

# Improvements in Physical Tension, Mental Tension, Anxiety, and Mental Sharpness/Focus Were Reported after Participating in 20-Minute HORA® Trance Fit and HORA® Trance Sport Training

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## Abstract

The effects of vigorous exercise on human cognitive function, including memory function, as people age, have been the subject of many studies and investigations. Other studies have tried to identify what human capabilities afford “getting into a zone” and staying there, on the assumption that “in the zone” is linked to the idea of being “in the flow”. Such research has been carried out mostly on students in university labs and/or through employee surveys. In an attempt to reduce employees’ burnout, a few other studies have pointed to root causes, such as overloading of the most capable, together with collaboration overload, which has an impact on long-term retention. However, these studies are limited by several factors, such as: 1) Testing cognitive functions after exercise in the lab setting rather than in a naturalistic environment; 2) Focusing on a single human function such as cognition; 3) Attributing human burnout to an organization’s work culture. To our knowledge, there are no studies comparable to the study we report here, which was done under the *real-life* conditions of work, school, home or office (i.e., a non-lab environment), and with pre- and post-measures reported from within these naturalistic environments. The present study asked how a specific exercise method, HORA Trance Fit/HORA Trance Sport (HTF/HTS) developed by Alexandr V. Atayan in 2011, impacts four dimensions of human health (physical tension, mental tension, anxiety level and sharpness of focus). We compared participant reports of these dimensions of health before and after exercise completed in real work and/or study environments. Participants completed these surveys before and after each 20-minute session of HTF/HTS, over the course of several weeks. The results revealed that participants reported statistically

significant and positive change in those four dimensions (physical tension, mental tension, anxiety level, and sharpness of focus) immediately following their participation in HTF/HTS during their active workload days.

## Keywords

Physical Tension, Mental Tension, Anxiety, HORA® Trance Fit

## 1. Introduction

This report presents data collected in partial fulfillment of a Harvard Kennedy School of Government Executive Education program course (Social Sciences—Project “LEADERSHIP, ORGANIZATION AND ACTION: A LEADING CHANGE”).

The research was organized and conducted by **Svetlana Bakla-Nova**, with supervision of the data collection and analysis by **Ariana Shahinfar, Ph.D.**, and in collaboration with colleagues in Practice HORA from Asia, Eastern Europe, and North America (Atayan, 1991). No financial remuneration was provided to participants, practitioners, or the data management team for their role in this research.

In a rapidly changing workplace, employees, business owners, and leaders need to keep learning to remain relevant and in demand. The McKinsey & Company article (Brassey et al., 2019), “Seven essential elements of a lifelong-learning mind-set”, highlights practices that can help people achieve success by being mindful along their career path. Underlining that today’s professionals need broad interdisciplinary competencies in addition to deep expertise in more than one area, Dr. Nick van Dam, Professor at Nyenrode Business University and Research Center for Strategy, Organization & Leadership, formed and visualized the following seven lifelong-learning mind-set elements: 1) Focus on growth; 2) Become a serial master; 3) Stretch; 4) Build your personal brand; 5) Own your development journey; 6) Do what you love and discover your *ikigai*; 7) Stay vital.

[The Oxford English Dictionary defines *ikigai* as “a motivating force; something or someone that gives a person a sense of purpose or a reason for living”.]

The essential element #7, “Stay vital”, was a recent and important addition to this mind-set and is described as follows:

- The ability to stay vital can contribute significantly to a person’s development. This goal demands that individuals make health and well-being a priority—paying attention to exercise, nutrition, sleep, and relaxation (for example, mindfulness and yoga) and developing good, sustainable habits.

Longevity in the workforce requires reinvention and growth. A reservoir of energy to support this hard work will help set individuals on the path to lifelong learning and provide the resilience needed to sustain these efforts.

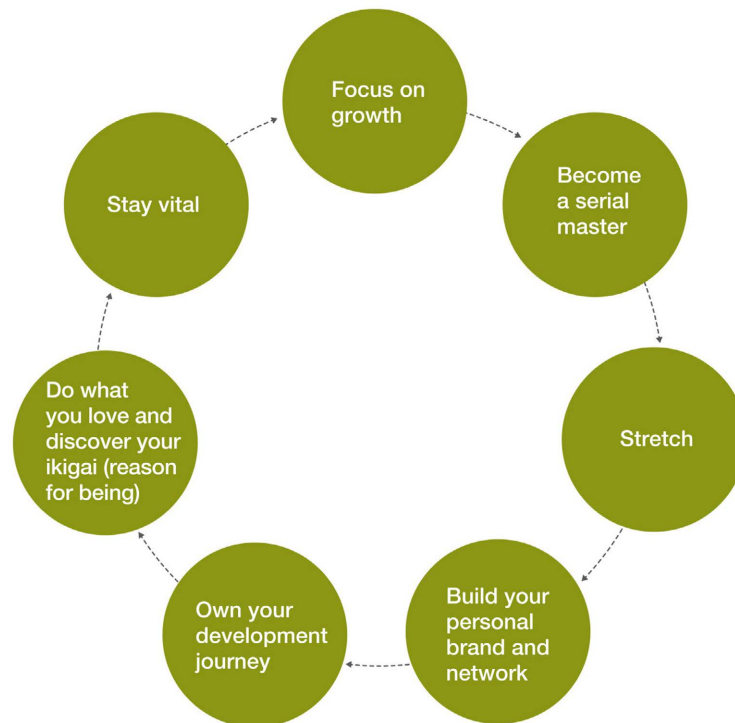
Considering the accelerating pace of life, its business, and seemingly endless multitasking, how can **longevity** in the workplace be reinvented and extended to refill the energy reservoir required to sustain lifelong learning? And, how can it be done most effectively and for all stakeholders, whether businesses, families, or individuals? Before answering this question, it is important to consider what science has already discovered about how to reach peak performance (see **Figure 1**).

