



UNIVERSITÀ
DEGLI STUDI
DI PALERMO



**Azienda Ospedaliera Universitaria
Policlinico Paolo Giaccone
di Palermo**

7th Mediterranean Maudsley Forum Palermo, 23-26 May 2022

Neurobiological and anti-inflammatory effects of a deep diaphragmatic breathing technique based on functional psychotherapy: a randomised clinical trial

**Prof. Daniele La Barbera – Dr. Giuseppe Maniaci
Department of Biomedicine, Neuroscience and Advanced Diagnostic
Section of Psychiatry – University of Palermo**

OVERVIEW OF THIS TALK

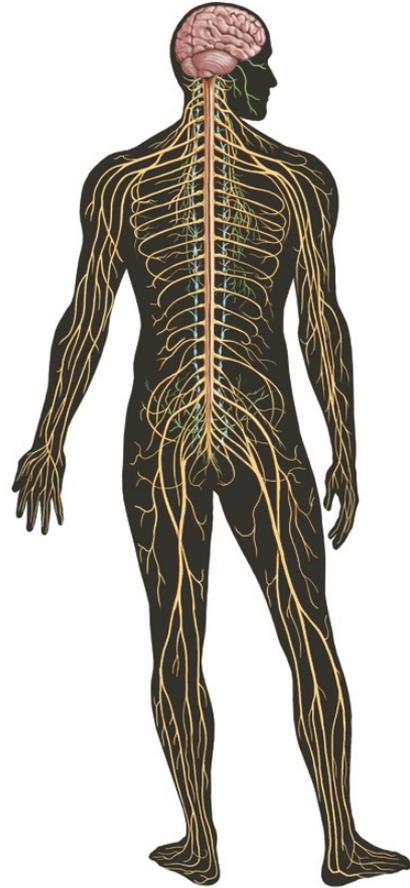
1

- **Mind-body therapies and PNEI: what are we talking about?**

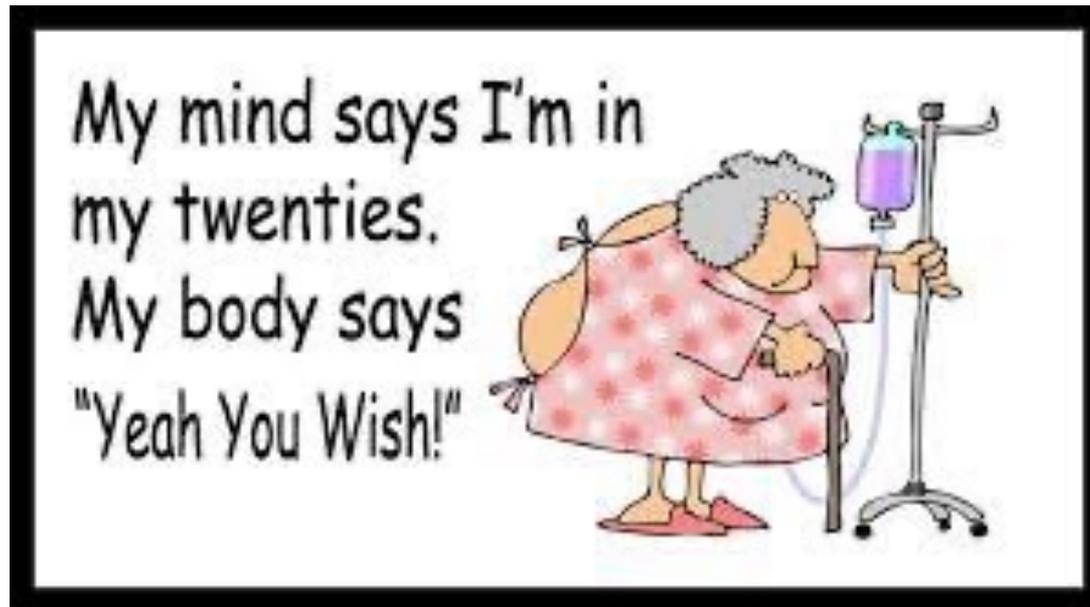
2

- **Neurobiological and anti-inflammatory effects of a deep diaphragmatic breathing technique based on neofunctional psychotherapy: a RCT**

An amazing communication...



But sometimes it fails..



Mind-body therapies

- Mind-body practices are techniques designed to enhance the mind's positive impact on the body.
- These techniques practices include behavioral, psychological, social, expressive, and spiritual approaches.

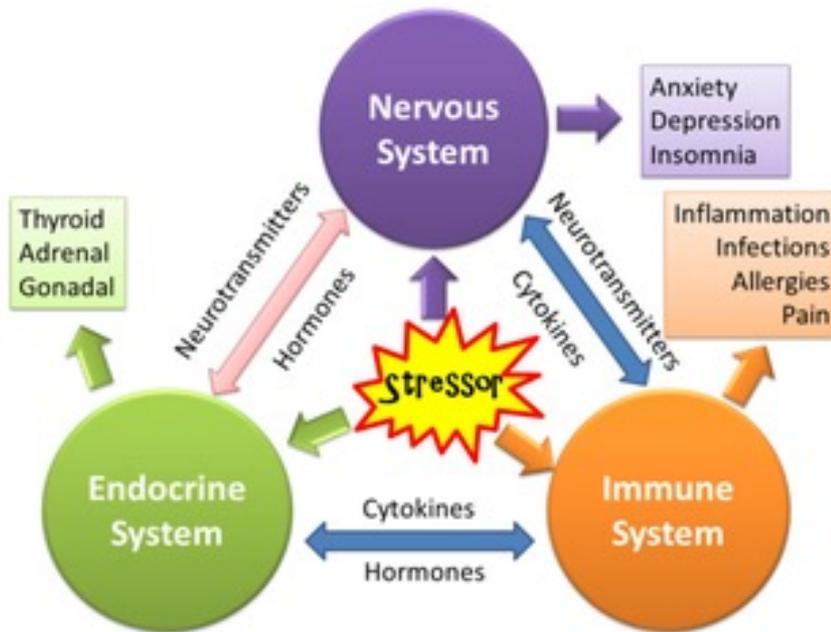


Mind-body therapies

- Some of the examples include **acupuncture, meditation, tai chi, yoga, mindfulness, biofeedback, and NeoFunctional psychotherapy**

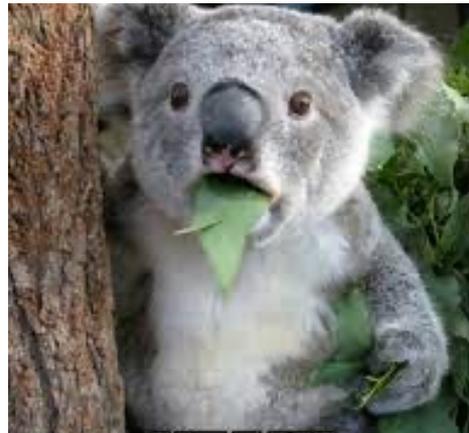


Mind-body therapies



- Awareness of the mind-body connection is certainly not a new idea, but it may feel unfamiliar to some in the West, where the mind and body has been traditionally viewed as distinct entities for several centuries

Fifty years ago, these approaches were considered fringe, the idea that they had any role in medical treatment, absurd



A wakeful hypometabolic physiologic state

ROBERT KEITH WALLACE, HERBERT BENSON, AND ARCHIE F. WILSON
Thorndike and Channing Laboratories, Harvard Medical Unit, Boston City Hospital, Boston, 02118, and Department of Medicine of Harvard Medical School, Boston, Massachusetts 02115; and Department of Medicine of University of California at Irvine, Orange, California 92668

 Relaxation Response	 Stress Response
<ul style="list-style-type: none">↓ Heartrate slows↓ Blood Pressure lowers↓ Blood Lactate Levels reduce↑ Immune System improves↑ Sense of Well-being increases↑ Sleep improves↑ Normal Libido↓ Brain Wave Patterns slow↑ Digestion improves	<ul style="list-style-type: none">↑ Heartrate increases↑ Blood Pressure rises↑ Cholesterol Levels go up↓ Immune System is less effective↑ Anxiety increases↑ Depression more prevalent↑ Sleep Disorders increase↓ Libido decreases↑ Irritability increases↓ Digestion works less effectively

- Today, meditation and other mind–body practices, such as yoga and mindfulness, are growing in popularity
- 14% of the U.S. adult population reporting having used these techniques within the previous year

**Use of Yoga, Meditation, and Chiropractors Among
U.S. Adults Aged 18 and Over**

Tainya C. Clarke, Ph.D., M.P.H.; Patricia M. Barnes, M.A.; Lindsey I. Black, M.P.H.;
Barbara J. Stussman, B.A.; and Richard L. Nahin, Ph.D., M.P.H.

In Italy...



In pandemia gli italiani hanno scoperto la meditazione



Uno su cinque la pratica abitualmente e uno su tre l'ha provata in passato, per trovare sollievo



Awareness and Experience of Mindfulness in Britain

Sociological Research Online

1–20

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University of Oxford, UK

Stephen Fisher
University of Oxford, UK

Maryanne Martin
University of Oxford, UK

Abstract

In recent years, the practice of mindfulness has become increasingly popular, but there is very little evidence on how many and what kind of people have heard of and learnt to practise mindfulness. Using data from an online survey on a sample of 1013 adults in Britain in November 2018, this study aims to estimate the prevalence of mindfulness use among adults in Britain and to identify the sociodemographic and political characteristics associated with awareness and experience of mindfulness. The findings suggest that 15% of adults in Britain had learnt to practise mindfulness, which is significantly more than the finding that 2.5% of adults in the United States in 2012 had practised mindfulness in their lifetime. Although widespread, awareness of mindfulness was more common among women, unmarried adults, adults from middle and high-income households, and those who voted Remain in the 2016 Brexit Referendum. Higher levels of engagement with mindfulness, beyond awareness, were more likely among young and middle-aged adults, but otherwise not concentrated in any particular groups.

Fighting any clichés

- Belief in these techniques is not necessary to realize benefit
- These treatments are not so expensive. Integrating these tools into the health care system may reduce health care utilization and be cost-effective

“..we believe that mind–body medicine should be recognized as potential primary and secondary prevention and routinely incorporated into primary care”.

*“It is not so considered because our health care system is, to a large extent, predominantly built on a **reactive disease-treatment model rather than a proactive health-enhancement model**”.*



HHS Public Access

Author manuscript

N Engl J Med. Author manuscript; available in PMC 2021 April 09.

Published in final edited form as:

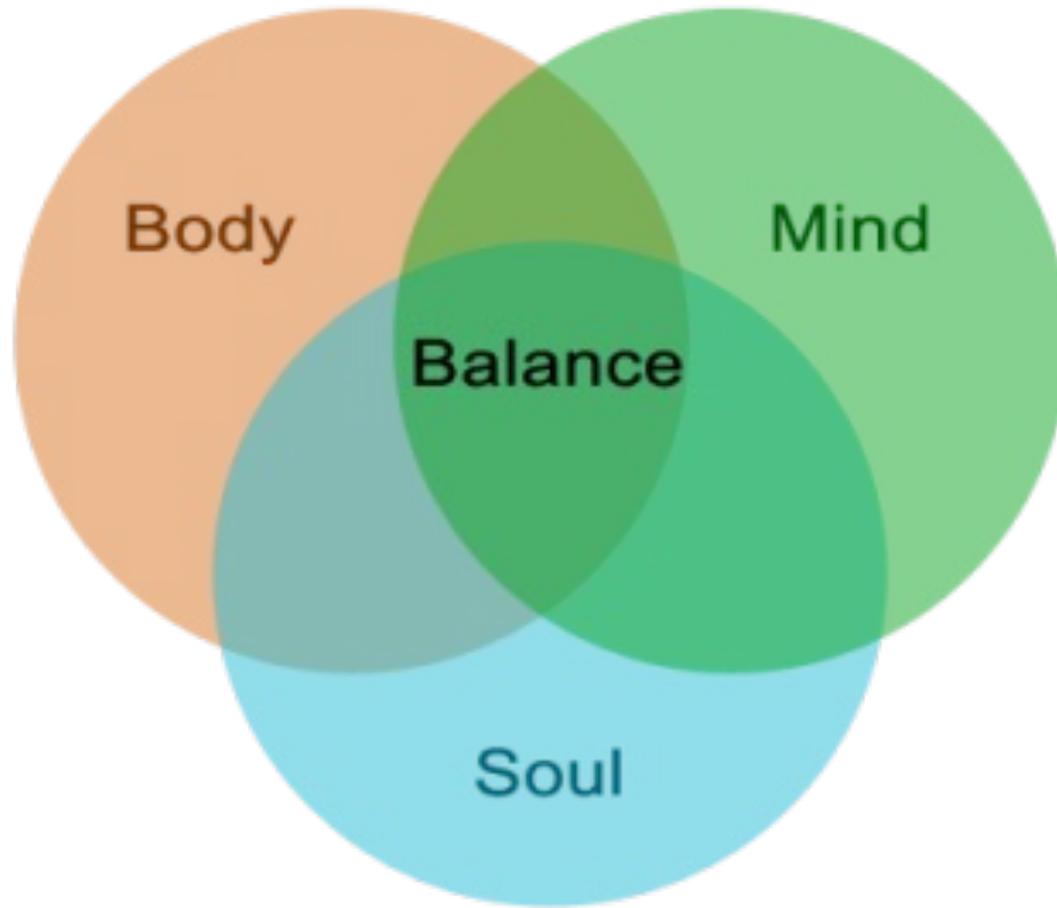
N Engl J Med. 2020 April 09; 382(15): 1390–1391. doi:10.1056/NEJMp1917461.

A New Era for Mind–Body Medicine

Michelle L. Dossett, M.D., Ph.D., Gregory L. Fricchione, M.D., Herbert Benson, M.D.

Department of Medicine (M.L.D., H.B.), the Benson-Henry Institute for Mind Body Medicine (M.L.D., G.L.F., H.B.), and the Department of Psychiatry (G.L.F.), Massachusetts General Hospital; and Harvard Medical School (M.L.D., G.L.F., H.B.) — both in Boston and from the University of California, Davis (M.L.D) in Sacramento.

Today neurobiologic, physiologic, and genomic changes associated with mind–body practices have been highlighted



Acupuncture



- The theory and practice of acupuncture originated in China. It was first mentioned and recorded in documents dating a few hundred years before the Common Era.
- Earlier instead of needles sharpened stones and long sharp bones were used around 6000 BCE for acupuncture treatment.

Acupuncture

- Traditionally, acupuncture involves the insertion of fine needles into specific points on the body to achieve a therapeutic effect.
- Following insertion, needles can be stimulated by hand (called 'manual acupuncture'), or via the application of a small electrical current (called 'electroacupuncture'). A modern alternative is laser acupuncture, a non-penetrative form of acupuncture that uses low-power laser light to stimulate acupuncture points.



Acupuncture



- Western medical acupuncture is the use of acupuncture following a medical diagnosis. It involves stimulating sensory nerves under the skin and in the muscles.
- This results in the body producing natural substances, such as pain-relieving endorphins. It's likely that these naturally released substances are responsible for the beneficial effects experienced with acupuncture.

It is used mainly to relieve discomfort associated with a variety of diseases and conditions, including:

Chemotherapy-induced and postoperative nausea and vomiting

Dental pain

Fibromyalgia

Headaches

Lower back pain

Osteoarthritis

Research

JAMA Oncology | Original Investigation

Clinical Evidence for Association of Acupuncture and Acupressure With Improved Cancer Pain A Systematic Review and Meta-Analysis

Yihan He, PhD; Xinfeng Guo, PhD; Brian H. May, PhD; Anthony Lin Zhang, PhD; Yihong Liu, MM; Chuanjian Lu, MD; Jun J. Mao, MD; Charlie Changli Xue, PhD; Haibo Zhang, MD

[J Pain Res.](#) 2019; 12: 527–542.

