Yu-Kai Chang, Distinguished Professor

NATIONAL TAIWAN NORMAL UNIVERSITY

【Education】

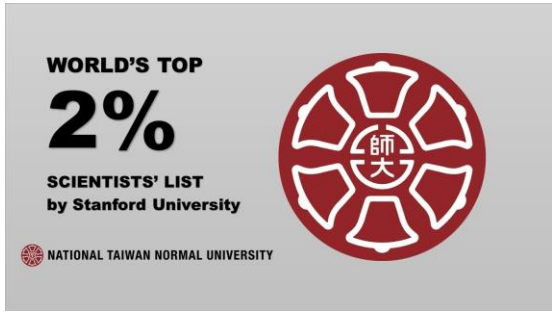
- Ph.D., Dept. of Exercise and Sport Science, University of North Carolina at Greensboro (UNCG)

【Current Position】

- Distinguished Prof. & Chair, Dept. of Physical Education & Sport Sciences, National Taiwan Normal University
- Director, Physical Activity and Cognitive Neuroscience Laboratory
- Treasurer, International Society of Sport Psychology (ISSP)
- Vice-President, Asian-South Pacific Association of Sport Psychology (ASPASP)
- Former President, Society for Sport and Exercise Psychology of Taiwan

【Honor】

- ~2021 World's Top 2% Scientists in Sport Science
- 2020 Distinguished Alumni Award, School of Health and Human Sciences (HHS), UNCG
- 2014 Early Career Distinguished Scholars, North American Society for Psychology of Sport and Physical Activity
- 2013 ISSP Developing Scholar Award, ISSP
- 2009 Outstanding Dissertation Award, UNCG



【Academic Interests】

- Exercise and Sport Psychology, Cognitive Neuroscience

【Sport Interests】

- Chinese Martial Art: Tai Chi Chuan/Taiji, Kung Fu, Bagua, Xingyi

NATIONAL TAIWAN NORMAL UNIVERSITY

Mindfulness as a New PST for Athletes' Mental Health and Performance: Empirical Evidence

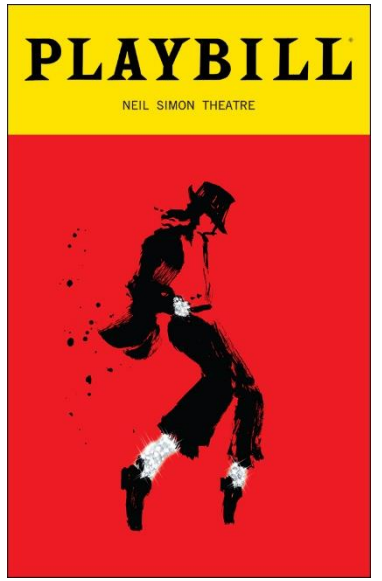
Yu-Kai Chang, Ph.D., Distinguished Prof. & Chair

Dept. of Physical Education & Sport Sciences, NTNU
Physical Activity and Cognitive Neuroscience Lab

2024/12 ASPC XII International Forum on Elite Sport: Enhancing Elite Sports – Asian Perspectives and Development

Playbill

- Athlete's Mental Health
  - Importance
  - COM-B Model
- New PST: Mindfulness and Evidence
  - What is mindfulness
  - Two empirical studies



“Faster, Higher, Stronger – Together” - IOC Session approves historic change in Olympic motto

The Session of the International Olympic Committee (IOC) approved a change in the Olympic motto that recognises the unifying power of sport and the importance of solidarity. The change adds the word “together” after an en dash to “Faster, Higher, Stronger”. The new Olympic motto now reads: “Faster, Higher, Stronger – Together”.

2 min read | Published on 20 July 2021

IOC Session | IOC News

A survey conducted by the International Olympic Committee in May 2020 revealed that managing mental health and sports careers, as well as nutrition and diet, were the biggest challenges the athletes faced during the unprecedented time of the COVID-19 pandemic.

The survey was conducted among more than 4,000 athletes and entourage members from 135 countries and was available in eight languages. The results highlight that 50 per cent of the athletes struggled with the complexity of conducting proper training as a consequence of the restrictions imposed in most countries to contain the virus.

Managing mental health and sports careers (both 32 per cent) were identified as the two biggest challenges, followed by nutrition and diet (30 per cent).

Mental Health in Elite Athletes

An International Olympic Comittee Consensus Statement

Potential Consequences in Sport

Prevalence of Mental Health Issues in Sport

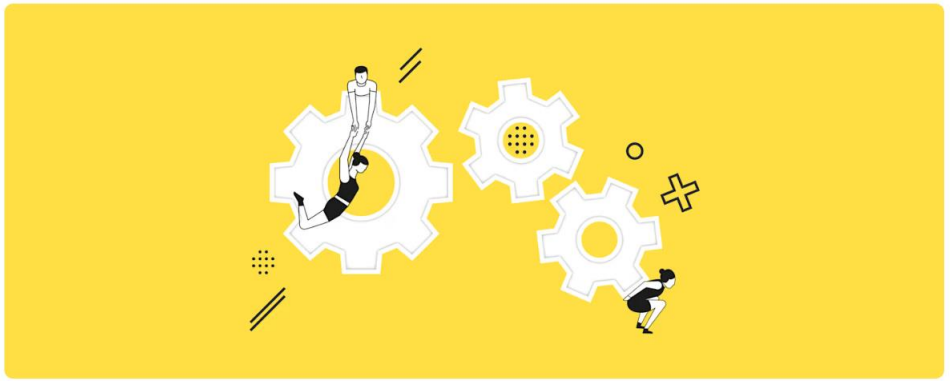
Anxiety & depression in male team sports