The optimal zone of performance was first summarized and visualized in the form of the **Yerkes-Dodson law** developed by psychologists Robert M. Yerkes and John Dillingham Dodson in 1908 (Yerkes & Dodson, 1908).

The **Yerkes-Dodson law** represents an empirical relationship between pressure and performance. The law predicts that performance increases with physiological or mental arousal, *but only up to a point*. When levels of arousal become too high, performance decreases (see **Figure 2**).

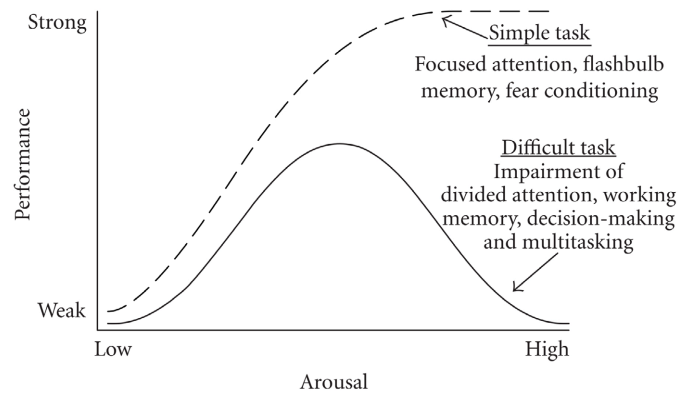
Accordingly, performance decreases if arousal exceeds the optimal zone. Staying in this non-optimal zone can cause burnout, with **the cost of this over-extension** represented in the mental, physical, and emotional degradation of human capabilities. From an economic perspective, a recent report suggested that the annual cost to employees for burnout-related issues has been estimated to be around \$190 billion in healthcare spending (Garton et al., 2021).

A lifelong-learning mind-set consists of seven essential elements.



Source: Nick van Dam, *Learn or Lose*, Breukelen, Netherlands: Nyenrode Publishing, November 2016  
McKinsey & Company

**Figure 1.** A lifelong learning mindset consists of seven essential elements.



**Figure 2.** Yerkes-Dodson law of the empirical relationship between pressure and performance.

The cost to organizational productivity can be measured in lost opportunities, slower speed-to-market, higher turnover, and lower morale.

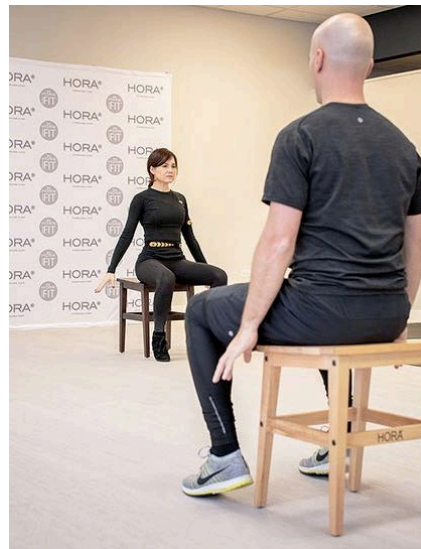
Scientists in wellness, sports psychology, and industry have attempted to answer the question of what a person must do to stay longer in the zone of optimal arousal and optimal performance. For example, Kath Woodward, Emeritus Professor of Sociology at the Open University in the UK, has attempted to apply studies of athletes and their ability to extend optimal performance in order to answer the question of how we (i.e., everyday individuals) can get into the zone of optimal arousal (Woodward, 2015).

Woodward's research revealed that business managers and employees would like to get *results faster, retain them longer, do less, be safe, and get more from the exertion of effort*—suggesting a valuing of the optimal zone—in much the same way as athletes do. Reporting on Woodward's team, Emily Barker reports that it “looked into the way that big corporations use the zone to try to motivate their staff; people now even have an app on their phones they can use to get themselves into the zone”.

In this paper, we present a new method of physical and psychological training to help participants reach optimal performance: HORA Trance Fit (HTF) and HORA Trance Sport (HTS) (Atayan, 2011). **HTF/HTS** was created in 2011, based on a request for a low-key, fast method of fitness that a working adult could perform before, during lunch, or after work to reset and neutralize his/her stress, anxiety, and tension in the mind, emotions or physical body. It was developed to provide a deep tension-release exercise program for the here and now—without warm-ups, special clothing, location or equipment. Young adults and youth wanted a faster, interactive rhythm (HTS), and older individuals wanted a safer, no-risk version of the exercises (HTF). HTF/HTS exercises were designed to accumulate energy and power while preventing exhaustion or the uncontrolled emission of energy. In other words, HTF/HTS was developed as a method to train individuals how to remain calm while being in action (i.e., calmness in action). In the **fast part of the HTF training**, the typical fitness/gymnastic exercises combine with constant shaking in the body, that is expressly

visible in the wrists. This is the provocation of adrenaline upsurge. This carefully organized training allows for a chance to submerge oneself into calmness. In the **slow part of the HTF training**, the common fitness actions are combined with the uninterrupted concentration of attention and deep submergence into self. This awakens an inner power. The inner power differs from physical power by its ability to transform into plasticity—not the usual “fitness flexibility” but rather into *pliability*, providing uninterrupted power. A person who has uninterrupted pliability can put themselves in any position as if in the state of a ready-to-release bowstring.