Published online 2019 Jan 30; doi: [10.2147/JPR.S196227](#)

PMCID: PMC6365227

PMID: [30787631](#)

Acupuncture therapy for fibromyalgia: a systematic review and meta-analysis of randomized controlled trials

[Xin-chang Zhang](#), [Hao Chen](#), [Wen-lao Xu](#), [Yang-yang Song](#), [Ya-hui Gu](#), and [Guang-xia Ni](#)



Review

Acupuncture for Depression: A Systematic Review and Meta-Analysis

Mike Armour^{1,2,*}, Caroline A. Smith^{1,2}, Li-Qiong Wang³, Dhevashka Naidoo⁴, Guo-Yan Yang⁵, Hugh MacPherson⁶, Myoung Soo Lee⁷ and Phillipa Hay^{2,4}

Meditation

- The practice of meditation originated in the ancient *Vedic* times of India and is described in the *Vedic* texts.
- The term “meditation” is now loosely used to refer to a large number of diverse techniques.



Meditation

In meditation, the practitioner intentionally engages the mind by bringing an increased awareness to thought and feeling.



Meditation has shown its efficacy in decreasing levels of:

Depression

Anxiety

Pain

Stress

Substance abuse

Blood pressure

Inflammation

Behavioural Brain Research 356 (2019) 208–220



Contents lists available at ScienceDirect

Behavioural Brain Research

journal homepage: www.elsevier.com/locate/bbr



Research report

Brief, daily meditation enhances attention, memory, mood, and emotional regulation in non-experienced meditators

Julia C. Basso^{a,b,*}, Alexandra McHale^a, Victoria Ende^a, Douglas J. Oberlin^a, Wendy A. Suzuki^{a,*}



Review

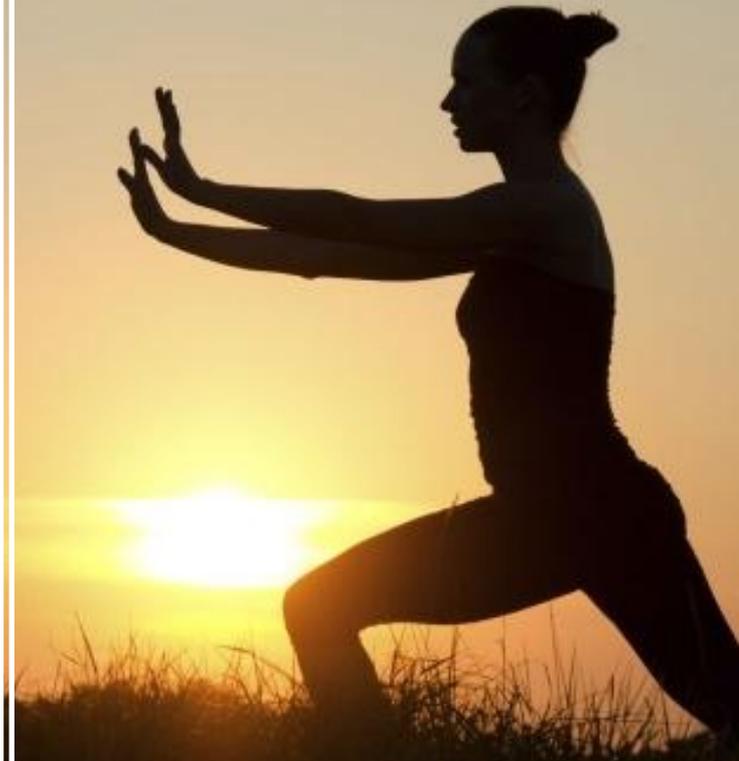
> [JAMA Intern Med. 2014 Mar;174\(3\):357-68. doi: 10.1001/jamainternmed.2013.13018.](https://doi.org/10.1001/jamainternmed.2013.13018)

Meditation programs for psychological stress and well-being: a systematic review and meta-analysis

Madhav Goyal¹, Sonal Singh¹, Erica M S Sibinga², Neda F Gould³, Anastasia Rowland-Seymour¹, Ritu Sharma⁴, Zackary Berger¹, Dana Sleicher³, David D Maron⁴, Hasan M Shihab⁴, Padmini D Ranasinghe¹, Shauna Linn⁴, Shonali Saha², Eric B Bass⁵, Jennifer A Haythornthwaite³

Tai Chi

- Tai chi was originally created as a combating style in the Chinese martial art system, involving balance, strength, flexibility, speed, coordination, and agility.
- The practice of tai chi includes slow body positions that flow from one to the next continuously and that promote posture, flexibility, relaxation, well-being, and mental concentration.
- Tai chi's formative influences came from Taoist and Buddhist monasteries, however some schools claim that tai chi sprang from the theories of Neo-Confucianism.





RESEARCH ARTICLE

Tai chi for health benefits in patients with multiple sclerosis: A systematic review

Liye Zou^{1*}, Huiru Wang², ZhongJun Xiao³, Qun Fang⁴, Mark Zhang⁵, Ting Li⁶, Geng Du⁷, Yang Liu⁸

Benefits of Tai Chi Exercise Among Adults With Chronic Heart Failure

A Systematic Review and Meta-Analysis

Taylor-Piliae, Ruth PhD, RN, FAHA, FAAN; Finley, Brooke A. MSN, PMHNP-BC, RN-BC

[Author Information](#) 

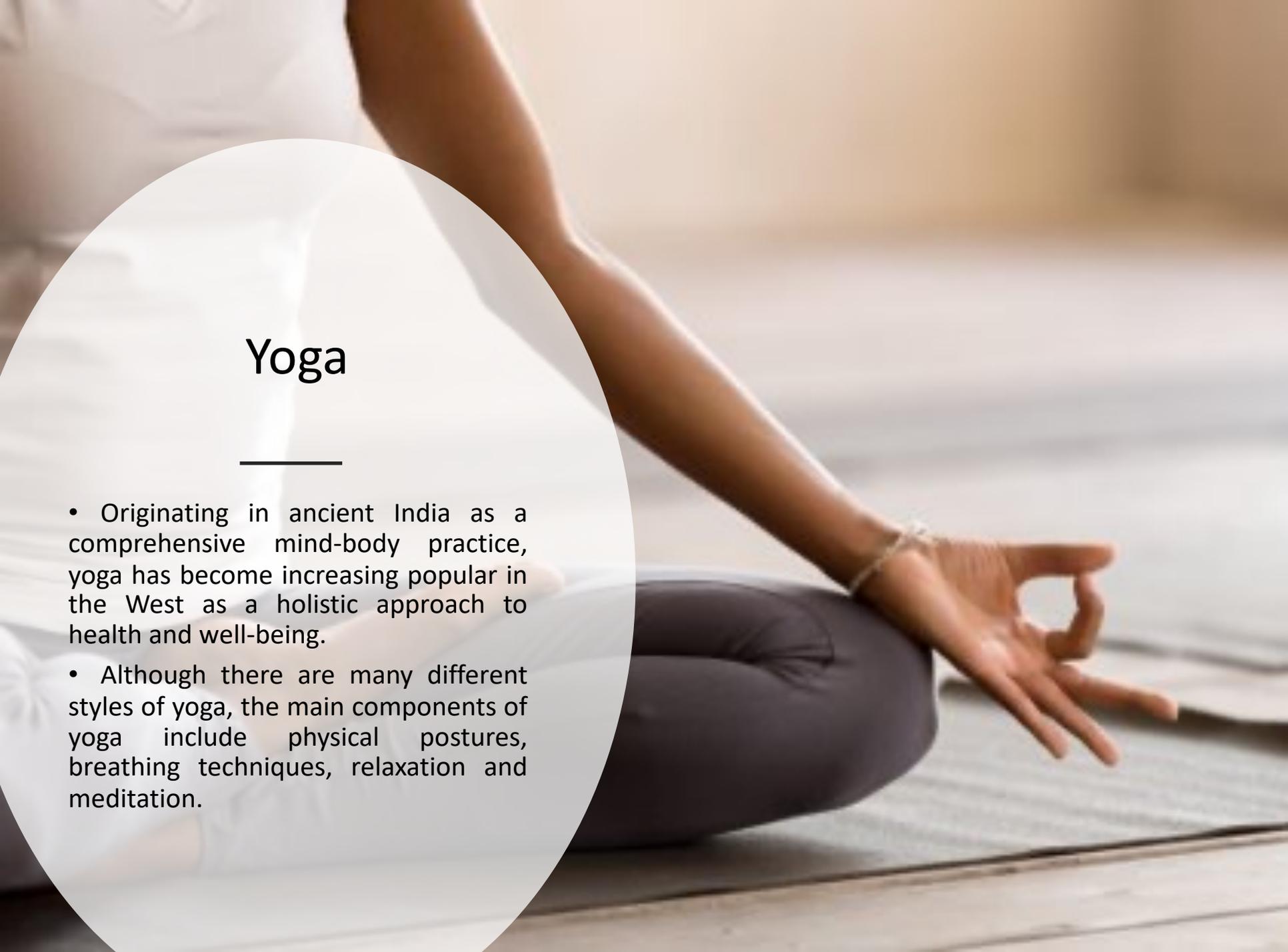
The Journal of Cardiovascular Nursing: 9/10 2020 - Volume 35 - Issue 5 - p 423-434
doi: 10.1097/JCN.0000000000000703

The Use of Tai-Chi to Reduce Anxiety Among Nursing Students Undergoing Simulation

Mulcahy, Angela; Holland, Brian; Gosselin, Kevin; Pittman, Alison

[Author Information](#) 

Nursing Education Perspectives: 5/6 2020 - Volume 41 - Issue 3 - p 183-184
doi: 10.1097/01.NEP.0000000000000495

A person is shown from the waist down, sitting in a yoga pose on a mat. They are wearing a white long-sleeved shirt and dark-colored pants. Their right hand is resting on their knee in a mudra (gesture). The background is a blurred outdoor setting with water and a wooden deck.

Yoga

- Originating in ancient India as a comprehensive mind-body practice, yoga has become increasingly popular in the West as a holistic approach to health and well-being.
- Although there are many different styles of yoga, the main components of yoga include physical postures, breathing techniques, relaxation and meditation.

Yoga is an effective multi-component health intervention in:

Depression

Anxiety

Lower back pain

Stress

Type 2 diabetes

Negative health behaviors



Diabetes & Metabolic Syndrome: Clinical
Research & Reviews

Volume 12, Issue 5, September 2018, Pages 795-805



The benefits of yoga practice compared to physical exercise in the management of type 2 Diabetes Mellitus: A systematic review and meta-analysis

Ranil Jayawardena ^{a, b, c, d}, Priyanga Ranasinghe ^c, Tharindu Chathuranga ^a, Piyusha Milani Atapattu ^a, Anoop Misra ^d

frontiers in
PSYCHIATRY

REVIEW ARTICLE

published: 02 April 2014
doi: 10.3389/fpsy.2014.00035



Yoga for children and young people's mental health and well-being: research review and reflections on the mental health potentials of yoga

Ingunn Hagen^{1} and Usha S. Nayar²*

Yoga practice in the UK: a cross-sectional survey of motivation, health benefits and behaviours

Tina Cartwright ¹, Heather Mason ², Alan Porter ¹, Karen Pilkington ^{1, 3}

BMJ Open 2020;**10**:e031848. doi: 10.1136/bmjopen-2019-031848

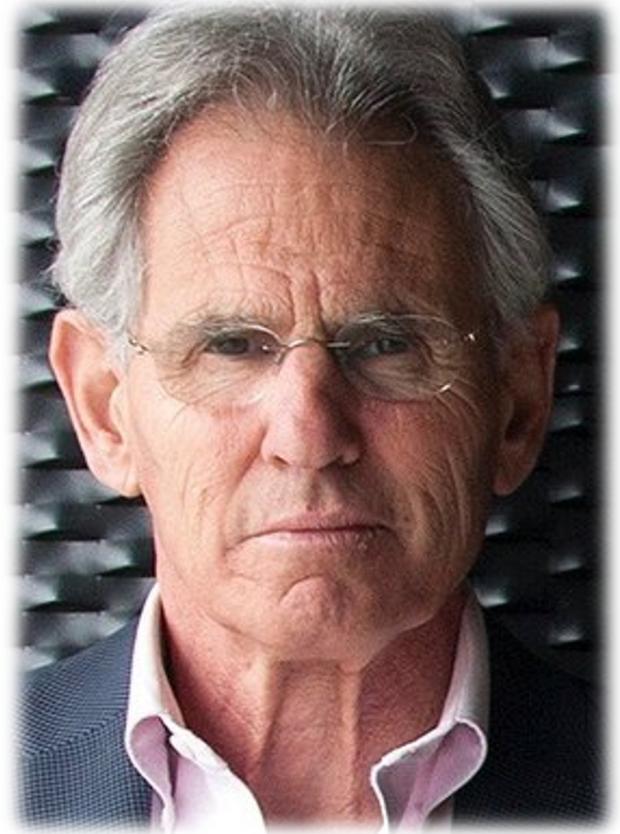
Mindfulness

- **Mindfulness** is the practice of purposely bringing one's attention in the present moment without any evaluation
- Mindfulness derives from Buddhist traditions, and is based on Zen, *Vipassanā*, and Tibetan meditation techniques.
- Individuals who have contributed to the popularity of mindfulness in the modern Western context include Herbert Benson, Jon Kabat-Zinn, and Richard J. Davidson.



Mindfulness

- Kabat-Zinn described mindfulness as a process of bringing a certain quality of attention to moment-by-moment experience.
- Indeed, mindfulness in contemporary psychology has been adopted as an approach for increasing awareness and responding skillfully to mental processes that contribute to emotional distress and maladaptive behavior.



