

SOC 5050: Week 08 Equations Quick Reference

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One-sample T-test

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} \quad (1)$$

Degrees of freedom (v) is defined as $v = n - 1$.

Independent T-test, Homogeneous Variance

Independent T-test

$$t = \frac{\bar{X}_a - \bar{X}_b}{\sqrt{\frac{s_p^2}{n_a} + \frac{s_p^2}{n_b}}} \quad (2a)$$

Degrees of freedom (v) is defined as $v = n_a + n_b - 2$.

Pooled Variance

$$s_p^2 = \frac{(n_a - 1)s_a^2 + (n_b - 1)s_b^2}{n_a + n_b - 2} \quad (2b)$$

Independent T-test, Heterogeneous Variance

Independent T-test

$$t = \frac{\bar{X}_a - \bar{X}_b}{\sqrt{\frac{s_a^2}{n_a} + \frac{s_b^2}{n_b}}} \quad (3a)$$

Welch's Corrected Degrees of Freedom (v)

$$v \approx \frac{\left(\frac{s_a^2}{n_a} + \frac{s_b^2}{n_b} \right)^2}{\frac{s_a^4}{(n_a^2)(n_a - 1)} + \frac{s_b^4}{(n_b^2)(n_b - 1)}} \quad (3b)$$

Dependent T-test

$$t = \frac{\bar{d}}{\sqrt{\frac{s_d^2}{n}}} \quad (4)$$

*Cohen's D**General Equation*

$$d = \frac{M_t - M_c}{\sqrt{\frac{(n_t - 1)s_t^2 + (n_c - 1)s_c^2}{n_t + n_c - 2}}} \quad (5a)$$

Note that groups t and c are defined for controlled experiments where $t = \text{treatment}$ and $c = \text{control}$. This can be applied to the above equations by defining $t = a$ and $c = b$.

Cohen's D after T-test, $n_a = n_b$

$$d = \frac{2t}{\sqrt{v}} \quad (5b)$$

Cohen's D after T-test, $n_a \neq n_b$

$$d = \frac{t(n_t + n_c)}{\sqrt{v}(\sqrt{n_t + n_c})} \quad (5c)$$

Document Details

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