 20% of the scores, a recommendation consistent with Rosenberger and Gasko’s (1983) calculations of standard errors of means trimmed by different amounts for several distributions and sample sizes. As an example, if there are 40 scores, the eight highest and lowest would be set aside in calculating the trimmed mean. These scores would be set equal to the ninth and 32 (in rank order) scores, respectively, when calculating the Winsorized mean and sum of squares.

Two independent groups. In applying this approach to data from an independent-groups design, the procedure is similar to that just described.

1. Sort the scores within each group. For example, in SPSS, select *Data*, then *Sort Cases*, then move the independent variable (e.g., *Method*) and then the dependent variable (e.g. Y) into the *Sort by* box, in that order.
2. Copy the sorted Y data into the T and W columns, trimming the highest and lowest *k* scores in each group (column T) and setting the lowest *k* scores in each group equal to the next lowest in their group, and the highest *k* scores in each group equal to the next highest in their group. The data file should look like the *IA1_Memory* file onthe website.
3. The numerator of the *t* statistic is the difference between the trimmed means for the two groups; $\overline{T}_1 - \overline{T}_2$.
4. The Winsorized sum of squares is obtained separately for each group as in the one-sample case, and then pooled; i.e., $SS_W = SS_{W,1} + SS_{W,2}$.
5. The standard error is

$$SE_W = \frac{\sqrt{SS_W}}{\sqrt{\left[(n_1 + n_2 - 4k - 2)\left(\frac{1}{n_1 - 2k} + \frac{1}{n_2 - 2k}\right)\right]}}$$

6. The *t* statistic is the ratio of the difference between the trimmed means divided by SE_W, and is distributed on $(n_1 + n_2 - 4k) - 2$ df.

SE_W can also be used to construct confidence intervals. These have the same form as those presented earlier for the untrimmed data.