Evaluation Settings

In the following we describe the analytical details of the different approaches used in the evaluation study:

1. Stratified Randomization and weighted stratified analysis

   - Degrees of freedom $df = \sum_{j=1}^{K} \sum_{\ell=E,C} (n_{j\ell} - 1)$
   - weights $w_j = w_j^* = \frac{n_{jE} \times n_{jC}}{n_{jE}+n_{jC}}$, $n_j = n_{jE} + n_{jC}$ in statistics and NCP,
   - $P\left(|T| > t_{df}(1-\frac{\alpha}{2})\middle|\mathbf{Z}\right) = F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right) + F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right)$.
   - first NCP: $\delta(\mathbf{Z}) = \left(\sigma\sqrt{\sum_{j=1}^{K} w_j^2/w_j^*}\right)^{-1} \left(\sum_{j=1}^{K} w_j \left(\tilde{\tau}_{jE} - \tilde{\tau}_{jC}\right)\right)$
   - second NCP: $\lambda(\mathbf{Z}) = \frac{1}{\sigma^2}\left(\sum_{j=1}^{K}\sum_{i=1}^{n_j} \tau_{ji}^2 - \sum_{j=1}^{K} n_{jE}\tilde{\tau}_{jE}^2 - \sum_{j=1}^{K} n_{jC}\tilde{\tau}_{jC}^2\right)$

2. Stratified Randomization and unweighted stratified analysis

   - Degrees of freedom $df = \sum_{j=1}^{K} \sum_{\ell=E,C} (n_{j\ell} - 1)$
   - weights $w_j = 1$ in statistics and NCP,
   - $P\left(|T| > t_{df}(1-\frac{\alpha}{2})\middle|\mathbf{Z}\right) = F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right) + F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right)$.
   - first NCP: $\delta(\mathbf{Z}) = \left(\sigma\sqrt{\sum_{j=1}^{K} w_j^2/w_j^*}\right)^{-1} \left(\sum_{j=1}^{K} w_j \left(\tilde{\tau}_{jE} - \tilde{\tau}_{jC}\right)\right)$
   - second NCP: $\lambda(\mathbf{Z}) = \frac{1}{\sigma^2}\left(\sum_{j=1}^{K}\sum_{i=1}^{n_j} \tau_{ji}^2 - \sum_{j=1}^{K} n_{jE}\tilde{\tau}_{jE}^2 - \sum_{j=1}^{K} n_{jC}\tilde{\tau}_{jC}^2\right)$

3. Stratified Randomization and unstratified analysis

   - Degrees of freedom $df = n_E + n_C - 2$
   - $P\left(|T| > t_{df}(1-\frac{\alpha}{2})\middle|\mathbf{Z}\right) = F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right) + F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right)$.
   - first NCP: $\delta(\mathbf{Z}) = \frac{1}{\sigma}\sqrt{\frac{N_E N_C}{N_E+N_C}}\,(\tilde{\tau}_E - \tilde{\tau}_C)$
   - second NCP: $\lambda(\mathbf{Z}) = \lambda = \frac{1}{\sigma^2}\left(\sum_{i=1}^{N} \tau_i^2 - N_E\tilde{\tau}_E^2 - N_C\tilde{\tau}_C^2\right)$

4. unstratified Randomization and unstratified analysis

   - Degrees of freedom $df = n_E + n_C - 2$
   - $P\left(|T| > t_{df}(1-\frac{\alpha}{2})\middle|\mathbf{Z}\right) = F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right) + F_{df,\delta(\mathbf{Z}),\lambda(\mathbf{Z})}\left(t_{df}(\frac{\alpha}{2})\right)$.
   - first NCP: $\delta(\mathbf{Z}) = \frac{1}{\sigma}\sqrt{\frac{N_E N_C}{N_E+N_C}}\,(\tilde{\tau}_E - \tilde{\tau}_C)$
   - second NCP: $\lambda(\mathbf{Z}) = \lambda = \frac{1}{\sigma^2}\left(\sum_{i=1}^{N} \tau_i^2 - N_E\tilde{\tau}_E^2 - N_C\tilde{\tau}_C^2\right)$