Finanziato dall'Unione europea NextGenerationEU

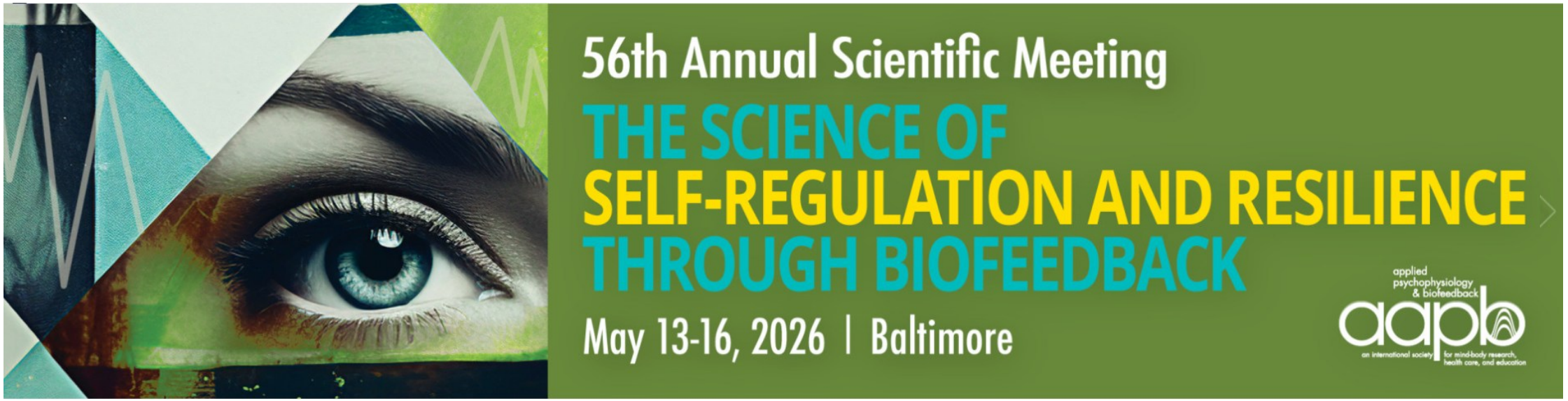
Neosin S.a.s.

UNIVERSITÀ DI PARMA
DIPARTIMENTO DI MEDICINA E CHIRURGIA

TRANCERIE EMILIANE

applied psychophysiology & biofeedback
aapb
an international society for mind-body research, health care, and education

STRESS LESS: an Integrated and Interpersonal Digital Framework for Work-Related Stress



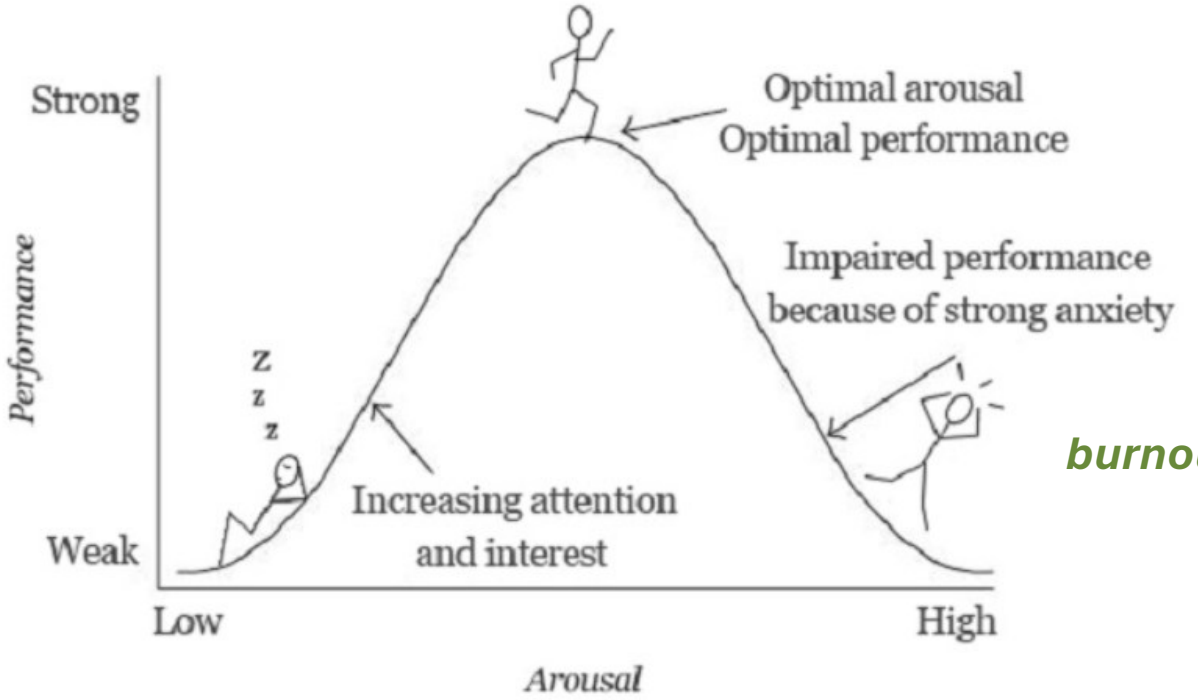
Alice Fiduccia

Clinical Psychology, Psychophysiology and Neuropsychology Labs
Dept. Of Medicine and Surgery – University of Parma