Prospectively in all elite athletes

Depression & eating disorders in collegiate athletes

Mental Health Conditions in Sport

- Overtraining/non-functional over-reaching
- Post-traumatic stress disorder
- Eating disorders
- Attention-deficit/ hyperactivity disorder
- Bipolar & psychotic disorders
- Suicide & self-harm
- Sleep disorders
- Sport-related concussion
- Gambling & other behavioural addictions
- Anxiety & related disorders
- Major depressive disorder & depression symptoms
- Substance use/ substance use disorders



MENTALLYFIT

IOC MENTAL HEALTH IN ELITE ATHLETES TOOLKIT

05 Jun 2024

Human well-being must be at the heart of elite athletic performance. Athletes should feel empowered and nurtured both physically and mentally… mental health and physical health are two halves of a whole, and care for both must be seen as priority.

ABHINAV BINDRA

Olympic champion; IOC Athletes' Commission member; IOC Mental Health Working Group member

COM-B for Mental Health

Michie et al. Implementation Science 2011, 6:42
http://www.implementationscience.com/content/6/1/42

IMPLEMENTATION SCIENCE

RESEARCH Open Access

The behaviour change wheel: A new method for characterising and designing behaviour change interventions

Susan Michie[1*], Maartje M van Stralen[2] and Robert West[3]

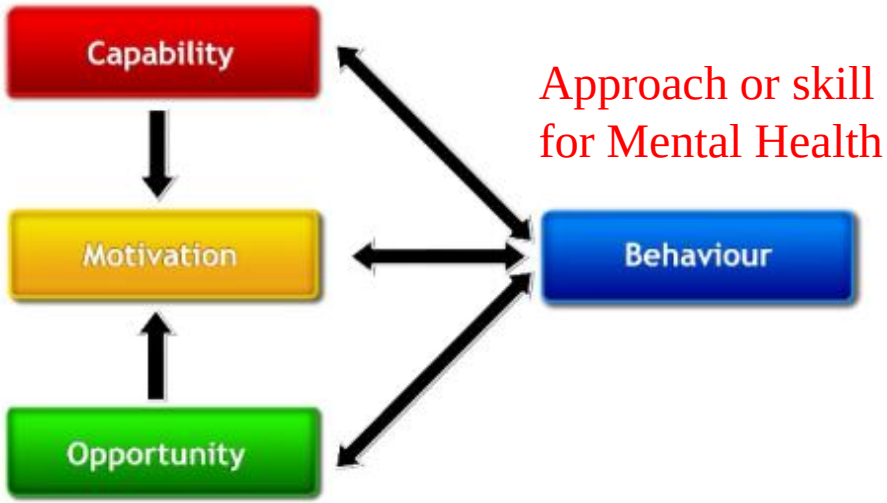
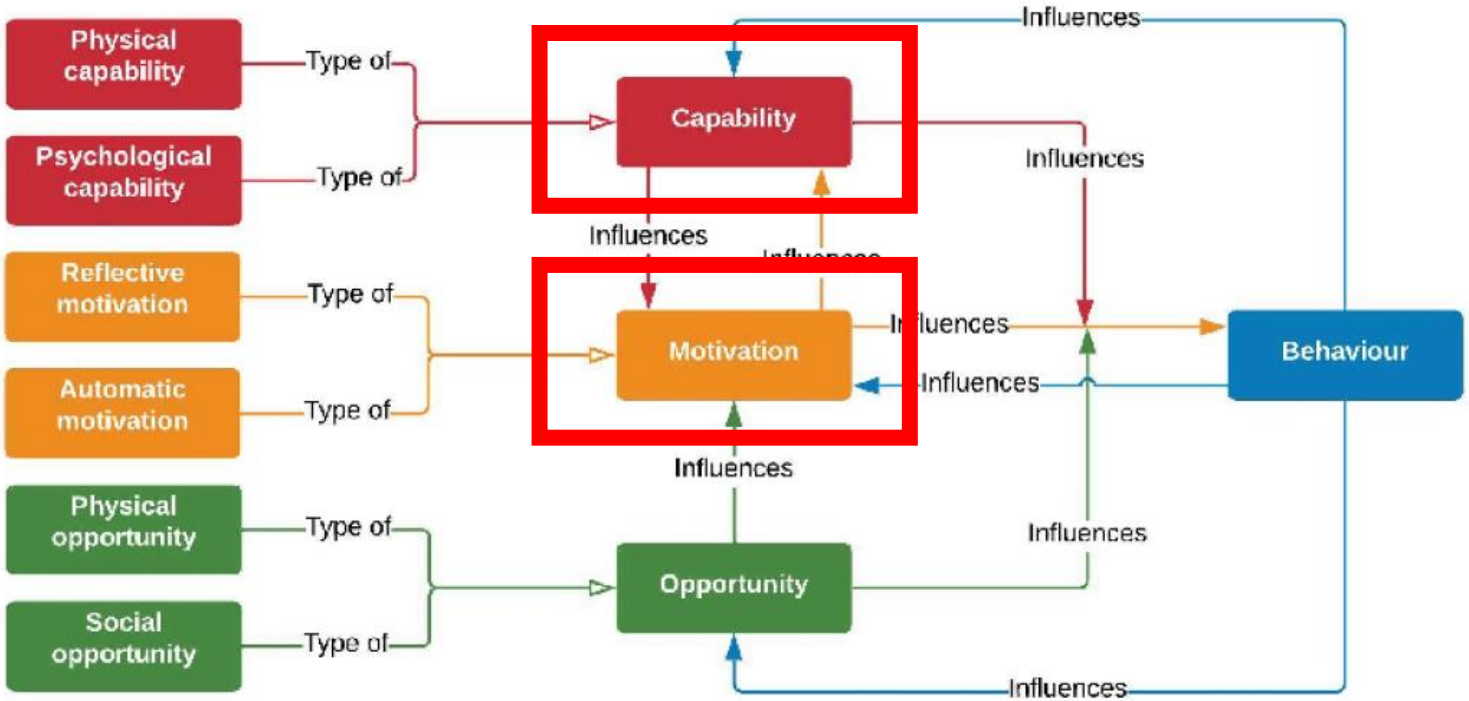