**Visual Examples: HORA Trance Fit/HORA Trance Sport (Picture 1 & Picture 2)**



**Picture 1.** ©Practice HORA, 2019.



**Picture 2.** © Practice HORA, 2017.

HTF/HTS exercises use principles of *nature and gravity* to release tension, re-energize the body and mind, and train a state of calmness under pressure. HTF is undertaken while the participant sits on a chair and is designed for adults 27+ and older, while HTS is done in a standing position, by youth under the age of 27. The HTF sitting version was developed in response to the fact that many adults have already accumulated physical ailments and non-productive physical postures/structures. Therefore, HTF uses the chair to provide additional stability and support during the exercises. Both HTF and HTS seek to give participants simple training to work with stress and turn it into an opportunity to overcome and be more productive. HTF/HTS have low-intensity movements, do not challenge joints and are done in synchrony with the body's natural rhythms.

The goal is to go beyond many meditative practices to allow for an inner reset by achieving a sustainable, controlled, aware “trance-mobilization state” through the exercises in an efficient 20 minutes of practice. These features and goals do not exist in similar practices, such as Zumba, Tai Chi or yoga (see **Box 1**).

Can HTF/HTS training be transformational and help people gain meaningful improvements in their everyday life? This is the question addressed by the research presented here. In this study, we assessed the impact of HORA Trance Fit (HTF) and HORA Trance Sport (HTS) training on participants' self-reports of anxiety, physical tension, mental tension, and mental sharpness/focus. Our goals were:

**Box 1.** Zumba, Tai Chi, Yoga (Lifefit Team & Franco, 2024; Zumba Fitness, n.d.; Yoga Point, n.d.).

**Zumba** was created in 1998 by Colombian aerobics instructor Alberty “Beto” Perez as a substitute workout when Alberto forgot his cardio music tapes. Zumba consists in high-energy, high-intensity aerobic fitness moves that are based on dance moves and elements from Merengue, Salsa, Mambo, Flamenco, Cumbia, Rumba, and Hip Hop. The core purpose of Zumba is to help people to reduce weight, provide social engagement, increase dance skills, and uplift mood (Zumba Fitness, LLC, n.d.).

**Tai Chi** is grounded in movement and martial arts principles based on the teachings of Taoist monks, developed around the 13th century. Its original purpose was for the perfection of physical and mental skills through 13 forms to defend the self and polish an individual's character. This practice requires consistent and dedicated effort. It was first taught in America around 1939 and established early followers in San Francisco (Franco, 2024).

**Yoga's** origins are traced back to Indian culture and tradition from 10,000-7500 BCE as mentioned in the *Vedas (Upanishads)*. The first explicit references to and objectives of yoga appeared in the *Upanishads*, and referred to the concepts of withdrawing the senses, controlling the mind, and attaining liberation. Systemization of yoga happened under Patanjali around 500 BCE, with a clear focus on providing practical methods of awakening and expanding the higher faculties of mind, intellect, and quality of consciousness. Patanjali became the founder of Ashtanga yoga that encompasses a whole series of practitioners' concepts such as *yamas* and *niyamas*, *asanas*, *pranayama*, *pratyahara*, *dharana*, *dhyana*, and *samadhi*. Hatha Yoga, now the most popular tradition of yoga, was developed later on between 600 to 1500 CE, because it is more practical and has a history of improving health and wellbeing. Hatha Yoga's objective is to strengthen and purify the body and mind. It focuses on the harmony of body and mind through the practice of *asanas*, cleansing, *pranayama*, *mudras*, and *bandhas*. The first of the masters who introduced the West to yoga was Swami Vivekananda, who lectured on the method in Chicago in 1897. He also founded an organization — Ramkrishna Mission — which works to keep the spiritual traditions of yoga pure and to uplift society (Yoga Point, n.d.).

- 1) To examine whether HTF and HTS may help as tools to address or reduce levels of anxiety and tension in the physical and mental domains.
- 2) Evaluate if the effort expended by a person in a 20-minute HTF/HTS session is sufficient to increase mental sharpness and focus, thus generating an extension of optimal arousal and optimal performance.
- 3) Evaluate the cumulative effect of participating in 20-minute HTF/HTS sessions over the course of time.
- 4) Evaluate if HTF/HTS sessions produce similar results among participants of all ages.

## 2. Methods

One hundred fifty-one unique participants self-selected to participate in this study. Participants were recruited via an open invitation to join the study placed on the Practice HORA website. It was shared with class participants at Harvard, students who have been exposed to HORA before, and other Practice HORA leaders for open invitation. Participants had to fill out a health pre-check form to determine if he/she can safely perform low intensity physical activities. The current study participants included people from different countries, professions and gender. One hundred fifteen participants (76%) identified as female, Thirty-six participants (24%) identified as male. The average age of participants was 29 (Range = 11 - 75; Median = 19). All subjects gave their informed consent before the study. **Table 1** provides details on participants' demographic distribution.

Our study was done with remote participants across the globe. Participants logged in to Zoom during their morning, day or evening from home or office. Since participants are not in the lab environment and do not have supervision from the lab team, for evaluating their perspective of before and after, we had to choose simple measures that could be understood and executed by a wide range of participants.

