

Action

To Do or Not To Do?

To act or not to Act – The Omission Bias

In the 1990s Professor David A. Asch, University of Pennsylvania, investigated the omission bias regarding pertussis vaccination

Asch investigated the role of omission bias in parents' decisions whether to vaccinate their children against pertussis (the action) or not (the omission or inaction)

A large survey was conducted in which participants were asked about their beliefs concerning the vaccine and the disease, and whether they had vaccinated their own children or planned to; they were also given test items to identify omission bias in their reasoning

Results clearly indicated that **omission bias** played a major role in the decision not to vaccinate against pertussis, much beyond the role played by one's belief about the risk of vaccination

The omission bias

Humans are biased to favor inaction over action

- Acts of omission are viewed as far less harmful than acts of commission, even if the outcomes are the same or worse
- Inaction is viewed as less causal, less blameworthy, and more moral

Morality/Blame

Ex: A faces a tough opponent tomorrow in a critical tennis match. The opponent is allergic to a food substance

- Scenario 1: John recommends food to his opponent containing the allergen
- Scenario 2: Opponent unknowingly orders allergenic food, John says nothing

Which is worse?

Studying The Opposite – The Action Bias

Action bias is particularly likely to occur if we do something for others or others expect us to act (see social norms), as illustrated by the tendency for soccer goal keepers to jump to left or right on penalty kicks, even though statistically they would be better off if they just stayed in the middle of the goal

Sports psychology research shows just the opposite of Omission Bias:
We opt to *act*, even when the information available tells us that we'd be better off doing nothing
This is precisely the basic dilemma of soccer goalkeepers in our study: "to jump or not to jump?"

PENALTY KICK OUTCOMES

	Left	Center	Right
Goalkeeper's choice ^a	49.3%	6.3%	44.4%
Goalkeeper's chance to stop the kick overall ^b	14.2%	33.3%	12.6%
Goalkeeper's chance to stop if the goalkeeper and kicker choose the same direction ^c	29.6%	60.0%	25.4%
Kicker's choice ^d	32.2%	28.7%	39.2%



Journal of Economic Psychology 28 (2007) 606–621



www.elsevier.com/locate/joep

Action bias among elite soccer goalkeepers:
The case of penalty kicks

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Yael Keidar-Levin ^a, Galit Schein ^b

To act or not to act ?

Whether to take action or not lies in a matter of timing

- No thumb rule to know what is right
- Through deliberate practice, one can improve one's performance
- Develop a better understanding of this timing and increase his anticipation skills and ability to confuse and distract competitors
- Developing these skills help understand when to strike, and when it's time to wait it out

Daily Practices

As an Individual

Don't follow the knee-jerk reaction to respond immediately to every snide or rude e-mail. In most cases, it will be better not to respond at all.

In day-to-day activities and in your overall career, don't rush

to simply do *something*: do your research, know your facts, and consider the outcomes of your actions

Study your competitors—take a walk in their shoes and

understand the inner workings of their company the best you can

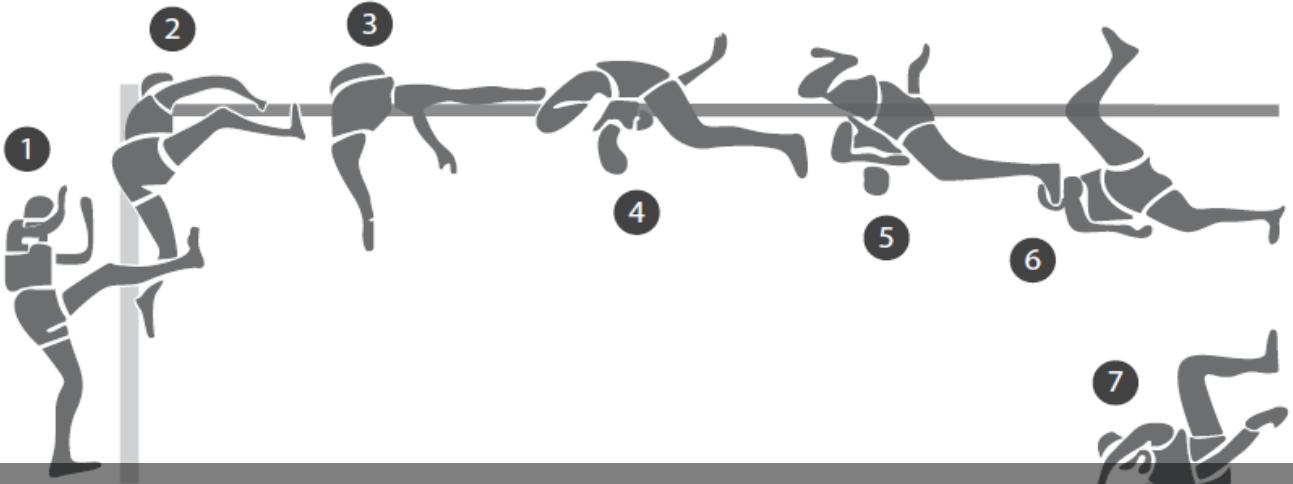
As a Leader

- Try giving your employees some space and take a more hands off leadership approach
- Develop your and your team's anticipation skills, by working in line with your strengths and knowing how you can use them against competition
- Don't let the action bias affect you—keep in mind that there will be many situations where it's better to take no action at all

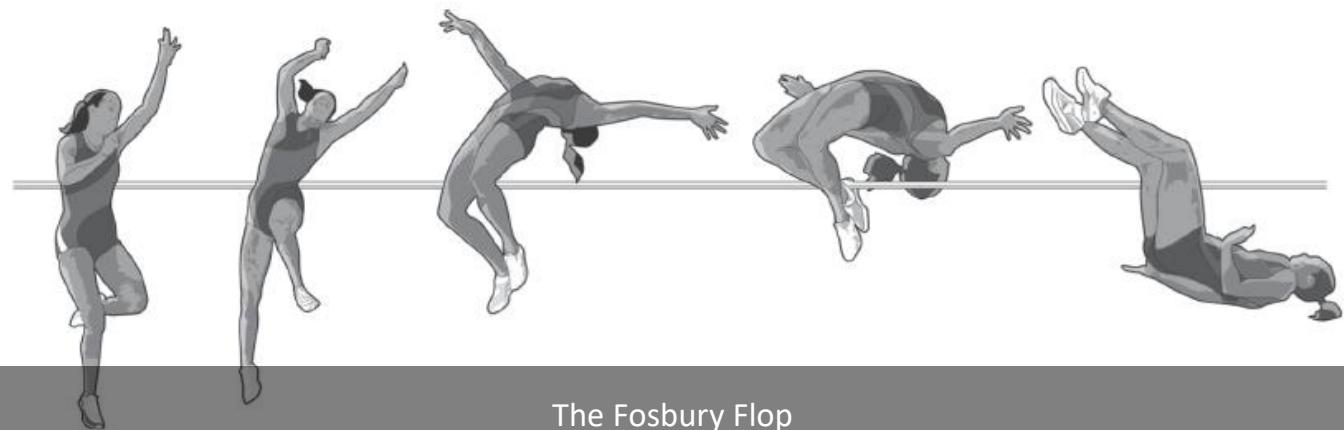
Creativity and Innovation

On Floppers and Vaulters

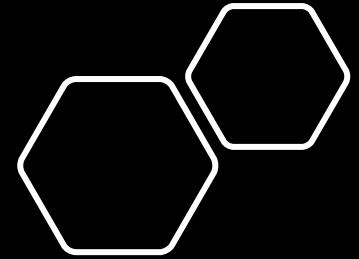
*I've never tried to be a nonconformist; I just
find different solutions*
— *Richard Douglas Fosbury*



The Straddle Roll Jump

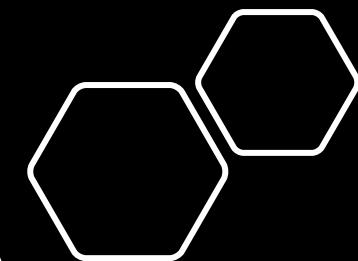
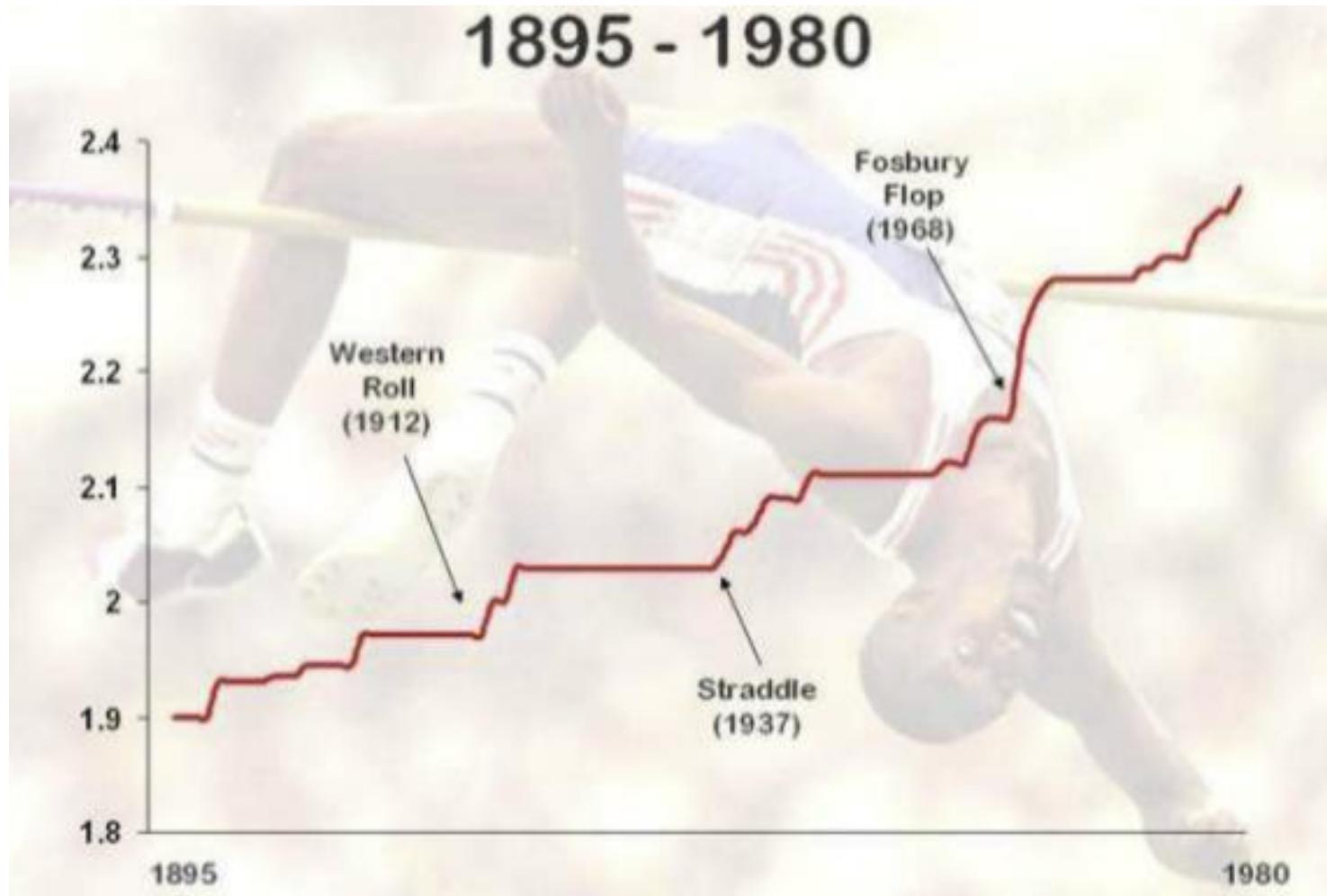


The Fosbury Flop



**1968 Olympics
sees a new
style of high
jumps**

1895 - 1980



Performance
improvement
with the new
style

What is creativity?

Creativity may be defined as the ability to produce original ideas and actions with flexibility and fluency

- Originality refers to the unusualness and novelty of creation
- Flexibility helps find different solutions for the same situation
- Fluency refers to producing such solutions effortlessly and quickly (Memmert, 2011)

“Innovation” is defined as a new idea applied to initiating or improving a product, process, or service

- In contrast to arts, where there are infinite possibilities for generating new ways and forms of expression, sports creativity should ultimately lead to one goal – victory
- This implies that it should be appropriate (Memmert, 2011) and not leading to defeat

4 steps in the creative process

Creativity involves breaking out of the established patterns in order to look at things in a different way

1. The innovator has a problem (e.g., wants to improve performance) and is looking for a solution
2. The innovator has the creative idea of using a new, nondogmatic way of meeting this challenge
3. The innovator begins to systematically improve the idea, and undertakes an evolutionary, incremental optimization process of the invention in order to maximize performance
4. The innovation is diffused, adopted and applied by other potential users



How do we take decisions in sport?

Dual-processing theory in Psychology (Evans & Stanovich, 2013) suggests that we process information and act in two ways in real life.

1. In an automated way without the demand of conscious attention, and we use it for well-learned actions
2. With active focus for information and actions which demand consciousness for control

In real life, we use both simultaneously. In real life, we rarely use these ways separately, and in most situations, our actions are a combination of both ways (the most popular example is driving a car). The same is true for the sport's field, so it would be reasonable to apply dual-processing theory there (Philip Furley, Schweizer, & Bertrams, 2015).

In most situations, our actions are a combination of both ways (eg: driving a car)

In the sport's field too, we apply both ways of information processing

(Philip Furley, Schweizer, & Bertrams, 2015)

Eg: every player can dribble the ball, control it, and make passes without thinking. He even performs some tactical patterns (e.g. one-two combination in football) automatically

One of the main goals in sports training is to create robust and reliable automated technical-tactical skills

The role of Working Memory

- **Working Memory (WM)** is a cognitive system with a limited capacity that can hold information temporarily. **Working memory** is important for reasoning and the guidance of decision-making and behavior

<https://www.youtube.com/watch?v=tKb9uGKHeEU>

WM helps keep a template of past game plans in memory – Mental imagery of where the other team-mates are placed and pass the ball



The other skills in Creative Decision Making

- **Experience** – Research states that expert players, though are not superior to a beginner in general perceptive abilities, nevertheless, in the sport-specific environment, can act much more quickly and efficiently
- **Attentional Control** – to maintain attention to relevant stimuli while ignoring irrelevant. In a game, the player is often overwhelmed by information flow and cannot make effective decisions without filtering it. The filtering process is not necessary based on the salience of the stimuli (e.g., who louder calls for the ball) but on working memory content. It is called biased competition (Philip Alexander Furley & Memmert, 2010). WM biases competition between different attentional stimuli towards that one, which is considered more relevant
- **Stress resistance** – Stress reduces visualizing newer options. Changes in attention under stressful conditions can influence a decision-making process. Attentional Control Theory (Eysenck, Derakshan, Santos, & Calvo, 2007) predicts that stress makes our attention more driven by stimuli than a goal. Distracting stimuli (shouting on the pitch, opponent's deceptions, etc.) can become more significant

<https://www.youtube.com/watch?v=M5HbmeNKino>

- How could Pele make that pass?
- What kind of qualities did he possess to simultaneously keep the ball, monitor the defender, and calculate Carlos Alberto's speed and position without even looking at him?
- Are these qualities inherited, or can we train that?



Can we train someone to be creative? How can we enhance it?

How to train creativity and Decision making?

- Practice
- Training imaginary abilities
 - When we consciously imagine an action, we activate the same brain areas involved in unconscious planning and execution. It is called Functional Equivalence. There is no complete equivalence between imagining the action and executing it, but overlapping is significant.
 - Training creativity and decision-making inside our minds, without performing that physically is a way to enhance DM skills in sports
- (*Imaginary is no substitution for decision-making training on a pitch but definitely can assist it, Cumming & Williams, 2012*)
- Imaginary (using imagery) in sports training can be helpful in two ways
 1. It is psychological, when imaginary can facilitate self-regulation. That can improve decision-making through increasing stress- resistance and might help control attention
 2. To imagine actions that are still difficult to practice in reality, thus facilitating learning
 3. Imagination often in this way creates a new experience
(it is not accidental that great football cultures like, for example, Brazil and Argentina, continuously produce great players who share the same creative traditions)
- Meditation

Daily Practices

As an Individual

- Try out a small innovation every day, including slight changes to your daily activities that may lead to greater productivity
- Consider the four- step innovation process before suggesting new ideas to your boss or other employees— make sure the problem is one that can be solved through the entire lifecycle of the process
- Understand that sometimes you need to overhaul the whole system and break the barrier of the ‘regular’ and try a new approach

As a Manager

Apply outside- the- box thinking to help yourself and your team overcome everyday obstacles or larger roadblocks Incorporate changes into the workplace— don’t be afraid to break convention and try something new
Don’t over-innovate: understand the costs and risks and make sure the time is right before implementation



Getting activated

Mental preparedness and
Psychological awareness

To act or not to act – The Action Bias Mental preparedness and Psychological awareness

<https://www.youtube.com/watch?v=oJIJwGFRoLg>

The concept of performance— a goal- directed behavior— plays a central role in contemporary culture. Everyone wants to perform better— not only in their careers, but also in their hobbies, relationships, and in pretty much everything else they do. And to perform better in any situation, it is necessary to focus on and develop the psychological skills that help lead to success

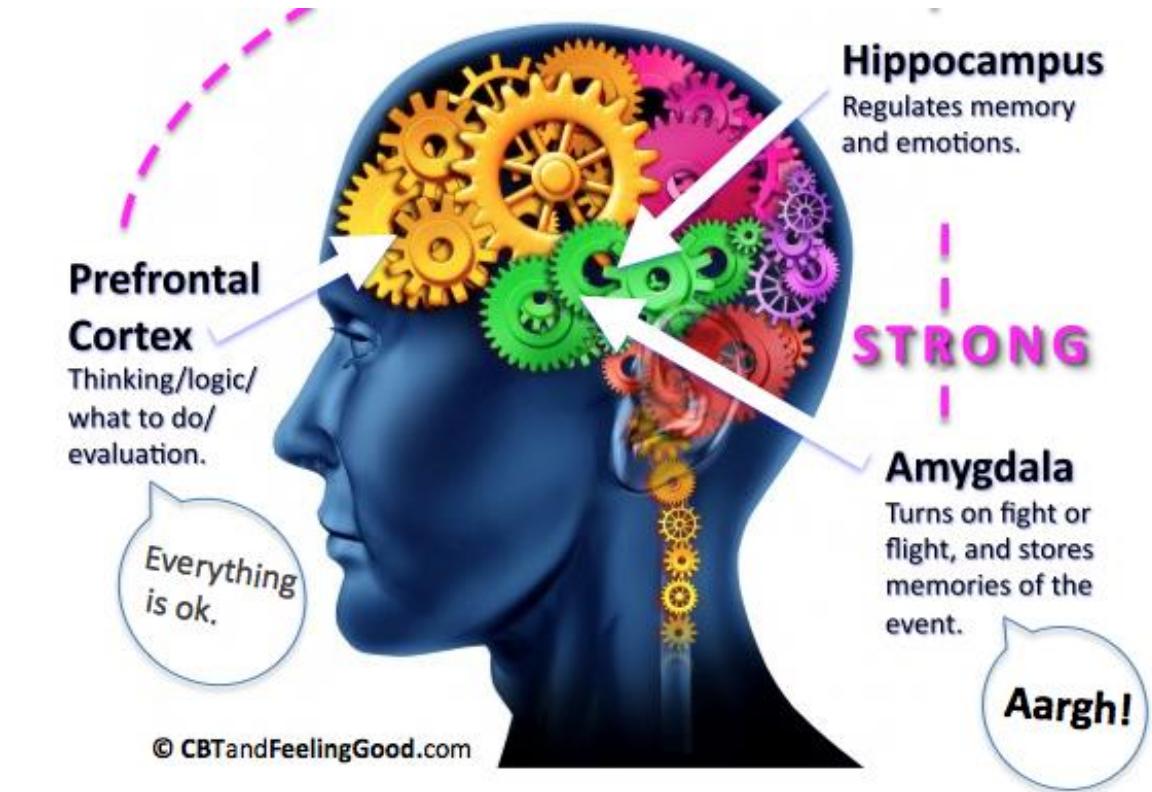
Just like physical skills, psychological ones can be taught, learned, and practiced. In understanding human behavior, both in individuals and in groups, you can develop these psychological skills and use them to heighten your awareness, foster your talents and abilities, and reach your peak performance



Arousal

Is a Lot of Stress Really That Bad?

- Arousal—a psychophysiological state of being awake or reactive to stimuli (i.e., general alertness and readiness to respond)—is the underpinning of stress, anxiety, pressure, and even motivation
- The concept dates back thousands upon thousands of years to our distant prehistoric ancestors



Branches of the Autonomic Nervous System (ANS) Measured by HRV

Sympathetic Nervous System (PNS)

- Controls stimulation of “fight-or- flight” stress response
- Needed for short-term survival



Parasympathetic Nervous System (PSNS)

- Controls stimulation of “rest- and-digest” activities essential for recovery
- Needed for long-term survival

In business, as in sports, one may not be handling life and death situations such as soldiers in battle or a prehistoric person facing off against a tiger, but arousal, or high levels of stress, can be used to your benefit in both everyday and extraordinary circumstances

Understanding how to healthily and positively handle and harness stress makes one

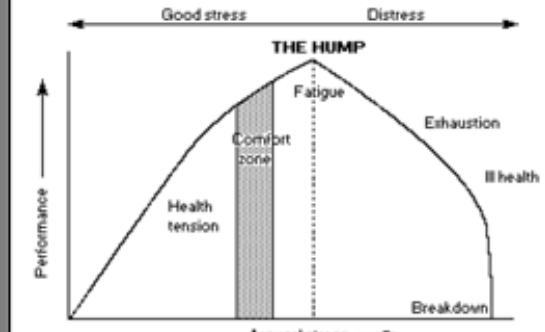
- ✓ more productive
- ✓ lead a happier and more inspired life



It's not stress that kills us, it is our reaction to it.