Figure 1 The COM-B system - a framework for understanding behaviour.

Approach or skill for Mental Health



Capability

- Do people have the physical skills needed (dexterity, strength, eyesight…)
- Do the people need to understand why the behaviour is important?

Motivation

- Do people feel good about doing/not doing the behaviour?
- Does the behaviour align with people's goals and values?

Opportunity

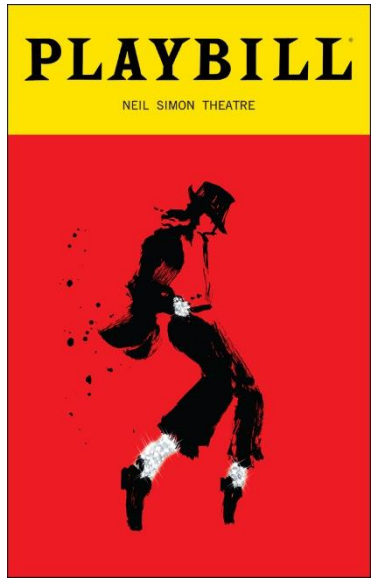
- Do people have the time to do the behaviour?
- Do people have the social support required to do the behaviour?

PST, Mental Abilities, and Mental Health

- Psychological Skills Training (PST) is a systematic practice of mental techniques to enhance performance and well-being.
  - resilience, focus, confidence, enabling athletes to perform consistently under pressure.

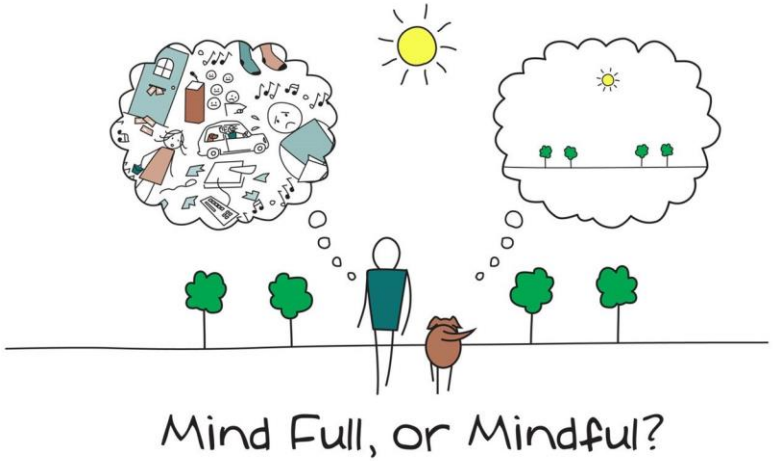
Playbill

- Athlete's Mental Health
  - Importance
  - COM-B Model
- New PST: Mindfulness and evidence
  - What is mindfulness
  - Two Empirical studies



Mindfulness

- An (trait or state) awareness that arises from intentionally paying attention to the present moment in a purposeful manner without judgment (Kabat-Zinn, 2023; Lindsay & Creswell, 2017).
  - Focus intentionally
  - Moment-by-moment experiences
  - Non-judgmentally
- A dispositional mindfulness can be enhanced through regular training (Nien et al., 2020).



- Mindfulness ↔ Mental health
  - Depression & Anxiety ↓ (Johannsen et al., 2022)
  - Stress ↓ (Myall et al., 2022)
  - Burnout ↓ (Zhang et al., 2023)
  - Rumination ↓ (Josefsson et al., 2017)
  - Well-being ↑ (Medlicott et al., 2021)
- Mindfulness ↔ Peak performance mental state
  - Flow ↑ (Kee et al., 2008)
  - Attention ↑ (Sumantry & Stewart, 2021)
  - Resilience ↑ (Tang et al., 2021)

Next step?

