| Measures | | Formula |
|---|---|---|
| Measures of change in $y_i$ $(i = 1, ..., k)^a$ | | |
| 1. | Range | max $y_i$ - min $y_i$ |
| 2. | Mean-over-time | $\bar{y} = \frac{1}{k}\sum_{i=1}^{k} y_i$ |
| 3. | Standard deviation (SD) | $s_y = \sqrt{\frac{1}{k-1}(y_i - \bar{y})^2}$ |
| 4. | Coefficient of variation (CV) | $100 \times \frac{s_y}{\bar{y}}$ |
| 5. | Change | $y_k - y_1$ |
| 6. | Mean change per time unit | $\frac{y_k - y_1}{t_k - t_1 + 1}$ |
| 7. | Change relative to the first score | $\frac{y_k - y_1}{y_1}$ |
| 8. | Change relative to the mean over time | $\frac{y_k - y_1}{\bar{y}}$ |
| 9. | Slope of the linear model $y_i = a + bt_i + \epsilon_i$ | $b = \frac{\sum_{i=1}^{k}(y_i - \bar{y})(t_i - \bar{t})}{\sum_{i=1}^{k}(t_i - \bar{t})^2}$ |
| 10. | $R^2$:Proportion of variance explained by the linear model $y_i = a + bt_i + \epsilon_i$ | $R^2 = b^2 \times \frac{\sum_{i=1}^{k}(t_i - \bar{t})^2}{\sum_{i=1}^{k}(y_i - \bar{y})^2}$ |
| Measures of change in $\Delta_{1,i} = y_{i+1} - y_i$ $(i = 1, ..., k)^*$ | | |
| 11. | Maximum of the first differences | max $\Delta_{1,i}$ |
| 12. | SD of the first differences | $s_{\Delta_1} = \frac{1}{k-2}\sum_{i=1}^{k-1}(\Delta_{1,i} - \bar{\Delta}_1)^2$ where $\bar{\Delta}_1 = \frac{1}{k-1}\sum_{i=1}^{k-1}\Delta_{1,i}$ |
| 13. | SD of the first differences per time unit | $s_{\Delta'_1} = \frac{1}{k-2}\sum_{i=1}^{k-1}(\Delta'_{1,i} - \bar{\Delta}'_1)^2$ where $\Delta'_1 = \frac{\Delta_{1,i}}{t_{i+1} - t_i}$ |
| 14. | Mean of the absolute first differences | $\lvert\Delta_1\rvert = \frac{1}{k-1}\sum_{i=1}^{k-1}\lvert\Delta_{1,i}\rvert$ |
| 15. | Maximum of the absolute first differences | max $\lvert\Delta_{1,i}\rvert$ |
| 16. | Ratio of the maximum absolute first difference to the mean-over-time | $\frac{(\max \lvert\Delta_{1,i}\rvert)}{\bar{y}}$ |
| 17. | Ratio of the maximum absolute first difference to the slope | $\frac{(\max \lvert\Delta_{1,i}\rvert)}{b}$ |
| 18. | Ratio of the SD of the first differences to the slope | $\frac{s_{\Delta_1}}{b}$ |
| Measures of change in $\Delta_{2,i} = \Delta_{1,i+1}\Delta_{1,i}$ $(i = 1, ..., k)^*$ | | |
| 19. | Mean of the second differences | $\bar{\Delta}_2 = \frac{1}{k-2}\sum_{i=1}^{k-2}\Delta_{2,i}$ |
| 20. | Mean of the absolute second differences | $\lvert\Delta_2\rvert = \frac{1}{k-2}\sum_{i=1}^{k-2}\lvert\Delta_{2,i}\rvert$ |
| 21. | Maximum of the absolute second differences | max $\Delta_{1,i}$ |
| 22. | Ratio of the maximum absolute second difference to the mean-over-time | $\frac{(\max \lvert\Delta_{2,i}\rvert)}{\bar{y}}$ |
| 23. | Ratio of the maximum absolute second difference to mean absolute first difference | $\frac{(\max \lvert\Delta_{2,i}\rvert)}{\lvert\bar{\Delta}_1\rvert}$ |
| 24. | Ratio of the mean absolute second difference to the mean absolute first differece | $\frac{(\lvert\bar{\Delta}_{2,i}\rvert)}{\lvert\bar{\Delta}_1\rvert}$ |

[a] $k$ may vary from subject to subject.