— Hans Selye —

THE HUMAN FUNCTION CURVE

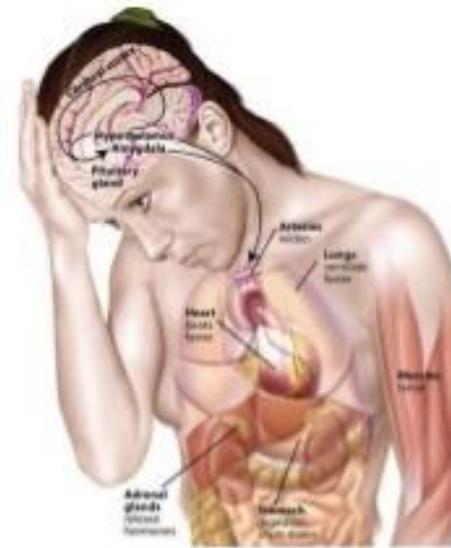


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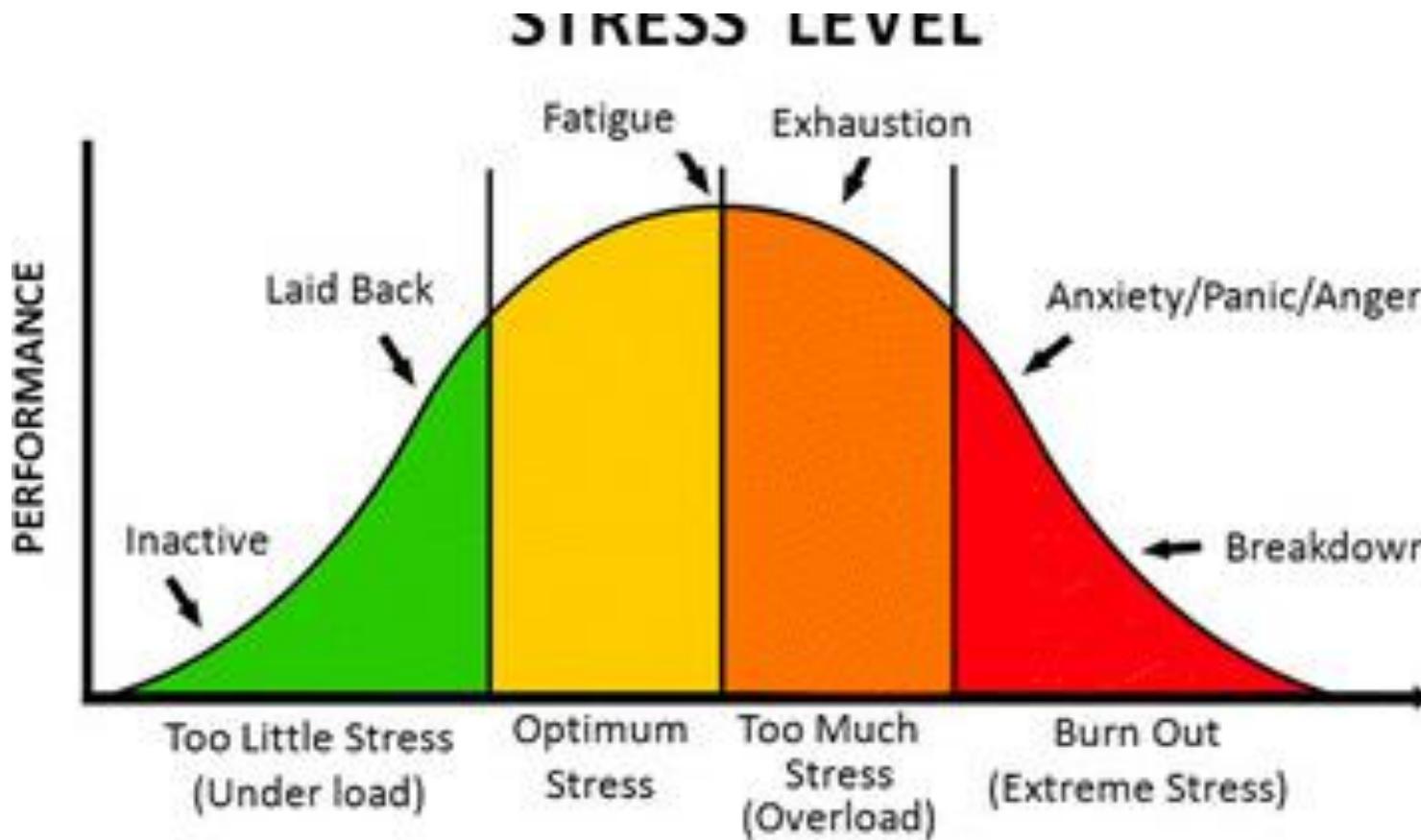
The concept of stress

The Stress Response System

Walter Cannon proposed that the stress response (fast) was a fight-or-flight response marked by the outpouring of *epinephrine* and *norepinephrine* from the inner adrenal glands (medulla), increasing heart and respiration rates, and dulling pain.



Medulla: Epinephrine
Cortex: Cortisol



STRESS AND PERFORMANCE

Stress is not necessarily something bad, it all depends on how you take it - Hans Selye

- A classic experiment conducted in 1908 by Robert M. Yerkes (1876– 1956), a pioneer of American psychology, and his colleague John D. Dodson, is highly relevant to the question of how stress influences performance
- They investigated “the relation of strength of stimulus to rapidity of habit-formation,” (*Journal of Comparative Neurology and Psychology*)
- They discovered that mild electrical shocks could effectively be used to cause mice to acquire the habit of completing a maze. If the electrical shocks were too mild or too strong, however, the mice’s performance in the maze decreased. From this they developed what is now called the Yerkes-Dodson law which shows a curvilinear relationship between stress and performance

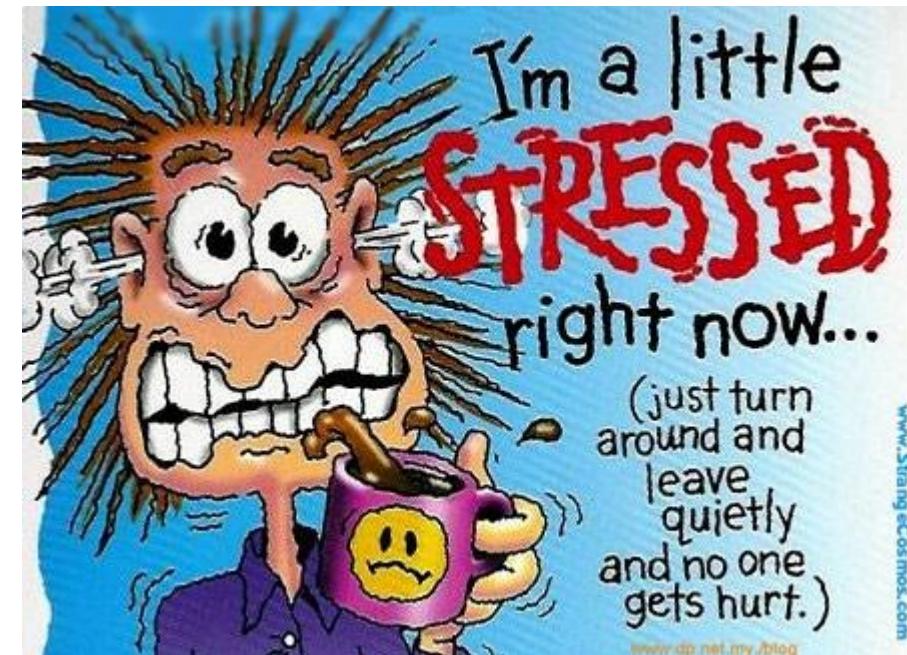
Types of Stress

ACUTE
STRESS

CHRONIC
STRESS



Episodic
Acute
Stress



Episodic acute stress and its Symptoms

When acute stress happens frequently, it's called episodic acute stress

- ▶ Displays prolonged effects of acute stress
- ▶ Negative health effects
- ▶ Personality is an important factor for developing acute stress
- Symptoms of extended over arousal
 - ▶ Persistent tension headaches
 - ▶ Migraines
 - ▶ Hypertension
 - ▶ Chest pain
 - ▶ Digestion problems
- Resistant to change

Chronic Stress

Grinding stress that wears people away day after day year after year

- Warfare
 - Financial crisis
 - Traumatic experiences
 - Chronic illnesses
 - Dysfunctional families
- Creates LEARNED HELPLESSNESS
- Dealing with chronic stress increases psychosomatic problems





Common signs of stress

Physical signs

Dry mouth
Difficulty breathing
Pounding heart
Stomach-ache
Chronic headache

Psychological signs

sudden irritability
problems
concentrating
Difficulty sleeping
Narrowed perception
Frequent feelings of
fatigue

Effect of stress on performance

Stress affects appetite and digestion
Stress affects cognition

Stress and its physiology

- The brain reacts to stress in a series of neural and chemical reactions that are meant for physical survival

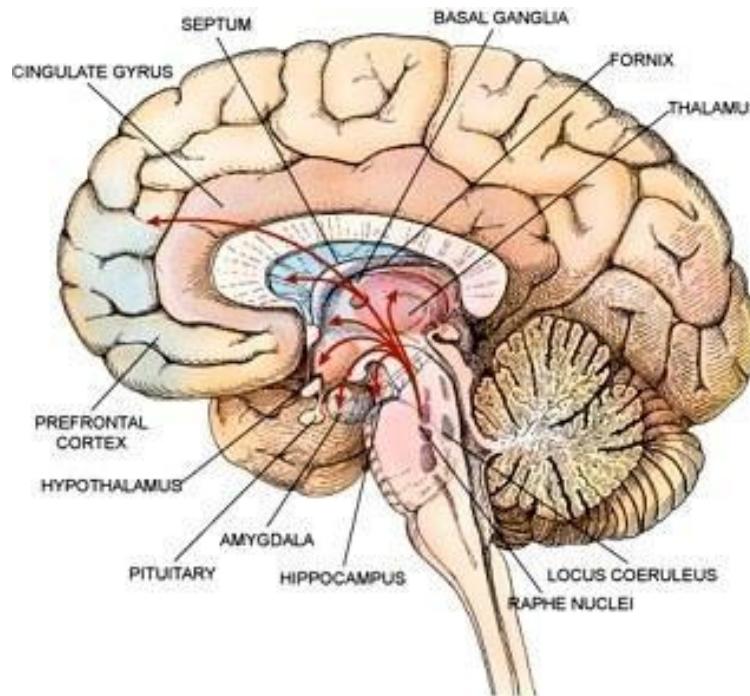
Stress caused by

- biological agents – viruses
- environment – temperature
- psychological agents – threat to self esteem, loss of loved one resulting in loneliness, social isolation etc

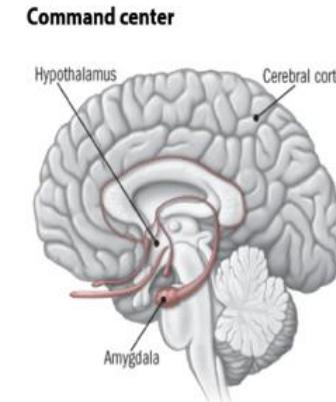
Physiological Systems Involved in the Stress Response

- The nervous system
- The endocrine system
- The immune system

Optimally, interaction of these systems maintains homeostasis and wellness



Initiation of the stress response in the brain



The sense organs sends information to **amygdala** which interprets images and sounds and sends a distress signal to the **hypothalamus**. The hypothalamus communicates with the rest of the body so that the person can immediately respond to the stressor

Harvard Health Publications, 2016

TRIGGERING THE HPA AXIS

- The Hypothalamic Pituitary Adrenal Axis or HPA axis – best known for its role in body's natural reaction to stress
- HPA axis includes a group of hormone secreting glands from the
- **NERVOUS and ENDOCRINE SYSTEM**
- This network consists of the Hypothalamus, the Pituitary gland and the Adrenal glands

When one experiences a stressful event:

- The hypothalamus releases a hormone called the Corticotrophin Hormone (CRH)
- CRH signals the Pituitary Gland to secrete the Adreno Cortico Tropic Hormone (ACTH) into the blood stream
- ACTH travels down to the Adrenal glands where it prompts the release of Glucocorticoids from the Adrenal Cortex
- One of these Glucocorticoids is Cortisol which plays an important role in stress response
- With increased cortisol level ↗ Epinephrine and Norepinephrine (hormones) secreted from Adrenal Medulla

HPA axis...

As epinephrine circulates through the body, it brings on number of physiological changes:

- ▶ The heart beats faster than normal
- ▶ pushing blood to the muscles, heart, and other vital organs
- ▶ Pulse rate and blood pressure go up
- ▶ The person undergoing these changes also starts to breathe more rapidly
- ▶ Small airways in the lungs open wide - the lungs can take in as much oxygen as possible with each breath. Extra oxygen is sent to the brain, increasing alertness
- ▶ Thus, Sight, hearing, and other senses become sharper

- ▶ The release of cortisol causes number of changes that helps the body deal with stress

Eg: Helps body mobilise energy like glucose so that body has enough energy to cope with prolonged stress

- ▶ When the threat passes, cortisol levels fall

The parasympathetic nervous system — the "brake" — then dampens the stress response

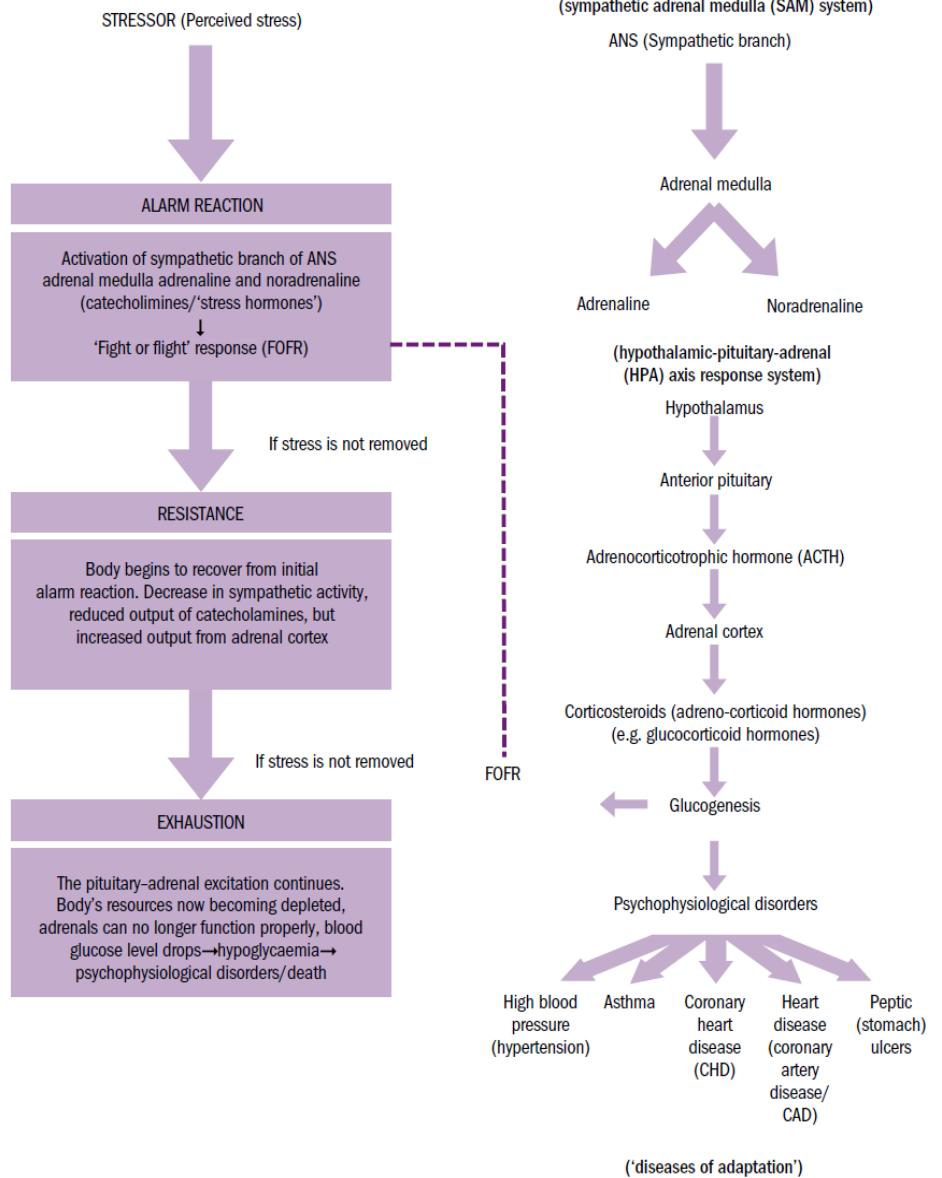


Figure 12.10 Summary diagram of the three stages of the general adaptation syndrome (GAS) (Selye, 1956) and their relationship to the physiological changes associated with (i) the SAM and (ii) HPA response systems

WHY DO INDIVIDUALS BEHAVE DIFFERENTLY DURING STRESS?

Importance of knowing physiology of stress:

- If one understands the physiology of stress, then one can begin to use this knowledge to augment one's own health and well-being through different stress management techniques
- It is important to know what happens to our body during a stressful situation...

- ▶ Stress depends on how an individual perceives a situation
- ▶ Perception of the ability to cope with the situation

The individual's judgment that a stressful situation exists, initiates a stress response

Without this appraisal there is no stress in the person's psychological schema

Individual differences

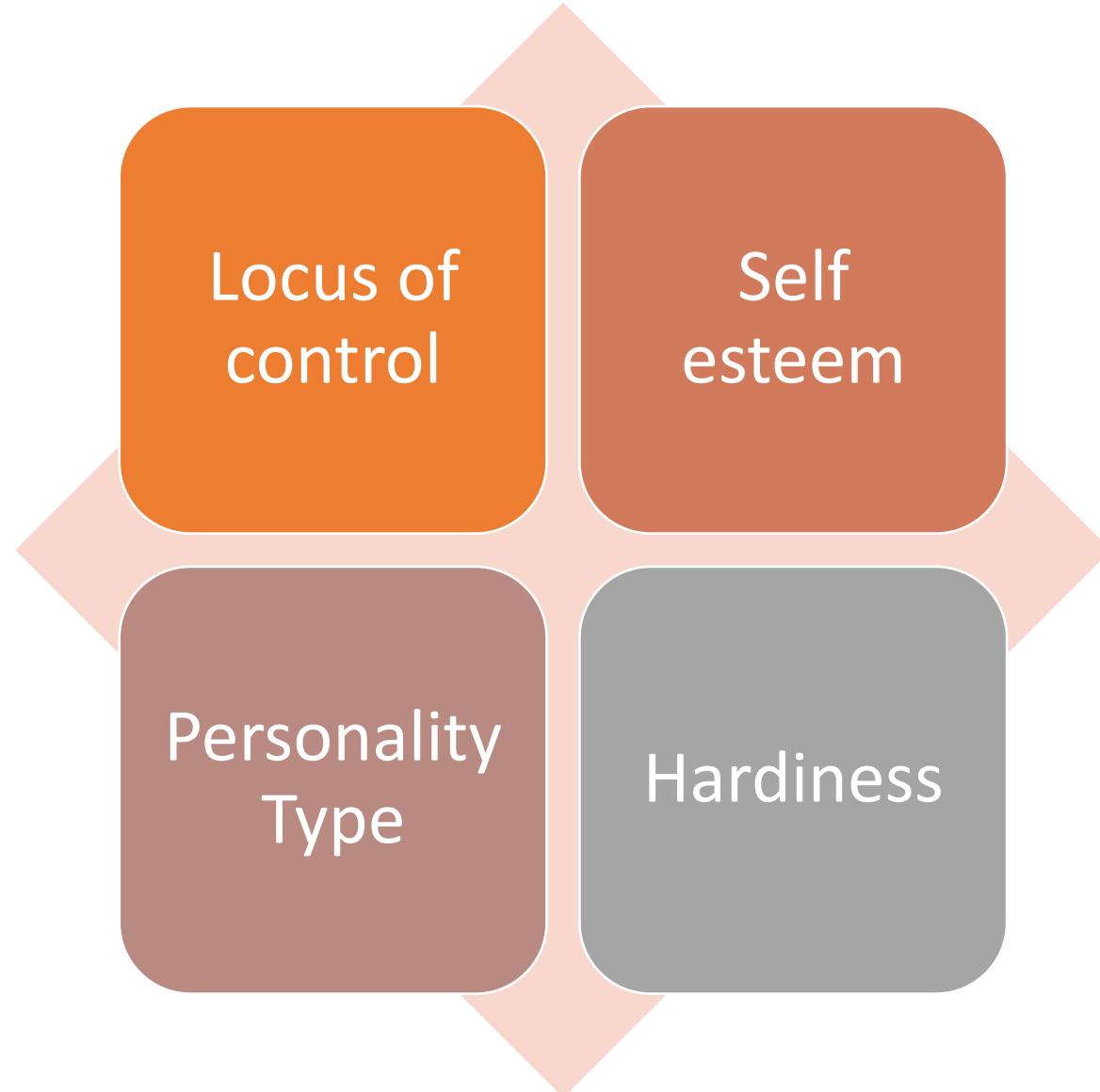
cognitive reaction to a situation - appraisal of the nature, importance and implications of the event, and by your ability to effectively manage or cope with the event

emotional responses to a situation - determined by appraisal of situation and coping abilities

Ex: “I can handle this,” – planning ways to handle the situation

“This is terrible. I’m going crazy” - quitting, getting more anxious

Factors of Personality related to stress



Main Characteristics of Type A Behavior

A sense of time urgency and hostility - A feeling that there is not enough time to do all the things that we believe should be done or that we wish to do.

symptoms:

- Rapid movements: The afflicted person usually walks, talks or eats fast
 - Impatience: There is a feeling that the rate at which most events take place is too slow
 - Anguish at waiting in line or waiting to be seated in a restaurant. Avoids repetitive tasks
 - **Tension:** finds it difficult to sit and do nothing. Feels guilty when relaxing He often has a characteristic facial tautness expressing tension and anxiety
 - **Restlessness:** knee jiggling, rapid tapping of the fingers, head nodding, rapid eyebrow lifting while speaking, sucking in air while speaking, tongue-to-front-teeth clicking during conversation, or tuneless humming
 - **Preoccupation:** Inattentive to others. Unable to detect mental and physical fatigue while engaged in a task. Fails to observe seemingly unimportant unrelated things
2. **Hostility** – a predisposition to evaluate people or events negatively, often in a suspicious, distrustful, cynical, and paranoid fashion

There is a generalized aggression or excessive competitive drive

Other Personality Types

Type B

People with Type B personality tend to be more tolerant of others, are more relaxed than Type A individuals, more reflective, experience lower levels of anxiety and display higher level of imagination and creativity

TYPE A PERSONALITY – Jenkins Activity Survey

Online version for college students -

www.psych.uncc.edu/pagoolka/TypeA-B-intro.html

Type C

- The Type C personality has difficulty expressing emotion and tends to suppress or inhibit emotions, particularly negative ones such as anger. Such individuals also display 'pathological niceness', conflict avoidance, high social desirability, over-compliance and over-patience
- While there's no clear-cut evidence that these personality characteristics can actually *cause* cancer, they influence the progression of cancer and, hence, the survival time of cancer patients

Weinman, 1995

Type D personality Traits

Type D personality - the joint tendency to experience negative emotions and to inhibit these emotions while avoiding social contacts with others

- experience increased negative emotions across time and situations and tend not to share these emotions with others, because of fear of rejection or disapproval
- Gloomy, anxious, and socially inept worrier
- Have fewer personal ties with other people and tend to feel less comfortable with strangers
- has a high risk of cardiac disorders



A small, vibrant green plant with several leaves is growing out of a narrow, irregular crack in a light-colored, textured concrete or stone surface. To the right of the plant, a thin, winding stream of reddish-brown liquid, possibly water or oil, flows along the surface. The background is a plain, light color.