International Journal of Environmental Research and Public Health

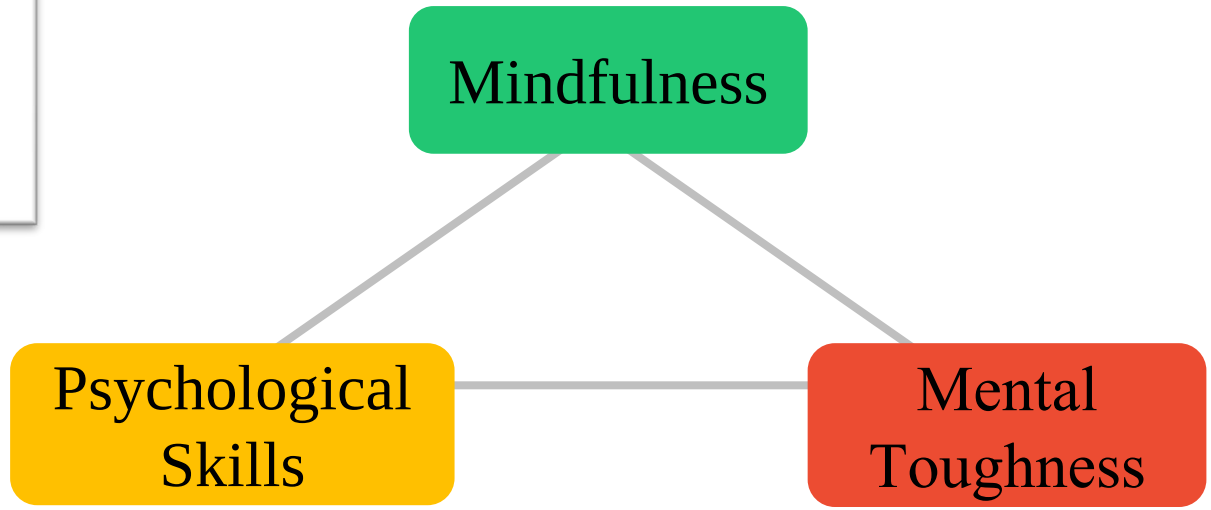
MDPI

Article

Relationship between Mindfulness, Psychological Skills and Mental Toughness in College Athletes

Chih-Han Wu [1], Jui-Ti Nien [1], Chi-Yen Lin [2], Yu-Hsiang Nien [3], Garry Kuan [4], Tsung-Yi Wu [5,*], Fei-Fei Ren [1,*] and Yu-Kai Chang [6,7,*]

- Aim of the study
  - Examining the correlation of dispositional mindfulness with PSTs and mental toughness
  - Chinese with multiple-sport



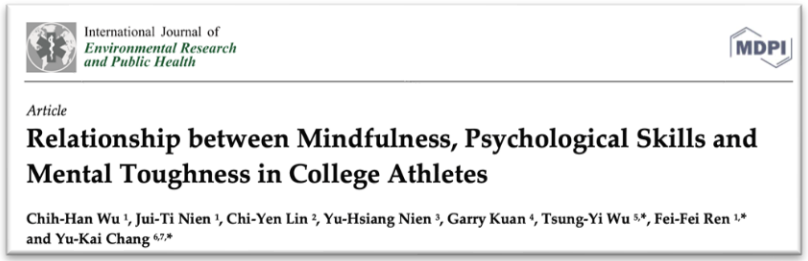
- Series of trainable psychological characteristics
  - ✓ Coping with adversity
  - ✓ Motivation
  - ✓ Attention
  - ✓ Confidence
  - ✓ Coachability

(Birrer et al., 2010)

- Abilities of athletes to rebound from failure, cope with pressure, and face adversity.
  - ✓ Positive effort
  - ✓ Anti-pressure
  - ✓ Endurance

(Gucciardi, 2016)

Methods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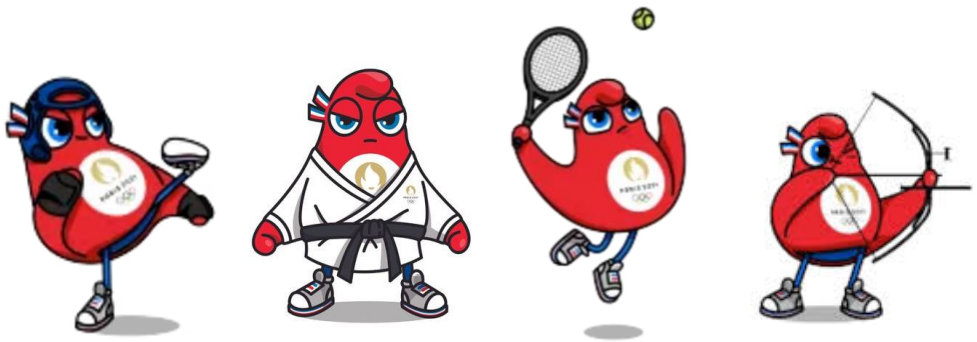