We took a self-evaluation concept, developed by Mongormery and Asberg that is used in screening interviews by therapists before determining the scale of mental health assistance needed by a potential client (Montgomery, 1978). Currently, online health support therapy clinics start with self-assessment questions to gather the state of the patient/participant. These measures ask participants to

**Table 1.** Demographics of participants in the study.

Generation	Estimated Age as of 2022	Female	Male	Total #	Total %
Baby Boomers	58 - 76	11	0	11	7%
Gen X	42 - 57	16	3	19	13%
Millennials	26 - 41	23	3	26	17%
Gen Z	10 - 25	65	30	95	63%
<b>Grand Total #</b>		<b>115</b>	<b>36</b>	<b>151</b>	100%
<b>Grand Total %</b>		76%	24%	100%	

assess their mental and physical state using instruments such as The Montgomery-Åsberg Depression Rating Scale (MADRS), which assess potential clients through a ten-question interview with a defined linear numeric scale, focused on perceived sadness, inner tension, concentration difficulties, lassitude, and pessimistic thoughts.

Based on feedback from potential participants in the study, asking 10 questions before and after the 20-minute exercise during the work day was considered a study burden. Thus, we designed only five questions that were closely related to the MADRS questions.

In this study, we assessed the impact of HORA Trance Fit (HTF) and HORA Trance Sport (HTS) training by asking participants to rate themselves along four dimensions (anxiety, physical tension, mental tension, and sharpness/focus of the mind) on a 10-point linear numeric scale ranging from “none” to “significant”, both before and after participating in 20-minute HTF/HTS class sessions:

- 1) How would you rate your physical tension?
- 2) How would you rate your mental tension?
- 3) How would you rate your anxiety level?
- 4) Does your mind feel sharp and focused?

These dimensions were chosen based on the theoretical foundations that underpinned the development of HTF/HTS, and comprise the benefits expected from similar physical exercise programs, as described earlier. For the purposes of our study, we defined Physical Tension as muscle tension that serves as a marker of stress (American Psychological Association, 2023). Mental Tension refers to a state of strain, worry or distress resulting from demanding circumstances that exceed one’s resources (Bazargan-Hejazi et al., 2013). Anxiety can be described as persistent, excessive worries that continue even in the absence of a stressor (American Psychological Association, 2022). Finally, Mental Sharpness/Focus is defined as a critical function that sculpts neuronal processing to benefit perception, decision making, and action (Thiele & Bellgrove, 2018).

In addition, we gathered qualitative data through one open-ended question:

- 5) Would you like to share anything else you noticed about your physical, mental, or psychological state since beginning today’s class?

In order to maximize survey completion, we sought feedback from potential participants regarding the amount of time they would be willing to devote to the pre-post surveys. In addition to limiting the survey questions to 5, respondents indicated that filling out the survey using one’s phone directly before and after class was optimal.

Our goal was to examine whether HTF and HTS could help as tools to address anxiety and tension. Participants answered pre-class questions (see above) measuring their perceived state of physical tension, mental tension, anxiety, and mental focus/sharpness on a scale of 0 (none) to 9 (significant), in addition to recording any qualitative observations they wished to share. After 20 minutes of HORA Trance Fit (HTF) and HORA Trance Sport (HTS) training, they answered the same questions again. Some participants did this training around



lunchtime (12:00-12:30) during the workday, twice a week; some did it in the morning, evening or weekends. The participants were encouraged to try to keep schedule consistency for 2 - 4 weeks; no other obligations or restrictions were given or enforced. The experiment lasted for 4 months and accepted new participants throughout this period. No participant received compensation and none received any special reminders or nudges before the class.

Participation required the use of video conferencing, computer speakers, and a chair for HTF or space in which to perform standing exercises for HTS. An easy-to-access Zoom link was published on the Practice HORA website and social media accounts. Most did their exercises in their homes (remote work) during the spring/summer of 2022 (at the end of the COVID-19 period, when many still worked from home). Participants “mirror-imaged” exercises that were led by specially-trained HTF leaders or HTS youth volunteers over Zoom.

### 3. Results

The **first goal** of our study was to examine whether HTF and HTS may help as tools to address and reduce levels of anxiety and tension. Indeed, they do. The average pre- and post-ratings reported by participants across all sessions of practice indicated the following improvements:

**36% increase in Sharpness/Focus of Mind**

**45% decrease in Physical Tension**

**50% decrease in Mental Tension**

**49% decrease in Anxiety**

Our **second goal** was to evaluate the magnitude of the gains reported by participants. In order to do so, we performed paired-samples t-tests on participants' pre-post ratings of tension and anxiety. **Figure 3** depicts the pre-post changes reported by participants across all program sessions, combined. Overall, a series of paired-samples t-tests revealed that participants reported a statistically significant reduction in physical tension ( $t(568) = 22.34$ ;  $p < .001$ ), mental tension ( $t(568) = 23.59$ ;  $p < .001$ ), and anxiety ( $t(555) = 25.20$ ;  $p < .001$ ), along with a significant increase in sharpness/focus ( $t(567) = 20.48$ ;  $p < .001$ ) after participating in practice sessions. Additionally, estimates of Cohen's  $d$  indicated pre-post effects that could be described as large in magnitude across all measures: physical tension ( $d = .94$ ); mental tension ( $d = .99$ ); anxiety ( $d = 1.07$ ); sharpness/focus ( $d = .86$ ).

In **Figure 4**, we present survey data as reported after only one session of program participation. The figure depicts statistically significant reductions in physical tension ( $t(141) = 7.13$ ;  $p < .001$ ), mental tension ( $t(141) = 8.41$ ;  $p < .001$ ), and anxiety ( $t(136) = 10.51$ ;  $p < .001$ ), and a significant increase in sharpness/focus ( $t(141) = 7.36$ ;  $p < .001$ ). Estimates of Cohen's  $d$  indicated pre-post effects that could be described as medium for physical tension ( $d = .60$ ), mental tension ( $d = .71$ ), and sharpness/focus ( $d = .62$ ). The effect size calculated for reports of anxiety, on the other hand, were large ( $d = .90$ ).