DEVELOPING RESILIENCE TO STRESS

HARDINESS

Hardiness moderates the **stress–illness relationship** by reducing cognitive appraisals of threat, and reducing the use of regressive coping

HARDINESS

Hardiness comprises the three Cs:

COMMITMENT – involve oneself in whatever one is doing

to approach life with a sense of curiosity and meaningfulness

The Commitment attitude led them to strive to be involved in ongoing events, rather than feeling isolated

CONTROL – related to Rotter's (1966) *locus of control*

individual differences in people's beliefs regarding what controls events in their everyday lives

The Control attitude led them to struggle and try to influence outcomes, rather than lapse into passivity and powerlessness

CHALLENGE – a tendency to believe that change is normal in Life

to anticipate change as an incentive to personal growth and development rather than a threat to security

The Challenge attitude led them to view stress changes, whether positive or negative, as opportunities for new learning (APA, 2003)

Are you serious about stress?

There is an old joke about a man who went to a psychiatrist because of a problem with thumb-sucking. After several months of therapy, the patient was delighted with the results and was describing them to a friend. "So," the friend said, "you don't suck your thumb any more?" "Oh, no," replied the patient, "I still suck it as much as ever. But now I know why!"

Learning about stress can produce similar problems
You can understand the stress reaction, and even note the signs of stress in your everyday life, yet still have little idea of what to do about it
Simply knowing about stress is not enough Achieving real control over stress requires something more: an understanding of the unique patterns that stress takes in your life
This personal understanding is necessary because the actual patterns that trigger stress reactions vary enormously from one person to the next

UNDERSTANDING YOUR STRESS LEVEL



STRESS MAPPING...



sensitize yourself to potential stressors in the environment

(Ask, yourself, when it is that you feel stressed and discover an event preceding it)



keep a *stress journal* or notebook, a day-by-day account of when and where the signs of stress appear

Helps in developing self control as it reveals the patterns of stress, those unique configurations of stressor and response that operate in your life



Personal stress analysis - a method by which you systematically evaluate and interpret the information in the journal

This analysis, when well grounded in your examination of potential stressors and in your careful observation of your own behavior, can then serve as the basis for the subsequent development of a comprehensive program of stress management



Knowing your personal stressors and how you react to them provides a tremendous opportunity for you to alter your behavior, coping more efficiently or perhaps avoiding stressful situations altogether

Work on your stress level

- Discover *patterns* of stress operating in your life
- Be aware of these signs of physical and mental response to stress
- Identify the triggers
- Analyze the relationship between the stress reaction and the stressful situation that evoked it
- Set realistic and effective stress control

Format for a stress Journal

- Date and Time:
- Signal of stress:
- Duration of symptom:
- Events prior to the symptom:
- Events when symptoms stopped:

Shaffer, M, 1982

How many of these symptoms do you have now/ in recent past?

BODILY SYMPTOMS	FEELING STATES	COGNITIVE STATES	MOTOR SYMPTOMS (MUSCLES INVOLVED)
<ul style="list-style-type: none">• Flushing• Sweating• Dry mouth• Shallow breathing• Chest oppression and pain• Heart palpitation• Pounding pulse• Increased blood pressure• Headache• -Backache• Feeling of weakness• Intestinal distress• Vomiting• Diarrhea <ul style="list-style-type: none">• Constipation• Fatigue• Loss of appetite• Nervous chill• Insomnia• restlessness• Flatus (passing gas)• Belching• Abdominal cramping• "Irritable colon"• Dizziness or faintness• Paresthesias (illusory prickly skin sensations)	<ul style="list-style-type: none">• Agitation• Shakiness• Easy tiring• Worry• Panicky feeling• Depression (feeling blue)• Irritability	<ul style="list-style-type: none">• Dread• Inattention• Distractibility• Forgetfulness• Nightmares• Fear of death	<ul style="list-style-type: none">• Muscular tightness• Tremors• Tics (spasms)• Increased startle reaction• Incoordination• Sighing• Freezing, feeling immobilized

Daily Practices

As an Individual

- Aim for an optimal state of stress and arousal to keep you on your toes, staying involved and productive, without overworking yourself or entering a state of chronic stress
- Remember that obstacles and tasks are subjective— your personal perception can be a major determinant in how you handle stress and how it affects your performance
- Make complex tasks simpler by employing chunking techniques, breaking down your actions into smaller, discrete units

As a Leader

Find the sweet spot when it comes to your personal levels of stress and that of the group, you're leading

The environment that leaders create and cultivate is crucial to employee performance— talk to your team about what works best for them and see how you can incorporate their preferences into the surrounding environment

Recognize that there will be Type A and Type B people on your team, and you will have to motivate them accordingly— the Type A group will likely need help decreasing stress and anxiety while Type B will need some added pressure

A blurred background image showing a yellow soccer ball hitting the black mesh of a goal net. The ball is in sharp focus, while the net and the surrounding field are out of focus.

SPORTS AND WELL-BEING

The Psychology of Performance

R. Guha

Need for the course

- Considering the current pandemic, WHO highlights the importance of physical and psychological fitness to deal with stressors
- Instead of following a regime for fitness blindly, it is thus imperative to comprehend the science of exercise and its relationship with physical and cognitive functions and over all well being

Objectives



To understand how psychological factors influence physical performance



To understand how participation in sports affects physical and psychological development



Acquire skills and knowledge about exercise and Sports psychology that the student can apply as a within relevant sport and physical activity settings

Outcomes

- 1. Analyze the influence of psychological factors on involvement and performance in sport, exercise and physical education settings**
- 2. Analyze how participation in sport, exercise and physical education influences the psychological make-up of those individuals involved**
- 3. Apply and exercise psychology skills and knowledge to increase individual well-being and interpersonal relationships**

Sports – a primary physical endeavour

Exceptions



Cognitive games
Chess, Sudoku, Go

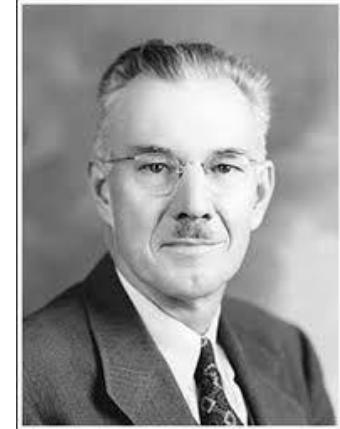
- Marshalling of bodily resources to complete a variety of specialized, demanding physical tasks
- Physical attributes such as speed, strength, stamina, fitness, coordination, agility, flexibility, and resilience are richly rewarded in competitive sport
- Despite emphasis on physical matters in the sport sciences,
- Widely accepted that sport performance is influenced not only by physical attributes, but also by psychological factors

Historical underpinnings of Sports Psychology

- The use of psychological methods to calm the mind, relax the body, or alter mental and physical states of being documented in eastern traditions
- The use of such methods for the enhancement of sport performance is, more recent
- Sport psychology got its start in about 1891, when the general psychological principles started to be applied in a unique setting: **physical education**
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Historical underpinnings of Sports Psychology

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Coleman Griffith

SOCIAL FACILITATION AND SPORTS



Triplett, a cyclist, observed that cyclists performed better when in a race as opposed to when they were riding against only themselves. (Triplet 1898)

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In timed trials for track and field events, those racing others generally push themselves more than those who run alone

Workplace: adults work harder when they are competing against each other or in a group than when they are alone in a cubicle

There are limits to the social facilitation. If the task is too difficult, or the participants are easily stressed and intimidated, competition will only lessen the effectiveness of those people

Norman Triplett and the Bicycle Study

Norman Triplett (1861-1931)

social facilitation-can be seen beyond those lab experiments and cycling

**The focus of Sports Psychology
is primarily on PERFORMANCE**

Where does WELL BEING come in?

Sport psychology issues

Issues pertaining to:

- Motivation
- focus/concentration
- Thought patterns
- arousal control,
- Confidence and mental preparation

Sport psychology methods

psychological skills

training

- goal setting
- Relaxation
- Imagery
- Self-talk

Thoughts

Mood

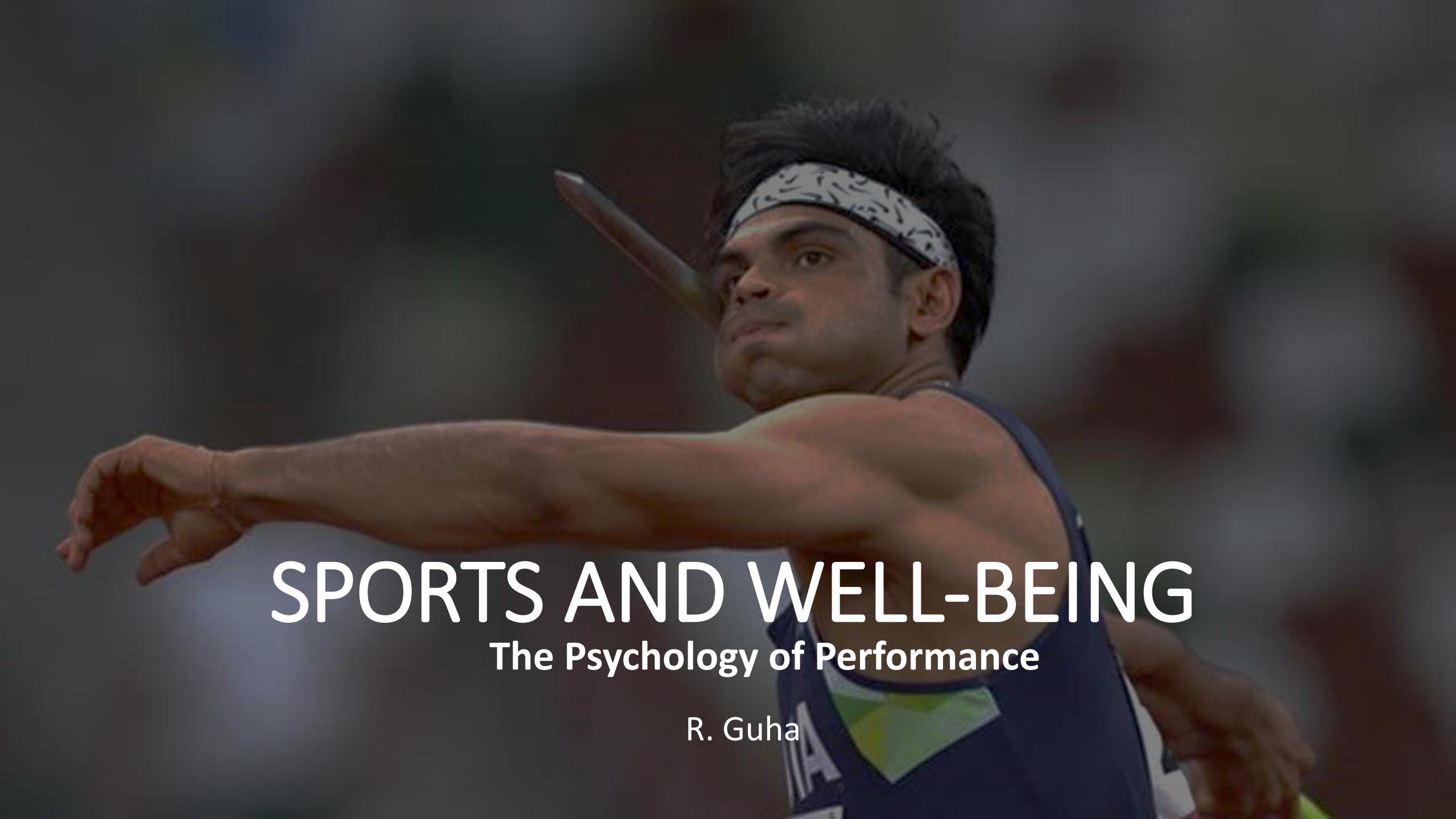
Well Being

SPORTS AND WELL BEING

Course content

- INTRODUCTION
- WELL-BEING AND SPORTS – A study of interdependence
- PHYSIOLOGICAL PARAMETERS OF WELL-BEING
 - Cardiovascular system in sports and exercise
 - Role of cardiovascular system in anxiety
 - Role of Neurotransmitters in well-being
 - Neurotransmitters and sports
- INDIVIDUAL DIFFERENCES IN WELL BEING:
Personality, Motivation and Cognition
 - Goal setting
 - Focus – Attention and concentration
 - Self-confidence and boosting
 - Role of sports in self-grooming

- SPORTS AND PSYCHOLOGICAL SKILLS:
 - Introduction to mental skills training – Flow
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 - Visualisation and mental imagery
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- A HEALTHY DOSE OF SPORTS AND WELL BEING
 - Energy management
 - burnout
 - Sports as a paired career option



SPORTS AND WELL-BEING

The Psychology of Performance

R. Guha

Need for the course

- Considering the current pandemic, WHO highlights the importance of physical and psychological fitness to deal with stressors
- Instead of following a regime for fitness blindly, it is thus imperative to comprehend the science of exercise and its relationship with physical and cognitive functions and over all well being
- Tokyo 2020 Olympics – shows that Sports could be an alternative career

Objectives

- To understand how participation in sports affects physical and psychological development
- To understand how psychological factors influence physical performance
- To understand how psychological factors influence physical performance

Outcomes

1. Understand the influence of psychological factors on involvement and performance in sport, exercise and physical education settings
2. Understand how participation in sport, exercise and physical education influences the psychological make-up of those individuals involved
3. Apply and exercise psychology skills and knowledge to increase individual well-being and interpersonal relationships

Outdoor Sports – a primary physical endeavour

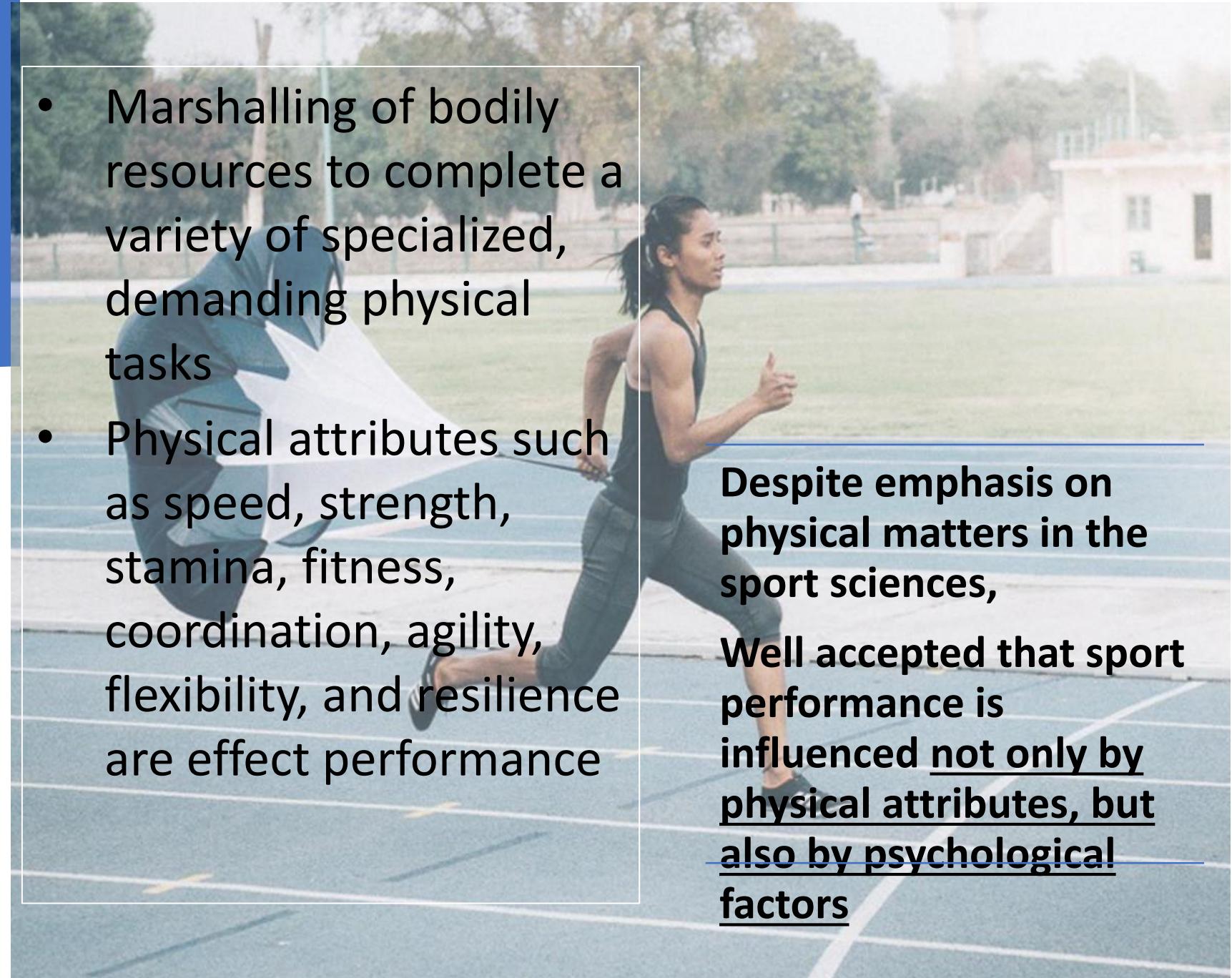
Exceptions



Cognitive games
Chess, Sudoku, Go



- Marshalling of bodily resources to complete a variety of specialized, demanding physical tasks
- Physical attributes such as speed, strength, stamina, fitness, coordination, agility, flexibility, and resilience are effect performance



**Despite emphasis on physical matters in the sport sciences,
Well accepted that sport performance is influenced not only by physical attributes, but also by psychological factors**



Importance of
biomechanics
in sports and
fitness

Sports psychology in the game

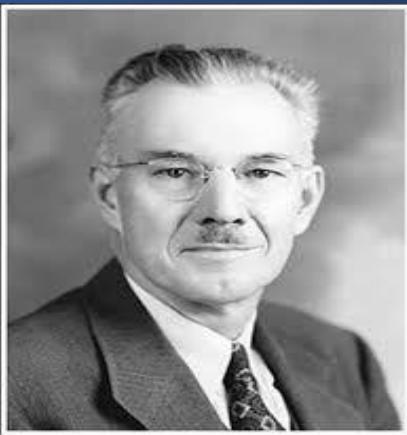
- Dealing with immediate and chronic stress
- Performance anxiety
- Motivational issues
- Dealing with competition
- Dealing with failure
- Team building

Sports engagement for enhancement of psychological skills

- Arousal motivation and activation
- Self Confidence
- Creativity
- Cognitive flexibility
- Improves response time in cognitive activities
- Attentional focus
- Cohesion and team building – cooperation
- Leadership skills

Historical underpinnings of Sports Psychology

- The use of psychological methods to calm the mind, relax the body, or alter mental and physical states of being documented in eastern traditions
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A group of Indian women's hockey players in blue and white uniforms are celebrating on a blue field under a clear sky. They are raising their arms in triumph, some holding up silver medals. The scene conveys a sense of team success and well-being.