Work-related stress

"The set of harmful physical and emotional responses that occur when job demands do not match the worker's capabilities, resources, or needs."

(National Institute for Occupational Safety and Health)



burnout!

Burnout impacts long-term health

- Associated with increased risk of all-cause mortality
- Higher incidence of cardiovascular events
- Linked to prolonged sickness absence and disability

HRV biofeedback interventions, following a multidimensional assessment of stress, have proven effective across different occupational settings

(Pruneti, Fiduccia & Guidotti, 2024; Guidotti, 2025)

NeuroRegulation

ISNR
INTERNATIONAL SOCIETY FOR NEUROREGULATION & RESEARCH

Top-Level Managers' Psychophysical Recovery Investigated Through Different Psychophysiological Parameters Benefits From Training Based on Muscle Relaxation and Self-monitoring of HRV-Biofeedback

*Carlo Pruneti, Alice Fiduccia, and Sara Guidotti**

Clinical Psychology, Clinical Psychophysiology, and Clinical Neuropsychology Labs, Dept of Medicine and Surgery, University of Parma, Italy

› Clin Neuropsychiatry. 2025 Dec;22(6):517-528. doi: 10.36131/cnfioritieditore20250609.

Physiological and Personality Measures as Potential Factors Associated with Cardiac Coherence Training Effects on Symptoms Reduction: A Pilot Study on Healthcare Workers

Sara Guidotti [1]

Interpersonal processes are central to occupational well-being

Relationships shape how stress is experienced

Social context influences regulation and engagement

Key gap

These processes are rarely integrated within existing models

Limited frameworks reflect real-world complexity

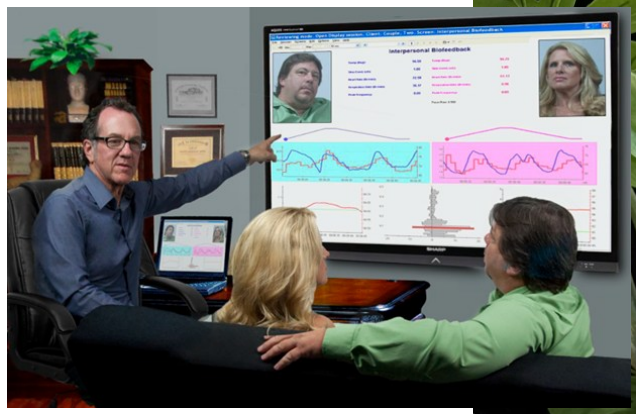
An integrated approach may better capture how work-related stress emerges and is regulated in everyday occupational settings

Project Framework

- European Union–funded project
- Developed within industrial innovation objectives
- Designed for real-world occupational settings

A multidisciplinary collaboration

- Clinical Psychology and Psychophysiology Labs (University of Parma)
- Engineers of Neosin
- Trancerie Emiliane S.p.A.
- Steven C. Kassel, our U.S. partner



Our aim

- To identify, through a multidimensional assessment, the interpersonal and psychophysiological dimensions associated with burnout
- To develop, based on these findings, a structured prevention and intervention protocol that reflects the multifaceted psychobiological complexity of the stress response

Participants

N = 50 employees from Trancerie Emiliane S.p.A.

- mean age = 47.4 years (SD = 10.6)
- 17 women (34%), 33 men (66%)
- 27 office workers (53.9%),
  23 production workers (46.1%)
- 32 daytime schedule (64%), 18 shift workers (36%)

Study design

1° phase

- Multidimensional assessment

  (burnout, interpersonal dynamics, physiology)