Mindfulness has shown to be effective in:

Depression

Anxiety

Body image concerns

Stress

Chronic pain

Insomnia

Mindfulness (2021) 12:198–214
<https://doi.org/10.1007/s12671-020-01512-5>

ORIGINAL PAPER

Effects of Length of Mindfulness Practice on Mindfulness, Depression, Anxiety, and Stress: a Randomized Controlled Experiment

Sarah Strohmaier¹  · Fergal W. Jones¹  · James E. Cane¹ 

Appetite 58 (2012) 847–851



Contents lists available at SciVerse ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet



Research report

Dealing with problematic eating behaviour. The effects of a mindfulness-based intervention on eating behaviour, food cravings, dichotomous thinking and body image concern

H.J.E.M. Alberts^{*}, R. Thewissen, L. Raes

Spinal Cord (2018) 56:750–761
<https://doi.org/10.1038/s41393-018-0090-2>

ARTICLE

Internet-delivered mindfulness for people with depression and chronic pain following spinal cord injury: a randomized, controlled feasibility trial

Jasmine Heath Hearn¹  · Katherine Anne Finlay²

ISCoS
The International
Spinal Cord Society

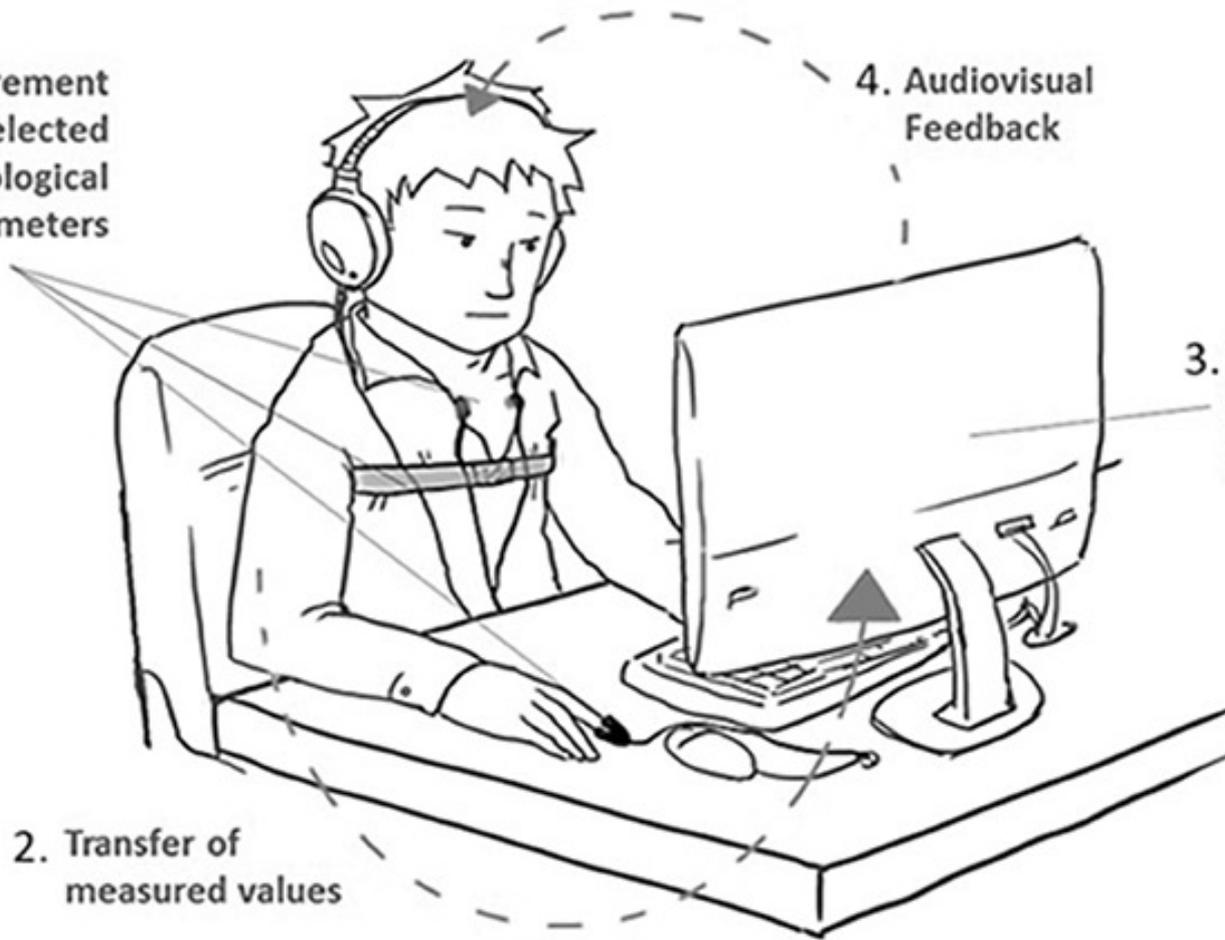


Biofeedback

- Biofeedback is a medical treatment in which physiologic markers like heart rate, breathing rate, EMG, EEG, or electrodermal activity are measured and displayed back to the patient.
- The patient can then attempt to modulate physiology to achieve a certain feedback goal, such as slowing heart or breath rate, or relaxing certain muscles. The desired feedback goal is based on the specific condition being treated.



1. Measurement
of selected
physiological
parameters



4. Audiovisual
Feedback

3. Personal computer
Or other device for
analyzing the data

2. Transfer of
measured values

Biofeedback is an important add-on treatment for:

Depression

Anxiety

Stress management

Migraine

Rehabilitation

REVIEW article

Front. Neurol. 30 March 2021 | <https://doi.org/10.3389/fneur.2021.637199>



Biofeedback for Post-stroke Gait Retraining: A Review of Current Evidence and Future Research Directions in the Context of Emerging Technologies

Jacob Spencer¹, Steven L. Wolf^{1,2,3,4} and Trisha M. Kesar^{1*}

International Journal of Psychophysiology 131 (2018) 96–101



ELSEVIER

Contents lists available at ScienceDirect

International Journal of Psychophysiology

journal homepage: www.elsevier.com/locate/ijpsycho



Adding HRV biofeedback to psychotherapy increases heart rate variability and improves the treatment of major depressive disorder

Yoko Tsui Caldwell, Patrick R. Steffen*



frontiers
in ICT

REVIEW
published: 07 September 2018
doi: 10.3389/fict.2018.00023



Biofeedback for Everyday Stress Management: A Systematic Review

Bin Yu, Mathias Funk, Jun Hu*, Qi Wang and Loe Feijs



NeoFunctionalism

- Neo-Functionalism (NF), otherwise known as Modern Functionalism, is an integrative approach to psychological treatment that combines mental and bodily aspects within a unifying framework.

NeoFunctionalism

- This approach was developed in Italy by Luciano Rispoli (1993)
- The focus is on the possibility to relive experiences that, in the past, have generated the present maladaptive behaviours.



NeoFunctionalism

- NF use breathing techniques
- NF use cognitive techniques
- NF use body oriented techniques
- A relevant therapeutical add-on of NF is the use of social touch as a therapeutic tool



Social touch has been categorized into:

1. simple, described as a touch of short duration and applied on a restricted part of the body;
2. protracted, involving longer and mutual contact, such as hugging or holding hands;
3. dynamic, comprising continuous and repetitive movements over the skin (such as caressing)

- Daily hugging behaviors over a 14-day period has been shown to be significantly and inversely related to proinflammatory cytokines (van Raalte & Floyd, 2021)



- Similarly, in women, the reported frequency of hugs with partners is correlated with elevated oxytocin levels and lowered blood pressure (Light et al., 2005).



Efficacy of a fasting-mimicking diet in functional therapy for depression: A randomised controlled pilot trial

Giuseppe Maniaci¹  | Caterina La Cascia¹ |
Alessandra Giammanco¹ | Laura Ferraro¹ | Roberta Chianetta² |
Roberta Di Peri¹ | Zaira Sardella¹ | Roberto Citarrella² |
Yuri Mannella¹ | Stefania Larcan¹ | Simonetta Montana¹ |
Mario G. Mirisola³ | Valter Longo^{4,5} | Manfredi Rizzo² |
Daniele La Barbera¹

Our study revealed positive outcomes in patients with depression treated with a structured functional therapy program combined with a fasting-mimicking diet protocol. Outcomes regarding self-esteem and psychological quality of life were especially promising, for improvements along those lines were maintained at 3-month follow-up.

EFFICACY OF A FUNCTIONAL THERAPY PROGRAM FOR DEPRESSION
AND C-REACTIVE PROTEIN: A PILOT STUDY

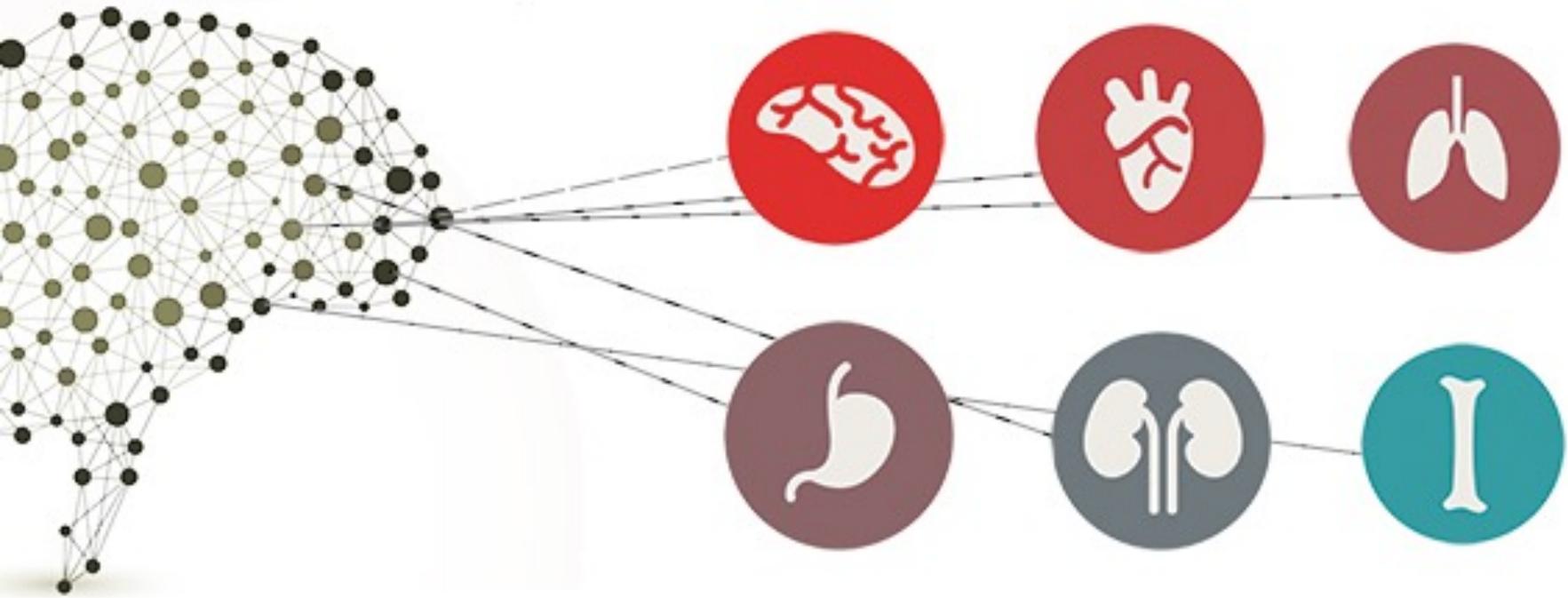
Giuseppe Maniaci, Caterina La Cascia, Alessandra Giammanco, Laura Ferraro, Zaira Sardella, Giulia Bivona,
Marcello Ciaccio, Daniele La Barbera

This study revealed a significant difference after treatment on depression levels, levels of self-esteem, and all dimensions of quality of life, such as physical, psychological, social relationships, and environment. Furthermore, a statistically significant difference on levels of CRP was found. At follow-up, improvements were maintained.

Okay, but...

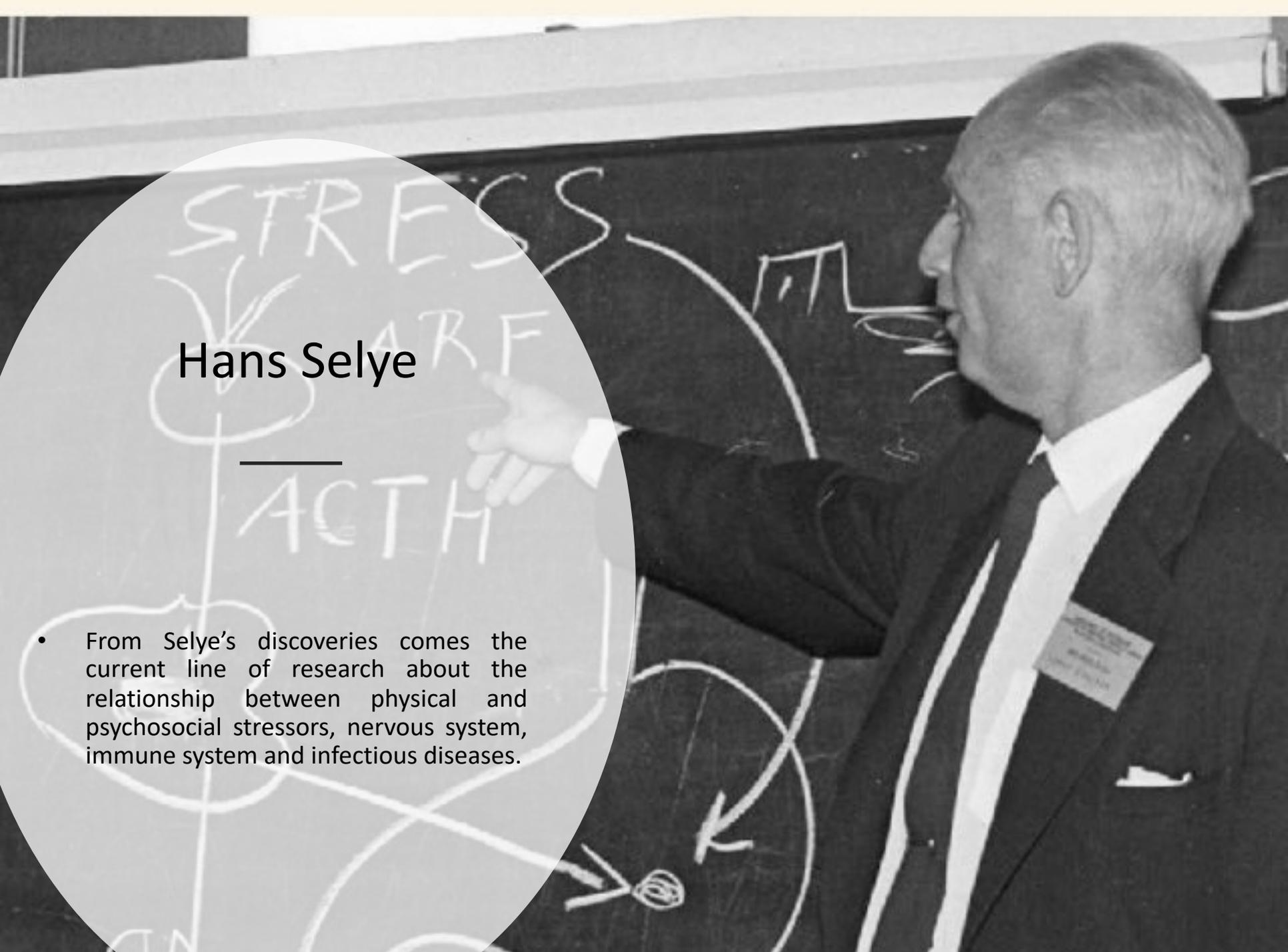
HOW
DOES IT
WORK





PNEI

- The **PsychoNeuroEndocrinImmunology** or **PNEI** is the study of the relationships among the major control systems of the human body: the nervous, the endocrine and the immune systems, and between them and the psyche which is the emotional and cognitive identity that distinguishes each of us.