Where does WELL BEING come in?
The focus of Sports Psychology
is primarily on TEAM PERFORMANCE

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Thoughts

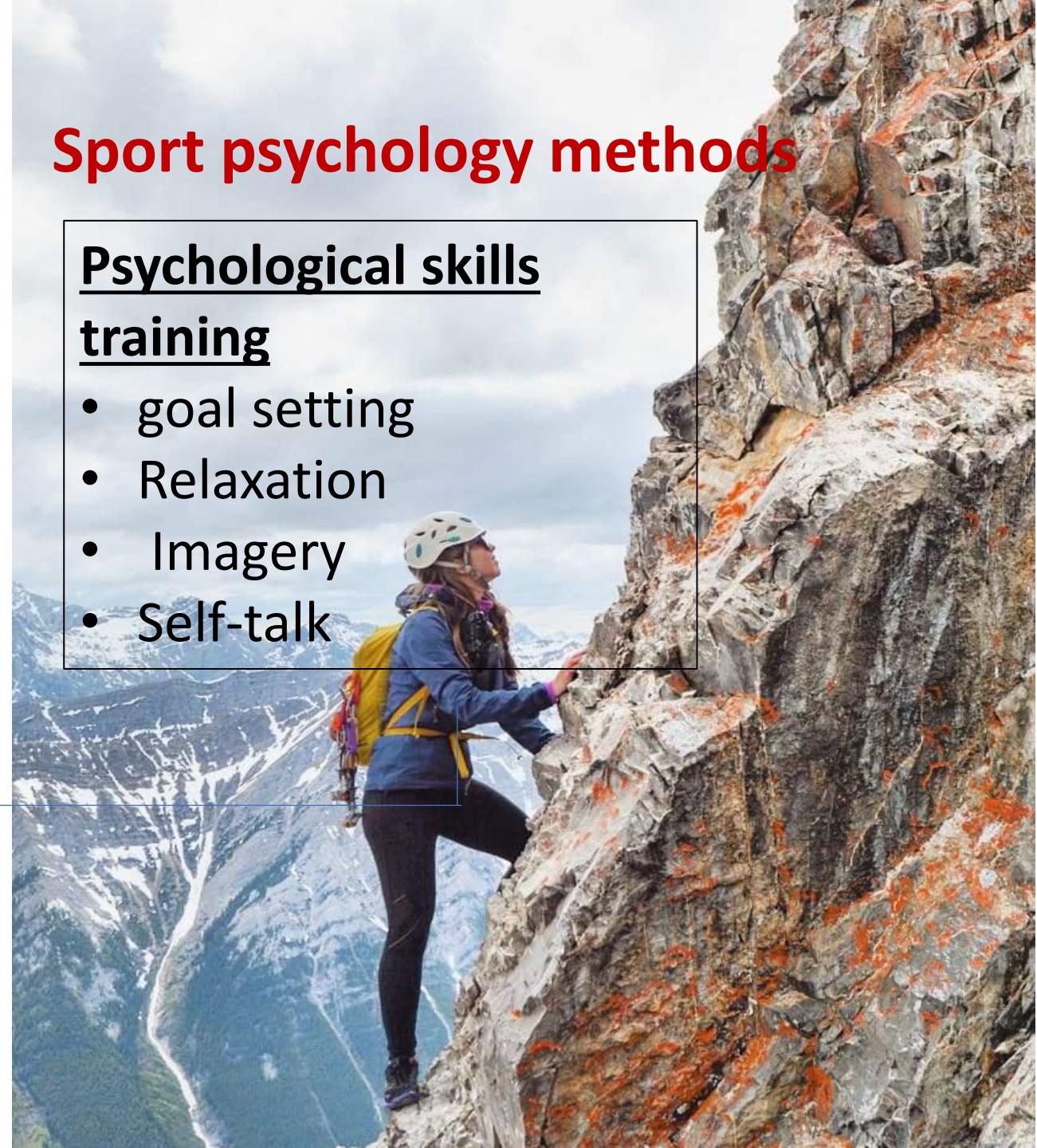
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Well-Being

Sport psychology methods

Psychological skills training

- goal setting
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- Imagery
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Motivation and Aspirations

Defining our driving force

And

Enhancing performance through goal setting

He who has a “Why?” in life, can tolerate almost any “How.”

Friedrich Wilhelm Nietzsche

The story of a fighter and a champion: Arunima Sinha
In 2011, twenty four year old Arunima Sinha was thrown off a moving train by thugs for refusing to hand over the gold chain she was wearing. She lost her left leg when a train went over it. While dealing with pitying murmurs of, “Who will marry you now,” and the absurd conspiracy theories that followed, she made a decision. She would climb Mount Everest. In 2013 she did just that, becoming the world’s first female amputee, and the first Indian amputee, to achieve this feat. Earlier this year she was awarded the Padma Shri

Read more
at: <https://yourstory.com/2015/05/arunima-sinha-world-champion>



*“Rehne de aasma, zameen ki talash kar
Rehne de aasma, zameen ki talash kar
Sab kuch yahi hai, kahin aur na talash kar
Jeene ke liye, ek kami ki talash kar”*

Motivation and the underlying processes

Many sports stars and players during training often hurl curses and abusive language - “You are an idiot!,” “What did you do?,” “Are you stupid?,” and “Can’t you play?”

Mostly they were not cursing each other but cursing themselves!!

Israel’s best tennis table players seriously consider this counterproductive tactic to be highly effective in psyching themselves up. This habit has traditionally been passed down in Israel from generations of coaches and veteran players, creating a culture of motivation

Human motivation in athletic performance environments is similar to motivating oneself in a daily working environment

Eg: While driving your car from home to work. **What does it take?**

Essentially, four basic things:

1. Produce energy to power movement by igniting the engine
2. With the help of the energy produced, move the wheel in order to steer the car in the right direction
3. Keep going, maintaining your speed and following traffic signals, and continue driving as long as required
4. Reach your goal by arriving at work

Motivation and the underlying processes

Motivational processes are similar to the driving behaviour. Motivation deals with what energizes behavior (i.e., motives or drives) and what focuses energized behavior in a particular direction toward a goal

1. Arousal
2. Direction
3. Maintenance
4. Goal— everything we need to accomplish any endeavor in life

Motivation comes from the Latin substantive *motivum*, which means “reason to move” or “drive”

- Should we motivate people at all?
- Should we motivate ourselves?
- Should human beings be moved or driven?

INTRINSIC MOTIVATION

The only way to do great work is to love what you do
— Steve Jobs

- In Oliver Kahn's book *Ich*, the champion German soccer goalkeeper tells his readers about the motivation that drove Michael Schumacher
- Kahn points out that Schumacher does not drive simply to win. Ofcourse, he aims to win, but that's not his actual motive
- Instead, winning a race is a byproduct that comes from the love of his sport and profession.
- Kahn explains that it's not about being first, but that Schumacher strives for perfection in each round every time. With consecutive perfect rounds, Schumacher succeeds in his goal and, as a result, wins the race. He's not doing it to win, he's doing it for himself



Intrinsic motivation is marked by doing something “for the sake of doing it”

extrinsic rewards— such as money, fame, or prestige— come later

Schumacher did not wait for somebody to drive him: he drove himself from within

Extrinsic rewards are important - but not always enough

Industrialist Henry Ford (1863– 1947), paid his workers a lot, surprisingly so for those days. Still, employee turnover in his plant was high— as many of these workers “burned out.”

An example from current industry:

Warby Parker - NY City based eyeglasses and sunglasses company

Their mission is simple and described easily by their “buy a pair, give a pair” model: for every pair of glasses customers purchase online, the company makes a monthly donation to their nonprofit partners, covering the cost of sourcing that number of glasses.

In doing so, these nonprofits train people in developing nations to provide eye exams and sell affordable glasses to their communities. This sustainable practice has led to the distribution of over a million pairs of glasses to people worldwide in need

Their intrinsic motivation led to a company that they founded in 2010 with only \$2,500 in seed investment money. As of April 2015, Warby Parker was valued at \$1.2 billion

Does larger incentive increase performance?

Monetary motivation as a “double- edged sword”

stating that in the case of work that requires cognitive ability, if the incentive levels are too high, a person may become distracted by the reward

The motivating factor— the additional money— can command too much attention, creating stress and reducing performance.

If the incentive is smaller, however, it may help *increase* the person’s performance

OVERMOTIVATION

*If you're a plumber and you don't do your job, you don't get any work
I don't think a plumber needs a pep talk*

— Gregg Popovich

Coaches/bosses/teachers/parents believe in motivational speech, as there are examples throughout history where such a motivational means has been proven effective

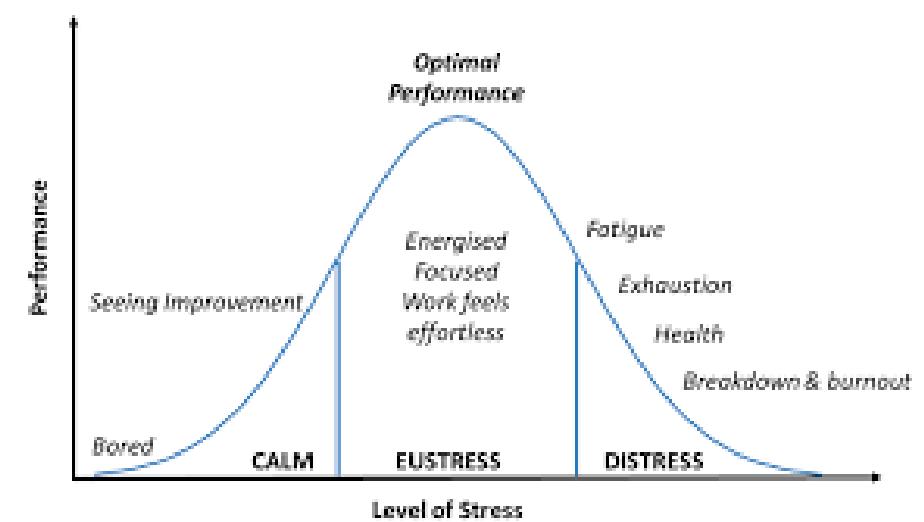
If the motivational speech talks about “what is at stake” or “on the line’ – adds to the stress and brings self doubt in the player

When one is highly motivated, the arousal increases:

- if the task is complex, high motivation will be detrimental to performance
- if the task is simple, high motivation will help to improve performance

One major solution to the problem is chunking; the more appropriate chunks you have, the more resistant you become to high levels of motivation

Thus, even when people “use their brain,” success in task-performance is very often just a matter of intensive training and deep practice



Choking Under Pressure

Jose Pesteguia's and Ignacio Palacios- Huerta's famous 2010 article

"Psychological Pressure in Competitive Environments":
The two economists looked at soccer penalty shootouts where two teams, in alternating order, kicked directly from the 11- meter (36-foot) penalty mark to score a goal. They collected data from 129 shootouts and found that the first team kicking won 60.5 percent of the cases (78 cases) and the second team only 39.5 percent (51)—despite an assumed a priori winning probability of 50 percent for each team

Apesteguia and Palacios- Huerta argue that this “first mover advantage” results from psychological pressure put on the “second mover.” Simply stated, the second team tended to choke much more under the pressure

Performance anxiety and choking

**Choking results from “overthinking,” “paralysis by analysis,” and worries, which inhibit the performance of well- practiced procedures by experts under pressure
Performance is not only poor but rather worse than expected, given what the performer is capable of doing**

This happens not only in sport but also in organizations, when employees compete for promotions or at school, when students compete for grades (e.g., when the smartest students do poorly on a standardized exam)
In all these situations, performers “choke under pressure”

Pressure- induced failure results from the simultaneous influence of neurological, biomechanical, and attention related (e.g., distraction) mechanisms

REFRAMING AND THE THREE STATES OF MOTIVATION

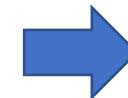
The happiness of your life depends upon the quality of your thoughts

— Marcus Aurelius

Choking – and its management

The desire to perform as well as possible (i.e., extremely high aspirations to function at one's best) in situations with a high degree of personal importance creates pressure and choking

Eg: I want my dream job – give my best performance → high level of arousal + expectations from self → creates pressure and choking



The factors for BEST PERFORMANCE and WORST PERFORMANCE due to choking are the same!!

Management

- Chunking
- Identifying which level of motivation one is in

3 stages of motivation

- Initiation
- Continuation
- Cessation

DAILY PRACTICES

As an Individual

- Ask yourself if what you’re doing is intrinsically rewarding, not “just a paycheck.” If necessary, consider what changes you potentially could make to create a more satisfying career
- Don’t put extra pressure on yourself— when you do so, you subjectively create a highly stressful situation under which you are more likely to choke
- Incorporate reframing techniques to change your perspective and boost your motivation

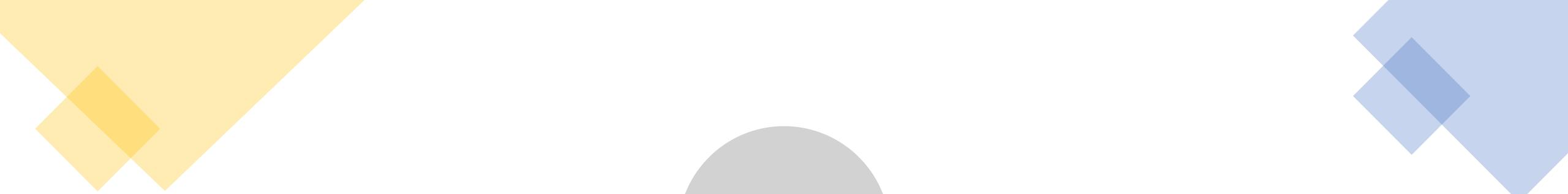
DAILY PRACTICES

As a Leader

- Help your employees reframe perceived tasks by discussing their importance and the related planned goals
- Get to know your team members so you understand what motivates them and how you can appropriately reward them for their work (remember: money isn't always the best motivator)
- Avoid over-motivation, in which you are likely to tip employees' balance of stress from positive to negative

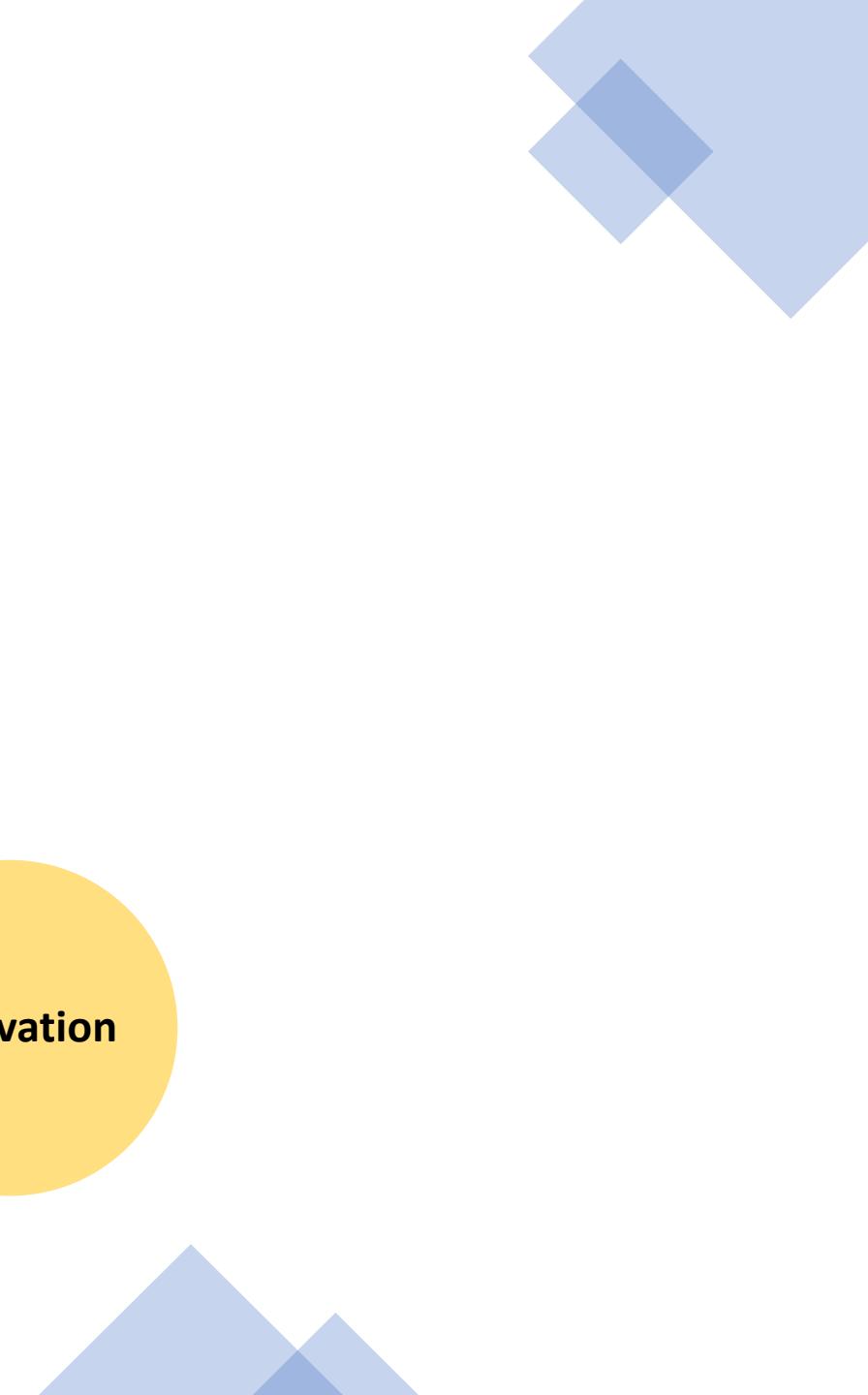
Aspirations

Enhancing performance through goal setting



Arousal

Getting activated



Aspiration

Motivation

GOAL SETTING AS STRATEGY

Motivation assessment – measures attitude

Goal setting assessment – measures performance and actual behaviour

Goal setting principles

Specificity and Proximity – Importance of specific goals as compared to non-specific goals

Eg: Sales manager to staff - each member of the team must sell a certain number of products per month to reach a company wide revenue or profits-
Here goal is specific, the employees are more likely to hit that target than if the sales manager simply said, “Go out there and do your best!” (nonspecific)

A major component of goal specificity is **Goal proximity** - the consideration of short-term and long- term goals.

Why do specific goals work so much more effectively?

- **They regulate performance** - helping in planning, focusing, and directing your activity
- **They also elicit effort, perseverance, and dedication**, and accurately measure actions and success in performing the task
- **The ability to effectively evaluate performance means options for receiving feedback**, eventually to make corrections to enhance later performance

Combining specific short-term goals (e.g., daily tasks) with long- term ones (e.g., career advancement) leads to higher productivity



DAILY PRACTICES

As an Individual

- Set a combination of short- term and long- term *specific* goals for yourself. Include every- day tasks that will help lead to your overall larger, long- term goal
- Work with your manager/mentor/advisor or boss to make sure these goals are understandable and acceptable to both – “don’t be smart, be wise!”

As a Leader

- Set specific, short- and long- term goals for your team that are challenging but also attainable
- Regularly provide feedback to employees and team members so they know whether or not they are on track to achieving set goals
- Help foster a common work culture to make sure that, despite people’s differences, everyone is on the same page regarding your company’s shared goals and values



Self Confidence

Handling Expectations and Unexpected Obstacles

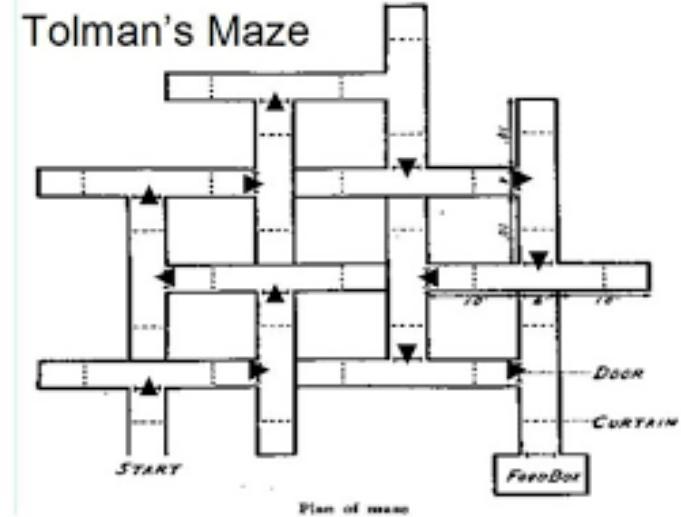
“If I can take it, I can make it”

Louis Zamperini

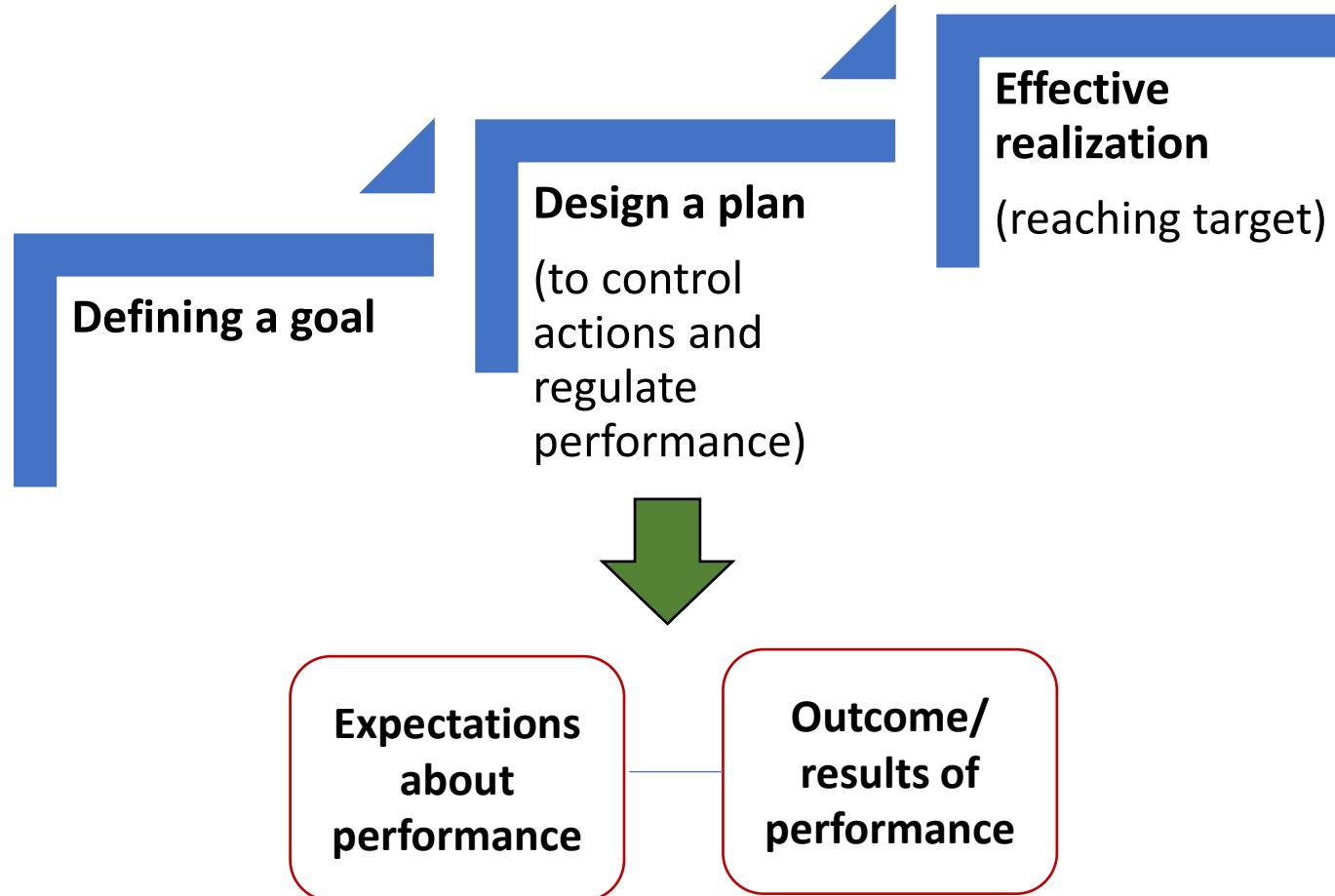
US WWII veteran and Olympic distance runner

EXPECTATIONS AND PERFORMANCE

- The term EXPECTATIONS was introduced in psychology in 1930s by E Tolman
- He emphasized the connection between human perception of environmental stimuli, individual expectations, and performance
- In his seminal 1948 article “Cognitive Maps in Rats and Men,” published in Psychological Review, he argued that expectations are embedded in a **“cognitive map” that determines, a person’s anticipation about the performance of an upcoming task in a particular environment**



Prior to any athletic event, athletes form expectations about the competition



Athletes not only consider how they expect to perform a training the best way they can, but also what they expect as a result of that optimal performance, such as becoming a world champion

In an office setting, one would likely expect that the positive performance would lead to new responsibilities, a potential raise or bonus, and an eventual promotion

Uncertainty management

- Adaptation to uncertainties in the environment is required of every living creature to ensure survival
- To adapt, one must correctly anticipate future events or changes
- Performers, such as top athletes, **feel more comfortable in a state where everything goes according to plan even in comparison to a state where things are too good**
- Contrary to basic assumptions there could be a self-limiting effect at play: players feel better with a lesser actual performance, which fits the mindset and planned goals, whereas a better performance, if it is too good to be true, makes them less comfortable, precisely because it is, to a great extent, unexpected

Research studies by Eli and Tenenbaum (1989):

- a. with twenty-eight elite German basketball coaches and players
- b. with forty-five top Israeli team-handball coaches and players

Showed that **any unexpected event (be it negative or positive), as compared to any expected one, was much more associated with the probability of crisis**

Expectations were even found to be more meaningful to the athletes than the momentary direction of lead, though less important than momentum of the game

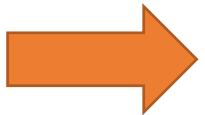
Unexpected events have been found to be detrimental for athletes—at least in their own perception—in several investigations conducted on psychological performance crisis in competition

What's the secret of your success?