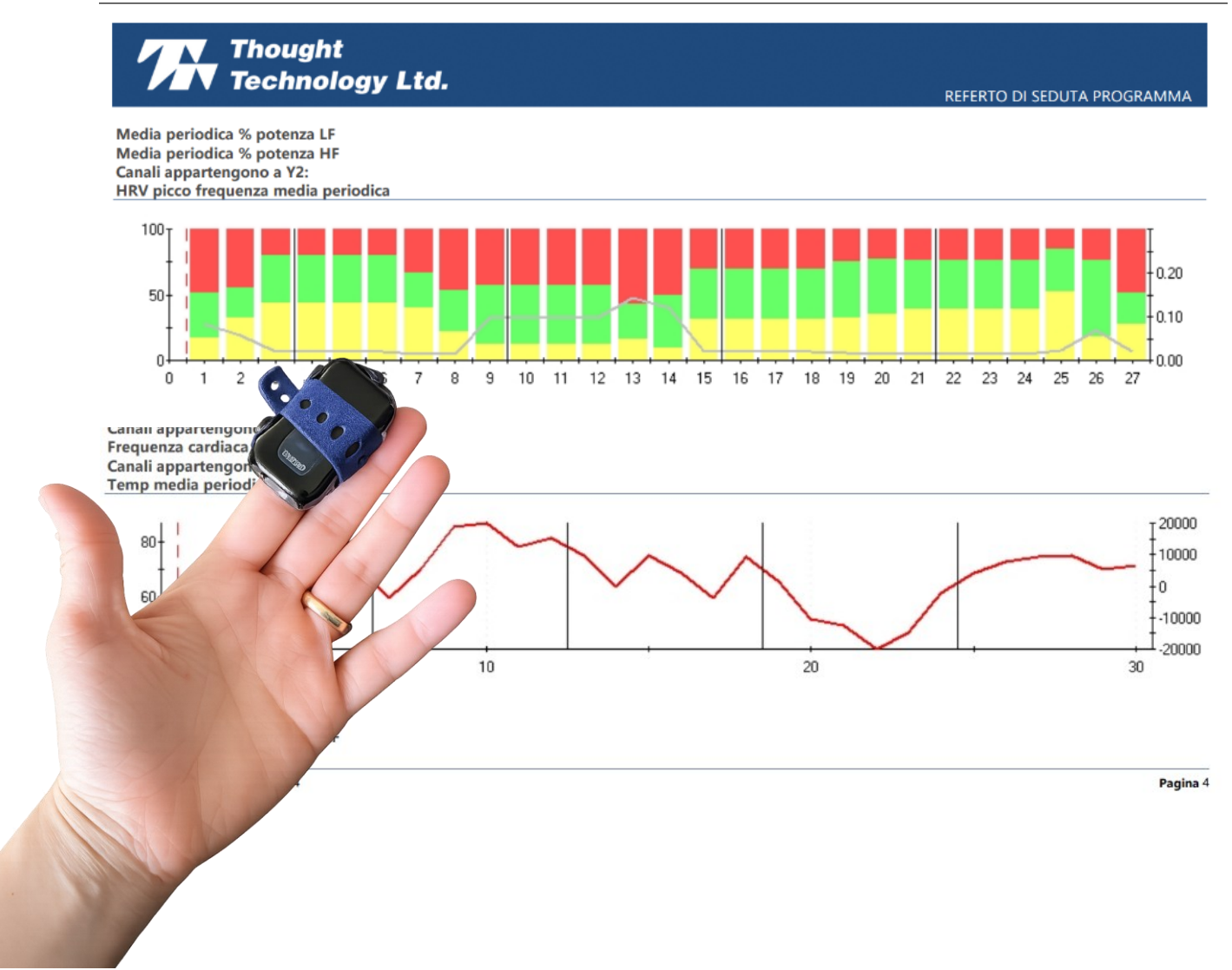
2° phase

- Training con i-bfb

3° phase

- Stress less:

  Development of an integrated digital model



Methods

Multidimensional assessment

- Maslach Burnout Inventory
- CBA 2.0
- Psychophysiological stress profile
  (e-vu Tps Thought Tech)

Preliminary Results

Burnout Dimensions (MBI, N = 50)

Emotional Exhaustion
Mean = 10.14 (SD = 7.32)
Depersonalization
Mean = 7.08 (SD = 6.09)
Personal Accomplishment
Mean = 27.34 (SD = 8.17)

