Online Resource 1: Model Equations for Multilevel Analysis

Do autonomy, self-efficacy, vitality, and fatigue predict daily morning heart rate variability? A running intervention study in healthy women

Applied Psychophysiology and Biofeedback

Laura Buchner*, Günter Amesberger, Sabine Würth, and Thomas Finkenzeller

*** Correspondence:**
Laura Buchner
Laura.buchner@plus.ac.at

Model equations H1-H5

On level 1 γ_{ij} is the outcome variable for individual *i* at time *j*. Beta coefficients represent the intercept (β_{0j}), the autoregressive effect (β_{1j}) and the effects of time (β_{2j}), type of day (β_{3j}), vitality (β_{4j}), fatigue (β_{5j}), Group (β_{6j}), VO_{2max} (β_{7j}), self-efficacy (β_{8j}), motivation (β_{9j}), and the co-variate (β_{10j}). Residual variation is displayed by (ε_{ij}). On level 2 we included a random term (μ_{0j}) to model variation in intercepts (γ_{00}).

Effects on daily morning vmHRV

Level 1:

$$\gamma(\text{RMSSDlog(t)})_{ij} = \beta_{0j} + \beta_{1j}(\text{RMSSDlog(t-1)})_{ij} + \beta_{2j}(\text{time})_{ij} + \beta_{3j}(\text{type of day(t)})_{ij} + \beta_{4j}(\text{vitality})_{ij}$$

$$+ \beta_{5j}(\text{fatigue})_{ij}\ \ \beta_{6j}(\text{Group})_{ij}\ \ \beta_{7j}(\text{VO2max})_{ij}\ \ \beta_{8j}(\text{self-efficacy})_{ij}\ + \beta_{9j}(\text{vitality})_{ij} + \varepsilon_{ij}$$

Level 2*:* $\beta_{0j} = \gamma_{00} + \mu_{0j}$

Effects on daily morning vmHRV controlled by heart period

Level 1:

$$\gamma(\text{RMSSDlog(t)})_{ij} = \beta_{0j} + \beta_{1j}(\text{RMSSDlog(t-1)})_{ij} + \beta_{2j}(\text{time})_{ij} + \beta_{3j}(\text{type of day(t)})_{ij} + \beta_{4j}(\text{vitality})_{ij}$$

$$+ \beta_{5j}(\text{fatigue})_{ij}\ \ \beta_{6j}(\text{Group})_{ij}\ \ \beta_{7j}(\text{Vo2max})_{ij}\ \ \beta_{8j}(\text{self-efficacy})_{ij}\ + \beta_{9j}(\text{vitality})_{ij} + \beta_{10j}(\text{RRlog})_{ij} + \varepsilon_{ij}$$

Level 2*:* $\beta_{0j} = \gamma_{00} + \mu_{0j}$

Effects on daily morning heart period

Level 1: $\gamma(\text{RRlog(t)})_{ij} = \beta_{0j} + \beta_{1j}(\text{RRlog(t-1)})_{ij} + \beta_{2j}(\text{time})_{ij} + \beta_{3j}(\text{type of day(t)})_{ij} + \beta_{4j}(\text{vitality})_{ij}$

$$+ \beta_{5j}(\text{fatigue})_{ij}\ \ \beta_{6j}(\text{Group})_{ij}\ \ \beta_{7j}(\text{VO2max})_{ij}\ \ \beta_{8j}(\text{self-efficacy})_{ij}\ + \beta_{9j}(\text{vitality})_{ij} + \varepsilon_{ij}$$

Level 2*:* $\beta_{0j} = \gamma_{00} + \mu_{0j}$

Effects on daily morning vmHRV controlled by heart period

Level 1: $\gamma(\text{RRlog(t)})_{ij} = \beta_{0j} + \beta_{1j}(\text{RRlog(t-1)})_{ij} + \beta_{2j}(\text{time})_{ij} + \beta_{3j}(\text{type of day(t)})_{ij} + \beta_{4j}(\text{vitality})_{ij}$

$$+ \beta_{5j}(\text{fatigue})_{ij}\ \ \beta_{6j}(\text{Group})_{ij}\ \ \beta_{7j}(\text{Vo2max})_{ij}\ \ \beta_{8j}(\text{self-efficacy})_{ij}\ + \beta_{9j}(\text{vitality})_{ij} + \beta_{10j}(\text{RMSSDlog})_{ij} + \varepsilon_{ij}$$

Level 2*:* $\beta_{0j} = \gamma_{00} + \mu_{0j}$