- 101 college athletes
  - Gender (M/F): 72/29
  - Age (years): 20.70 ± 1.31
  - Educational level (years): 14.99 ± 1.03
  - Sport types: TKO, KAT, Tennis, Archery
  - Sport experiences (years): 9.58 ± 3.47

Level of psychological characteristics (*M* ± *SD*)	
Dispositional mindfulness (CMAAS)	4.34 ± 0.61
Psychological skills overall score (APSI)	3.37 ± 0.50
Coping with adversity	3.20 ± 0.69
Motivation	3.20 ± 0.81
Concentration	3.52 ± 0.78
Confidence	2.94 ± 0.75
Coachability	4.01 ± 0.68
Mental toughness overall score (TMTIS)	3.85 ± 0.53
Positive effort	3.98 ± 0.67
Anti-pressure	3.41 ± 0.64
Endurance	4.17 ± 0.59

CMAAS = Chinese version of Mindful Attention Awareness Scale; APSI = Athletic Psychological Skills Inventory; TMTIS = Trait Mental Toughness Inventory for Sport.

Results & Conclusion

Table 2. Pearson correlation coefficients for CMAAS and APSI.

	1	2	3	4	5	6	7
1. CMAAS	-	0.36 **	0.24 *	0.23 *	0.21 *	0.32 **	0.21 *
2. APSI overall		-	0.73 **	0.52 **	0.61 **	0.70 **	0.81 **
3. Motivation			-	0.41 **	0.13	0.43 **	0.46 **
4. Coachability				-	0.14	0.05	0.20 *
5.Concentration					-	0.27 **	0.48 **
6. Confidence						-	0.60 **
7. Peaking and coping							-

Note. CMAAS = Chinese Version Mindful Attention Awareness Scale; APSI = Athletic Psychological Skills Inventory; Peaking and coping = Peaking under pressure and coping with adversity; * = $p < 0.05$; ** = $p < 0.01$.

- CMAAS ↔ APSI overall score ($p < .01$, $r = 0.36$)

Table 3. Pearson correlation coefficients for CMAAS and TMTIS.

	1	2	3	4	5
1. CMAAS	-	0.27 **	0.26 **	0.30 **	0.12
2. TMTIS overall		-	0.89 **	0.80 **	0.80 **
3. Positive effort			-	0.57 **	0.63 **
4. Antipressure				-	0.40 **
5. Endurance					-

Note. CMAAS = Chinese Version Mindful Attention Awareness Scale; TMTIS = Trait Mental Toughness Inventory for Sport; ** = $p < 0.01$.

- CMAAS ↔ TMTIS overall score ($p < .01$, r = 0.27)

International Journal of *Environmental Research and Public Health*

MDPI

Article

Relationship between Mindfulness, Psychological Skills and Mental Toughness in College Athletes

Chih-Han Wu [1], Jui-Ti Nien [1], Chi-Yen Lin [2], Yu-Hsiang Nien [3], Garry Kuan [4], Tsung-Yi Wu [5,*], Fei-Fei Ren [1,*] and Yu-Kai Chang [6,7,*]

- **Initial evidence**
  - Mindfulness is positively correlated with psychological skills and mental toughness in Chinese multiple-sport athletes.
- Further development of mindfulness-based interventions might be considered in the athlete population.

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

Effect of brief mindfulness and relaxation inductions on anxiety, affect and brain activation in athletes

Jui-Ti Nien [a], Diane L. Gill [b], Ting-Yin Chou [c], Chen-Shuo Liu [d], Xiaoling Geng [a], Tsung-Min Hung [a,e], Yu-Kai Chang [a,e,*]

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[b] Department of Kinesiology, University of North Carolina at Greensboro, NC, USA
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ARTICLE INFO

Keywords:
Mindfulness
Relaxation
Mental health
EEG
Cognitive resource

ABSTRACT

The mindfulness-based intervention and psychological skills training are often used for maintaining the mental health or reducing undesirable mental states in athletes. However, their differences in acute effects on mental health and underlying neural mechanism are not well understood. Therefore, the purpose of the current study was to examine the differential effects of brief mindfulness induction (MI) and relaxation induction (RI) on state anxiety, affect and brain activation. Thirty-five track and field athletes were recruited for this study. Using a within-subjects crossover design, participants underwent three conditions that incorporated two 30-min experimental conditions (i.e., MI or RI) and a control condition. State anxiety and affect were assessed before and after intervention, and brain activation (i.e., theta, alpha bands) were recorded by electroencephalography (EEG) during each 30-min condition. Repeated measures analysis of variance revealed that MI and RI similarly reduced state anxiety and negative affect from pre-test to post-test compared to the control condition. In terms of positive affect, there were no significant differences among the three conditions across times. Furthermore, participants exhibited higher frontal theta power during the MI and RI than control condition, whereas no differences in alpha power were observed among conditions. The current study provides initial evidence from an electrophysiological perspective that brief MI and RI both improve the negative psychological states in individual sport athletes through similar neural mechanisms. Nevertheless, the moderating effects of training experiences and long-term interventions on mental state and EEG activity in athletes need further investigation in future studies.