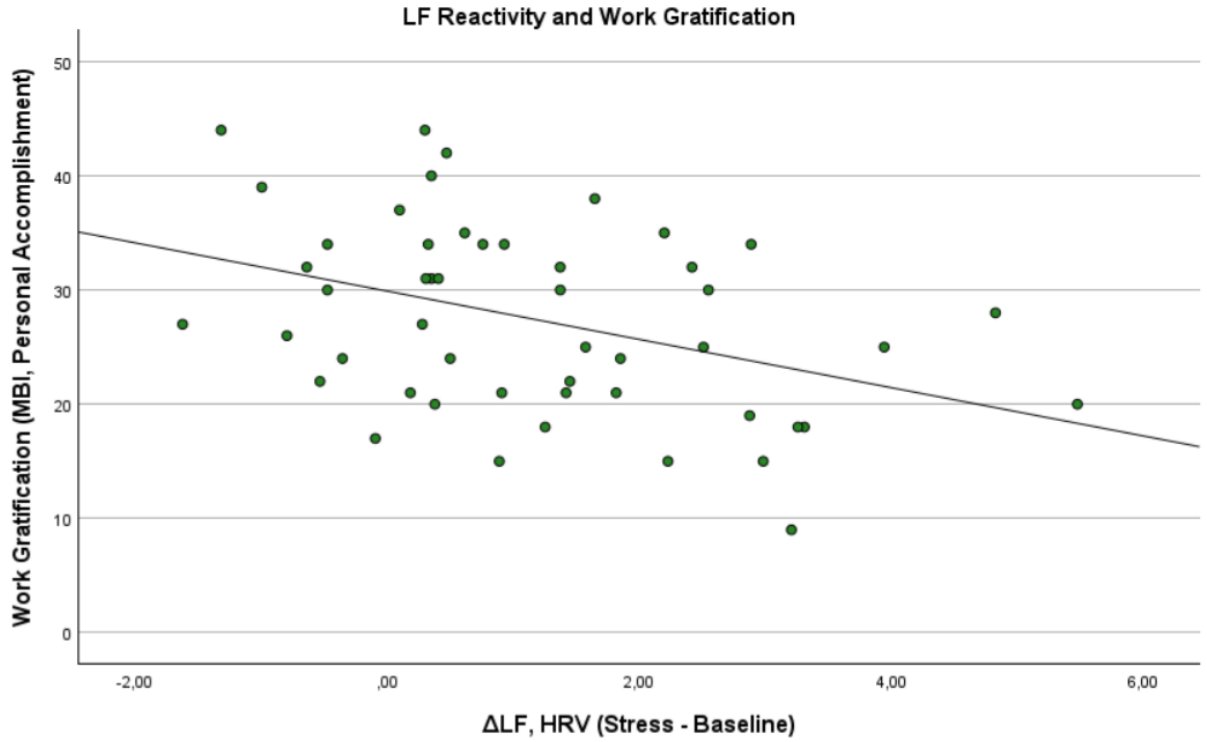
Among the burnout dimensions, reduced ***personal accomplishment*** *appears to be the most critical signal in this sample.*

MBI Interpretation (Maslach et al., 1996)
Emotional exhaustion: low ≤17 | moderate 18–29 | high ≥30
Depersonalization: low ≤5 | moderate 6–11 | high ≥12
Personal accomplishment: high burnout ≤33 | moderate 34–39 | low burnout ≥40

Preliminary Results

Greater LF reactivity to stress is associated with lower personal accomplishment

(β = −0.42, p = .006; adjusted for age, gender, smoking, physical activity)