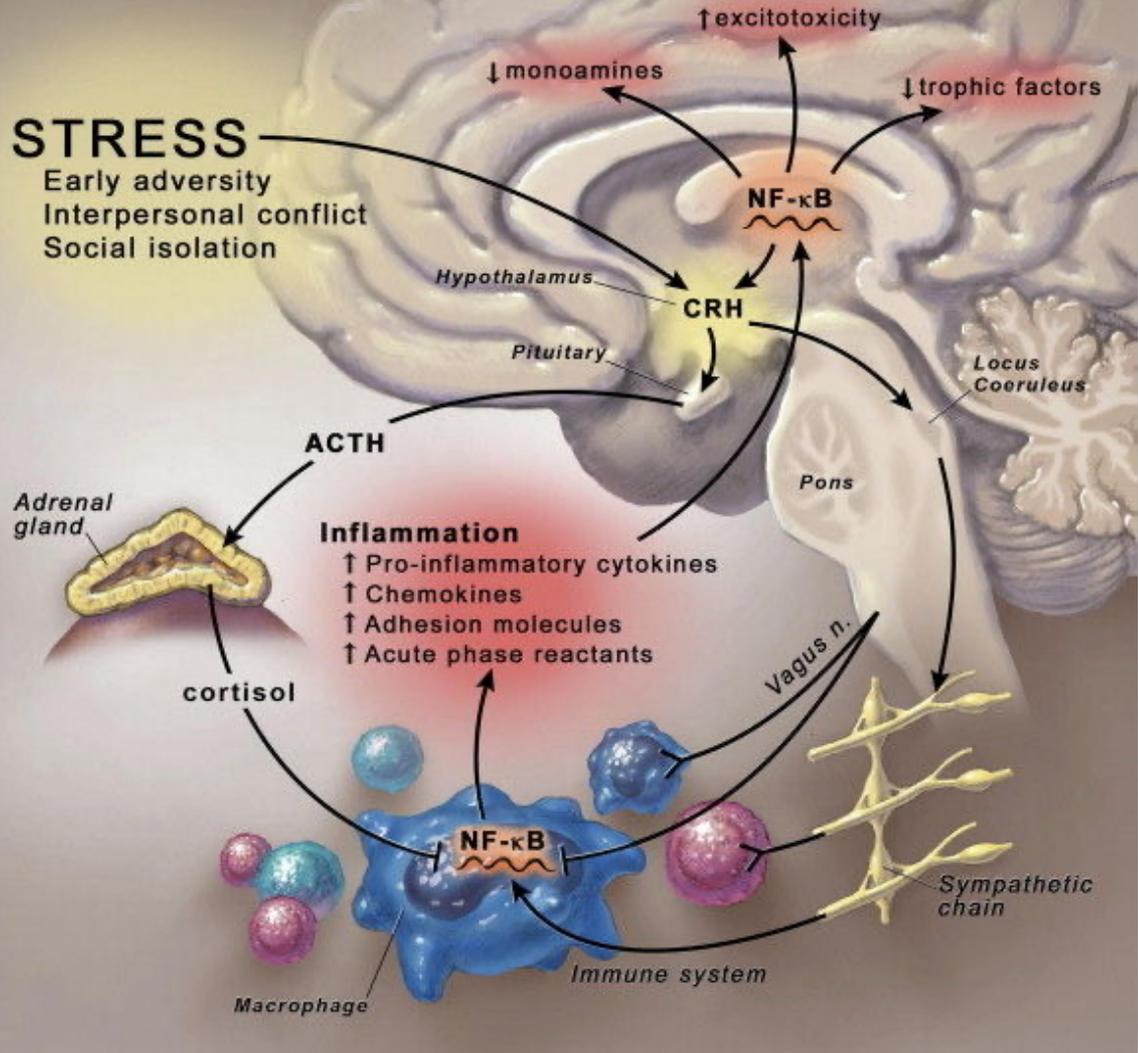


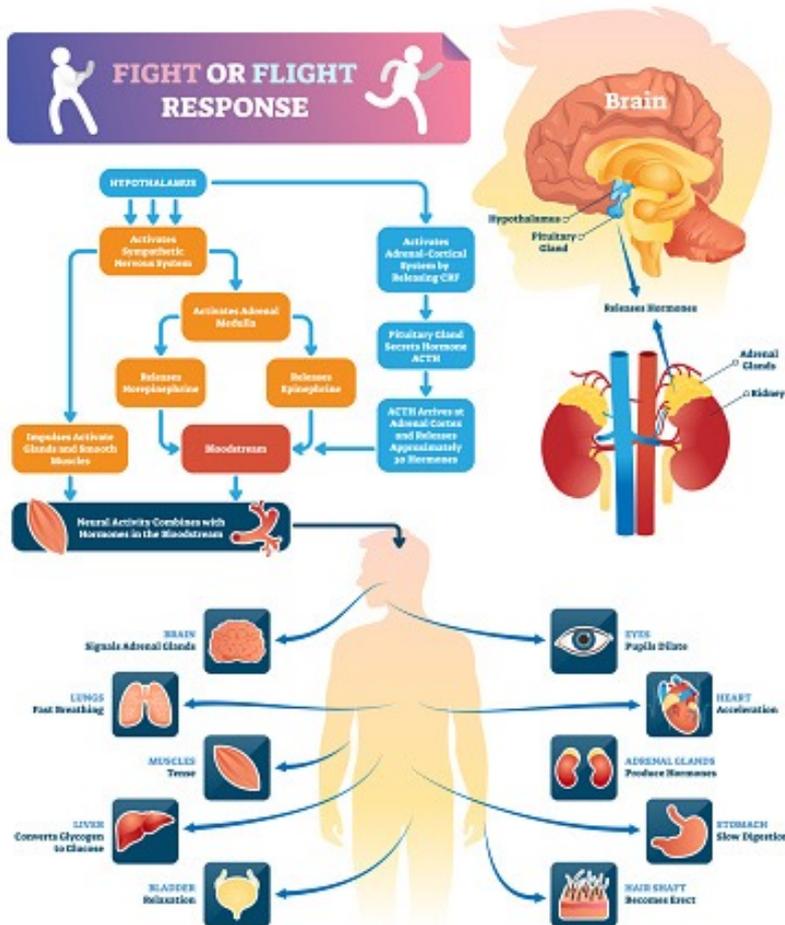
Hans Selye

- From Selye's discoveries comes the current line of research about the relationship between physical and psychosocial stressors, nervous system, immune system and infectious diseases.

STRESS

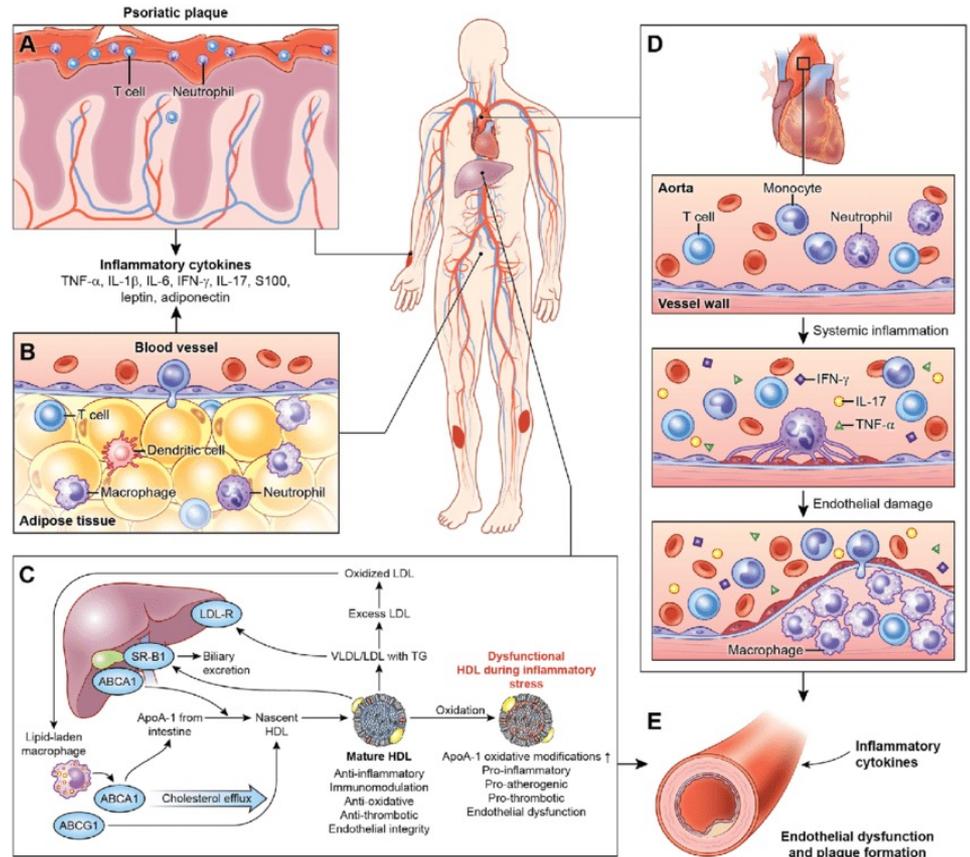
Early adversity
Interpersonal conflict
Social isolation



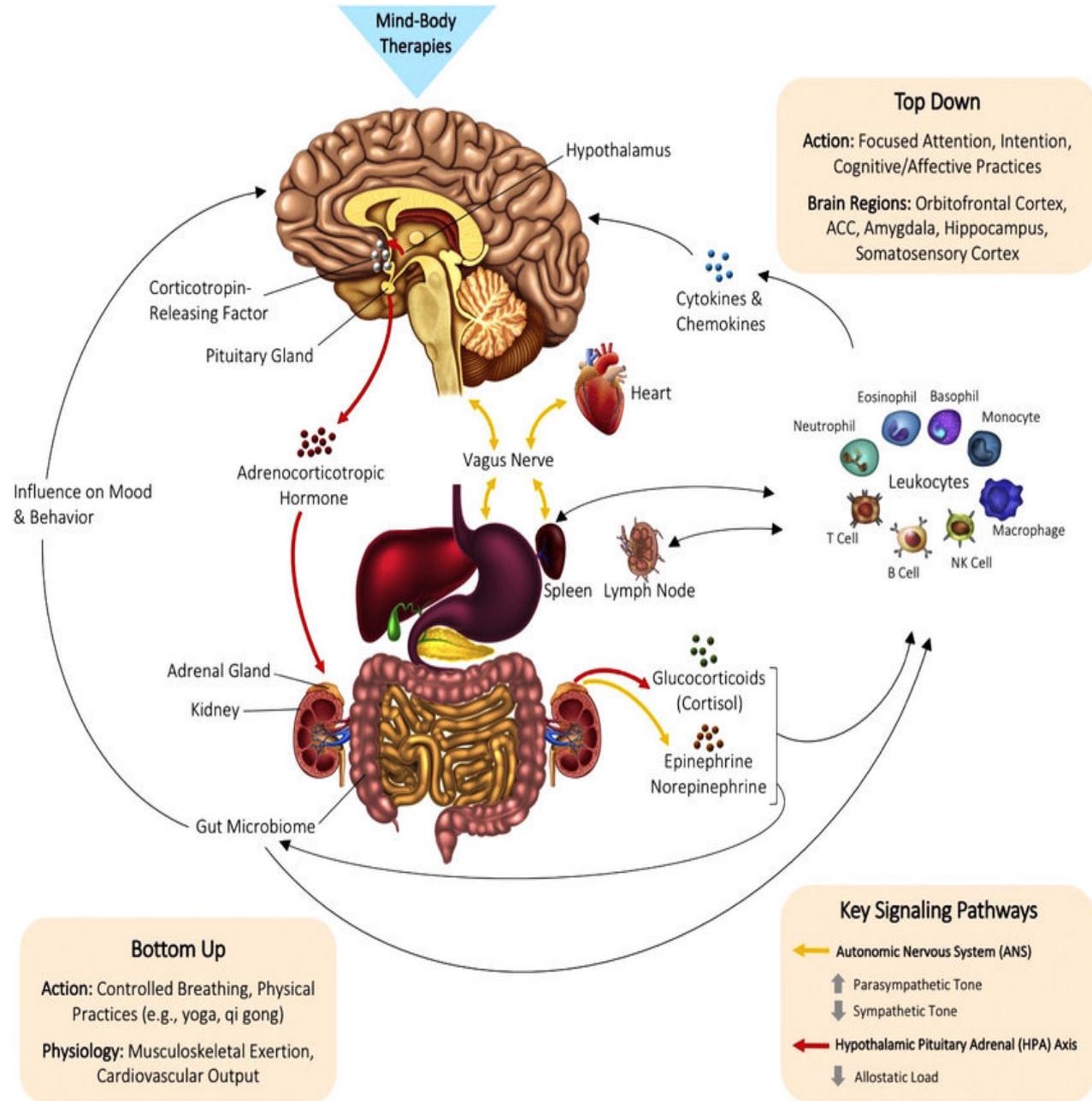


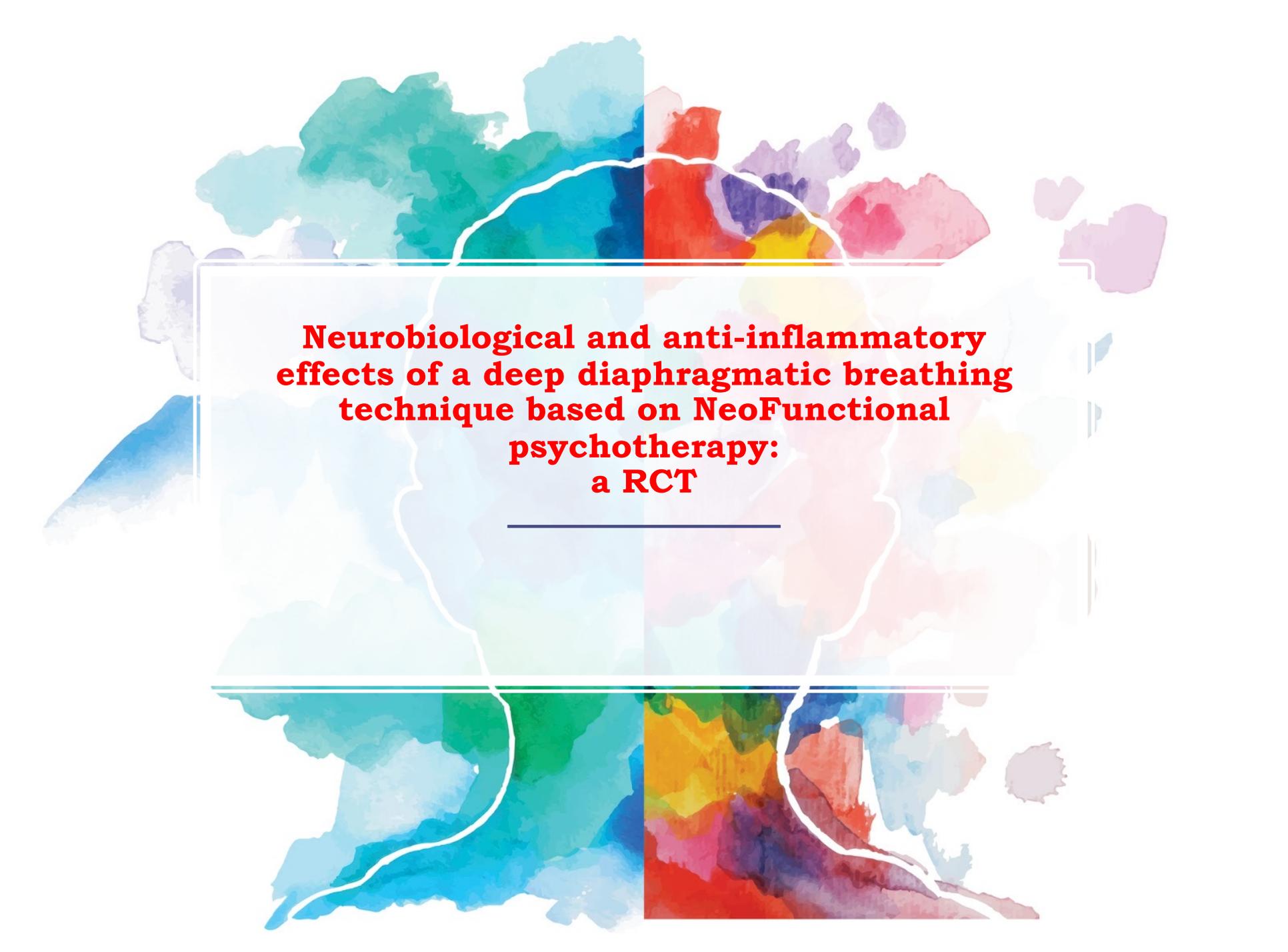
- It has been widely proved that stress has a deep impact on the functionality of the immune and the endocrine system.
- The effects of stress on the homeostatic balance of these two systems are strictly related to the **duration of the stimulus**.

On the other hand, the chronic exposition to stress stimuli is related to a general dysregulation of the immune system: this condition results in an extensive immunosuppression, but it is also likely connected to a more unspecific subthreshold inflammatory state named **Low Grade Chronic Inflammation**.