A successful German Volleyball coach when asked how his team won continuously replied

"I take time outs when the team is playing too well to prevent crises"

The Icarus effect



Upward time out strategy

The term "Icarus Effect" refers to a sociological phenomenon in which members of society whose ability greatly exceed average are seen as a threat and are therefore eliminated by society. Thus, the "Icarus Effect" serves to regulate the pace of evolution

Striking the right balance

HOW EXPECTATIONS AND SELF-CONFIDENCE SHAPE OUR PERFORMANCE

Believe you can and you're halfway there —Theodore Roosevelt

The Self-fulfilling prophecy:

An individual's behavior is often determined by other people's expectations which they start believing about themselves

Morality?

Should coaches/bosses/teachers tell the truth or boost the confidence?

Harvard Business Review: whether an entry-level assistant or a top-level executive, job seekers today believe that opportunities for learning and development are more important than any other aspect of a potential position.

Related, up to 90 percent of this learning and development takes place on-the-job through new assignments, feedback, and conversations with bosses and mentors.

Helping others develop their skills boost their confidence and, in return, create higher performance.

SELF-EFFICACY

If you accept the expectations of others, especially the negative ones, then you never will change the outcome - Michael Jordan

Self-efficacy is the personal judgment or belief in one's capability to successfully execute an activity. It reflects the extent to which one feels confident about performing a specific task in a particular situation (i.e., "I can" versus "I cannot")

Albert Bandura (1977) - presented the central aspects of "a unifying theory of behavioral change" which he labeled "self-efficacy." He stated –

if you want to change people's behavior, change their perception of self-efficacy: make them believe that they "can do"

How to change from “no, I cannot” to “yes, I can”?

Main sources of self-efficacy:

- Vicarious experiences – observing or imagining others engaging in a task that the observers themselves do not perform
- “performance accomplishments,” /“enactive mastery experiences.” - Performance accomplishments refer to clear successes and failures, which provide the most influential source of efficacy information and the most authentic evidence on which we can build robust beliefs about personal efficacy

This concept implies: when one is faced with a major problem, one should take a “from light to heavy” approach

Backward Generalizations

Once the most fearful hurdle is crossed, it may be used for comparisons to boost performance for other future hurdles

THE POWER OF ATTITUDE and MOMENTUM

David Lehman and Jungpil Hahn (2013): “Momentum and Organizational Risk Taking”

Momentum is a “sustained and systematic trajectory in performance over time, and . . . such trends impact interpretations of current performance as well as expectations of future performance.”

Game momentum: a substantial source of feedback for athletes concerning their own competitive performance

Momentum, both positive and negative, is a major determinant of an athlete’s psychological state, regardless of the direction of the lead

Statistician Robert Hooke’s 1989 paper “Basketball, Baseball and the Null Hypothesis,” published in Chance:

In almost every competitive activity in which I’ve ever engaged (baseball, basketball, golf, tennis, even duplicate bridge), a little success generates for me a feeling of confidence which, as long as it lasts, makes me do better than usual. Even more obviously, a few failures can destroy this confidence, after which for a while I can’t do anything right

DAILY PRACTICES

As an Individual:

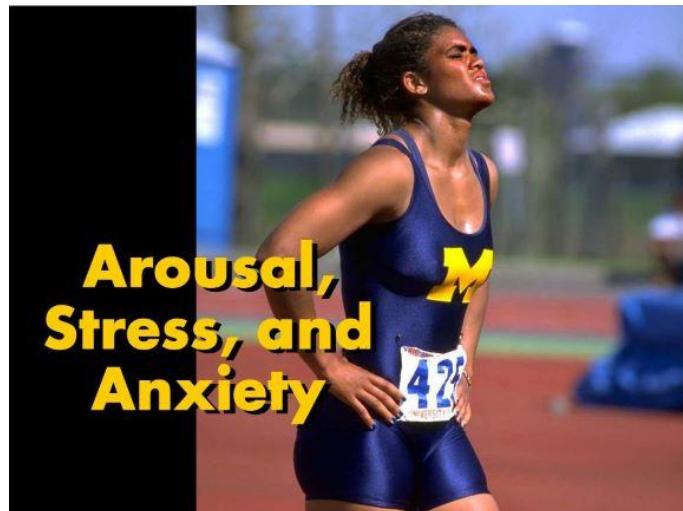
- Stay on top of industry trends, both your industry and others that may be seemingly unrelated, by attending events and conferences, reading about the latest developments, and understanding how such changes could potentially affect your job and work life
- Take advantage of advice from mentors, bosses, and experienced colleagues, while developing new skills and embracing new opportunities
- When faced with a daunting task, utilize the concept of **backward generalization**—you've overcome larger obstacles in the past, so this one should be a piece of cake

As a Leader:

- Help your employees and team members develop new on-the-job skills through everyday mentoring, increased responsibilities, and informal learning opportunities
- Provide feedback, support, and compliments on a job well-done (or even a job that may need some improvement) to help boost employees' self-confidence and increase their performance
- Support your staff by instilling a positive “we came to win” attitude, keeping up general morale and engagement



Arousal, Stress, and Anxiety



Manas K Mandal, PhD, FNAPsy
Distinguished Visiting Professor, IIT-Kgp



ABOUT US

Some clarifications...

- You ‘face’ it, we ‘read’ it
- You get the goosebumps, we tell you how to get out of it
- You get these lessons from grand-ma as well, we only tell you the science behind
- The program is not about a target, its only a process to learn
- Everyone expects success from you, we expect failure also to be the part of your story



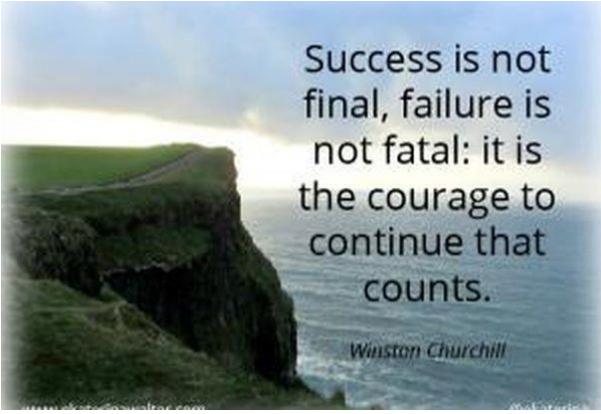


UNCOVER THE FACTS

Some clarifications...about stress

- Stress is a core to some personalities (pre-game jitters affects everyone)
- Too much of load breaks us down (it's the way you carry it)
- Stress is only a mental phenomenon (it affects physical status)
- Some sports are more 'mental' than others (all games require mental conditioning)
- Entertainment has stress-buffering effect (but also impairs the cognitive strategy)





Success is not final, failure is not fatal: it is the courage to continue that counts.

Winston Churchill

Some clarifications...about failure

- Failure causes stress (**stress is a result of apprehension of losing respect after failure**)
- Successful players rarely fail (**no one gets success unless willing to fail enough**)
- Failure breaks a sports person (**failure is an important training partner**)
- Players fail if they are not too focused on success (**they choke instead**)
- Sports psychology can make a loser into a winner (**it only assists in bouncing back**)





What causes stress?

- **Blind ambition:** tendency to win at all costs, resulting in increased apprehension about outcome
- **Alienation:** pre-occupation with self & loss of belongingness in team
- **Faulty coping strategy:** lack of insight & flexibility about dealing with uncertain situations
- **Hypothetical missed opportunity:** lack of clarity about success & failure
- **Lack of resilience:** difficulty in ‘bouncing back’





Markers of stress...

- Overreaction to life's small problem
- Expecting the worst to happen always
- Wanting to make sure that everything is all right
- Unable to take decision or to concentrate
- Taking everything that goes wrong 'personally'
- Experiencing panic reaction without reason
- Feelings easily hurt
- Something to worry about always



Outcome of stress...

- ...alters player's risk taking attitude, decision making power
- ...impairs tolerance to ambiguity
- ...allows to choose a riskier alternative
- ...distorts threat perception & forces poor judgment
- ...takes away focus on skilled-based training
- ...considers only immediate survival goals





Managing daily stress

- Avoid self-medication & maintain sleep cycle
- Perform deep breathing exercise
- Establish realistic target & stop negative self talk
- Do not combat stress & maintain a stress diary
- Manage time effectively & do not take big decision
- Improve attitude & Learn to say 'No'
- Practice 'mindfulness'



Managing the ‘big day’ stress

- Recognize the symptoms being under pressure:
butterfly in stomach, heartbeat, numbness
- Avoid external source of pressure: well-wishers, pep-talk, media, social media
- Reduce internal source of pressure: bad experience, negative self-talk, failure outcome
- Reframe pressure: connecting physical symptom with positive outcome gives rise to determinism
- Have plan ‘B’ for unexpected situation





Stress in coaching...!

Players' behavior & attitude

- Players not performing to their potential
- Apathy & indifference of players
- Argumentativeness in players
- Players not having best interest of the team
- Players not accepting responsibility
- Lack of dedication & motivation
- Injuries in players



It only takes one player with a bad attitude to destroy the team chemistry on the whole team!



Stress in coaching...II

Performance / results

- Inability to produce consistent outcome
- Game day performance
- Not winning the big game
- Not getting players 'in the flow'
- Unwarranted criticism
- Adherence to sports authority guidelines





Stress in coaching...III

Other factors

- Relationship with other staff members
- Actions in hibernation
- Communication barricades
- Reaction of fans, hate mail, social media
- Time consuming travel, meeting deadline
- Being in public after losing game



Managing Cumulative Stress



- Take personal responsibility for stress
- Accept what cannot be changed— not every stressful situation can be changed
- Avoid overwork— learn to share
- Be realistic about goals; one can only accomplish so much within a limited time-frame
- Learn about coping style; more than life style
- Exercise self-discipline; in out-of-control situations
- Learn 'pattern breaking' when into a negative state

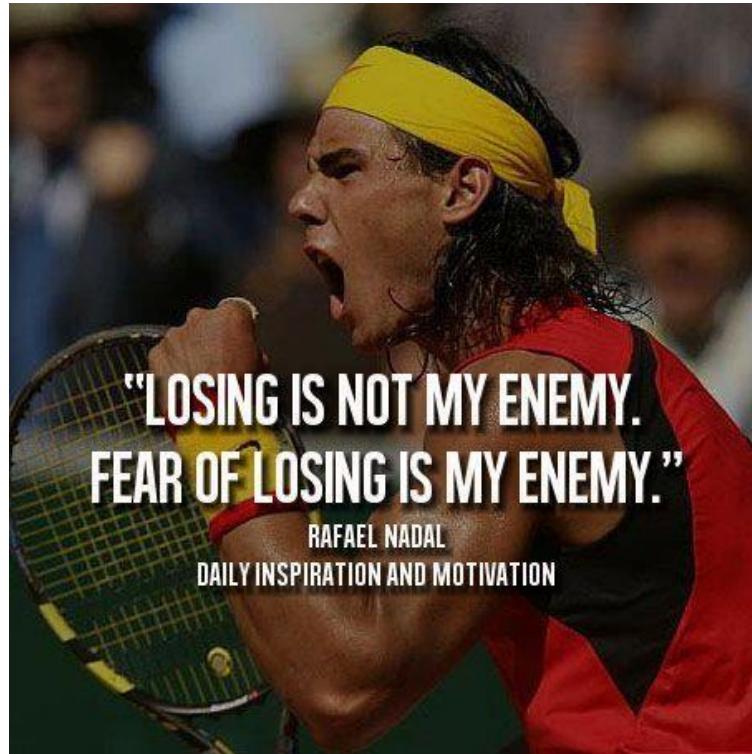


What coaches may do...

- Develop awareness about stress
- Learn about the science of counseling
- Identify self-defeating behaviors in players
- Detect triggers & help players reduce these
- De-stigmatize help-seeking behavior
- Strengthen family support networks

"It's not the load that breaks you down, it's the way you carry it."
~ Lou Holtz





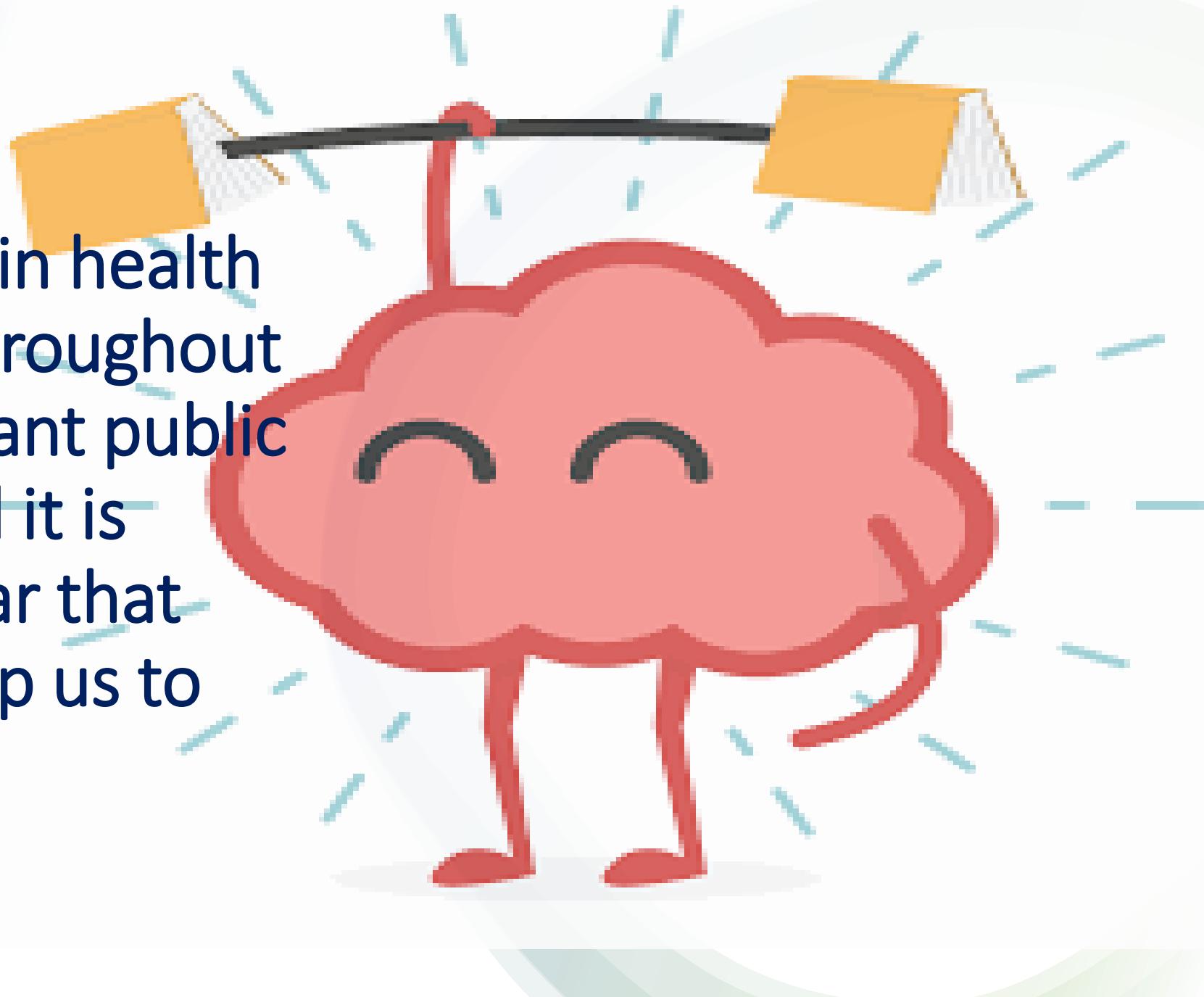
Good luck to all of you...

Components of fitness and Well-being

Role of the Cardio-vascular system



Maintaining brain health and plasticity throughout life is an important public health goal, and it is increasingly clear that exercise can help us to achieve it



What is the difference between anatomy and physiology?

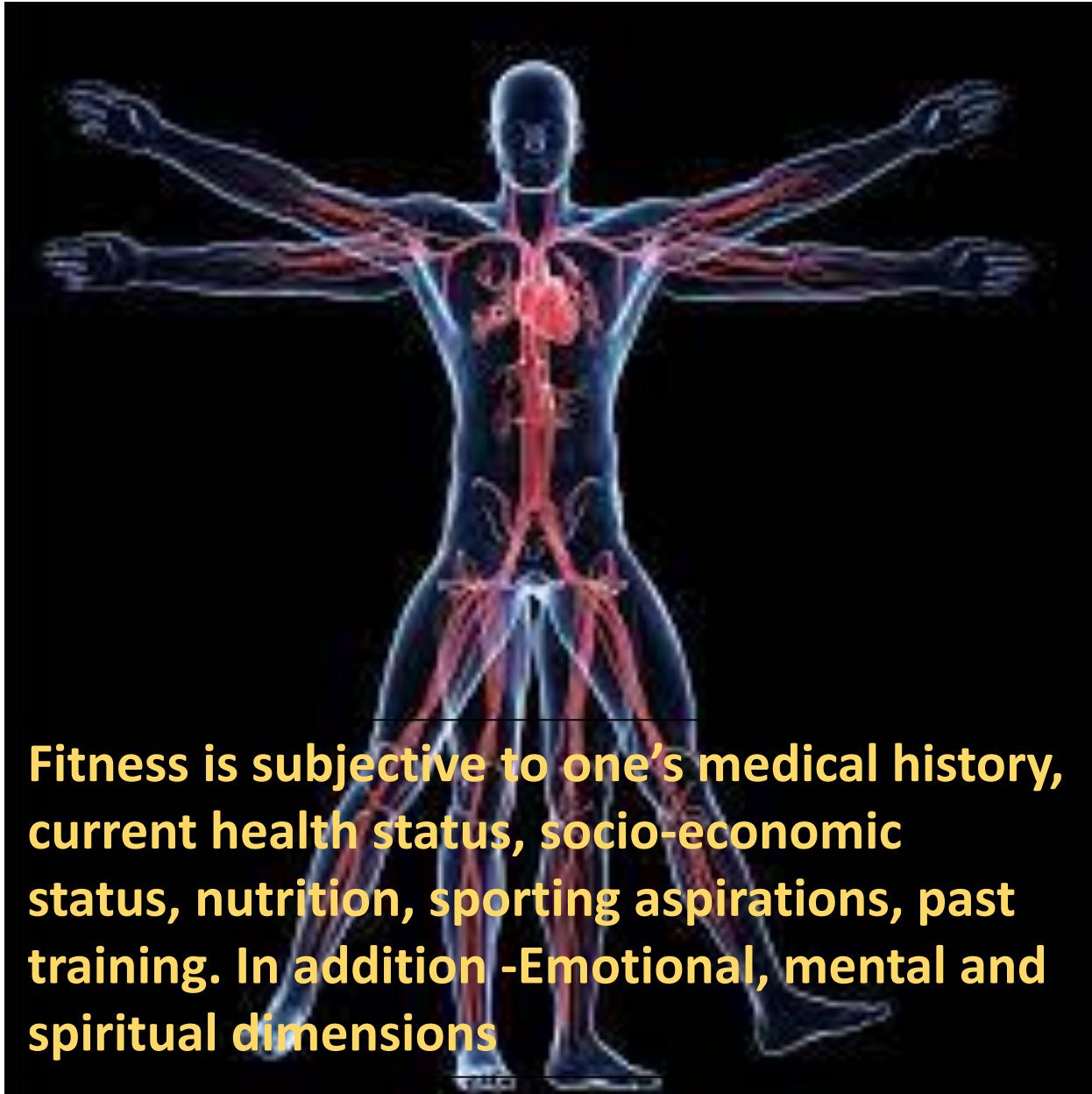
Instruction: Stand up straight and take a deep breath

What happened?