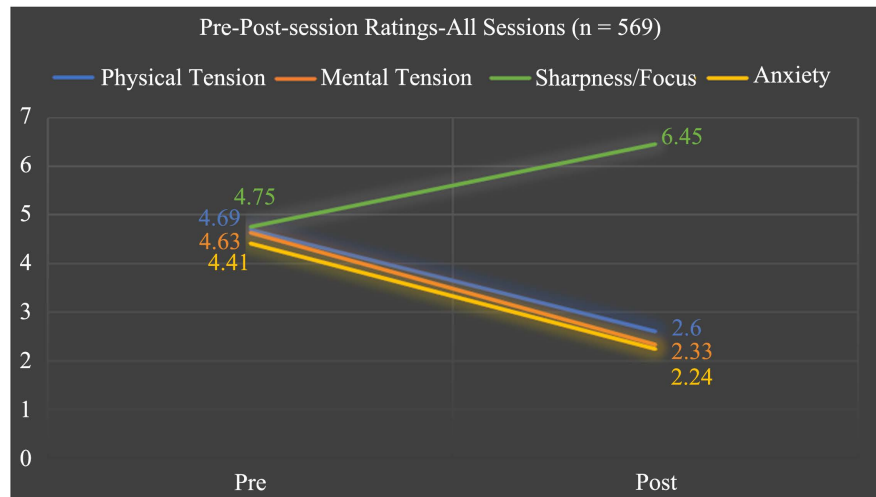


Figure 3. Full sample/all practice levels combined vs.

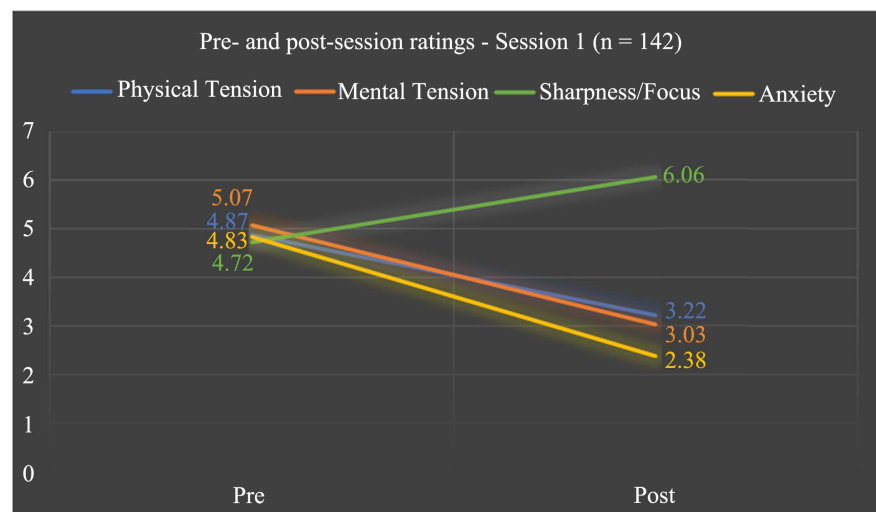
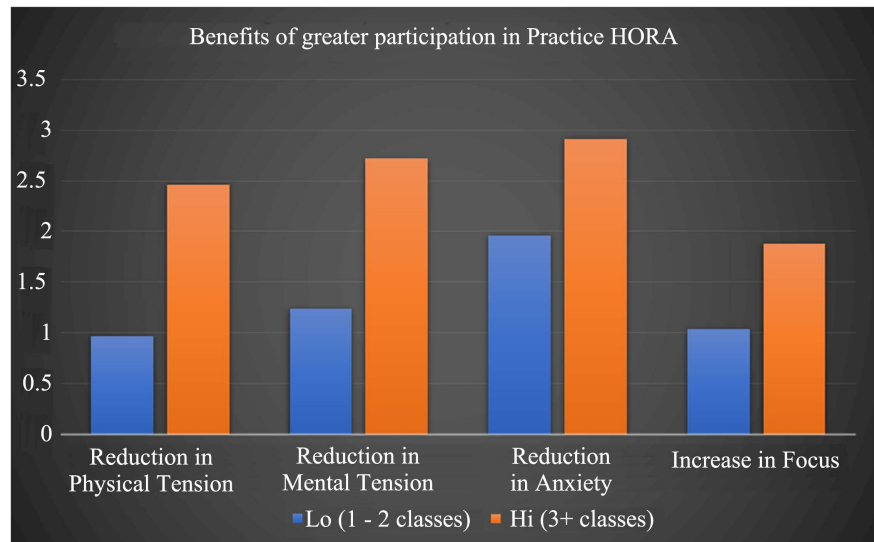


Figure 4. First session.

