Standard Deviation Calculation

For categorized questions, each response is assigned 1 or 2 stat weights. If a single weight is assigned, then this is the value used to calculate the standard deviation. If 2 weights are provided, the mid point is used.

D = Question Mean – Stat Value as described above
SS = Sum of Squares, D*D*Weighted Response Count, for all table responses
Sample = Sum of all Weighted Response Counts for all table responses

Standard Deviation = SQRT(SS/(Sample – 1));

The calculation is the same for continuous variables except the actual data values are used instead of a stat weight.

D = Question Mean – Response Value
SS = Sum of Squares, D*D*Respondent Weight for each response
Sample = Sum of all Respondent Weights for each response

Standard Deviation = SQRT(SS/(Sample – 1));

Comparison of two population means using T-Statistic

<u>When the two populations have equal variances</u>

$$t = \frac{m_1 - m_2}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{(n_1 + n_2 - 2)}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Where
m_1 = Mean of the first sample
s_1 = Standard Deviation of the 1st sample
n_1 = Un-weighted Sample of the 1st sample

m_2 = Mean of the 2nd sample
s_2 = Standard Deviation of the 2nd sample
n_2 = Un-weighted Sample of the 2nd sample

Decision rules:

If |t| < 1.65 then the two populations are NOT significantly different at 90%
If |t| >= 1.65 then the two populations ARE significantly different at 90%
If |t| < 1.96 then the two populations are NOT significantly different at 95%
If |t| >= 1.96 then the two populations ARE significantly different at 95%

When the two populations have UNEQUAL variances

$$t = \frac{m_1 - m_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Where
m_1 = Mean of the first sample
s_1 = Standard Deviation of the 1st sample
n_1 = Un-weighted Sample of the 1st sample

m_2 = Mean of the 2nd sample
s_2 = Standard Deviation of the 2nd sample
n_2 = Un-weighted Sample of the 2nd sample

Decision rules:

If |t| < 1.65 then the two populations are NOT significantly different at 90%
If |t| >= 1.65 then the two populations ARE significantly different at 90%
If |t| < 1.96 then the two populations are NOT significantly different at 95%
If |t| >= 1.96 then the two populations ARE significantly different at 95%