Mechanisms in mind-body therapies





**Neurobiological and anti-inflammatory
effects of a deep diaphragmatic breathing
technique based on NeoFunctional
psychotherapy:
a RCT**

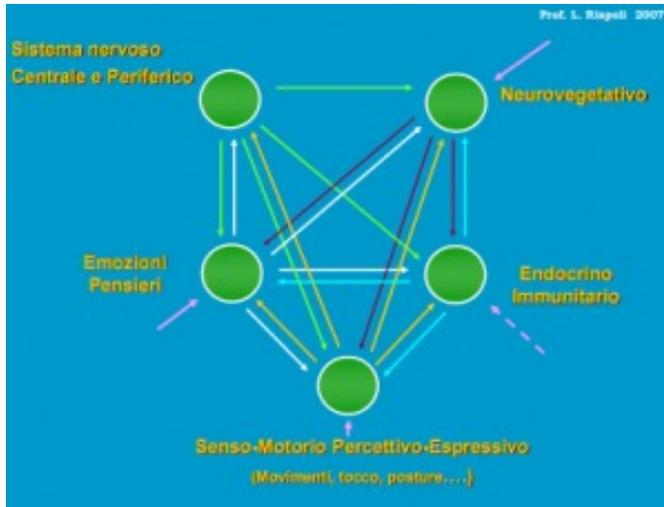
Neurobiological and anti-inflammatory effects of a deep diaphragmatic breathing technique based on neofunctional psychotherapy: a RCT



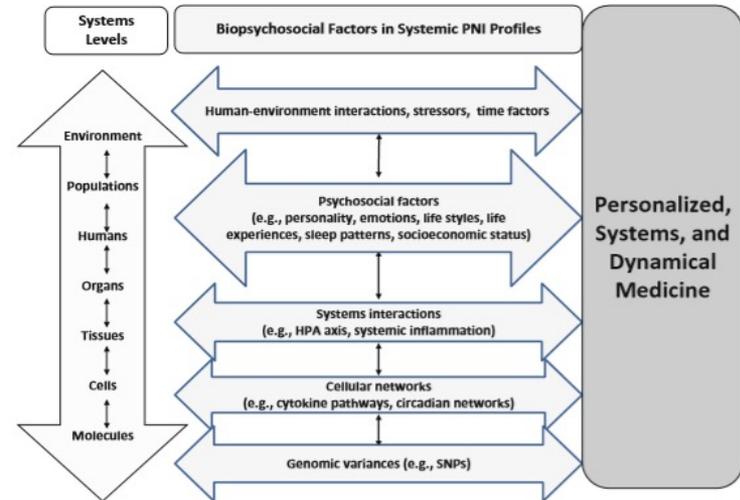
CENTRO STUDI DI PSICOTERAPIA NEO-FUNZIONALE

Background

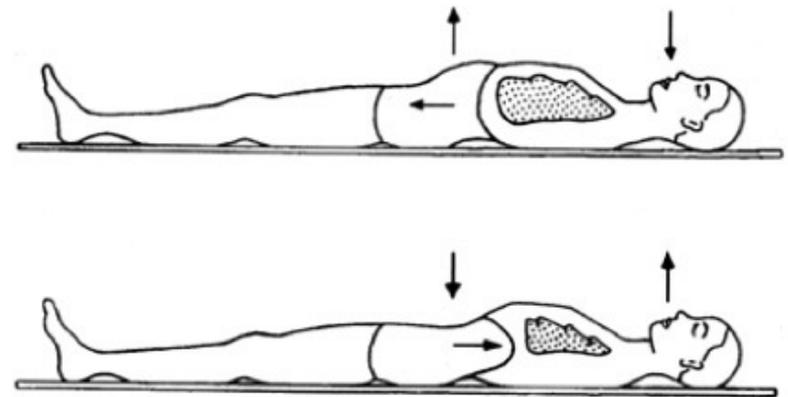
NeoFunctionalism Prof. Luciano Rispoli



PNEI Prof. Francesco Bottaccioli

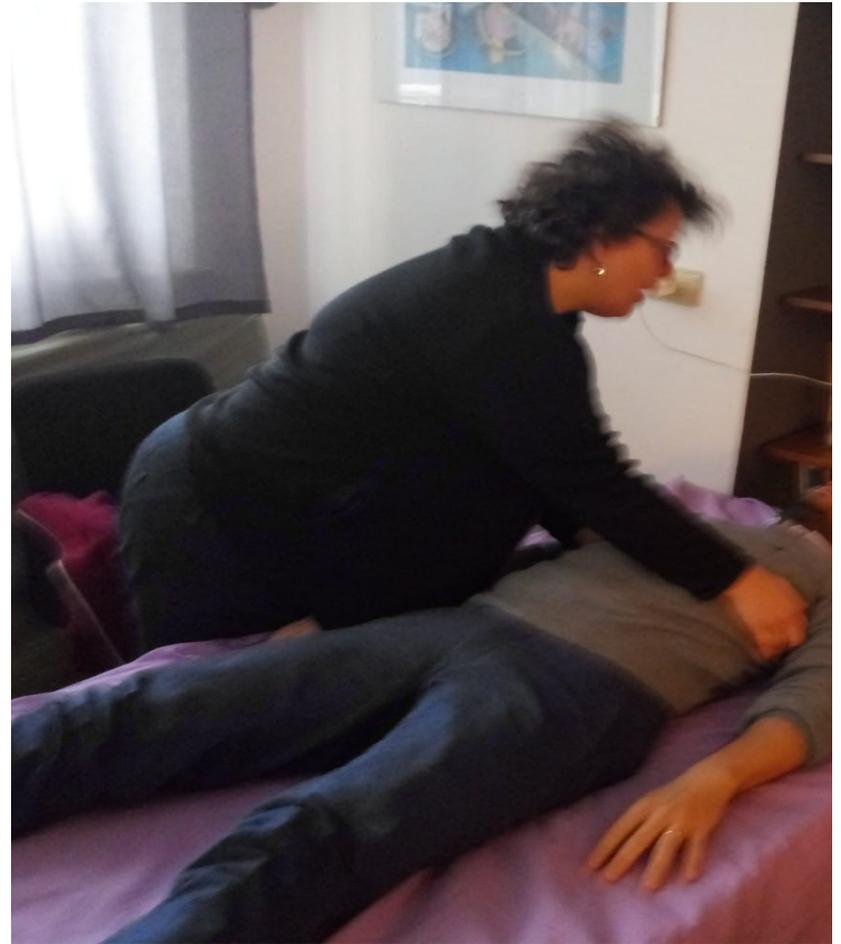


- DB is an evidence-based, low-cost technique that consists in breathing deeply and expanding the lungs into the diaphragm rather than using the abdomen or ribcage alone.
- Through the stimulation of the vagus nerve, DB could strongly increase the parasympathetic activity and the cardiac vagal activity, normalising blood pressure and heart rate, and modulating the HRV values.



NDB protocol

- The NeoFunctional deep breathing (NDB) technique aims to improve a deep DB together with a decrease of the respiratory rate into 6-10 bpm slow breathing range.
- Differently from other MBTs, NT enhances a deep DB through a direct manipulation of the thoracoabdominal compartment by the therapist, in order to restore the integrated movement of ribcage and abdomen during quiet breathing.



NDB protocol



In supine position, the patient is instructed to start breathing spontaneously through his mouth. The inspiratory-to-expiratory time ratio (I\|E) of the entire session is set to the range of 5-6\|3-4 seconds. In this first step the hand of the therapist is lean on the patient's abdomen in order to increase the perception of abdominal movements during spontaneous breathing; then a lighter contact is applied to induce the abdominal surface to rise autonomously up to the hand's palm.

A pressure on the lower ribs is applied in sequence on right, left and both sides, in order to reduce abdomen circumference and diaphragm muscle's tension, during both inspiration and expiration movements.

The same manoeuvre is repeated, in addition with the therapist's hand leading down the thoraco-abdominal compartment during the expiratory phase.

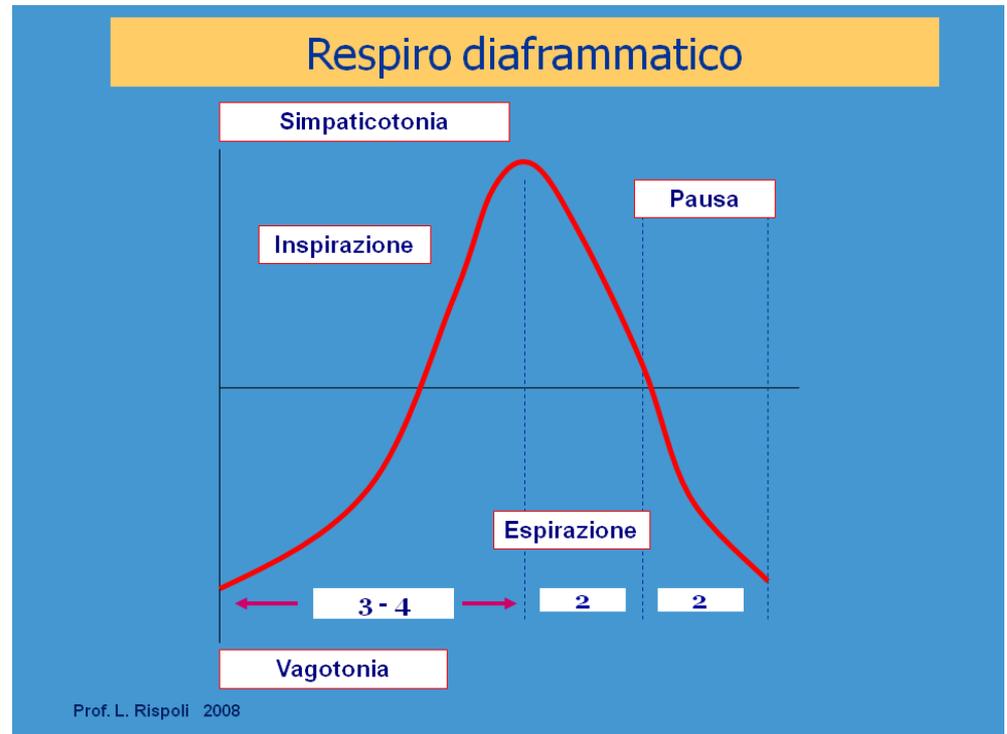
Inspiration is assisted by the therapist's hands which accompany ribcage movement upwards. Expiration is helped by pressing the ribcage towards inferior-posterior direction.

Therapist places his hands on patient's chest to limit excursions in the antero-posterior direction during inspiration movement.

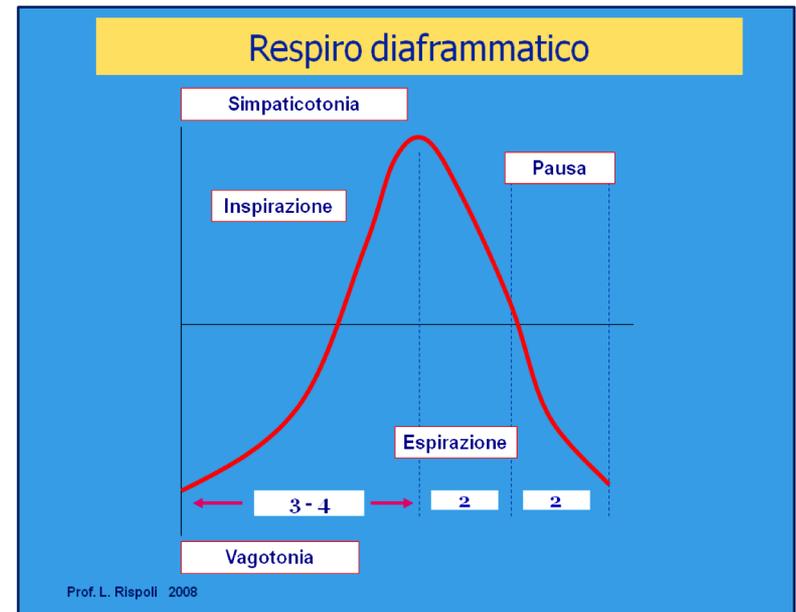
Lastly, when a deep DB is already enhanced, the patient is encouraged to breath spontaneously. In this step the therapist manages little adjustments leaning softly his hands on patient's abdomen surface.

Aim

This RCT aimed to investigate the effect of a NDB technique both on psychological and physiological stress levels and on inflammatory cytokines patterns in a sample of healthy subjects after the administration of a psychosocial stressor



- We hypothesised in the experimental group (EG) a **significant increase of vagal tone**, in association to a **reduction of cortisol levels and pro-inflammatory cytokines**.
- Furthermore, we hypothesised in EG a **greater reduction of perceived stress levels and state anxiety** after the application of the NDB technique.



Prof. Luciano Rispoli

WE NEED



Eligibility – first stage

- Age < 18 or > 55;
- BMI > 40;
- regular physical activity practise (at least 1h/day);
- chronic inflammatory diseases;
- serious infections (such as HIV, HBV and HCV);
- cancer in the previous 6 months;
- therapies with immunoactive drugs (e.g. antibiotics, antihistamines, corticosteroids) or psychotropic substances during the 2 weeks prior to the trial procedure;
- regular use of anti-inflammatory drugs for more than 15 days/month;
- past or current drug abuse problem or drug addiction (including nicotine);
- difficulty in reading Italian;
- participation to other clinical trials.

YOU !!!

WE NEED

Eligibility – second stage

Any
psychiatric
disorder

YOU !!!



Meanwhile...

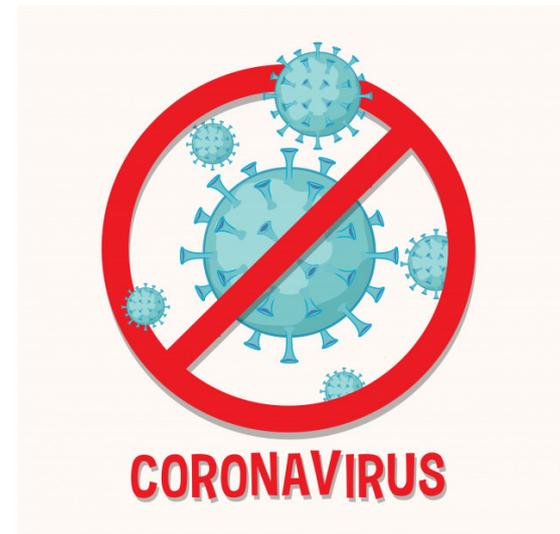


March 2021 - at long last!



New eligibility criteria were established and added to the prior ones:

- Not having contracted SARS Cov-2 infection during the previous months;
- having completed the vaccination cycle against SARS Cov-2.





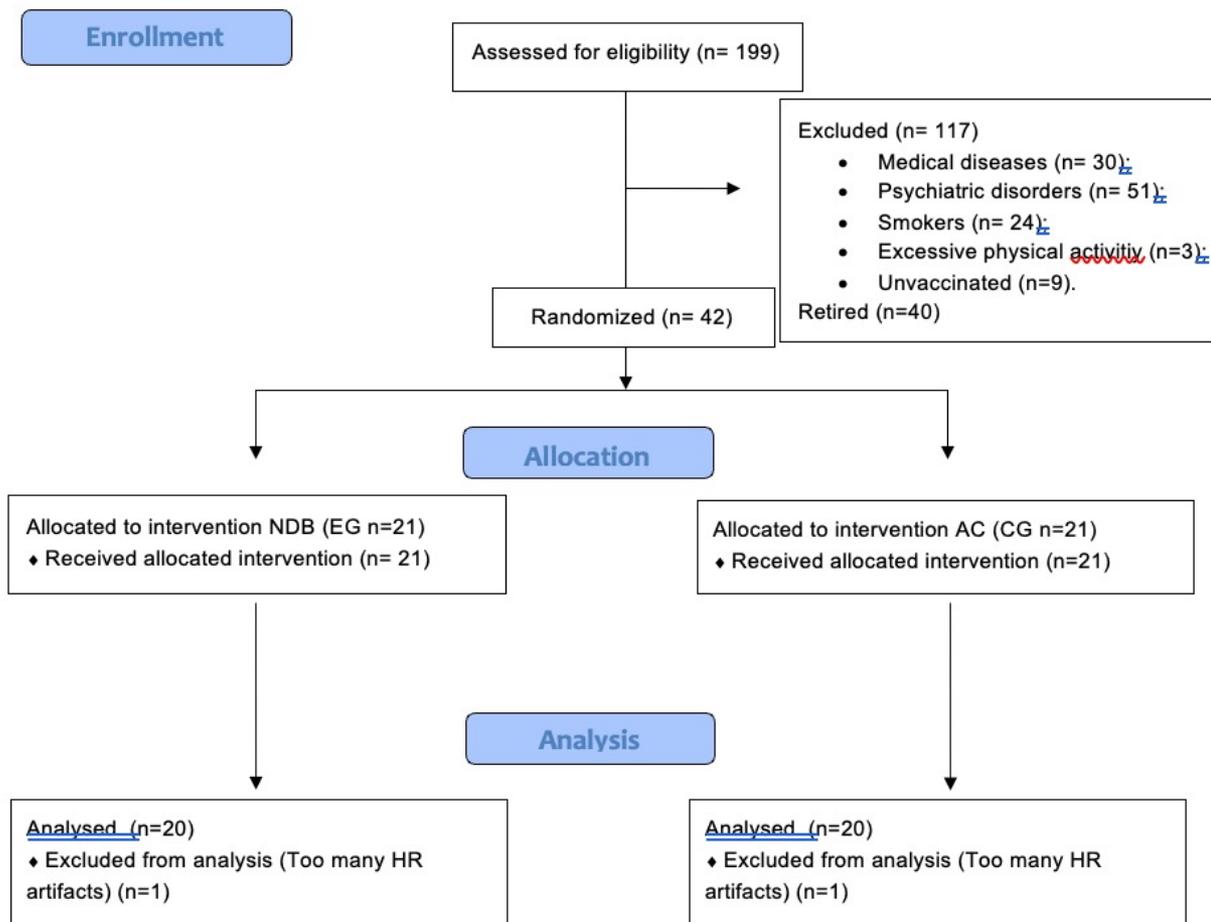
- Therefore, a new group of participants was recruited in the period from March 2021 to May 2021.
- All participants were submitted to a nasopharyngeal swab in our laboratory just before undergoing the treatment.
- The experimenters involved in the procedure were vaccinated and provided with the appropriate PPE (FFP2-mask, visor, and gloves).