### HORA Trance Sport and HORA Trance Fit self-assessment results

In order to address our **third question**—the cumulative effect of participating in 20-minute HTF and HTS sessions over the course of time—we compared reports from those who engaged in more sessions of practice with those who only attended once or twice. First, we calculated change scores by subtracting pre-session reports from post-session reports for each dimension queried. In order to create roughly equal-sized groups amenable to comparison, we then compared the change scores reported by those who participated in only one or two classes ( $n = 91$ ) to those who participated in 3 or more class sessions ( $n = 60$ ). As depicted in **Figure 5**, an analysis of variance (ANOVA) indicated statistically significant differences between lo (1 - 2 sessions) and hi (3+ sessions) participation in terms of reduction in physical tension ( $F(1,135) = 13.35$ ;  $p < .001$ ; eta-squared = .09), reduction in mental tension ( $F(1,135) = 10.81$ ;  $p < .001$ ; eta-squared = .07), reduction in anxiety ( $F(1,133) = 4.59$ ;  $p = .03$ ; eta-squared = .03),



**Figure 5.** Average change in all 4 categories as a function of low (1 - 2 times)/high (3+) participation.

and increase in mental sharpness/focus ( $F(1,135) = 6.53$ ;  $p = .01$ ; eta-squared = .05). These findings suggest an increased—or cumulative—benefit to those who sustained engagement with the practice beyond the introductory stages.

Our **fourth goal** was to evaluate if HTF/HTS sessions were comparably effective for participants across generations. In order to do this, we conducted an ANOVA on average change reported in physical tension, mental tension, anxiety, and mental sharpness/focus with participant generation (Baby Boomer, Generation X, Millennials, and Generation Z) as a factor. The ANOVA revealed no significant differences between generational groups, indicating HTF and HTS appeared to be similarly effective regardless of participant age.

Finally, we present below a sampling of the qualitative responses given to the free-form question at the end of the survey: “Would you like to share anything else you have noticed about your physical, mental, or psychological state since beginning today’s class?” These reports not only echo but also highlight the benefits of HTS/HTF gleaned from the quantitative data with respect to a reduction in both physical and mental tension and anxiety, as well as an increase in mental focus.

“The sleepiness is gone”

**Millennial Generation, Unknown Profession—after 1st training session.**

“My brain feels more engaged after these sessions”

**Millennial Generation, IT Professional—after 1st training session.**

“Feel more centered, still anxious, but less. Do feel a center of calm in the middle of the body”

**Baby Boomer Generation, Script Writer—after 6th training session.**

“I felt I had a better understanding/feeling of how to do these exercises today—the connection from hand to spine to foot. And I feel more benefit from it—clearer and calmer in my mind”

**Gen X Generation, IT Professional—after 7th training session.**

“I feel like my mind has cleared: relaxed but able to focus on what I want to do”

**Gen X Generation, IT Professional—after the 9th training session.****4. Discussion**

In general, there are studies that provide important evidence that physical fitness is known to show an overall impact on the health of individuals. One example is a recently published study summary on “Acute Exercise Improves Prefrontal Cortex but not Hippocampal Function in Healthy Adults”, based on research carried out with volunteers from the New York University community and summarized by Cambridge University Press with Dr. Wendy Suzuk (Basso et al., 2015). Another study by researchers at Florida Atlantic University and CINVESTAV, Mexico City, Mexico provides novel insight into the benefits of exercise by deriving positive evidence that shows that consistent exercise, beginning in young adulthood and continuing throughout middle age, helps maintain memory function during aging (Vivar et al., 2023).

This discussion draws on research carried out by Dr. Wendy Suzuki’s Neural Science and Psychology Lab, which is focused on “immediate (acute) and long-term effects of exercise on both EEG signals and cognitive functions in high school and college students. The lab’s goal is to identify the optimal exercise regime that maximally enhances brain function and academic performance”. Her research into Acute Exercise and Prefrontal Cortex function generated evidence “indicate[ing] that acute bouts of aerobic exercise improve a variety of cognitive processes including attention, concentration, working memory, reasoning, and planning although not all prefrontal cortex-dependent tasks are improved by acute aerobic exercise.” Furthermore, “[A]cute aerobic exercise enhances the overall functioning of the prefrontal cortex” (Basso et al., 2015). Our work is most comparable to similar studies that examine steady-state aerobic exercise on cognition.

Suzuki’s Acute Exercise and Prefrontal Cortex was based on eighty-five participants (51 F/34 M, Mean age = 22.21, range 18 - 35) doing a 50 minutes vigorous-intensity physical activity session on a stationary bicycle with a 5-minutes warm up and 5 minutes cool-down period for a total of 60 min of exercise. The study concluded that the beneficial effect of acute exercise on cognitive capabilities endured from 30 minutes to 2 hours post-exercise. What the study concluded was in line with the transient increase in a variety of neurotransmitters, neuromodulators, and neurotrophins including dopamine, norepinephrine, endogenous opioids, endocannabinoids, brain-derived neurotrophic factor, and insulin-like growth factor 1, with these increases lasting for at least 2 hours after exercise.

The study reported here was designed to assess the impact of a new kind of efficient, 20-minute, low-intensity training (HTF/HTS) on participants’ physical

and mental states. Both quantitative and qualitative findings show self-reported measurable benefits of HTF/HTS on all four dimensions: physical tension, mental tension, sharpness/focus of the mind, and anxiety. Indeed, the pre- and post-effects reported by participants across all measures were found to be statistically significant.

It can be seen through the self-reported data that participating in the HTF/HTS training was associated with a promising increase in sharpness/focus of the mind, and decreases in anxiety, and physical and mental tension, suggesting that HTF and HTS has a positive impact on physical and mental tension, anxiety and ability to focus in just 20 minutes of non-vigorous exercises on all four dimensions.

Why is this important and how can this be achieved in such a short time period across various ages, professions and genders? Why does HTF/HTS have such efficient outcomes? The answers may reside in the purpose of the program. They can be glimpsed from consideration and review of the history, focus and purpose of currently available, popularized methods of exercise, such as Zumba, Yoga, or Tai Chi (see **Box 1**), vs. the purpose of HTF/HTS.