- activated around 302 muscles to stand up
- 26 bones in the spinal column shifted to lift the head and align your neck with the rest of the back
- Multiple other systems engaged to move you

Anatomy: Refers to the bones and muscle systems along with other structural parts in the body

Physiology: Interaction of these bones and muscles along with nerves, tendons, other structures of body working in synchrony to assist in different functions – standing, walking, bending, eating, breathing etc. It explores how your body functions



Fitness is subjective to one's medical history, current health status, socio-economic status, nutrition, sporting aspirations, past training. In addition -Emotional, mental and spiritual dimensions

Fitness components

Fitness can be broken down into 2 strata: health-related and skill-related components

Health related fitness components have the potential to impact one's quality of life

- Cardiovascular endurance → capability of the heart, lungs, and circulatory system to take in, absorb, and use oxygen
- Muscular endurance → capacity of a muscle/group of muscles working together, to maintain continued contractions against a low or moderate resistance
- Strength → force effectiveness of a muscle or a group of muscles.
- Flexibility → mobility of the joints and their associated soft-tissue structures
- Body composition → the proportional segmentation of body weight into lean and fat constituents

Fitness components:

Skill-related fitness components are desirable for many sporting activities, but a deficiency in these won't negatively impact your health, as with health-related components of fitness

- Agility → ability to change direction of the body or parts of the body, incorporating elements of deceleration and acceleration
- Balance → ability to maintain both static and dynamic equilibrium of the body parts as well as the whole body
- Coordination → ability to perform a range of simple to complex movements with precision, timing, and continuity
- Power → ability to achieve optimal force development of the voluntary muscles—but in a minimal time period
- Reaction speed → ability to recruit selected neuromuscular responses with a minimal time delay

The need for different Exercise programs

- There are many influences on total fitness, and thus different ways of exercising
- A program designed to improve only one of these components won't satisfy the others

Cardiovascular Endurance: also referred to as cardiorespiratory fitness (CV), **cardio, stamina, and aerobic fitness**—is improved through specific activity that usually involves number of large muscle groups and is sustained for a certain length of time
Eg: aerobics, jogging, and cycling

The American College of Sports Medicine recommends:

- About **30 minutes of exercise at medium intensity for 5 days/wk**
- or **20 minutes at high intensity for 3 days per week**
- For **weight loss 60 minutes** of exercise at a time
- Even 15 minutes can have a significant impact, to build up as the body strengthens

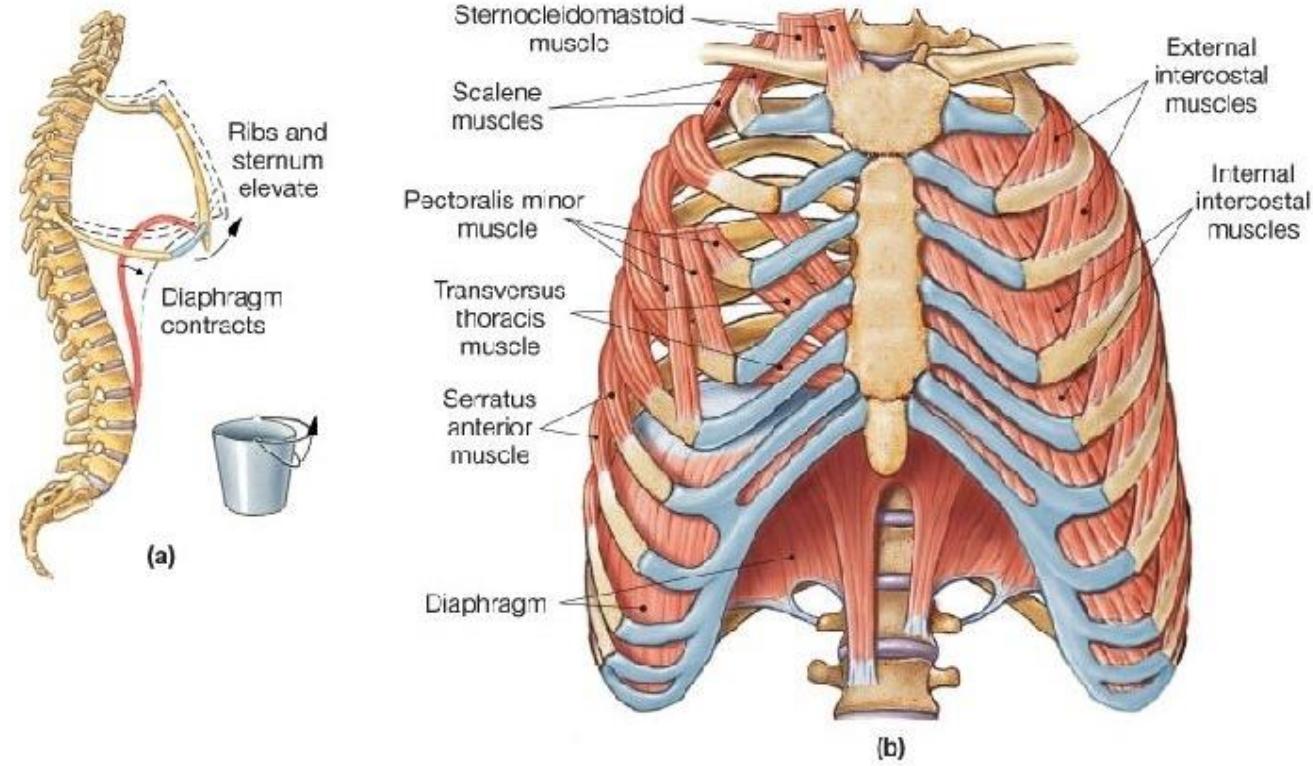
What happens to the body when one exercises?

O₂ inspiration is the beginning of the process of exercise

In response to the increased demands of exercise → body absorbs more oxygen

With time, the diaphragm, intercostal muscles, and pectoralis minor that control respiration all become more efficient and able to work longer at higher intensities

Respiratory Muscles



Ventilation - movement of air into and out of lungs.

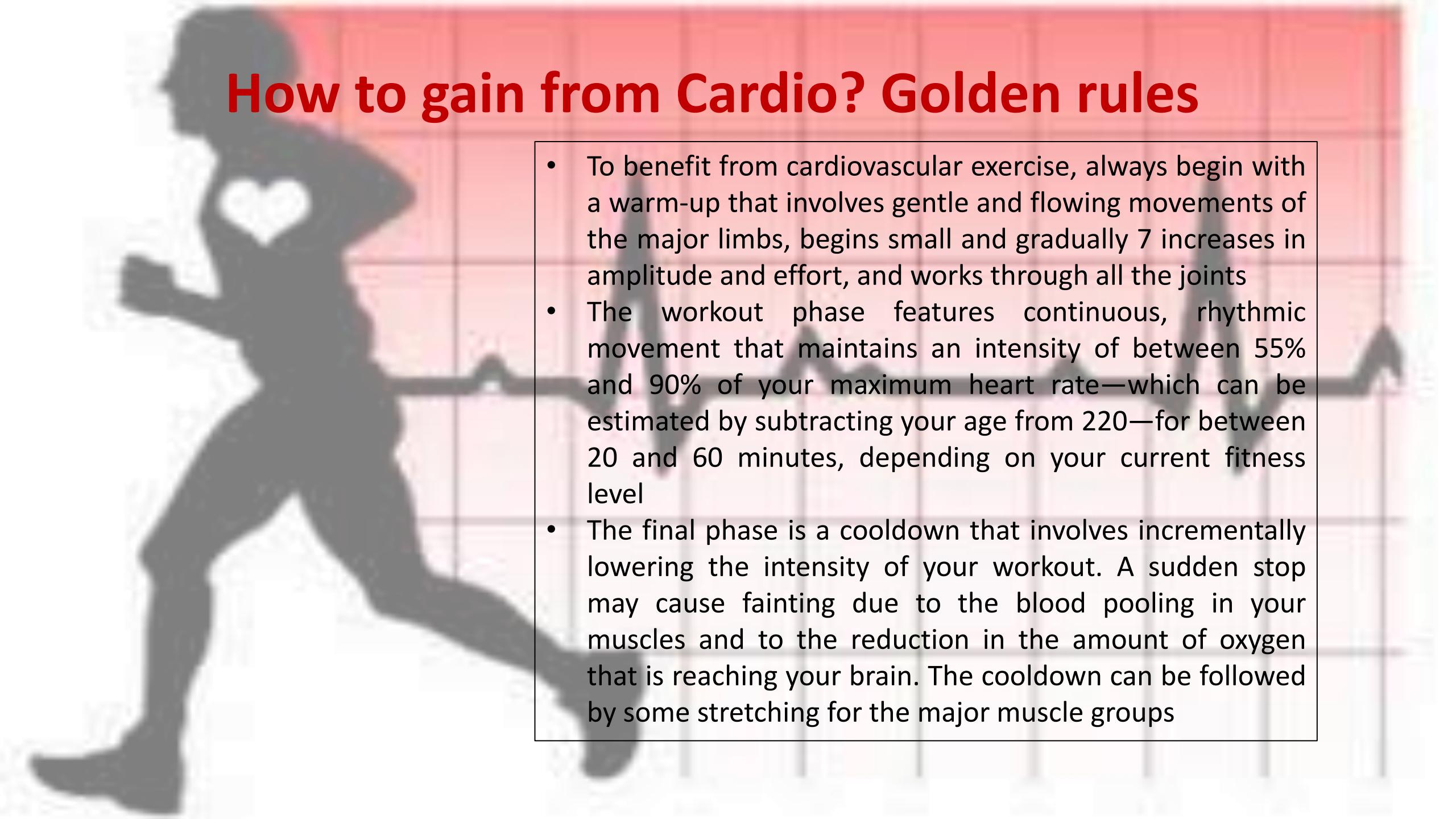


Lungs don't actually become larger

What happens to the body when one exercises?

- **Oxygen is transported in the blood as we breathe** – increasing the total blood volume and the concentration of red cells (the carriers of the oxygen)
- Over time, **the body grows more capillaries to deliver more oxygen faster** and more efficiently
- **The blood takes the oxygen to the heart** through the pulmonary veins, and then it is pumped around the whole body
- Working out leads to the **heart being able to hold more blood**.
- The **wall of the heart becomes stronger**. An increased amount of blood is ejected with each beat. The body is then able to accommodate higher intensities of exercise
- A by-product is that **the stronger heart will not have to work as hard when resting, so the resting pulse drops with exercise**

- Within the muscle cells, **mitochondria break down food for fuel**, use the oxygen delivered by the blood to do their work
- The **number and size of these mitochondria increase** so that the muscles can use more oxygen and sustain greater effort for longer periods of time
- Exercise changes the way fats are transported in the blood by **increasing the ratio of high-density lipoproteins (HDL)**, the “good” cholesterol, to **low-density lipoproteins (LDL)**, the “bad” cholesterol.
- Low-density lipoproteins - associated with the accumulation of fatty deposits on the walls of the blood vessels, leading to atherosclerosis



How to gain from Cardio? Golden rules

- To benefit from cardiovascular exercise, always begin with a warm-up that involves gentle and flowing movements of the major limbs, begins small and gradually increases in amplitude and effort, and works through all the joints
- The workout phase features continuous, rhythmic movement that maintains an intensity of between 55% and 90% of your maximum heart rate—which can be estimated by subtracting your age from 220—for between 20 and 60 minutes, depending on your current fitness level
- The final phase is a cooldown that involves incrementally lowering the intensity of your workout. A sudden stop may cause fainting due to the blood pooling in your muscles and to the reduction in the amount of oxygen that is reaching your brain. The cooldown can be followed by some stretching for the major muscle groups

Muscular Endurance and Strength

Muscular endurance and strength are different health-related fitness components, but they functionally complement each other; there is a continuum that ranges from strength at one end to endurance at the other end
CDC recommends endurance and strength training twice weekly

- **Muscular endurance** – fueled by the lactate system (supplying energy gradual builds up lactic acid in the muscle). Regular exercise improves the supply of oxygen so that you're able to perform for a longer amount of time before lactic acid builds up
- **Muscular strength** – training leads to microscopic tears to the tissues at the cellular level. Ingesting sufficient protein and resting builds the adaptive process of **super-compensation**, leading to increase in the cross-sectional muscle size and a corresponding increase in strength
- Muscular endurance and strength training have been proven to increase bone density, which reduces the risk of osteoporosis; increases metabolic rate, assisting in weight management; reduces blood pressure; decreases LDL; and raises HDL. Muscular endurance and strength training also improve posture, thereby reducing the risk of lower back malady and the risk of injury from events such as falls



Women will grow bulging muscles with strength training
The degree to which muscles grow is dependent upon testosterone levels, which explains the different responses between men and women with this type of training. In general, men who lift weights increase muscle size, but women improve their tone and appear leaner

Muscular Endurance and Strength



To improve muscular endurance and strength, warm up to be done by performing basic resistance training movements but with no resistance

Desirable → a minimum frequency of 2 times/week and 1 to 3 sets of 5 strength and 25 endurance repetitions—resting for 30 to 60 seconds between sets and allowing 30 to 45 minutes for each session

Cool down with some stretches for the muscle groups worked in the session

Flexibility

Divided into static and dynamic classifications, and a good score in one doesn't necessarily imply the same in the other

- **Static flexibility** → slowly lengthening a muscle, by natural movement or by adding external pressure at the end point and then holding the position
- **Dynamic flexibility** → range that can be achieved through movement, in which the muscle is continuously lengthened and shortened but is not held at an end point. **Movement must be controlled because dynamic flexibility carries an injury risk if it causes an overstretching of the muscle's capability**

The American College of Sports Medicine recommends including flexibility training 3 times per week
Eg: Yoga, dance
the rate of improvement is greater at a younger age

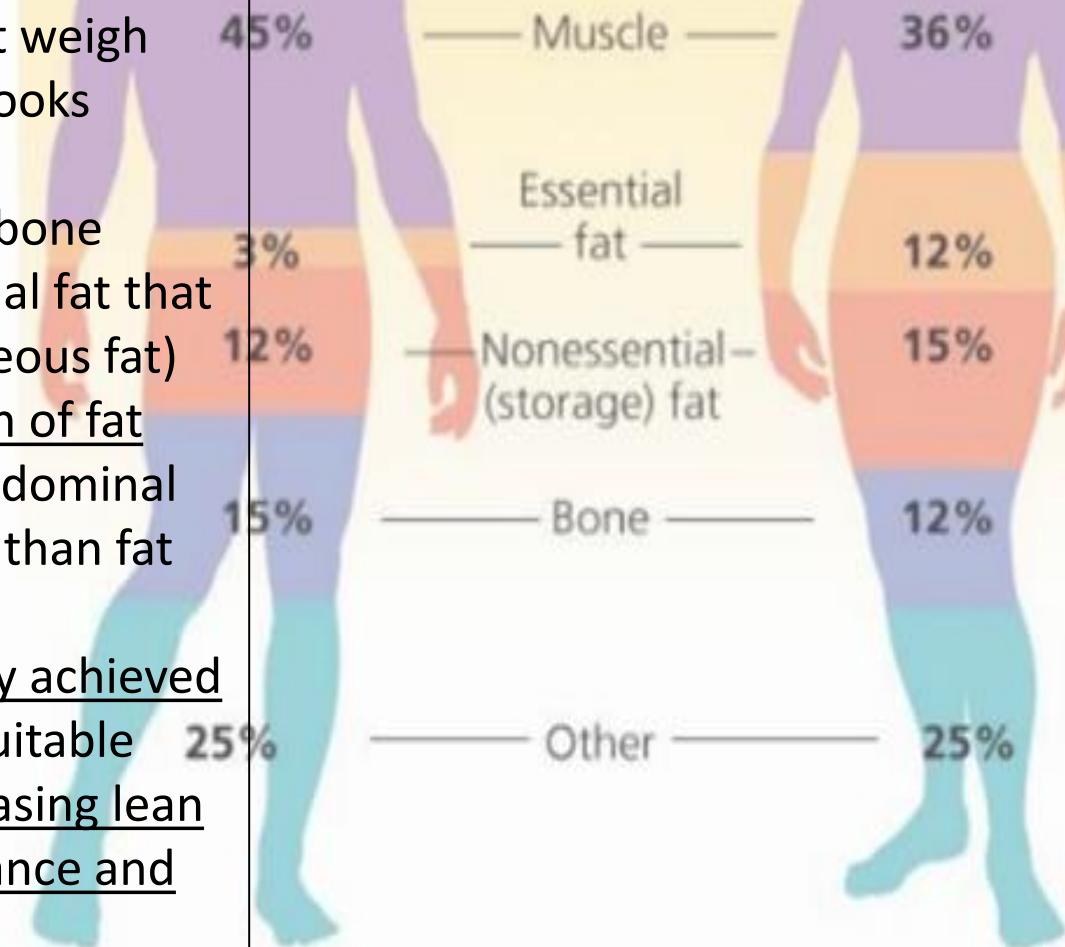
Improvements in flexibility → a developmental stretch

Flexibility improves with developmental stretch - A static stretch carefully applied and aims to lengthen the elastic muscle beyond its original length

Body Composition

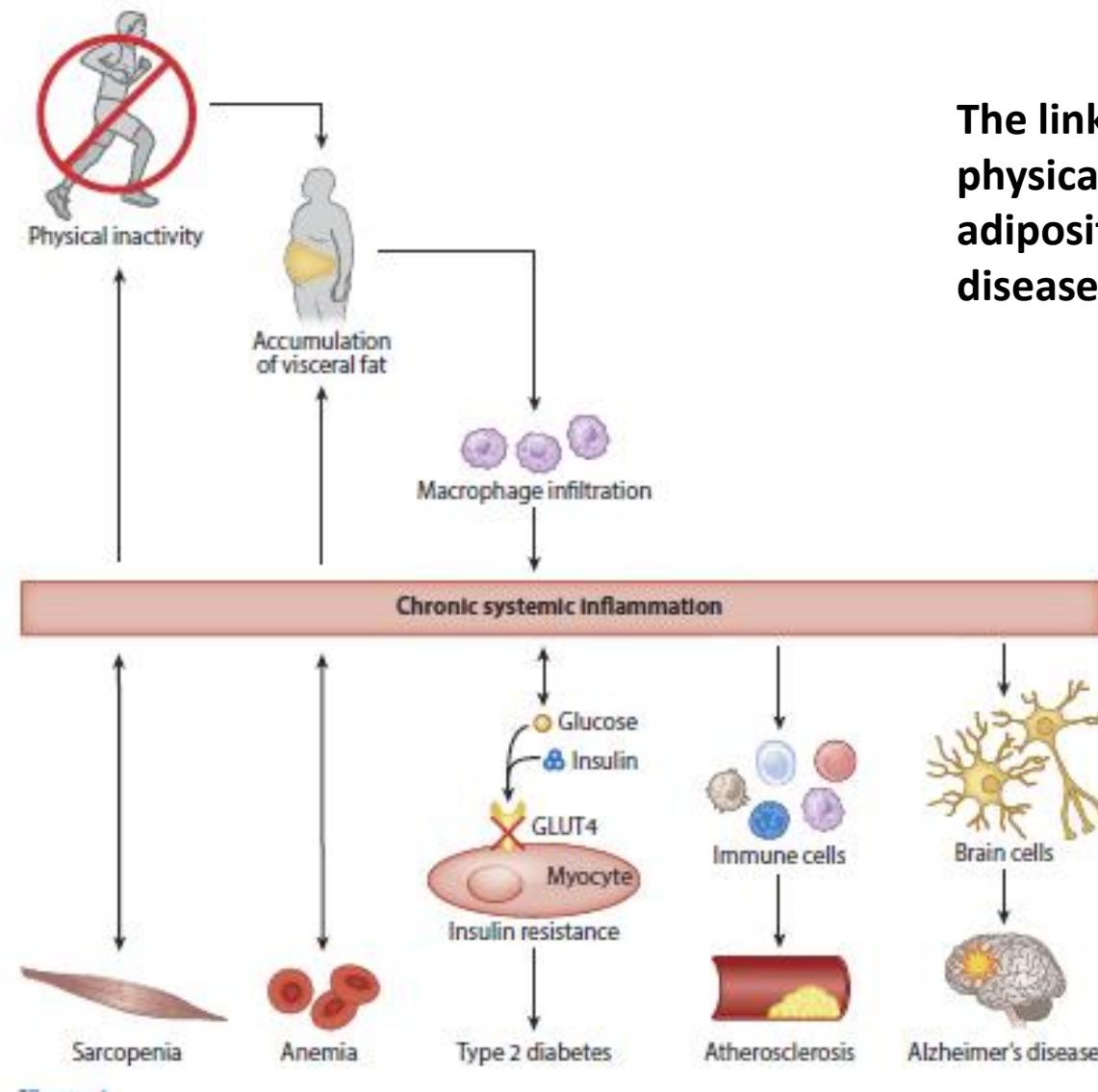
- **Lean body weight**—muscles and bones—are more dense than fat. This explains why someone who is in great shape might weigh more than someone who physically looks heavier
- **Body fat** (essential fat), found in the bone marrow and the organs. The additional fat that we store beneath the skin (subcutaneous fat) presents a risk factor. The distribution of fat influences the degree of risk, with abdominal accumulation being more dangerous than fat around the hips and thighs
- Improving body composition is ideally achieved by reducing calorie intake, through suitable cardiovascular exercise, and by increasing lean body mass, through muscular endurance and strength training

To assess the percentage of our body weight that's attributed to fat. The medical community universally agrees that excess body fat can lead to increased risk of diabetes, cardiovascular disease, joint problems, respiratory issues, and high blood pressure



The National Institutes of Health target guidelines are 20–21% body fat for women, with 30% or more being considered obese

The healthy ranges for men are between 13% and 17%, with 25% or more being considered obese



The links between the lack of physical inactivity, abdominal adiposity, inflammation, and disease

Figure 1

Pedersen, 2018, Annual Review of Physio

Recent literature

- Physical activity is associated with a range of health benefits, and its absence can have harmful effects on health and well being, increasing the risk for coronary heart disease, diabetes, certain cancers, obesity, hypertension and all cause mortality (CDC [1996](#))
- Physical inactivity may also be associated with the development of mental disorders: some clinical and epidemiological studies have shown associations between physical activity and symptoms of depression and anxiety in cross-sectional and prospective-longitudinal studies (Goodwin [2003](#); Motl et al. [2004](#))
- Exercise is an integral part in the treatment and rehabilitation of many medical conditions. Improving physical well being may also lead to improved psychological well being and is generally accepted that physical activity may have positive effects on mood and anxiety

Exercise and neurotrophic factors

Exercise is a simple behavior that activates molecular and cellular cascades that support and maintain brain plasticity. It induces expression of genes associated with plasticity, such as those encoding BDNF, and in addition promotes brain vascularization, neurogenesis, functional changes in neuronal structure and neuronal resistance to injury. Significantly, these effects occur in the hippocampus, a brain region central to learning and memory.