Randomization procedure

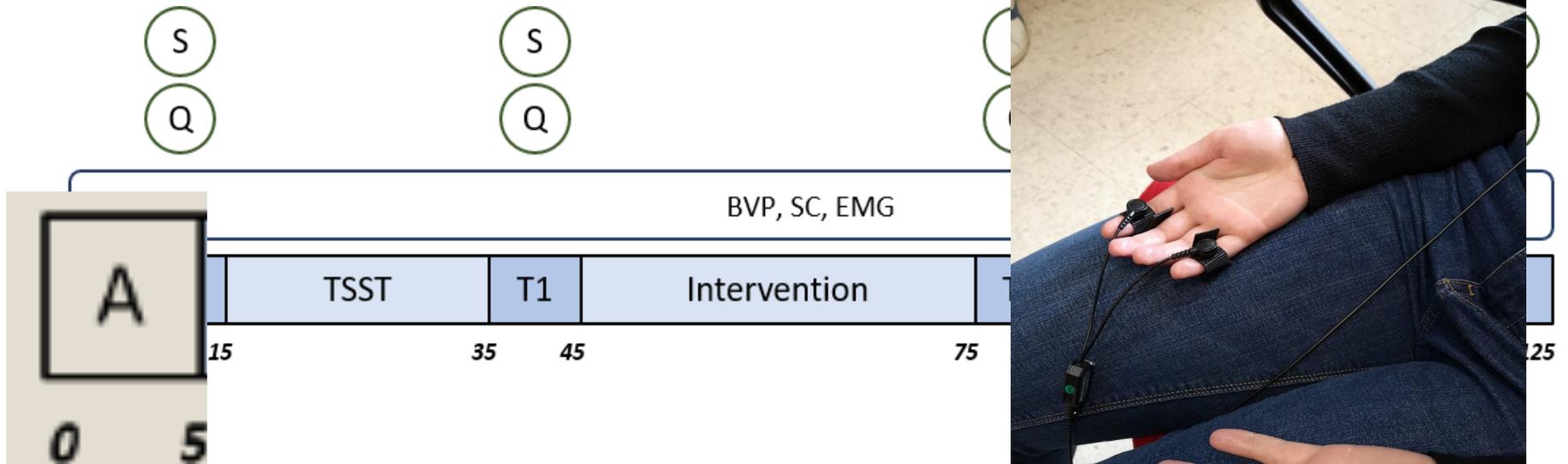
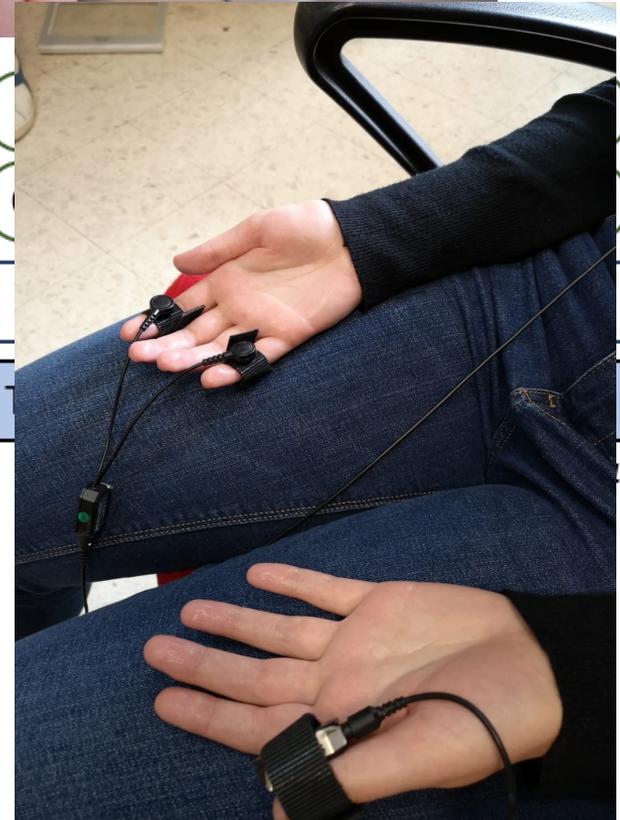


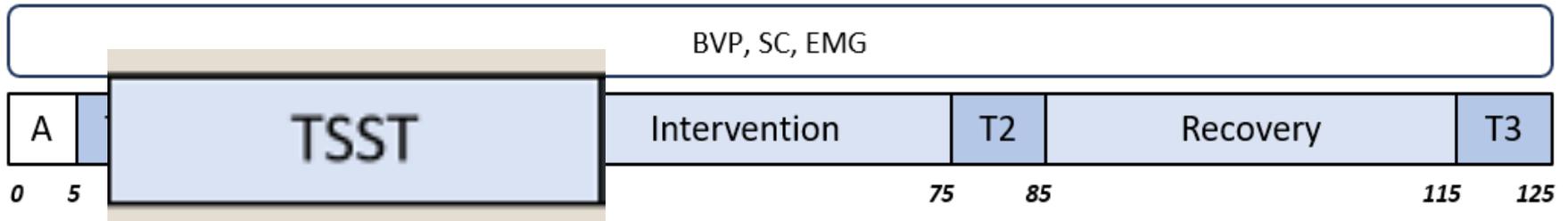
Participants were allocated in Experimental Group (EG) or Control Group (CG) through a randomisation procedure performed on IBM SPSS 24. A stratified random sampling for age and sex was performed to ensure a better representation of the volunteer population and equal gender distribution in both groups. A block design procedure of 10 blocks of size 4 was adopted to obtain equally sized groups.

CONSORT 2010 Flow Diagram



Procedure





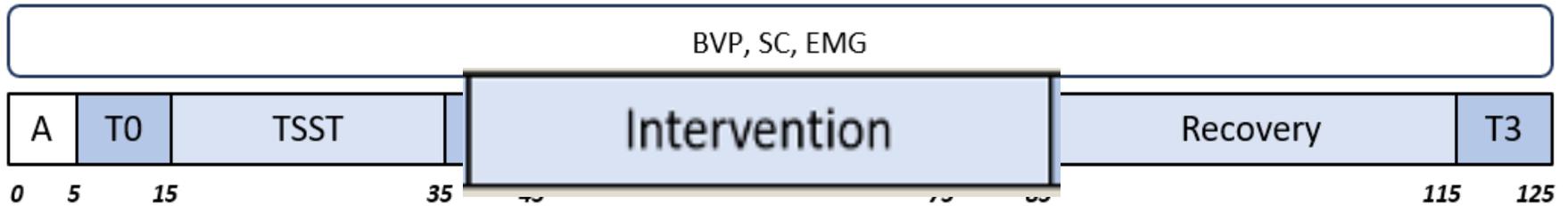


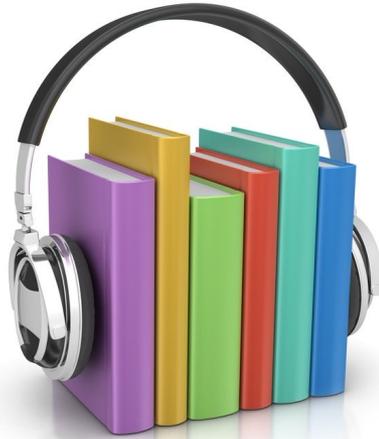
S
Q



S
Q

S
Q



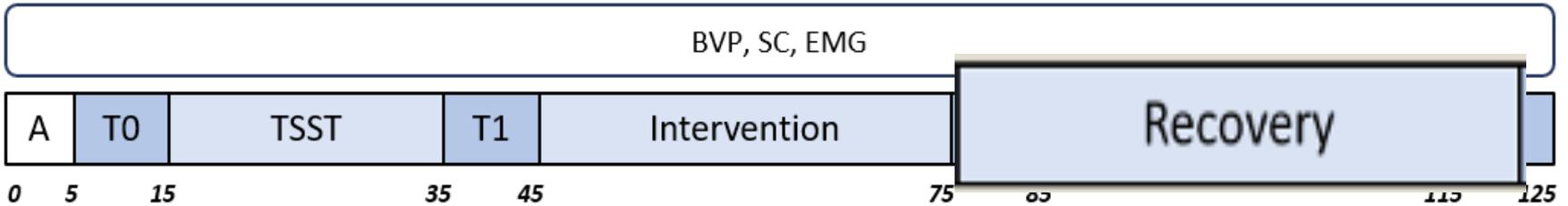


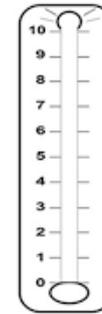
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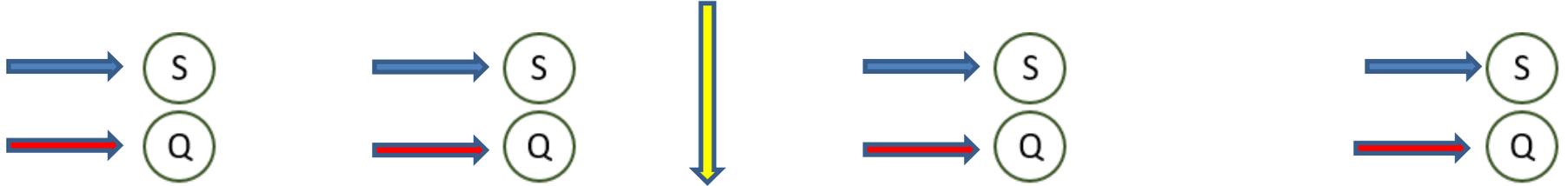
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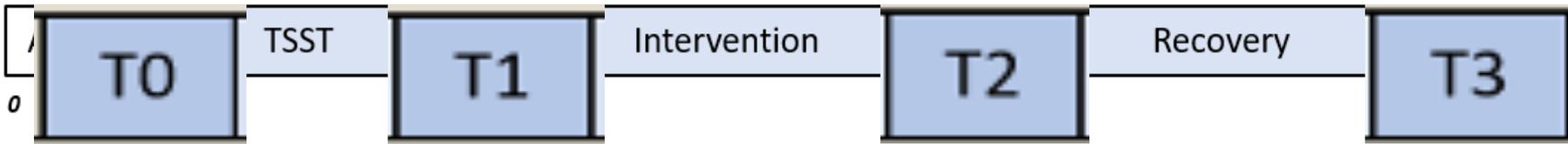


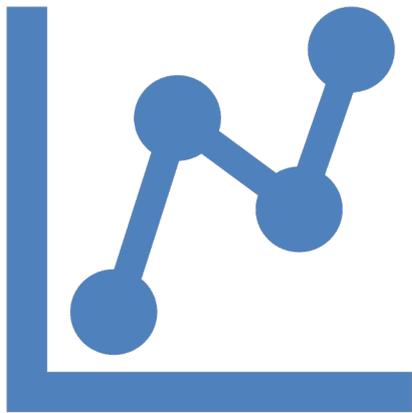


- 10 - Highest distress/fear/anxiety/discomfort that you have ever felt
- 9 - Extremely anxious/distressed
- 8 - Very anxious/distressed, can't concentrate
- 7 - Quite anxious/distressed, interfering with performance
- 6 -
- 5 - Moderate anxiety/distress, uncomfortable but can continue to perform
- 4 -
- 3 - Mild anxiety/distress, no interference with performance
- 2 - Minimal anxiety/distress
- 1 - Alert and awake, concentrating well
- 0 - Totally relaxed