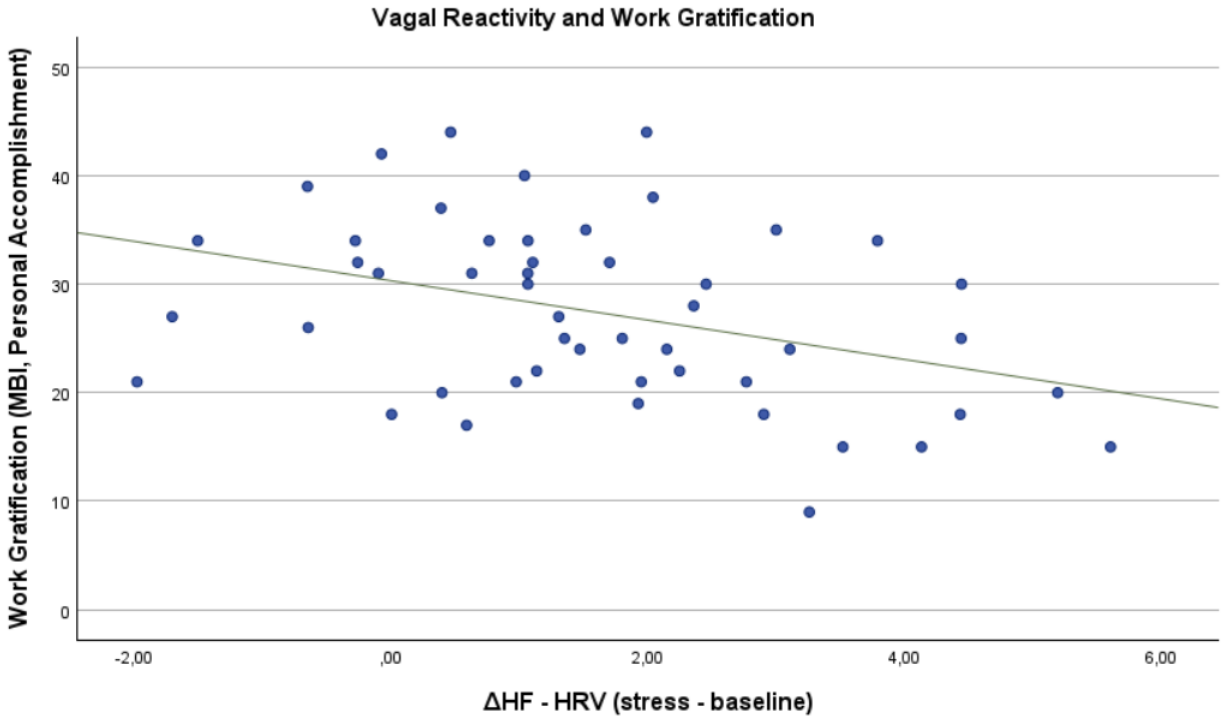


Autonomic stress reactivity was estimated as the change (Δ) in HRV indices between the stress phase and the baseline phase (Δ HRV = HRV_stress − HRV_baseline). LF and HF indices were analyzed using log-transformed values (ln) to reduce the typical skewness of spectral measures (Laborde, 2018).

Preliminary Results

Greater vagal reactivity to stress is associated with lower personal accomplishment

(β = −0.38, p = .019; adjusted for age, gender, smoking, physical activity)

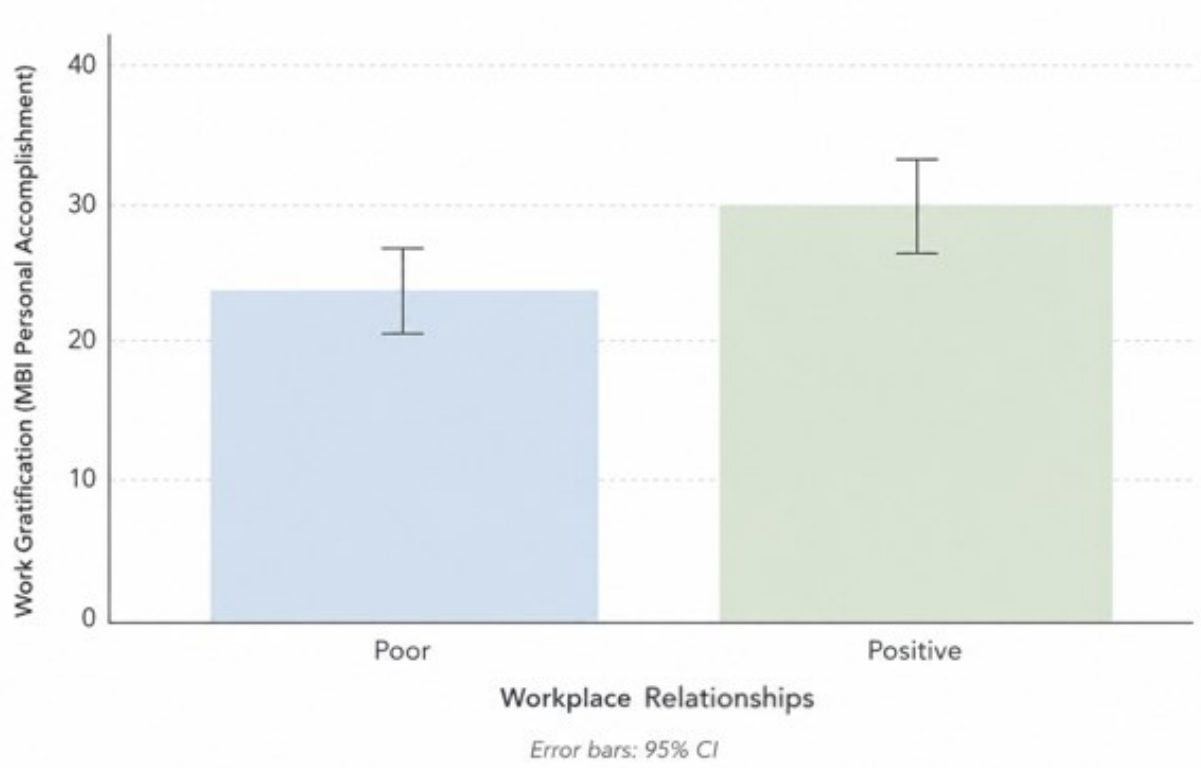


The combined LF and HF pattern observed during stress may suggest compensatory vagal activation, potentially reflecting reduced autonomic flexibility and less efficient physiological adaptation to stress-related demands.