Our findings suggest that the purpose and design of the exercises has a promising impact on how participants witness effects in their own mental, emotional, physical states based on the four dimensions of this study. In the Acute Exercise and Prefrontal Cortex after 50 mins of vigorous exercise, there was evidence of increased cognitive ability. However the study did not measure impact on tiredness for the day or the next day, and it did not measure impact on stress, anxiety and tension. It may be that after 50 mins of stationary bicycle exercises—a non college age adult—will not be able to function optimally if they have had previous joint issues, problems with blood pressure, excessive body weight, or other chronic challenges. At the same time our HTF/HTS study could benefit from study done at lab environment evaluation—where control group, cognitive testing and measures are asset by study lab team.

To our knowledge, few if any studies have examined the speed, and accumulation of effects persistence and longevity from exercises on all 4 dimensions, without posing a significant risk of damage, that can be undertaken by adults aged 18 - 76+, at a variety levels of physical fitness, body shape and prior damage or limitations. Additionally, we are not aware of studies comparable to our HTF/HTS study in that ours was conducted under *real-life* conditions of work, school, home or office (i.e., a non-lab environment) and with pre- and post-measures monitored during the work week. In this study, no limits or requirements were set on participants mandating them to not miss classes. One of the reasons there were no such limitations is because real life produces scheduling conflicts, and sometimes people cannot attend training sequentially.

This study also shows promising evidence that individuals accumulate the benefits of consistent training. As shown in **Figure 5**, individuals who only attended 1 or 2 times reported less reduction in physical and mental tension, and

anxiety than those who participated in 3 or more sessions. They also reported a lower increase in focus vs. the individuals who participated in 3 or more sessions. This can be interpreted as promising evidence of the additive effect of training, of the benefits of training lasting for the participant and carrying over in between sessions, so that he or she arrives at the next session less physically or emotionally tense, and more focused.

Accordingly, this study was set to also test the *accumulated benefits* of HTF/HTS from consistent training. As per the **Yerkes-Dodson law**, there is an empirical relationship between pressure and performance. The law predicts that performance increases with physiological or mental arousal, *but only up to a point*. When levels of arousal exceed a certain limit, performance decreases. This decrease has a cumulative chronic effect by virtue of how often a person spends outside the point of optimal performance, as measured in hours, days, and months. Burnout does not happen from a single instance of arousal or stress, whether it surpasses the optimal amount or not.

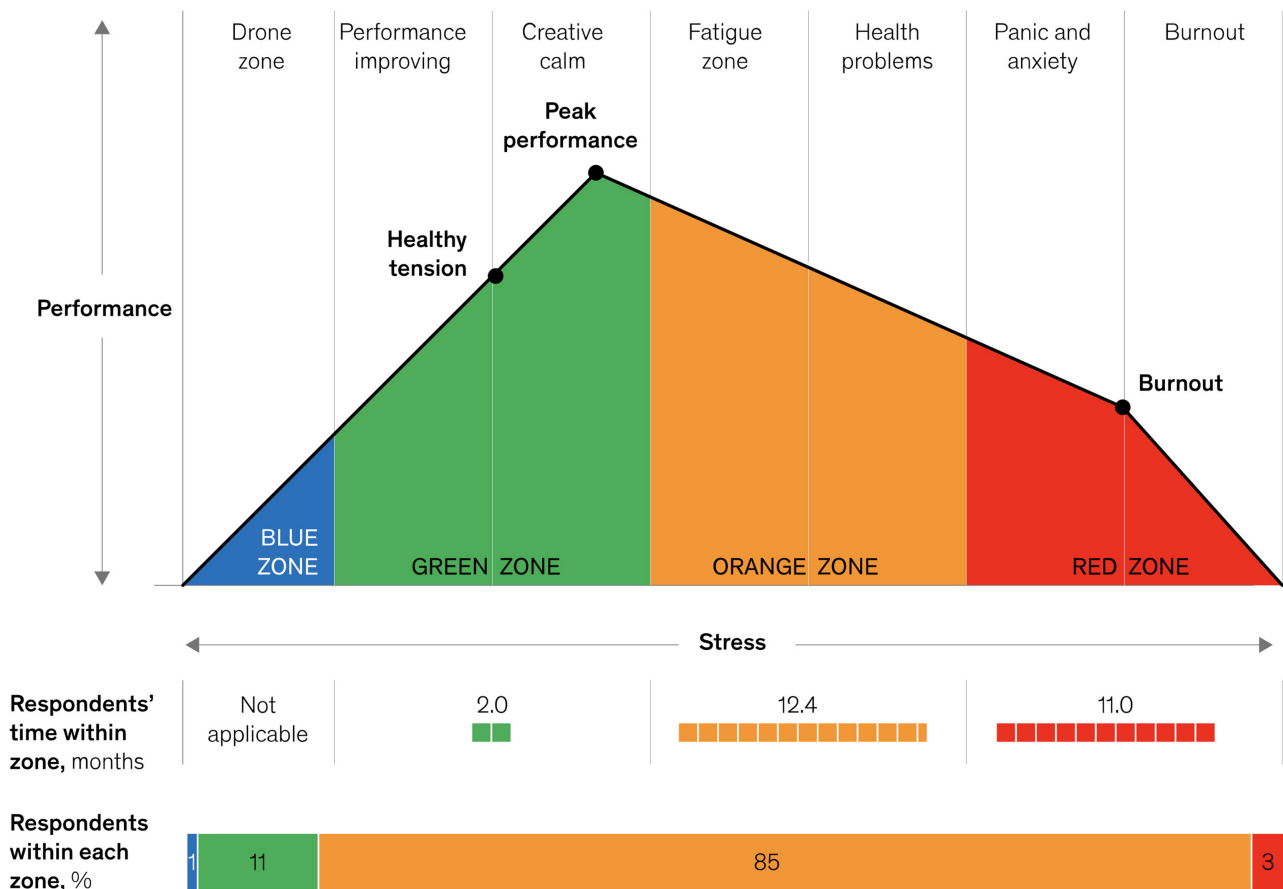
Stress accumulates over time when a person is not able to fully reset between instances of stress and pressure. This can also be attested by another recent survey and infographic by Carmichael et al. at McKinsey & Company (**Figure 6**), which they carried out by means of personal self-assessments by executives, who persisted in a beyond-optimal arousal zone regularly and continuously for months (Carmichael et al., 2023). Executives answered these questions: *Where do you sit today on the performance stress curve? And how long have you been in that zone?*