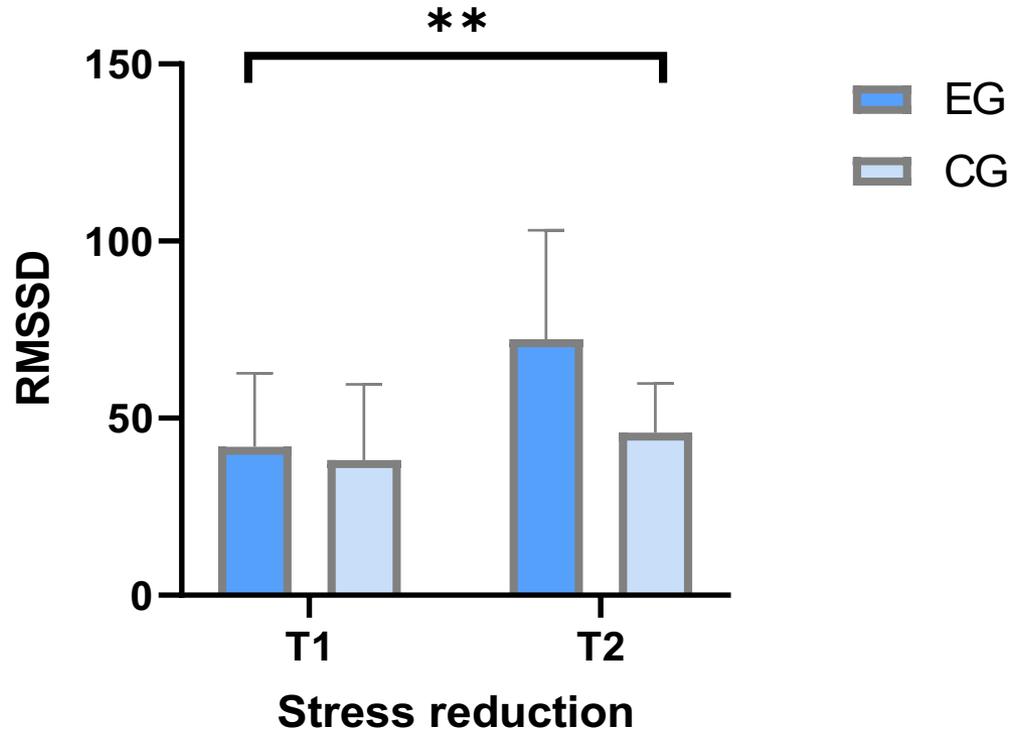
BVP, SC, EMG



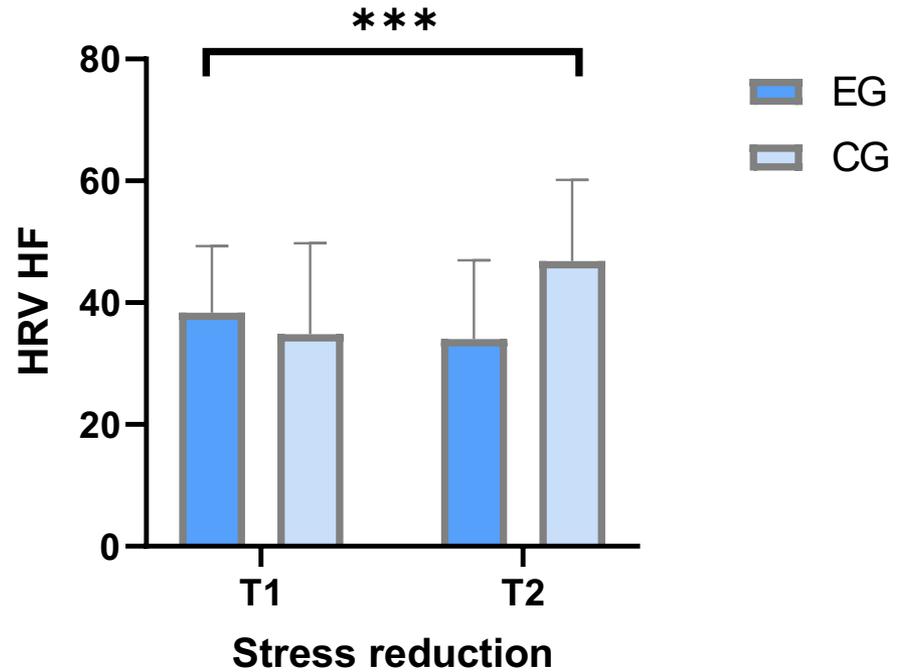
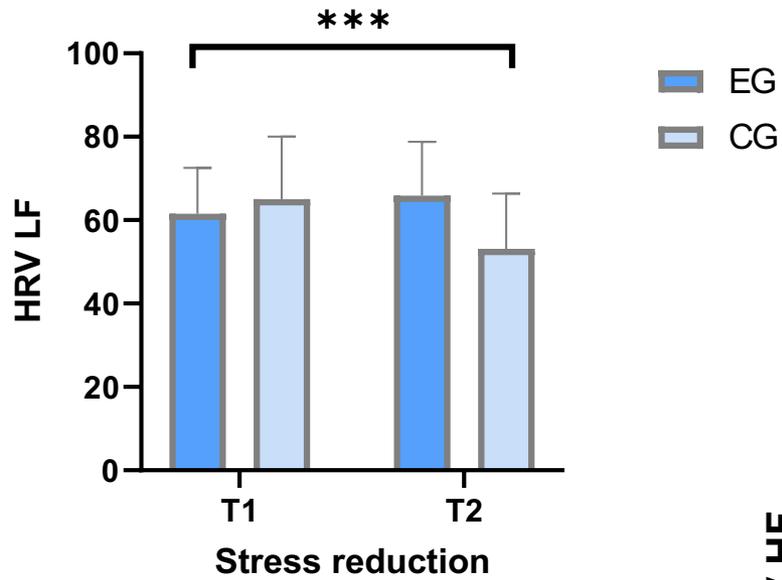


Results

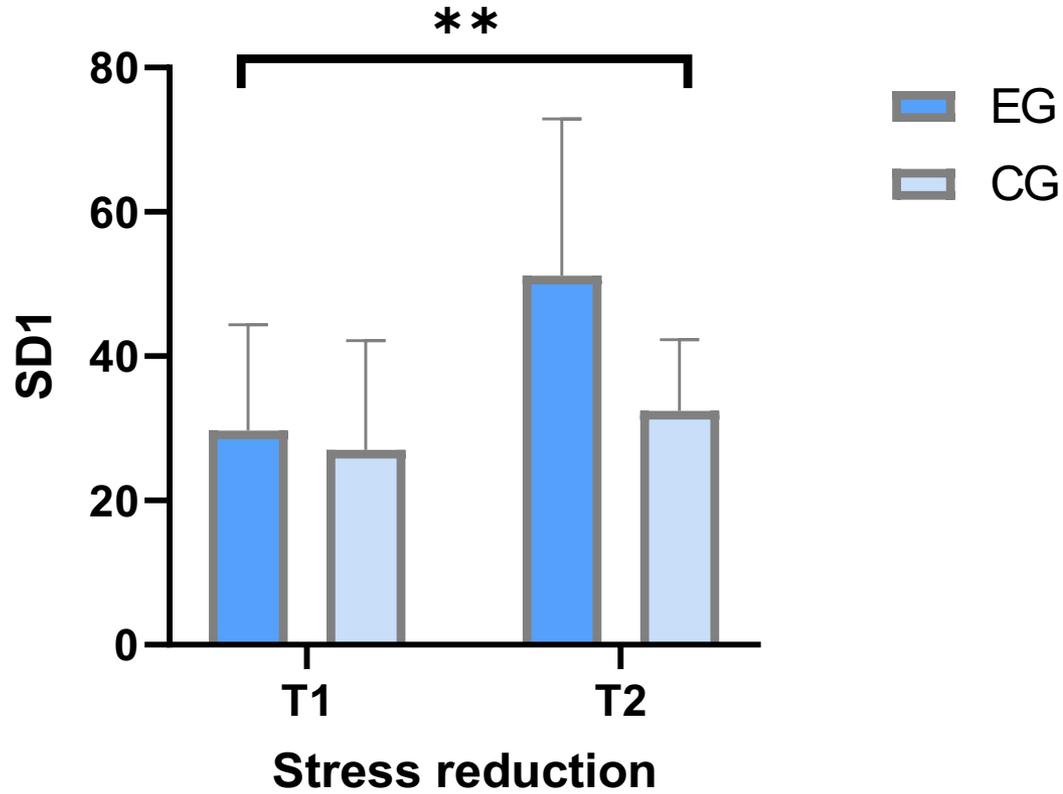
Results



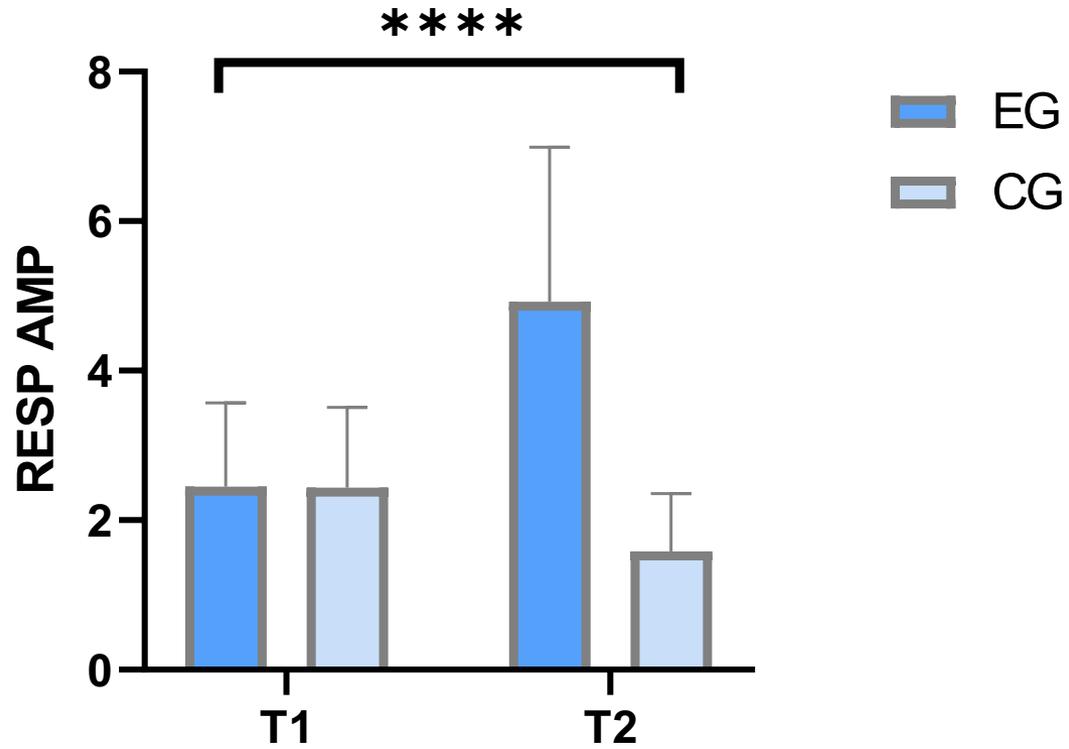
Results



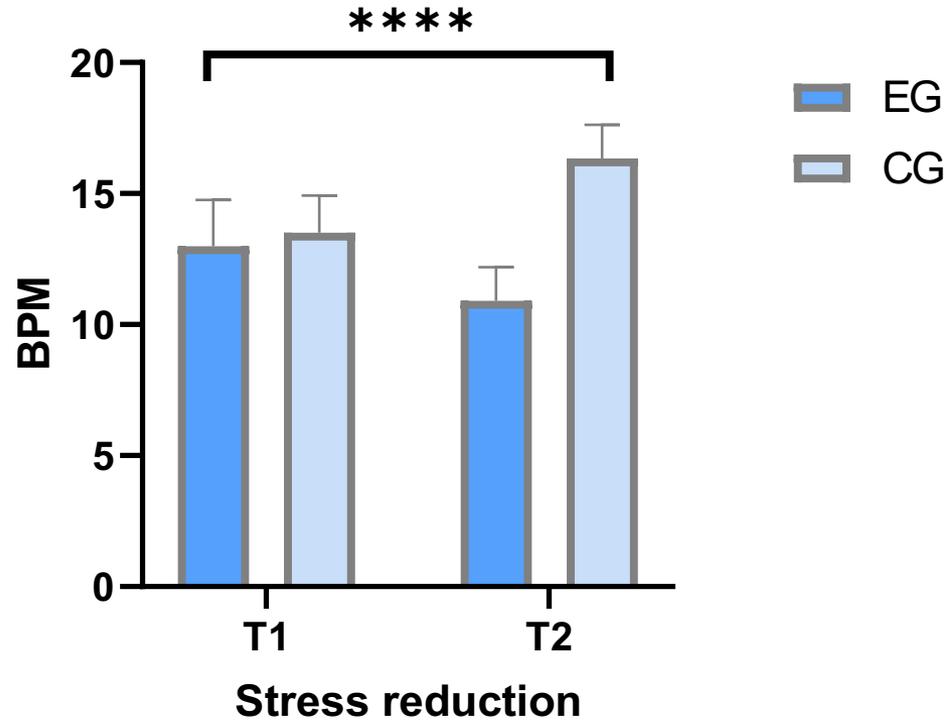
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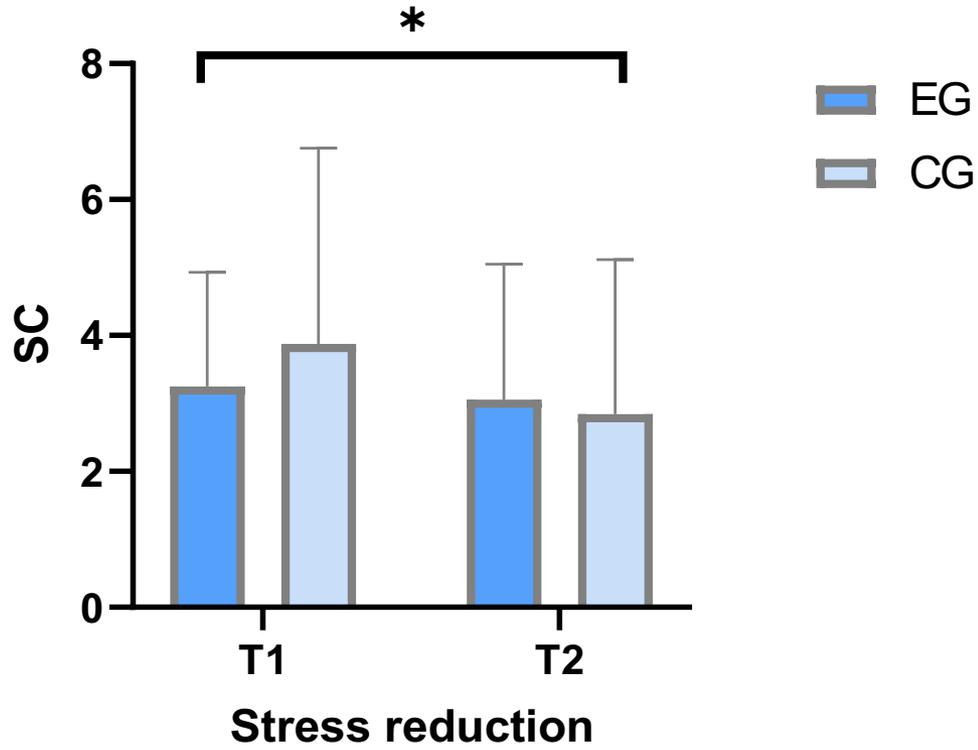
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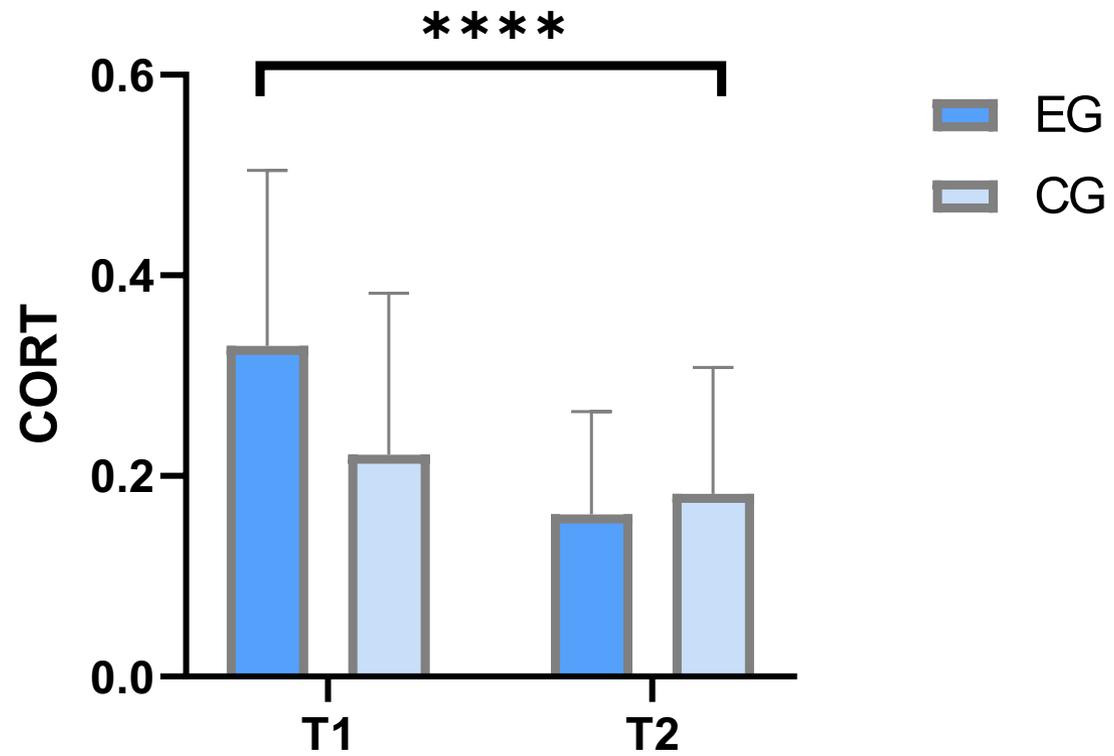
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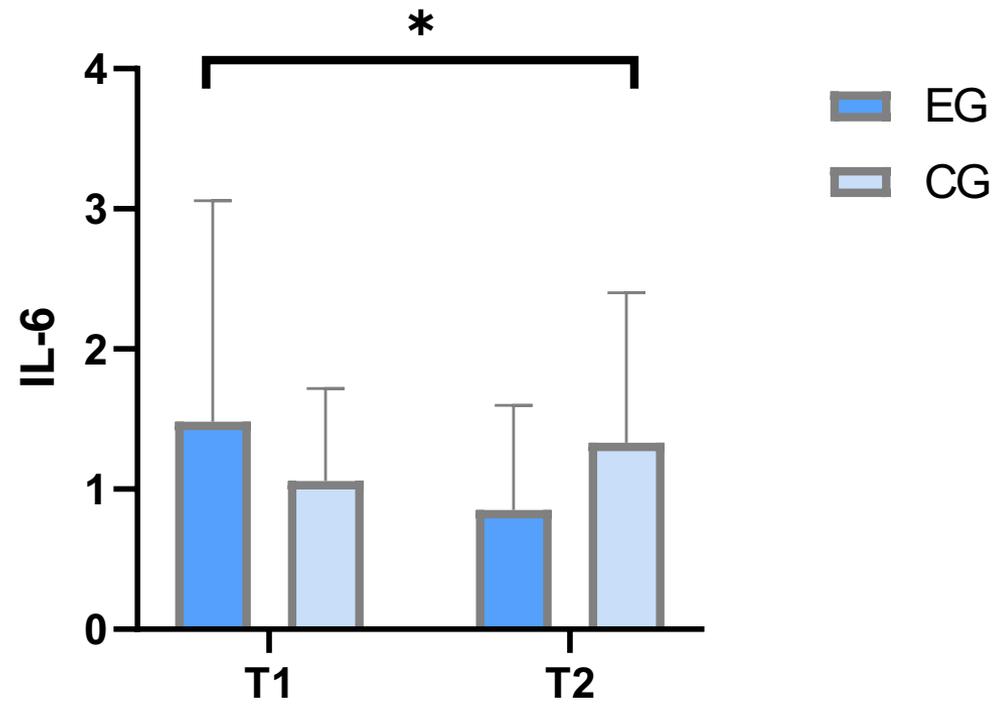
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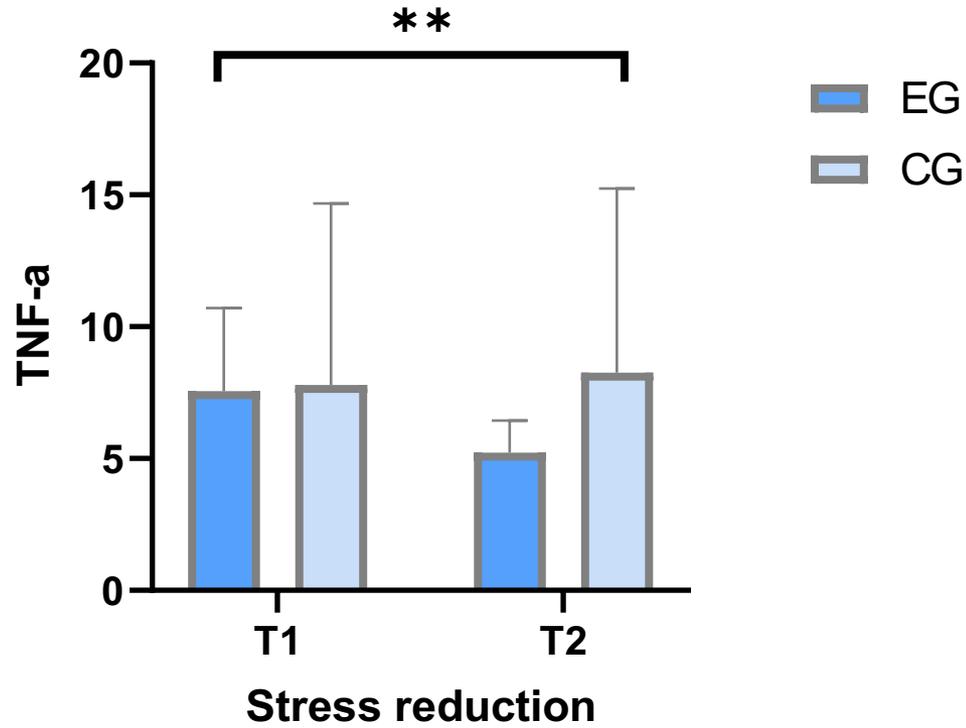
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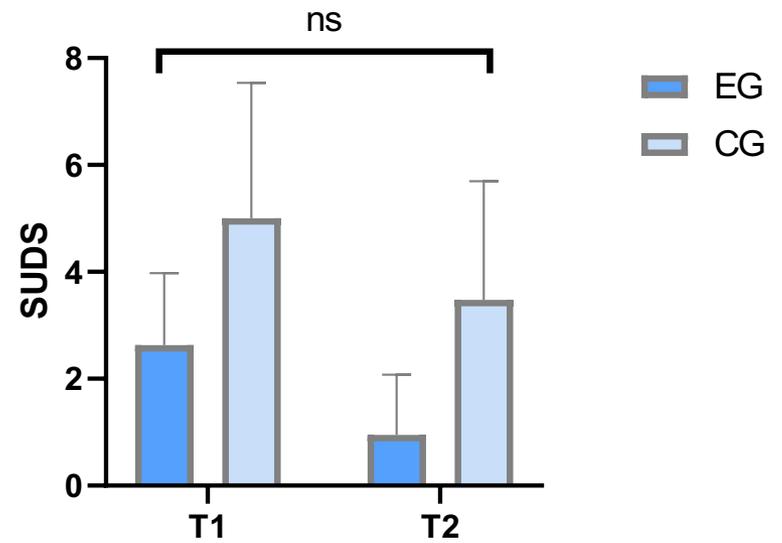
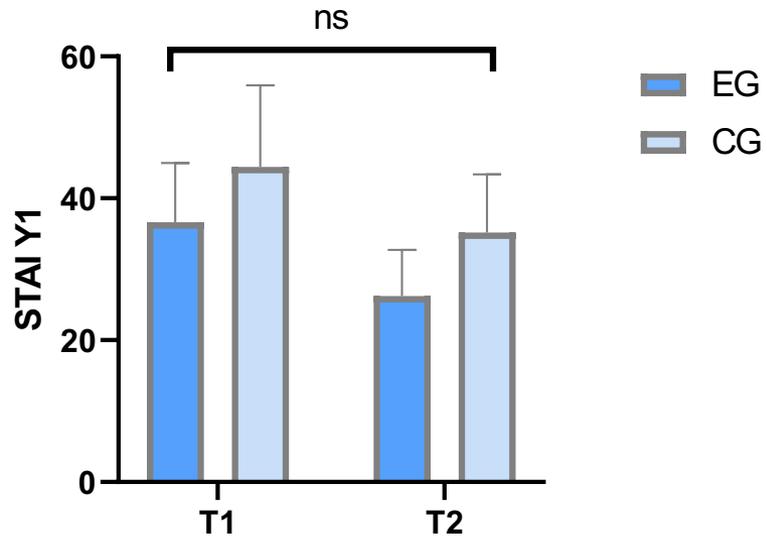
Results