Preliminary Results

Better interpersonal relationships → higher personal accomplishment

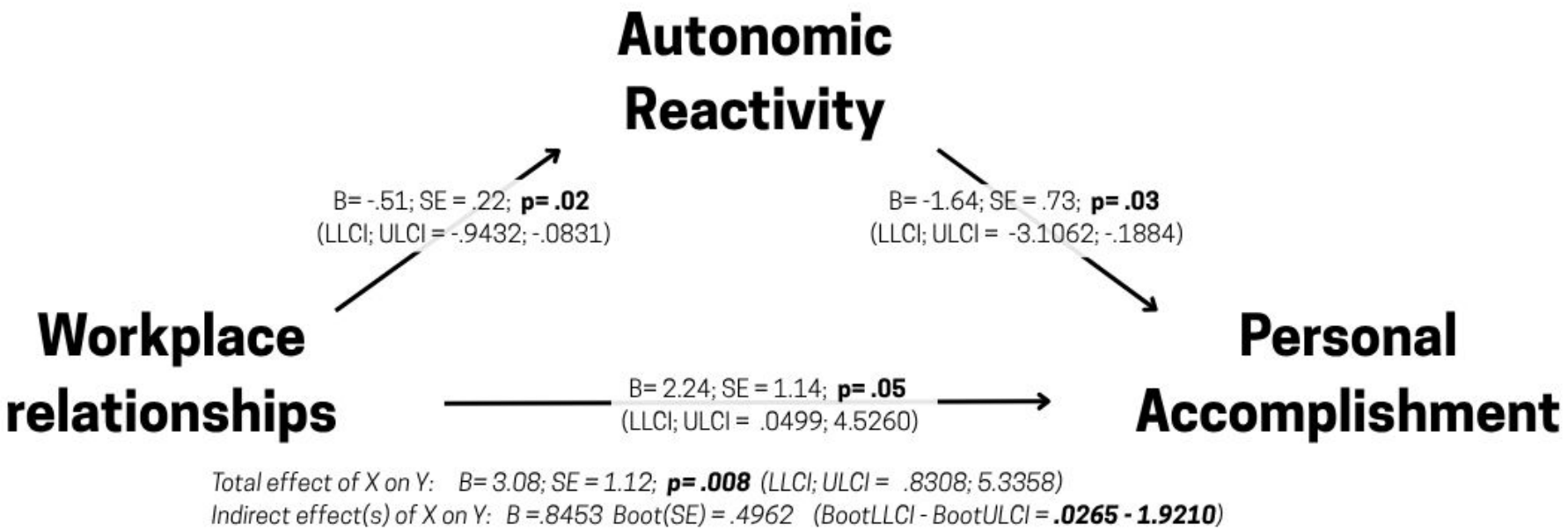
(F(1,48) = 7.58, p = .008)



- Relational context may act as a protective resource in occupational well-being
- These findings support the integration of interpersonal biofeedback as a promising approach to enhance co-regulation and shared stress management

Preliminary Results

LF reactivity partially mediate the association between workplace relationships and personal accomplishment



56th Annual Scientific Meeting
THE SCIENCE OF SELF-REGULATION AND RESILIENCE THROUGH BIOFEEDBACK
May 13-16, 2026 | Baltimore

UNIVERSITÀ DI PARMA

AUTONOMIC STRESS REACTIVITY AND WORKPLACE RELATIONSHIPS SHAPE WORK GRATIFICATION: TOWARD INTERPERSONAL BIOFEEDBACK

Alice Fiduccia[1], Steven C. Kassel[2], Rosanna Sanseverino[1], Sara Guidotti[1], Roberto Bardini[3], Carlo Pruneti[1]

1. Clinical Psychology, Clinical Psychophysiology, and Clinical Neuropsychology Labs - Department of Medicine and Surgery, University of Parma, Italy
2. Biofeedback and Family Therapy Center, Santa Clarita & Los Angeles, CA (USA)
3. Trancerie Emiliane S.p.a., Parma, Italy

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

INTRODUCTION

Work-related stress contributes to burnout and reduced occupational well-being. Psychophysiological models highlight the role of autonomic nervous system regulation in stress adaptation. Heart rate variability (HRV) is widely used as a non-invasive marker of autonomic flexibility and self-regulatory capacity, and represents a key measure in psychophysiological research and biofeedback interventions (Pruneti, Fiduccia & Guidotti, 2024). Interpersonal dynamics may also shape how individuals experience occupational stress. However, the combined role of autonomic stress reactivity and workplace relationships has received limited attention.

PURPOSE

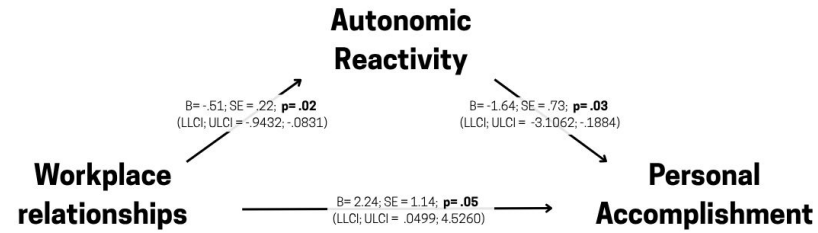
This study explores how workplace relationships and autonomic stress reactivity interact in shaping work gratification, with particular focus on the potential role of autonomic regulation as a psychophysiological link between interpersonal experience and occupational well-being.