1. Introduction

A growing body of recent research shows increasing attention on mental health in athlete populations (Reardon et al., 2021; Schinke et al., 2021). Data from previous studies have demonstrated that athlete populations have significant levels of mental health problems related to inevitable stressors such as overtraining, competition, injury, social expectation and media (Kuettel & Larsen, 2020; Rice et al., 2016), especially those elite athletes who are injured, in their later careers, retired or experiencing poor performance (Rice et al., 2016). Additionally, Pluhar et al. (2019) indicated that negative mental states are more common in individual sports athletes (e.g., track and field) than those who are in team sports (e.g., soccer). Given that, early prevention interventions have been suggested to reduce the risk of mental health problems (Schinke et al., 2021), and to prevent mental health problems from affecting the training and competition of athletes. Adopting appropriate coping strategies is necessary to reduce the adverse effects of the stress (Hardy et al., 1996; Woodman & Hardy, 2003).

Mindfulness-based intervention (MBI) and psychological skills training (PST) are common strategies to cope with unwanted mental states (e.g., anxiety, worry) and increase focus on current tasks in sports (Gross et al., 2018; Josefsson et al., 2019; Röthlin et al., 2020). Mindfulness is generally described as a trait or state that referring to how an individual focuses intentionally and non-judgmentally on moment-by-moment experiences (Lindsay & Creswell, 2017). MBI refers to an educational and practical program that aims to foster mindfulness

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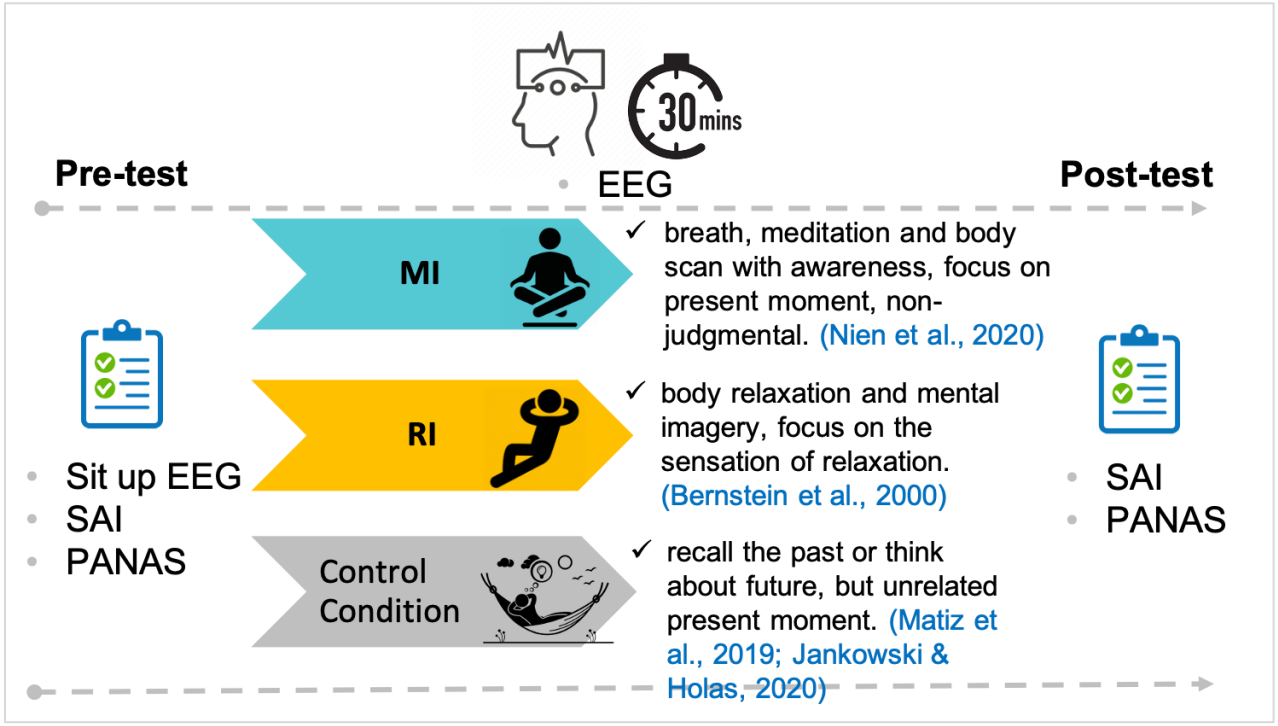
E-mail address: yukaichangnew@gmail.com (Y.-K. Chang).

