The Associations between Self-Rated Affective Well-Being and Physiological Indicators of Stress and Relaxation among Cleaning Staff

Feldt T[1], Rönkä T[1,2], Rusko H[2], Kinnunen, M-L[1,2], & Kinnunen, U[3].
[1]University of Jyväskylä, Department of Psychology, Finland (e-mail: taru.feldt@psyka.jyu.fi)
[2]University of Jyväskylä, Department of Biology of Physical Activity, Finland
[3]University of Tampere, Department of Psychology, Finland

The most utilized instrument in identifying occupational well-being is questionnaire which relies on employees' self-reports. Methods based on heart rate (HR) and heart rate variability (HRV) are still rare. In particular, multi-source methods combining self-reports and physiological indicators are urgently needed to gain more complete picture of well-being at work.

AIMS

This study investigated the associations between self-rated affective well-being based on Warr's model (see Fig. 1) and physiological indicators of stress and relaxation based on HRV during two working days.
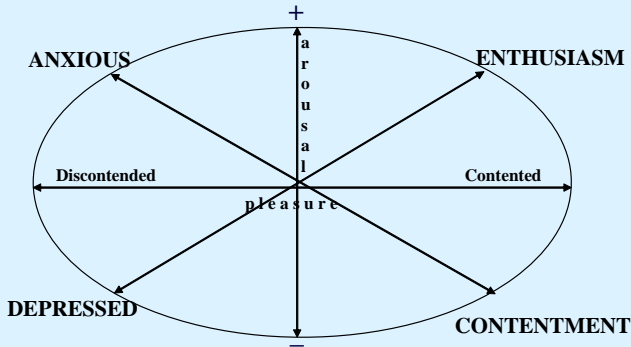

Figure 1. The principal axes of affective well-being (Warr, 1987).

METHODS

SUBJECTS AND PROTOCOL
- 38 women (age 48±5 yrs) in cleaning work in an organization in Central Finland
- ECG and movement recording on two working days with ALIVE heart and activity monitor
- Diaries and questionnaires

VARIABLES
- Self-rated **anxiety** (3 items), **contentment** (3 items), **enthusiasm** (3 items) and **depression** (3 items) was assessed after work hours on both days with a 12-item questionnaire modified from Warr's (1992) scale.
- Physiological indicators of stress and relaxation: Traditional variables **heart rate (HR)** and **high frequency power (HFP),** and new variables **Absolute Stress Vector (ASV)** and **Absolute Relaxation Vector (ARV),** based on both HR and HRV, were analyzed with Firstbeat PRO heartbeat analysis software (www.firstbeattechnologies.com) (see Fig. 2).

DATA ANALYSIS
Partial correlations were calculated by using SPSS 14.0 for Windows software package.
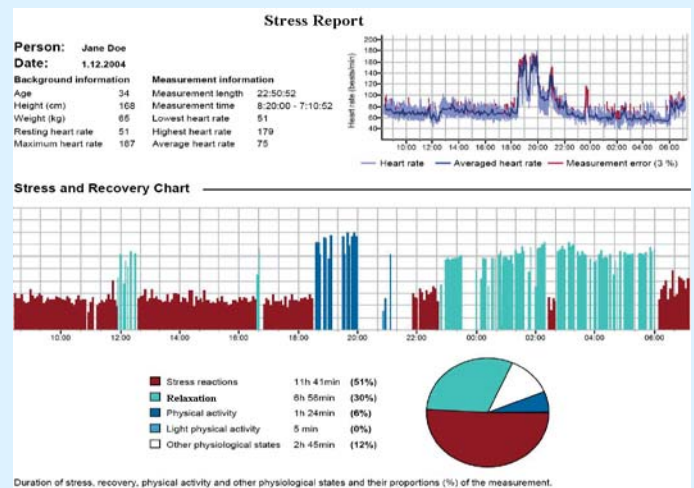

Figure 2. An example of a stress and recovery chart from FBT-PRO (below) (red=stress, green=relaxation and blue=physical activity) and the corresponding HR signal (above).

RESULTS
After controlling for the effects of age, BMI, workday duration, physical activity during working day and amount of caffeine, **self-rated contentment showed negative correlation with ASV** (Day 1: $r = -.40$, $p = .02$; Day 2: $r = -.51$, $p = .00$) **and positive correlations with ARV** (Day 1: $r = .37$, $p = .04$; Day 2: $r = .38$, $p = .04$). **A significant correlation was also found between contentment and HFP on Day 2** ($r = .36$, $p = .04$). Self-rated anxiety and enthusiasm did not correlate with any of the physiological indicators stress and relaxation. In addition, the subjects did not report depression during their working days and, therefore, the correlational analyses were not calculated.

SUMMARY: The study showed significant correlations between new HRV derived variables (ASV, ARV) and psychological self-assessment indicating contentment at work. Thus, contentment indicating subjective experiences of relaxation (antipole of anxiety in Warr's (1987) model) is linked to low physiological stress and high physiological relaxation. The results suggest that physiological indicators of stress and relaxation can be used together with subjective ratings to evaluate effects of work strain on individuals.