METHODS

- Participants included 50 workers employed at *Trancerie Emiliane*, a leading Italian multinational metalworking company.
- Work gratification was assessed using the Personal Accomplishment dimension of the Maslach Burnout Inventory (MBI),
- Workplace relationships were derived from the anamnestic section of the Cognitive Behavioral Assessment (CBA).
- Autonomic stress HRV reactivity (ΔLF) was measured using a standardized psychophysiological profile (eVu-TPS, Thought Tech).
- ΔLF was defined as the change between baseline and stress conditions (Laborde, 2018).
- A mediation analysis was performed using Hayes' PROCESS macro (v. 5.0; 2022) for SPSS, Model 4. The significance of the indirect effect was assessed using 5,000 bootstrap samples to generate 95% percentile confidence intervals (CIs)

RESULTS

WORKERS REPORTING MORE POSITIVE WORKPLACE RELATIONSHIPS SHOWED HIGHER WORK GRATIFICATION.
MEDIATION ANALYSES SUGGESTED THAT ΔLF REACTIVITY PARTIALLY MEDIATED THIS ASSOCIATION.



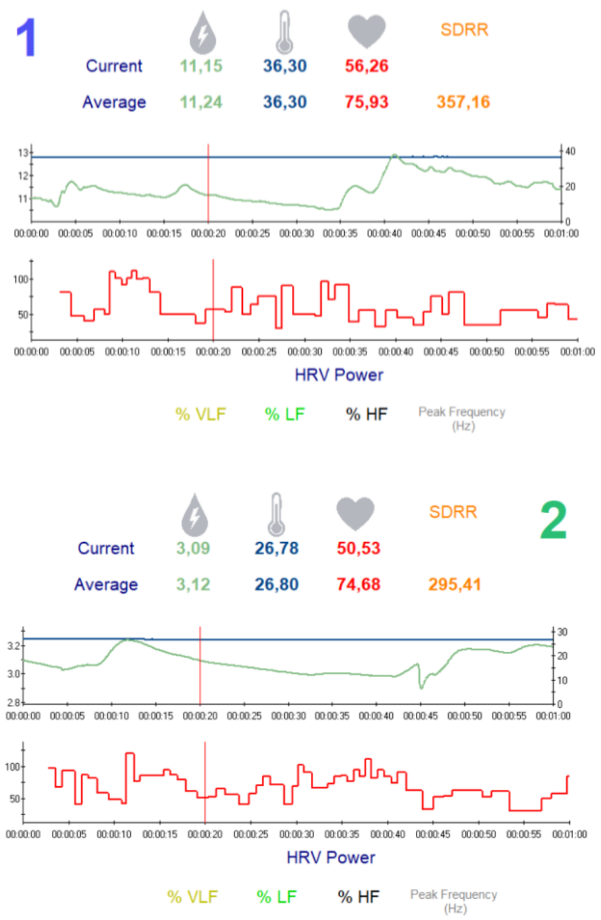
*Total effect of X on Y: B= 3.08; SE = 1.12; **p= .008** (LLCI; ULCI = .8308; 5.3358)*
*Indirect effect(s) of X on Y: B =.8453 Boot(SE) = .4962 (BootLLCI - BootULCI = **.0265 - 1.9210**)*