- **Purpose**
  - Examining the differential effect between a single bout of mindfulness and relaxation on
    - ✓**Mental health**
      - ✓state anxiety, positive/negative affect
    - ✓**Mechanism**
      - ✓brain activation

Methods

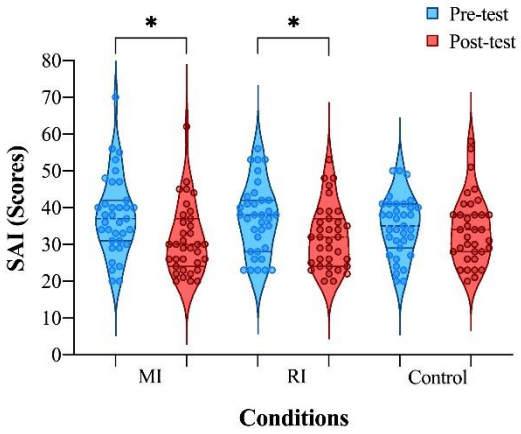
- **Participants**
  - 35 track and field athletes (M_{age} = 20.63 ± 2.43 years, 27 male, 8 female)

- **Experiment design**
  - Within-subjects design
  - Counterbalanced experimental conditions (30-min)
    1. Mindfulness induction (MI)
    2. Relaxation induction (RI)
    3. Control

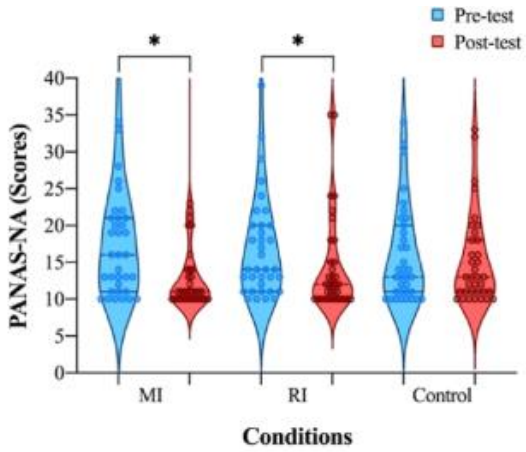


- SAI = State Anxiety Inventory; PANAS = Positive and Negative Affect Schedule; EEG = Electroencephalography.

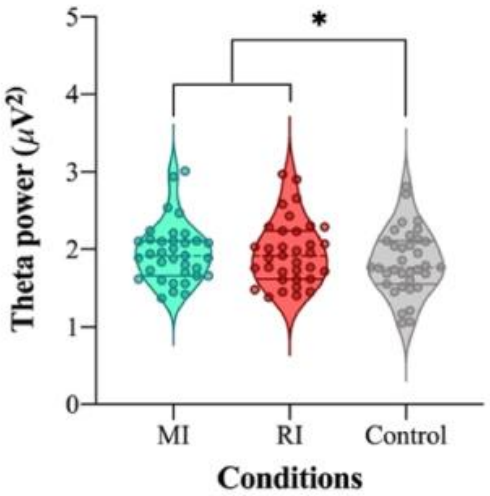
Results & Conclusion

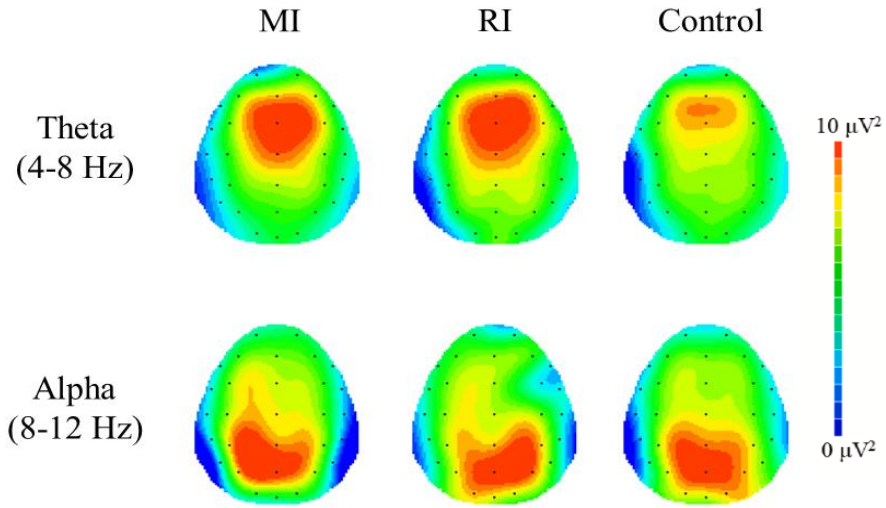


- State anxiety ↓
  - MI, RI (p = .003)



- Negative affect
  - MI, RI (p < .001)

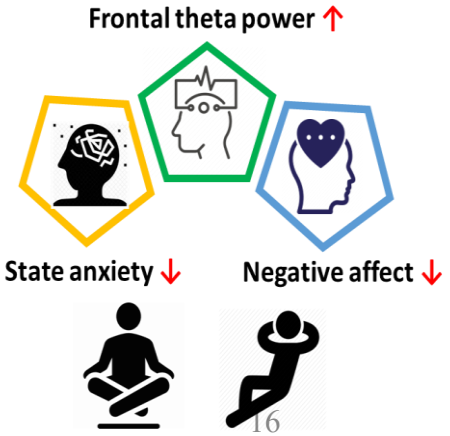




- Higher frontal theta power
  - MI, RI (p = .009)

Both 30-min MI and RI improve negative mental states.

- A single bout of MI or RI have comparable immediately effect in mental health outcomes
- through similar neural processing for athletes.
- Athletes could choose the most appropriate interventions → ideal mental state in daily life or competition.