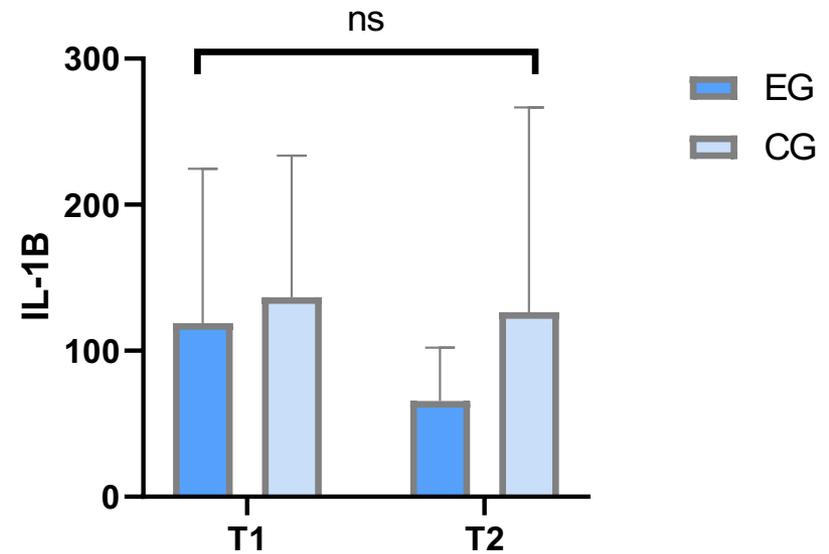
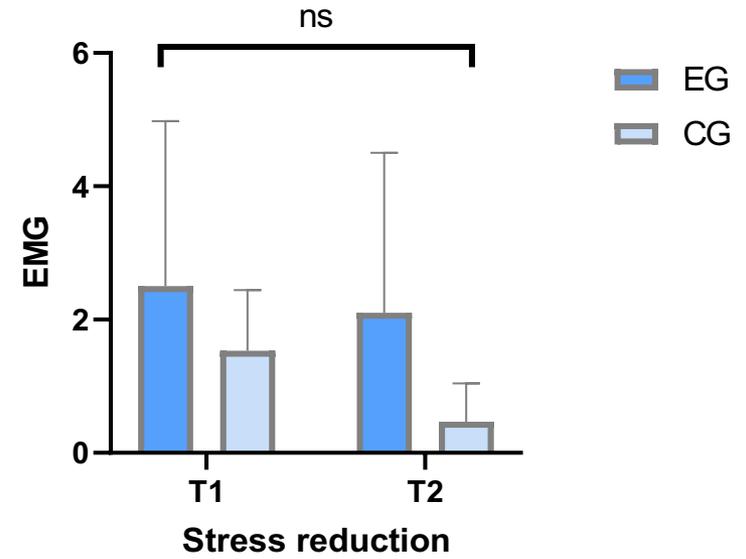
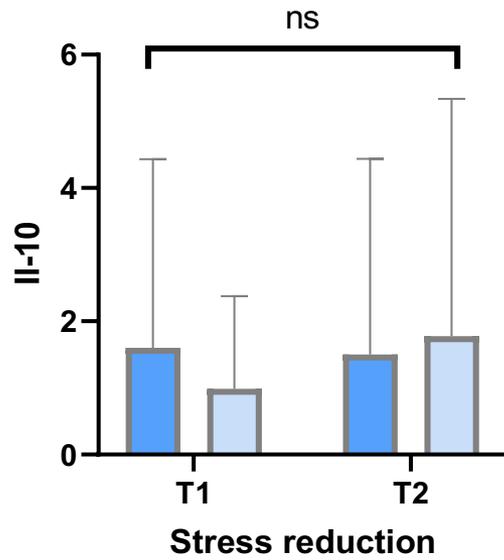
Results



Results



Results



Conclusions

In conclusion, this RCT proved the efficacy of the NDB technique in inducing a psychosomatic effect in terms of:

1. stimulating a strong parasympathetic activity
2. decreasing cortisol levels
3. reducing inflammation.

Therefore, the NDB technique can be able to help to modulate the cross talk between the immune, endocrine, and psychoneurological systems.

Future directions...

- Breathing wearing a ffp2 mask



Future directions...

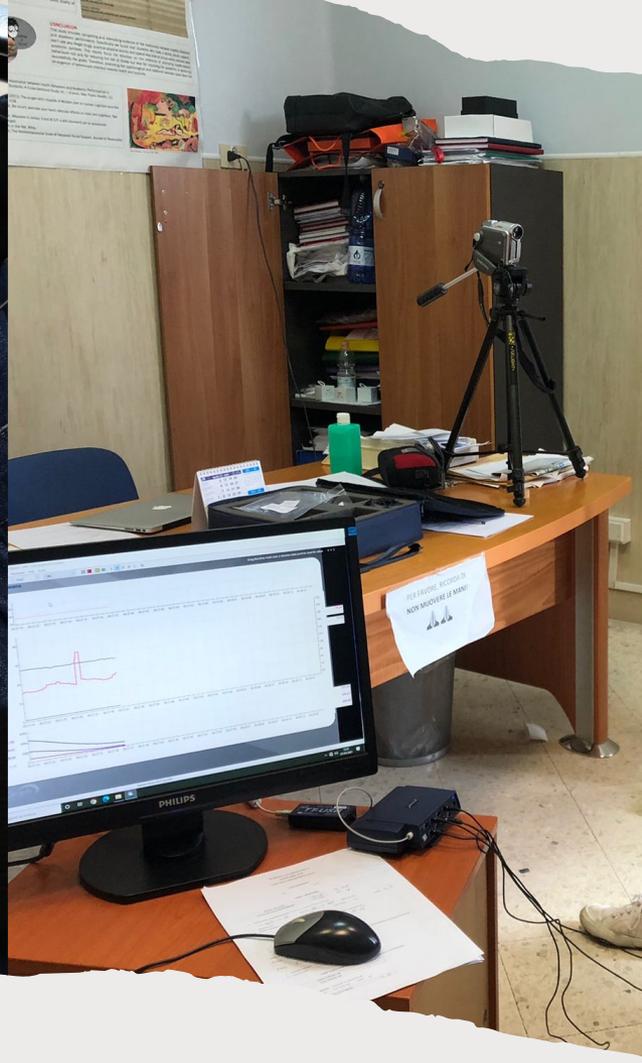


- Administer the NDB protocol to several disorders

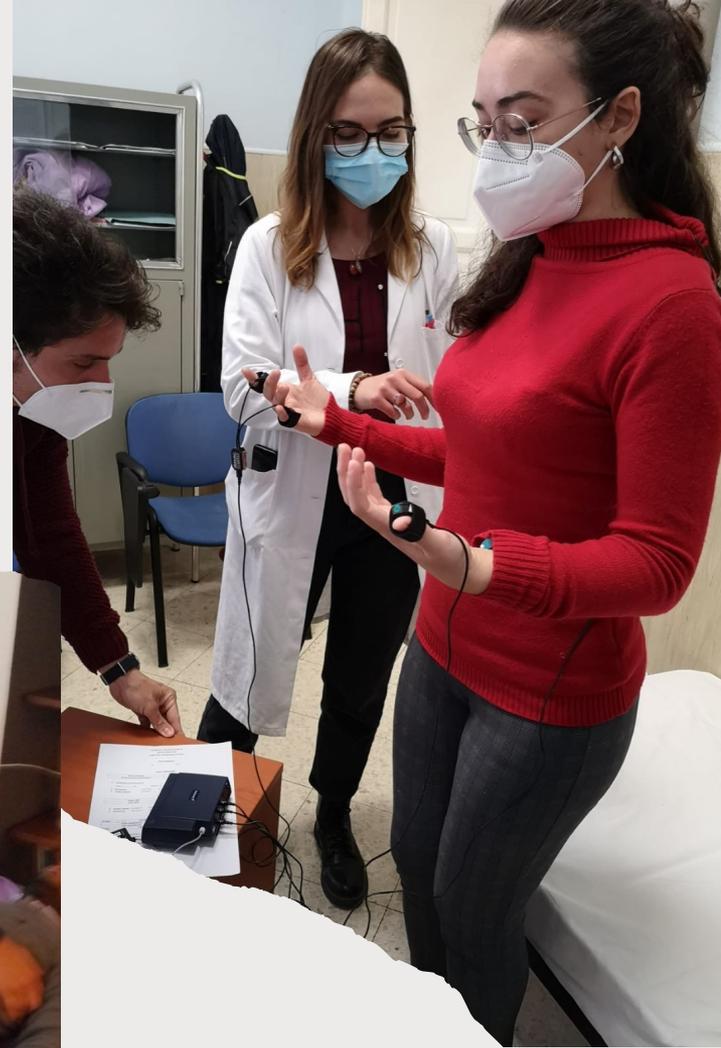
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Behind the scenes..





Behind the scenes..



Behind the scenes..



Thanks to:

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CENTRO STUDI DI PSICOTERAPIA NEO-FUNZIONALE



Azienda Ospedaliera Universitaria
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**Thanks for your
attention**

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