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Exercise and the brain

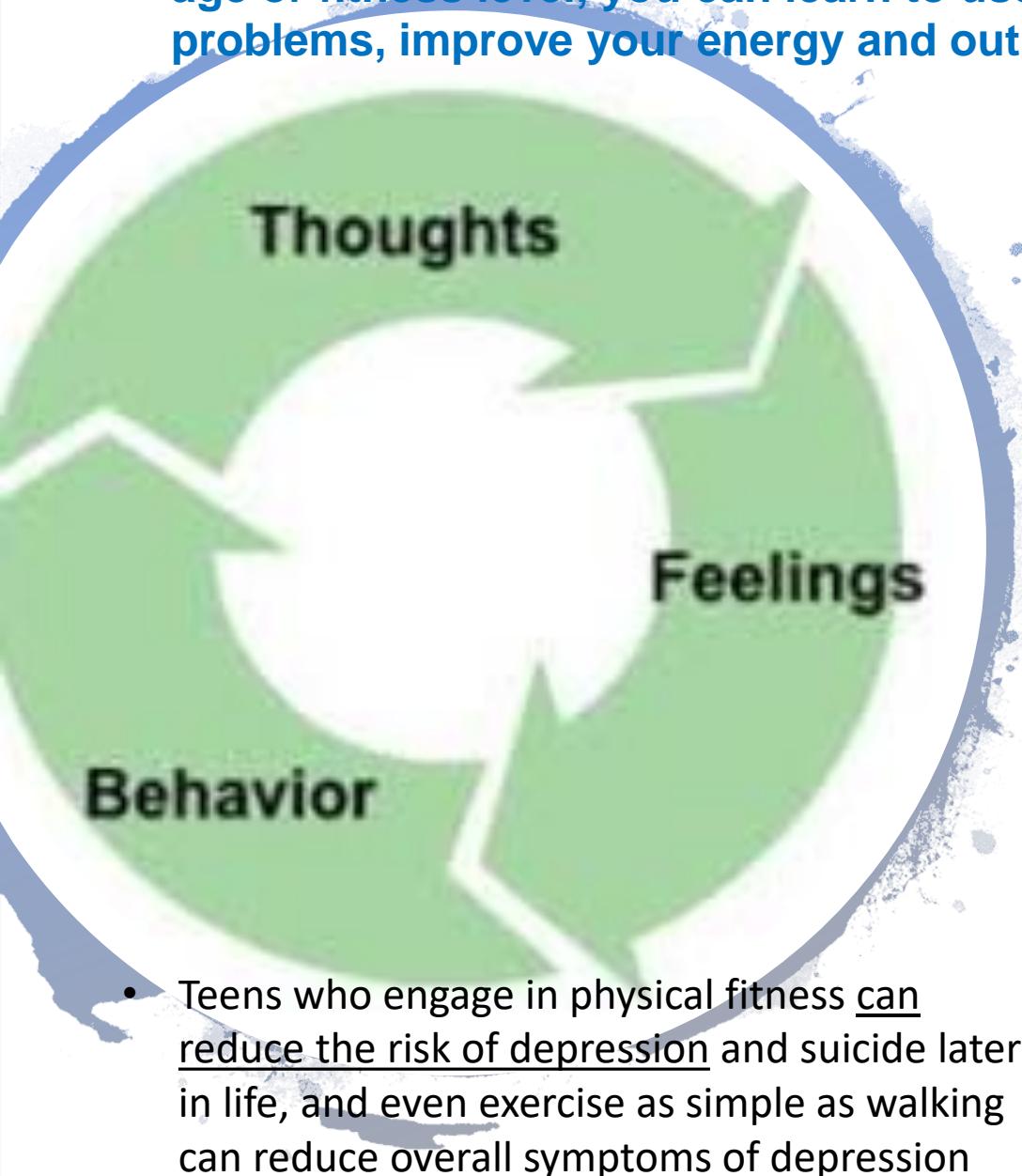
Cardiovascular exercise make you smarter

- Heart-pumping activity is also an instant mood booster and has been shown to be as effective as prescription antidepressant medicine. Exercise activates the same pathways in the brain as morphine and increases the release of endorphins, natural feel-good neurotransmitters

Cardio allows natural mood-enhancing **amino acid tryptophan** to enter the brain

- **Tryptophan** is a precursor to the neurotransmitter **serotonin**, which balances moods
- It is a relatively small amino acid, and it often competes with larger amino acids to cross the blood channels into the brain. With exercise, the muscles of the body utilize the larger amino acids and decrease the competition for tryptophan to enter the brain, which makes you feel better

Research indicates that modest amounts of exercise can make a real difference. No matter your age or fitness level, you can learn to use exercise as a powerful tool to deal with mental health problems, improve your energy and outlook, and get more out of life



What are the mental health benefits of exercise?

- **Exercise and depression** - Harvard T.H. Chan School of Public Health found that running for 15 minutes a day or walking for an hour reduces the risk of major depression by 26%. In addition to relieving depression symptoms, research also shows that maintaining an exercise schedule can prevent you from relapsing
 - Cardio exercise produces endorphins that may improve your sense of well-being and overall mood
 - Cardio can increase neurotransmitters like glutamate, GABA, serotonin, and norepinephrine, which may be low in depressed people
 - Exercise improves sleep. Going outside, changing routine, and social interaction helps mood elevation
-
- **Exercise and anxiety** - It relieves tension and stress, boosts physical and mental energy, and enhances well-being through the release of endorphins

What are the mental health benefits of exercise?

- **Exercise and stress** – stress contracts muscles inducing back or neck pain, or painful headaches, tightness in your chest, a pounding pulse, or muscle cramps, with added problems of insomnia, heartburn, stomachache, diarrhea, or frequent urination. The worry and discomfort of all these physical symptoms can in turn lead to even more stress, creating a vicious cycle between your mind and body

Exercising is an effective way to break this cycle. As well as releasing endorphins in the brain, physical activity helps to relax the muscles and relieve tension in the body. Since the body and mind are so closely linked, when your body feels better so, too, will your mind.

- **Exercise and ADHD** - Exercising regularly is one of the easiest and most effective ways to reduce the [symptoms of ADHD](#) and improve concentration, motivation, memory, and mood. Physical activity immediately boosts the brain's dopamine, norepinephrine, and serotonin levels—all of which affect focus and attention. In this way, exercise works in much the same way as ADHD medications such as Ritalin and Adderall

Other mental health benefits of exercise

- **Sharper memory and thinking**
- **Higher self-esteem**
- **Better sleep**
- **More energy**
- **Stronger resilience**

If exercise makes us feel so good, why is it so hard to do it?

- Starting out too hard in a new exercise program may be one of the reasons people disdain physical activity
- When people exercise above their respiratory threshold — that is, above the point when it gets hard to talk — they postpone exercise's immediate mood boost by about 30 minutes
- For novices, that delay could turn them off from the treadmill for good.
- Sports trainers suggest workout neophytes start slowly, with a moderate exercise plan
- An emphasis on the physical effects of exercise also brings about apathy to activity. Physicians frequently tell patients to work out to lose weight, lower cholesterol or prevent diabetes. Unfortunately, it takes months before any physical results of your hard work in the gym are apparent

Getting started with exercise

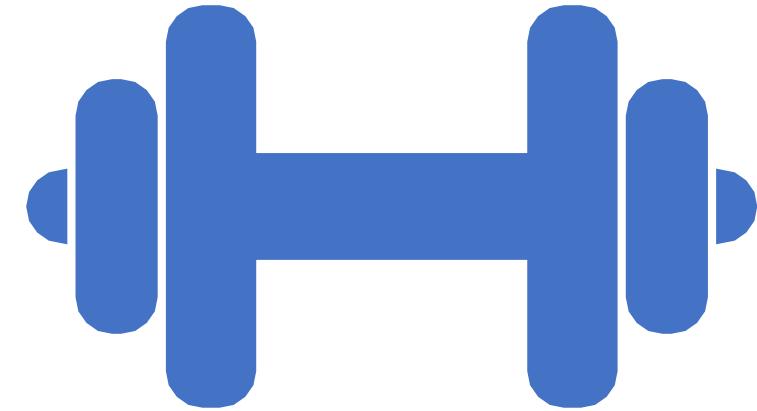
- Start small
- Schedule workouts when your energy is highest
- Focus on activities you enjoy
- Be comfortable
- Reward yourself
- Make exercise a social activity

- The exercise mood boost, offers near-instant gratification

Designing a therapeutic exercise program

A program may include exercise for improving or preventing deterioration in:

- aerobic capacity
 - muscle strength power and endurance
 - flexibility or range of movement
 - balance, coordination, and agility
-
- All exercise training and sport sessions should start with a 10–15-min dynamic warm-up period followed by 20–60 min of exercise training
 - Finally, a 10-min cool-down period with less intensive activities and stretching should end the exercise training session
 - Between the training sessions, there must be enough time to recover



Common training principles of exercise

Overload

- A system must be exercised at a level beyond which it is presently accustomed for a training effect to occur
- The system being exercised will gradually adapt to the overload or training stimulus being applied, and this will go on happening till the training stimulus continues to be increased until the tissue can no longer adapt
- The training stimulus applied consists of different variables such as intensity, duration, and frequency of exercise
- It is important to give the system being exercised enough time to recover and only apply a training stimulus again when the system is no longer fatigued (warm up and cool down)

Specificity

- Any exercise will train a system for the particular task being carried out as the training stimulus. Eg: a training program including muscle strengthening will train the muscle in the range that it is working and the way that the muscle is being used, i.e. isometrically, concentrically, or eccentrically
- It is important that any exercise to strengthen muscle targets the muscle range and type of muscle work specific to the task required. Eg: riding a bicycle requires concentric knee extension from mid-to inner range, as the pedal is pushed down to propel the bicycle along. Cyclist wishing to increase the strength of his quadriceps will need to train concentrically in mid-to inner range
- Depending on the presenting problem, the required task should become part of the training program at an appropriate stage

Common training principles of exercise

Reversibility

- The beneficial effects of training begin to be lost as soon as training stops. This happens in a similar time frame as it takes to train the system

Safety

Whenever an individual exercises, there is a risk that they may injure themselves. Safety factors are considered here in relation to the physiotherapist, the environment and the patient or person carrying out the exercise^[4].

Individuality

- Variation in response to a training program will occur in a population as people respond differently to the same training program. This depends on the initial fitness level of the individual, their health status, and their genetic makeup
- Those individuals with a lower fitness level before starting an exercise program show improvement in fitness more quickly than those who are relatively fit before training begins
- Some individuals with health conditions may not be able to work at the same kind of intensity as a healthy individual and so will take longer to achieve a training goal



The FITT Principle



Aerobic activities strengthen the lungs and heart and make the working muscles more efficient at using oxygen. They also increase stroke volume (amount of blood pumped per heartbeat) and lowers the resting heart rate. Increasing stroke volume is very important because it means that the heart does not have to work as hard.

A resting heart rate varies from person to person, however the lower your resting heart rate, the more efficient your heart is working.

One long-term result of regular aerobic activity is cardiovascular endurance, also known as cardiorespiratory endurance. This is the ability of the body to work continuously for extended periods of time. Those who have a high level of cardiovascular fitness have lowered risks of adult lifestyle diseases, such as, **type 2 diabetes, cardiovascular disease, and obesity**.

Cardiovascular endurance increases chances for living a longer and healthier life. It is important to know your FITT Principles so that you gain health benefits for your heart. The table below illustrates the different FITT Principles

FITT Principle Table

F	Frequency of Exercise	How Often	Beginner	3-5 days per week
			Moderate to High	5-7 days per week
I	Intensity of Exercise	How Hard	Beginner	Less than 145 BPM
			Moderate to High	145-186 BPM
T	Time of Exercise	How Long	Beginner	20-30 minutes
			Moderate to High	30-60 minutes
T	Type of Exercise	Which Exercises	A continuous activity that is aerobic (Requires Oxygen)	

FITT PRINCIPLES

- **Frequency of Exercise:** Cardiovascular benefits are achieved when you engage in exercise 3-5 times each week. You may gain additional benefits if you engage in an activity more frequently, but 3-5 times is the recommended range to improve general fitness
- **Intensity of Exercise:** Intensity refers to how hard you are working. Intensity is one of the most important ways to determine if you are exercising at a level that benefits your heart. This level is called your Target Heart Rate (THR) Zone. In general, this means exercising at a level where the heart is beating between 50% and 85% of a person's maximum heart rate (220 minus age) or approximately 142–186 BPM (average for youth)
- **Time (Duration) of Exercise:** Time refers to how long you should C03-02A exercise in your Target Heart Rate Zone. To achieve the greatest cardiovascular benefit, a workout should be at least 20 minutes of continuous or intermittent aerobic activity per exercise session. Intermittent means that the activity should be done in blocks of time that are 10 minutes or longer. Cardiovascular benefits continue to increase as the exercise duration is extended to 60 minutes. Beyond 60 minutes of activity, cardiovascular benefits start to level off, and the risk of injury increases
- **Type of Exercise:** Types of cardiovascular fitness exercises include rhythmical, repetitive activities that involve large muscle groups and are performed over prolonged periods. These types of activities provide the greatest improvements in cardiovascular fitness. The list of activities that fall into this category include walking, cycling, swimming, jogging, and aerobic class type activities.



Heart Rate Percentages

Age	MHR	50%	60%	70%	80%	90%
11	209	147	160	172	185	197
12	208	146	159	171	183	196
13	207	146	158	170	182	194
14	206	146	158	170	182	194
15	205	139	152	165	178	192
16	204	138	151	164	178	191
17	203	138	151	164	177	190
18	202	137	150	163	176	190

THANK YOU

BUFFER SLIDES



What is meant by Cardiovascular exercise?

Cardiovascular fitness relates to the body's ability to generate energy and deliver oxygen to working muscles. It is considered the most important component of physical fitness and is one of the best indicators of overall health. Aerobic exercises are best for developing cardiovascular fitness. Aerobic means "with oxygen" and includes continuous activities that use oxygen. A few examples of aerobic activities are walking, biking, jogging, and skating. These types of exercises sustain oxygen to the muscles for an extended time period

Aerobic (cardiorespiratory endurance) capacity

- The dose of exercise can be described using the so-called FITT factors, where FITT stands for Frequency, Intensity, Time, and Type of activity
- The same principle could be used endurance training to dose a load
- Some individuals may not respond as expected because of individual variability in the magnitude of response to a particular exercise regimen
- Furthermore, the FITT principle of exercise may not apply in certain cases because of individual characteristics (e.g., health status, physical ability, age) or athletic and performance goals
- Accommodations to the exercise should be made for individuals with clinical conditions and healthy individuals with special considerations

EXERCISE YOUR POTENTIAL

Get F.I.T.T. to start a personalized fitness plan this Monday.



FREQUENCY



INTENSITY



TIME



TYPE

MoveItMonday.org



ACSM recommends to use the FITT method



STRENGTH TRAINING

Frequency -2-3 days a week



Intensity -one set of 8-10 RM to volitional fatigue



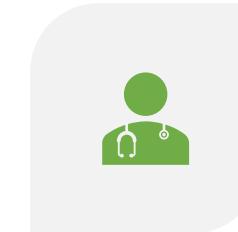
Duration -3 seconds for the concentric phase and 3 seconds for the eccentric phase of the activity (about 1 minute in total)



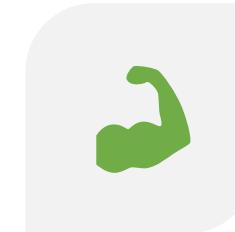
A general strengthening program would include 8-10 exercises that target all the major muscle groups in the body



Resistance training (RT) is an effective method to improve muscular strength, power, and hypertrophy which are fundamental components of physical fitness related to the quality of life



RESEARCH OVER THE LAST FEW DECADES HAS INVESTIGATED THE EFFECTS OF SEVERAL ACUTE TRAINING VARIABLES ON MAXIMAL STRENGTH GAINS THAT INFLUENCE THE OVERALL OUTCOME OF AN RT PROGRAM



THESE RT VARIABLES INCLUDE EXERCISE ORDER, THE NUMBER OF SETS, REPETITIONS, INTER-SET RECOVERY PERIODS, TRAINING INTENSITY PER MUSCLE GROUP, AND TOTAL TRAINING VOLUME

SPORTS AND WELLBEING

INTRODUCTORY CLASS



EVALUATION CRITERIA

- Continuous Evaluation
 - Surprise Speed Tests
 - Assignments
 - App-Based work / activity records
- Attendance
- Percentile Scoring
 - Top 5% students shall be Awarded 'EX'
 - Next 10% students shall be Awarded 'A'
 - Next 15% students shall be Awarded 'B'

TAKEAWAYS FROM THE COURSE

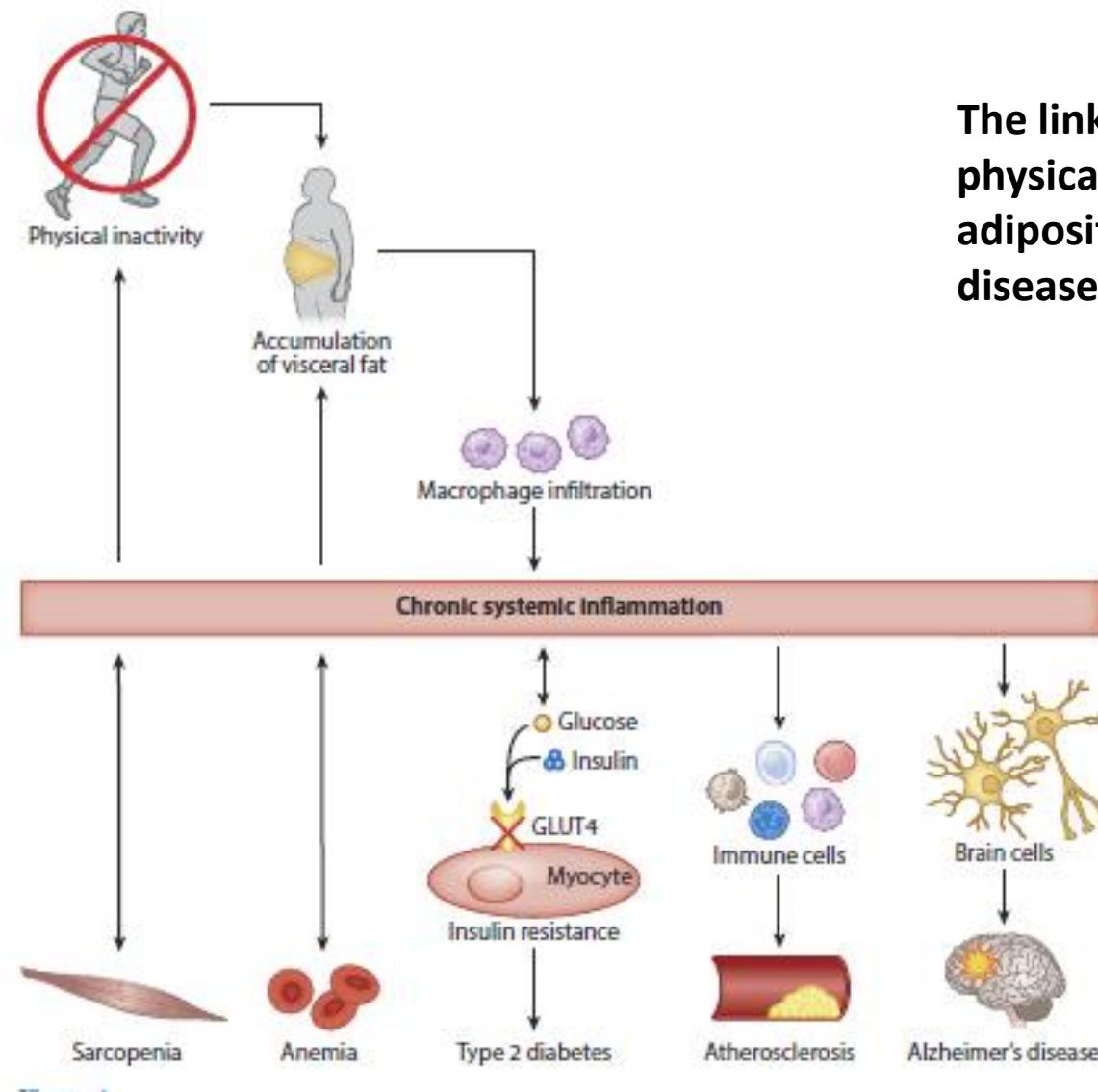
- Awareness on health and sports
- Learn to be physically and mentally fit than before
- Learn to be in a continuous process of wellbeing

Physiological parameters of Well- being

Role of the Cardio-vascular system



Maintaining brain health and plasticity throughout life is an important public health goal, and it is increasingly clear that exercise can help us to achieve it



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Pedersen, 2018, Annual Review of Physio

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Research indicates that modest amounts of exercise can make a real difference. No matter your age or fitness level, you can learn to use exercise as a powerful tool to deal with mental health problems, improve your energy and outlook, and get more out of life



What are the mental health benefits of exercise?

- **Exercise and depression** - Harvard T.H. Chan School of Public Health found that running for 15 minutes a day or walking for an hour reduces the risk of major depression by 26%. In addition to relieving depression symptoms, research also shows that maintaining an exercise schedule can prevent you from relapsing
 - Cardio exercise produces endorphins that may improve your sense of well-being and overall mood
 - Cardio can increase neurotransmitters like glutamate, GABA, serotonin, and norepinephrine, which may be low in depressed people
 - Exercise improves sleep. Going outside, changing routine, and social interaction helps mood elevation
-
- **Exercise and anxiety** - It relieves tension and stress, boosts physical and mental energy, and enhances well-being through the release of endorphins

What are the mental health benefits of exercise?