COM-B for Mental Health

Michie *et al. Implementation Science* 2011, **6**:42
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IMPLEMENTATION SCIENCE

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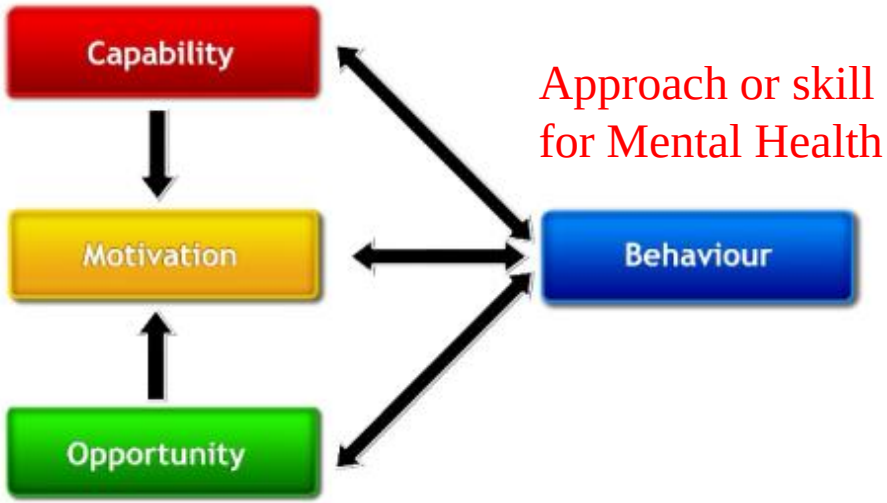

Approach or skill for Mental Health

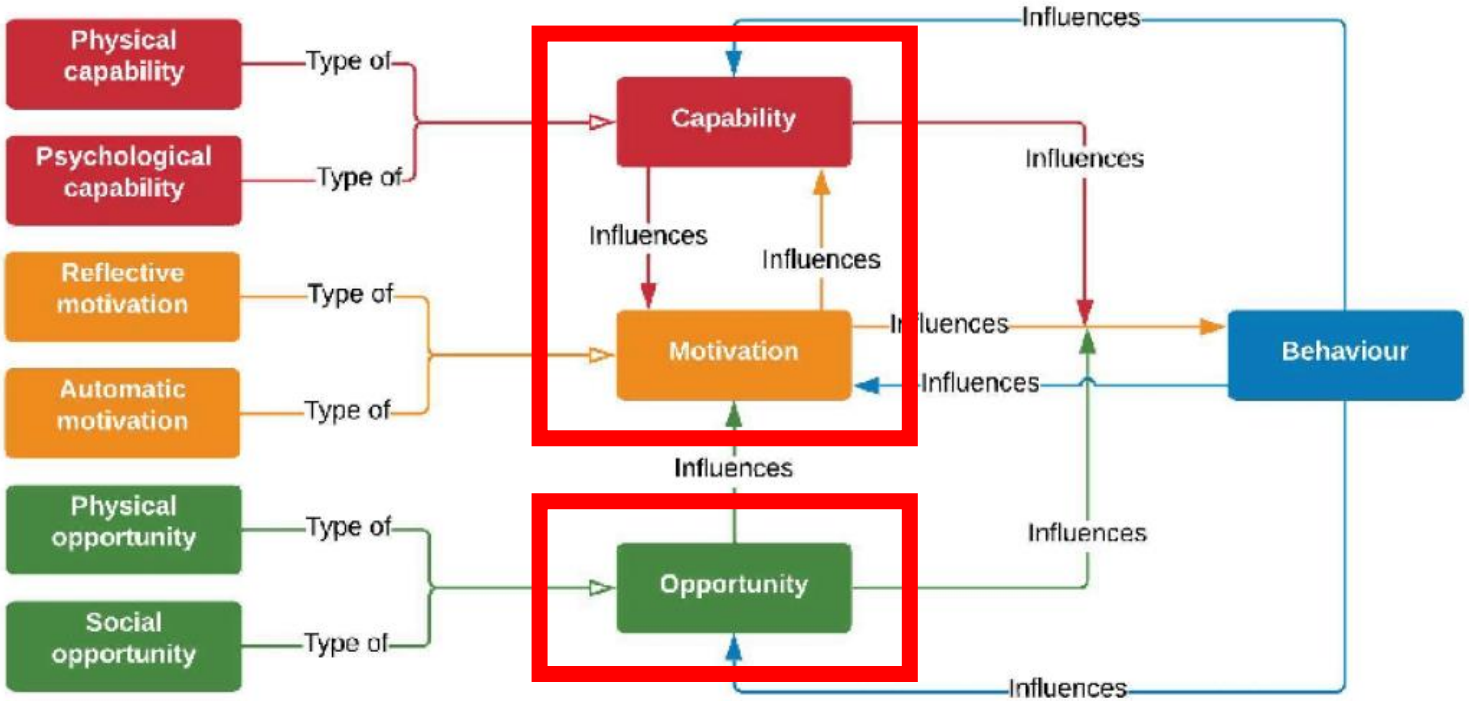

Figure 1 The COM-B system - a framework for understanding behaviour.


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HONG KONG 2024

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