CONCLUSION

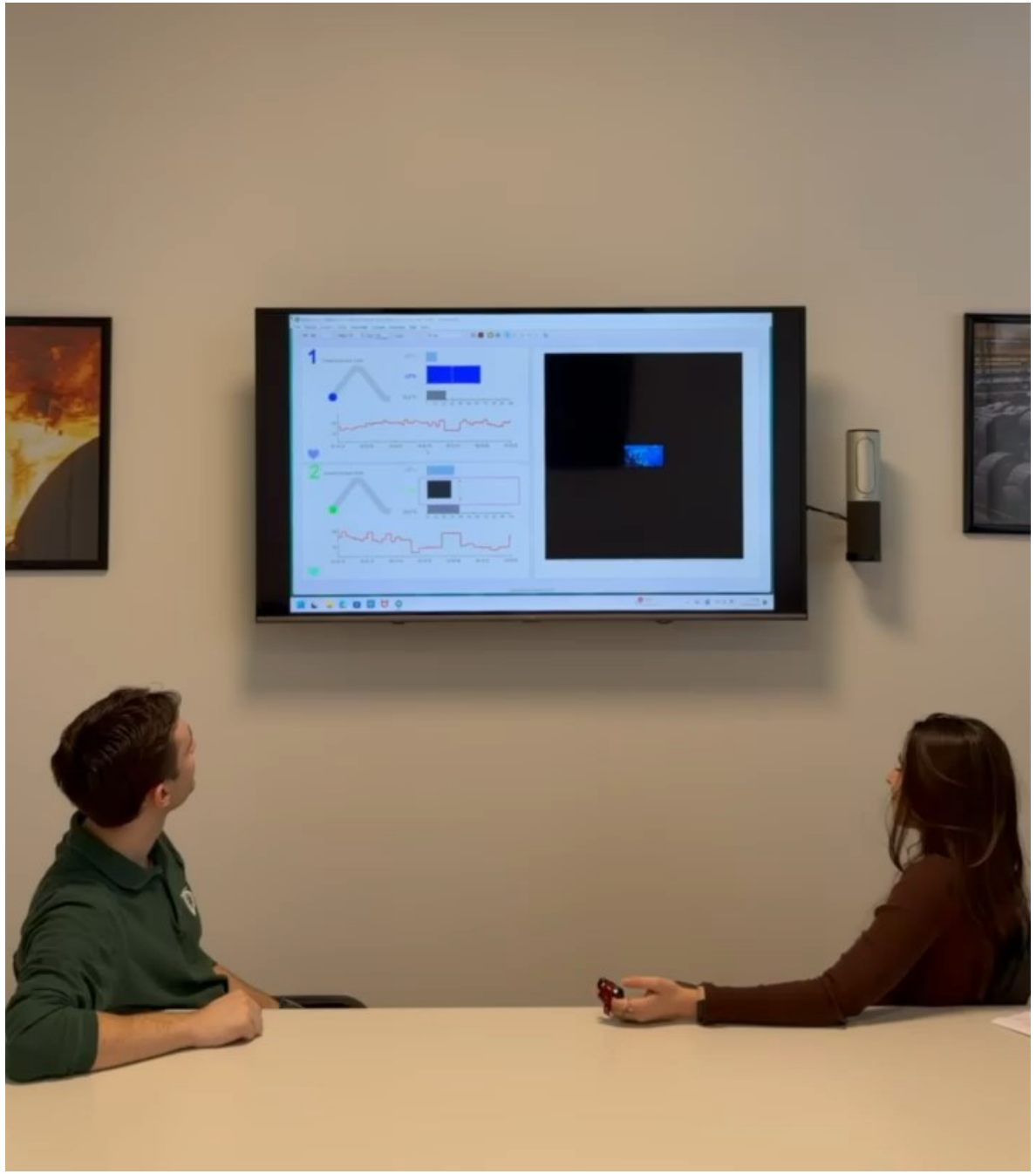
The present findings suggest that work gratification may emerge not only from individual stress regulation, but also from the quality of interpersonal experience within the workplace. In particular, mediation analyses suggested that autonomic stress reactivity may partially account for the association between workplace relationships and personal accomplishment, highlighting a potential psychophysiological pathway linking relational context and occupational well-being. Together, these findings support a more integrated understanding of occupational stress, in which physiological regulation and interpersonal experience are deeply interconnected. They further underscore the potential of HRV and interpersonal biofeedback interventions to promote co-regulation, resilience, and work-related well-being within workplace teams. As emphasized by Daniel J. Siegel, *"Regulation is not only an individual process, but an interpersonal one."*

SCAN ME!

Toward an integrative model



- I-BFB is an advanced form of biofeedback that targets relational dynamics
- it involves the simultaneous monitoring of two participants (e.g., pairs of colleagues) through synchronized physiological measures, combined with breathing exercises and cognitive regulation techniques
- The aim is to leverage social support to enhance emotional co-regulation and develop shared strategies for stress management


1
2

Future directions

- Implementation of i-bfb interventions
- Development of a digital ecosystem integrating relational, psychological, and psychophysiological data - an app for multidimensional stress assessment, currently under validation in a real-world setting

Our goal is to scale STRESS LESS across occupational contexts, making it increasingly tailored, adaptive, and impactful.

🦀 *Take aways*

- Burnout is not only an organizational issue, but reflects individual and relational regulation processes
- Physiological and interpersonal dynamics play a key role in shaping stress responses
- Interpersonal biofeedback offers a promising pathway to enhance co-regulation and shared resilience

a new vision of work-related stress assessment and management: toward more relational and digital solutions

It all started in San Diego, where an idea met connection. Because it's not about stopping the waves, but learning to ride them - together.

Thank you!

alice.fiduccia@unipr.it

Clinical Psychology, Psychophysiology and Neuropsychology Labs
Dept. Of Medicine and Surgery – University of Parma
Prof. Carlo Pruneti