Another limitation of our study is that we did not draft a set of direct questions that could better measure the impact of continuous HTF/HTS training sessions on participants' day-to-day optimal arousal and optimal performance as described by the **Yerkes-Dodson law**. This question could have been, "Do you see better productivity in your work or studies?" Such preliminary confirmation is captured in **Figure 4** and **Figure 5**, which depict the self-assessment results for mental acuity/focus over 10 sessions. Originally, HTF/HTS exercises were designed to accumulate energy and power while consistently preventing exhaustion or the uncontrolled emission of energy. Put another way, HTF/HTS exercises are designed to enable participants to stay calm while being in an active state, to achieve "calmness in action". While we may have measured the "calmness" piece in terms of how participants felt directly following the exercises, we did not measure the "application of calmness" after some period of time as suggested by the Yerkes-Dodson Law. As a follow-up, we suggest the following questions that should be further tested:

- Do improvements in mental acuity and focus automatically extend the ability to stay longer in the **Yerkes-Dodson optimal arousal and optimal performance state**?
- Is it easier for a person to reach the **optimal arousal and optimal performance state if they continuously train in HTF/HTS**?

To better understand the pressures on nonprofit organizations, we asked nonprofit leaders in Australia to characterize their current stress level.

Nonprofit leaders' self-assessed performance and stress levels,<sup>1</sup> (n = 93)



<sup>1</sup>Question: Where do you sit today on the performance stress curve? And how long have you been in that zone?  
 Source: Dr. Jemma King, adapted from the Yerkes–Dodson Law (1908). Based on a survey of 93 nonprofit CEOs and senior leaders in Australia, 2022  
 McKinsey & Company

Figure 6. Self-assessed current stress level by nonprofit leaders.

### 5. Limitations and Future Research Considerations

The study participants mostly gave feedback based on their HTF/HTS sessions they participated in during the middle of the day in the afternoon on Mondays and Wednesdays (Central Time), however we did not track in this pilot any impact on the second part of their workday.

This study did not set up an experiment with randomized control and comparative analysis with other methods such as cardio, gym or yoga or specialized video viewing. Our *pilot* study was done with remote participants across the globe in naturalistic settings. This was important to us so that we may assess the impact of HTF/HTS as a part of people’s everyday activities. As such, this type of research does not suit a typical lab control group common at university labs. Participants logged into Zoom during their morning, day or evening from home or office. Since participants are not in the lab environment and do not have su-

pervision from the lab team for assessing pre-post observations, we only have the participants' own perceptions as assessment of their physical, emotional state. In such a context it is possible for overestimation or underestimation of perceived impact from HTF/HTS sessions. In future research, we plan to develop methods to allow for inclusion of a control group under similar naturalistic conditions. In addition, we are currently exploring options to include objective measures of both physical and cognitive states to better assess the impact of HTF/HTS exercises.

Not all participants in this study participated for 10 sessions or more. We think this is due to the fact that HTF/HTS involves unfamiliar movements and some may not feel comfortable repeating such movements. It may also be due to the voluntary nature of this study and to the absence of a reminder or reachout campaign to those individuals who started missing sessions. This study has not explored the reasons why some individuals discontinued their participation. However, data suggest that those who undertook more than 3 training sessions experienced more benefit from the program, and so prevention of attrition will be something worth turning our attention to in the future.

Other possible areas and questions a future study should attempt to answer and test are captured below.

- How do these results compare to other forms of exercise (e.g., yoga, swimming, running)?
- Do the results differ by sex (M/F) and age?
- Do the results differ by the time of day training is done?
- For how long do the results last after a session? You will notice that there appears to be a slight trend downward in our initial pre-test reports of anxiety, for example. Could this be attributed to an accumulating effect of the practice? This is what some of the testimonials suggest. We need more data because the sample sizes are much smaller for the 2nd, 3rd and 4th sessions, but if we continue to collect data, we might be able to map this type of insight. Another way to consider this question would be to ask people to fill out the questionnaire a few hours after practicing, and on days in between practice.
- Are there a number of sessions at which a person appears to stop increasing sharpness or losing tension/anxiety? This might indicate a ceiling effect.
- We ought to consider objective outcome data, such as data that fitness tracking apps might yield.
- We might also want to adopt metrics to measure properties such as the quality of sleep, for this is something that resonates with many people and likely could indicate a reduction in tension.
- We might consider a way to deliver a cognitive test to the participants who are at work or home to measure before and after cognitive capabilities.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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