- **Exercise and stress** – stress contracts muscles inducing back or neck pain, or painful headaches, tightness in your chest, a pounding pulse, or muscle cramps, with added problems of insomnia, heartburn, stomachache, diarrhea, or frequent urination. The worry and discomfort of all these physical symptoms can in turn lead to even more stress, creating a vicious cycle between your mind and body

Exercising is an effective way to break this cycle. As well as releasing endorphins in the brain, physical activity helps to relax the muscles and relieve tension in the body. Since the body and mind are so closely linked, when your body feels better so, too, will your mind.

- **Exercise and ADHD** - Exercising regularly is one of the easiest and most effective ways to reduce the [symptoms of ADHD](#) and improve concentration, motivation, memory, and mood. Physical activity immediately boosts the brain's dopamine, norepinephrine, and serotonin levels—all of which affect focus and attention. In this way, exercise works in much the same way as ADHD medications such as Ritalin and Adderall

Other mental health benefits of exercise

- **Sharper memory and thinking**
- **Higher self-esteem**
- **Better sleep**
- **More energy**
- **Stronger resilience**

If exercise makes us feel so good, why is it so hard to do it?

- Starting out too hard in a new exercise program may be one of the reasons people disdain physical activity
- When people exercise above their respiratory threshold — that is, above the point when it gets hard to talk — they postpone exercise's immediate mood boost by about 30 minutes
- For novices, that delay could turn them off from the treadmill for good.
- Sports trainers suggest workout neophytes start slowly, with a moderate exercise plan
- An emphasis on the physical effects of exercise also brings about apathy to activity. Physicians frequently tell patients to work out to lose weight, lower cholesterol or prevent diabetes. Unfortunately, it takes months before any physical results of your hard work in the gym are apparent

Getting started with exercise

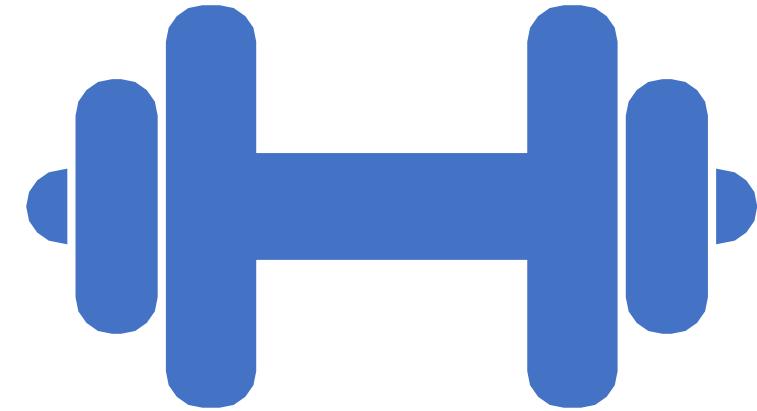
- Start small
- Schedule workouts when your energy is highest
- Focus on activities you enjoy
- Be comfortable
- Reward yourself
- Make exercise a social activity

- The exercise mood boost, offers near-instant gratification

Designing a therapeutic exercise program

A program may include exercise for improving or preventing deterioration in:

- aerobic capacity
 - muscle strength power and endurance
 - flexibility or range of movement
 - balance, coordination, and agility
-
- All exercise training and sport sessions should start with a 10–15-min dynamic warm-up period followed by 20–60 min of exercise training
 - Finally, a 10-min cool-down period with less intensive activities and stretching should end the exercise training session
 - Between the training sessions, there must be enough time to recover



Common training principles of exercise

Overload

- A system must be exercised at a level beyond which it is presently accustomed for a training effect to occur
- The system being exercised will gradually adapt to the overload or training stimulus being applied, and this will go on happening till the training stimulus continues to be increased until the tissue can no longer adapt
- The training stimulus applied consists of different variables such as intensity, duration, and frequency of exercise
- It is important to give the system being exercised enough time to recover and only apply a training stimulus again when the system is no longer fatigued (warm up and cool down)

Specificity

- Any exercise will train a system for the particular task being carried out as the training stimulus. Eg: a training program including muscle strengthening will train the muscle in the range that it is working and the way that the muscle is being used, i.e. isometrically, concentrically, or eccentrically
- It is important that any exercise to strengthen muscle targets the muscle range and type of muscle work specific to the task required. Eg: riding a bicycle requires concentric knee extension from mid-to inner range, as the pedal is pushed down to propel the bicycle along. Cyclist wishing to increase the strength of his quadriceps will need to train concentrically in mid-to inner range
- Depending on the presenting problem, the required task should become part of the training program at an appropriate stage

Common training principles of exercise

Reversibility

- The beneficial effects of training begin to be lost as soon as training stops. This happens in a similar time frame as it takes to train the system

Safety

Whenever an individual exercises, there is a risk that they may injure themselves. Safety factors are considered here in relation to the physiotherapist, the environment and the patient or person carrying out the exercise^[4].

Individuality

- Variation in response to a training program will occur in a population as people respond differently to the same training program. This depends on the initial fitness level of the individual, their health status, and their genetic makeup
- Those individuals with a lower fitness level before starting an exercise program show improvement in fitness more quickly than those who are relatively fit before training begins
- Some individuals with health conditions may not be able to work at the same kind of intensity as a healthy individual and so will take longer to achieve a training goal



What is meant by
Cardiovascular exercise?

- Cardiovascular fitness relates to the body's ability to generate energy and deliver oxygen to working muscles
- These types of exercises sustain oxygen to the muscles for an extended time period
- The most important component of physical fitness and the best indicator of overall health
- Aerobic exercises are best for developing cardiovascular fitness
- Aerobic means “with oxygen” and includes continuous activities that use oxygen
- Examples: walking, biking, jogging, skating

Aerobic (cardiorespiratory endurance) capacity

- The dose of exercise can be described using the so-called FITT factors, where FITT stands for Frequency, Intensity, Time, and Type of activity
- The same principle could be used endurance training to dose a load
- Some individuals may not respond as expected because of individual variability in the magnitude of response to a particular exercise regimen
- Furthermore, the FITT principle of exercise may not apply in certain cases because of individual characteristics (e.g., health status, physical ability, age) or athletic and performance goals
- Accommodations to the exercise should be made for individuals with clinical conditions and healthy individuals with special considerations

EXERCISE YOUR POTENTIAL

Use F.I.T.T. to start a personalized fitness plan this Monday.



FREQUENCY



INTENSITY



TIME



TYPE

MoveOnMonday.org



ACSM recommends to use the FITT method



STRENGTH TRAINING

Frequency -2-3 days a week



Intensity -one set of 8-10 RM (Repetition Maximum) to volitional fatigue



Duration -3 seconds for the concentric phase and 3 seconds for the eccentric phase of the activity (about 1 minute in total)



A general strengthening program would include 8-10 exercises that target all the major muscle groups in the body



Resistance training (RT) is an effective method to improve muscular strength, power, and hypertrophy which are fundamental components of physical fitness related to the quality of life

A **repetition maximum** (RM) is the most weight you can lift for a defined number of exercise movements. For example, a 10RM would be the heaviest weight you could lift for 10 consecutive exercise repetitions. Your RM is a good measure of your current strength level¹ as you follow your weight training program

Volitional fatigue is achieved during a set of repetitions (in exercise) when the muscle can no longer perform the action to perfect form. You will feel lapses in the smoothness or find yourself having to “cheat” to finish repetitions beyond the point of **volitional fatigue**



RESEARCH OVER THE LAST
FEW DECADES –
THE EFFECTS OF SEVERAL
ACUTE TRAINING VARIABLES
ON MAXIMAL STRENGTH
GAINS THAT INFLUENCE THE
OVERALL OUTCOME OF AN
RT PROGRAM

THESE VARIABLES INCLUDE
EXERCISE ORDER, THE
NUMBER OF SETS,
REPETITIONS, INTER-SET
RECOVERY PERIODS, TRAINING
INTENSITY PER MUSCLE
GROUP, AND TOTAL TRAINING
VOLUME

The physiology behind it....

- Aerobic activities strengthen the lungs and heart and make the working muscles more efficient at using oxygen
- They also increase stroke volume (amount of blood pumped per heartbeat) and lowers the resting heart rate
- Increasing stroke volume means that the heart does not have to work as hard
- A resting heart rate varies from person to person, however the lower your resting heart rate, the more efficient your heart is working

One long-term result of regular aerobic activity: Increase in cardiovascular endurance, or cardio-respiratory endurance -
The ability of the body to work continuously for extended periods of time

Those who have a high level of cardiovascular fitness have lowered risks of adult lifestyle diseases, such as, **type 2 diabetes, cardiovascular disease, and obesity**

Cardiovascular endurance increases chances for living a longer and healthier life. It is important to know your FITT Principles so that you gain health benefits for your heart. The table below illustrates the different FITT Principles

FITT Principle Table

F	Frequency of Exercise	How Often	Beginner	3-5 days per week
			Moderate to High	5-7 days per week
I	Intensity of Exercise	How Hard	Beginner	Less than 145 BPM
			Moderate to High	145-186 BPM
T	Time of Exercise	How Long	Beginner	20-30 minutes
			Moderate to High	30-60 minutes
T	Type of Exercise	Which Exercises	A continuous activity that is aerobic (Requires Oxygen)	

FITT PRINCIPLES

- **Frequency of Exercise:** Cardiovascular benefits are achieved when you engage in exercise 3-5 times each week. You may gain additional benefits if you engage in an activity more frequently, but 3-5 times is the recommended range to improve general fitness
- **Intensity of Exercise:** Intensity refers to how hard you are working. Intensity is one of the most important ways to determine if you are exercising at a level that benefits your heart. This level is called your Target Heart Rate (THR) Zone. In general, this means exercising at a level where the heart is beating between 50% and 85% of a person's maximum heart rate (220 minus age) or approximately 142–186 BPM (average for youth)
- **Time (Duration) of Exercise:** Time refers to how long you should exercise in your Target Heart Rate Zone. To achieve the greatest cardiovascular benefit, a workout should be at least 20 minutes of continuous or intermittent aerobic activity per exercise session. Intermittent means that the activity should be done in blocks of time that are 10 minutes or longer. Cardiovascular benefits continue to increase as the exercise duration is extended to 60 minutes. Beyond 60 minutes of activity, cardiovascular benefits start to level off, and the risk of injury increases
- **Type of Exercise:** Types of cardiovascular fitness exercises include rhythmical, repetitive activities that involve large muscle groups and are performed over prolonged periods. These types of activities provide the greatest improvements in cardiovascular fitness. The list of activities that fall into this category include walking, cycling, swimming, jogging, and aerobic class type activities.



Heart Rate Percentages

Age	MHR	50%	60%	70%	80%	90%
11	209	147	160	172	185	197
12	208	146	159	171	183	196
13	207	146	158	170	182	194
14	206	146	158	170	182	194
15	205	139	152	165	178	192
16	204	138	151	164	178	191
17	203	138	151	164	177	190
18	202	137	150	163	176	190

How fit are you? See how you measure up

- Generally, fitness is assessed in four key areas: aerobic fitness; muscular strength and endurance; flexibility; and body composition

To do your assessment, you'll need:

- A stopwatch or a watch that can measure seconds
- A cloth measuring tape
- A yardstick
- Heavy-duty tape
- A scale
- Someone to help you record your scores and count repetitions

You'll also need a pencil or pen and paper to record your scores as you complete each part of the assessment. You can record your scores in a notebook or journal, or save them in a spreadsheet or another electronic format



Aerobic fitness: Heart rate at rest

Your heart rate at rest is a measure of heart health and fitness. For most adults, a healthy heart rate is 60 to 100 beats a minute

- To check your pulse over your carotid artery, place your index and middle fingers on your neck to the side of your windpipe
- To check your pulse at your wrist, place two fingers between the bone and the tendon over your radial artery, located on the palm side of your wrist below the thumb.
- When you feel your pulse, look at your watch and count the number of beats in 15 seconds. Multiply this number by 4 to get your heart rate per minute. Let's say you count 20 beats in 15 seconds. Multiply 20 by 4 for a total of 80 beats a minute



Measuring muscular fitness

- **Muscular strength and endurance: Pushup test**
- Pushups can help you measure muscular strength and endurance. If you're just starting a fitness program, do modified pushups on your knees. If you're generally fit and able to do them, do classic pushups. Follow these steps for both types:
 - Lie facedown on the floor with your elbows bent and your palms next to your shoulders.
 - Keeping your back straight, push up with your arms until your arms are extended.
 - Lower your body until your chin touches the floor.
 - Do as many pushups as you can until you need to stop for rest

Aerobic fitness: Target heart rate zone

- The target heart rate zone is an increase in your heart rate — 50% to 85% of the maximum heart rate for your age — great enough to give your heart and lungs a good workout
- Aim for 50% to 70% when you do moderately intense activities and 70% to 85% when you do vigorous activities
- You can use the target heart rate zone as a guide for making sure your exercise is intense enough. If you're not reaching your target zone, you may need to increase the intensity. If you're achieving a target rate in the lower end of the target rate zone, you can set goals for gradually increasing your target
- If you already exercise regularly, you can stop to check your heart rate sometimes during an aerobic workout. If you don't exercise regularly, you can do a simple test by checking your heart rate after a brisk 10-minute walk or static jump for 30 times

Target heart rate zone

Age	Target heart rate zone: Beats a minute	Maximum heart rate: Beats a minute
25	98-166	195
35	93-157	185
45	88-149	175
55	83-140	165
65	78-132	155

Flexibility: Sit-and-reach test

How far can you reach?

The sit-and-reach test is a simple way to measure the flexibility of the back of your legs, your hips and your lower back

- Place a yardstick on the floor. Secure it by placing a piece of tape across the yardstick at the 15-inch (38-centimeter) mark
- Place the soles of your feet even with the 15-inch (38-centimeter) mark on the yardstick
- Slowly reach forward as far as you can, exhaling as you reach and holding the position for at least 1 second
- Note the distance you reached
- Repeat the test two more times
- Record the best of the three reaches



How fit are you mentally?



Manas K Mandal, PhD, FNAPsy
Distinguished Visiting Professor, IIT-Kharagpur

Sports & well-being

A career & a paired career



How do I prioritize decision?
Interest – Ability - Expectation

What motivates me to take a decision?

Power – Affiliation - Achievement

How do I take a decision?

Reason – Intuition - Feeling

What guides me to take a decision?

Value – Norm - Reality

Career Decision
Making...



Decidophobia...in career choice



- Choice vs. Compulsion
- Aptitude vs. Attitude
- Stability vs. Dynamicity
- Economic vs. Social reward
- Life vs. Career



Major Questions...

- Can physical feat or technical skill alone win medal in highly competitive sport?
- What crucial mental aspect separates a medal winner from the rest?
- How unheralded athletes upset their more touted opponents in high-stake competitions?
- Why ‘athlete readiness’ is also important outside the narrow focus of medal winning?



Why well-being is important...?

- to develop a psychological ‘edge’ in competitive sports
- to manage failure, avoid second thoughts & to ‘bounce back’ following setbacks
- to develop social skills & bonding with teammates
- to manage stress, anxiety/isolation, & peer relationship within & outside the games arena
- to seed a thought for tomorrow & build a paired career to avoid post-career difficulties



Our focus... in well-being

- ...not about Medals only, it's about the journey behind
- ...not about Winners only, more about those who face hurdles
- ... not about failure only, it's about those who learn to bounce back
- ...not about developing 'self', it's about growing with others, developing 'between'-ness in team

Learning Objectives





Misconceptions

- The core of 'sports & well being' is 'success' only
- Sports are at least "90% Mental" at higher skill
- Mental conditioning is only for athletes who are mentally weak
- Sports psychology is only for elite performers
- Nice guys rarely wins the race
- Winners shall practice-till-they-drop
- Mental conditioning seeks to change the athlete's personality



Sports & well-being domains...



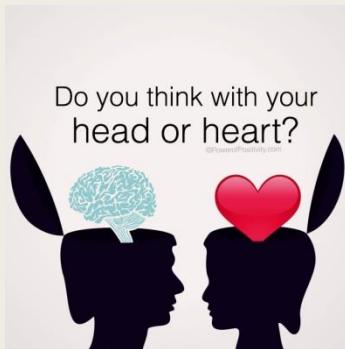
- **Happiness & Unhappiness:** Imparts knowledge about what makes us happy. Misconceptions in our belief system that causes unhappiness & produce bodily changes



- **Optimism:** Aims at discovering & promoting conditions that enable individuals to thrive. Also deals with the issue of optimism bias that causes a person to overestimate the chances of success



Sports & well-being



- **Emotional intelligence:** Helps in conducting an ‘inner dialogue’ for managing feeling & impulses, reading & interpreting social cues, understanding perspectives of others, & knowing the difference between feeling & actions
- **Arousal control:** Discusses ways & means to avoid the perception of stress which is subjective in nature. It occurs when there is a perceived imbalance between pressure & coping resources for a situation





Sports & well-being



- **Motivation:** Direction and intensity of one's effort toward developing excellence in sport. Deals with Goal setting, goal orientation, reward / punishment & intrinsic motivation
- **Attention & concentration:** The process implies withdrawal from other irrelevant input to deal effectively with a situation. Deals with deliberate investment of conscious effort, ability to 'zoom-in', & divided attention for concurrent actions.



Sports & well-being



- **Resilience:** Discusses ways & means to bounce back from the frustrations of failure. It's a process of adapting well in face of adversity, or of unusual difficulty.



- **Decision making:** Deals with the psychological process through which we take decisions in uncertain conditions like in post-career. It will also cover the sources of our bias & prejudices in judgment about others

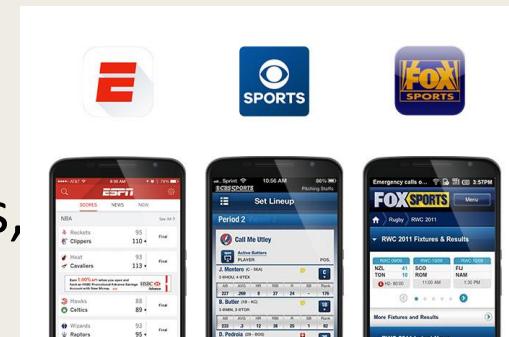


Techniques to improve performance...

- **Mindfulness:** ‘Mindfulness’ exercise assist participants to be aware & awake in the present moment. It is a practice of touching daily life deeply every moment of our existence.



- **Sports Apps:** Sport-based reflection packs targeting every phase of training, including pre-competition, post-performance analysis, recovery





Techniques to improve performance...

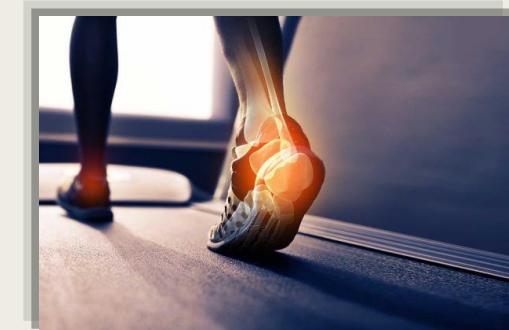
- **Visualization:** It is the process of creating a mental image or intention of what you want to happen or feel in reality.
- **Guided imagery:** Through a combination of imagery sub-processes, such as image transformation, scanning, & sustenance, vivid & controllable images are generated





Techniques to improve performance...

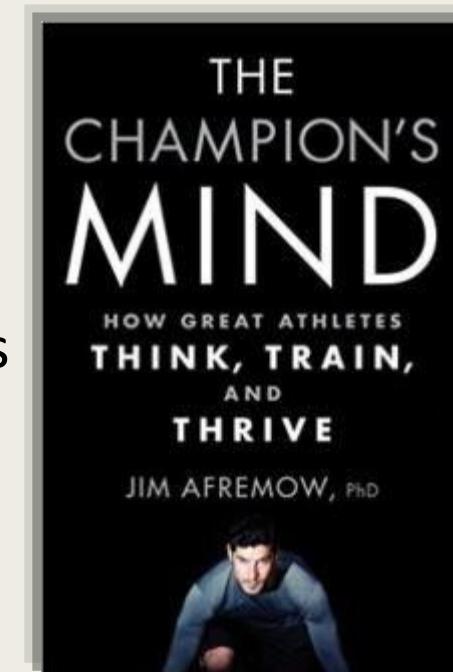
- **Feedback & reinforcement:** Applied behavior analysis is done to utilize feedback & reinforce behavior, involving positive reinforcement for proper movement, consistent feedback & chaining behavior sequence for complex skill.
- **Injury prevention & rehabilitation:** With sports injury , players tend to experience drop in self-worth, begin attributing negatively, & start developing faulty coping strategy. Injury counseling addresses such issues.





Disciplines that contribute to sports science

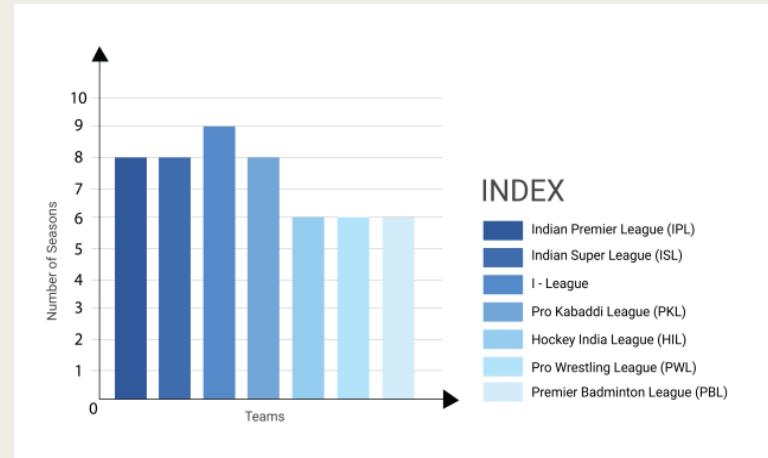
- Exercise physiology
- Sports bio-mechanics
- Physiotherapy
- Sports medicine & nutrition
- Strength & conditioning science
- Kinanthropometry
- Computational performance analysis
- Sports tool technology
- Sports psychology







Developing a paired career in sports



Changing landscape of Indian sports

- Make a list of your skills & find the right fit
- Shed self-doubt & figure out your transferable skills
- Acquire new skills & learn from your mistakes
- Keep your expectations in check
- Make it a habit & set up a strong network
- Set a deadline & have a financial plan
- Convert without penalty & shed apprehension of hypothetical missed opportunity



keep delivering, ...we need your light

