



**The importance of Non Cognition Functions and the  
Memory during soccer learning processes**





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**COGITRAINING AND SENSEBALL**



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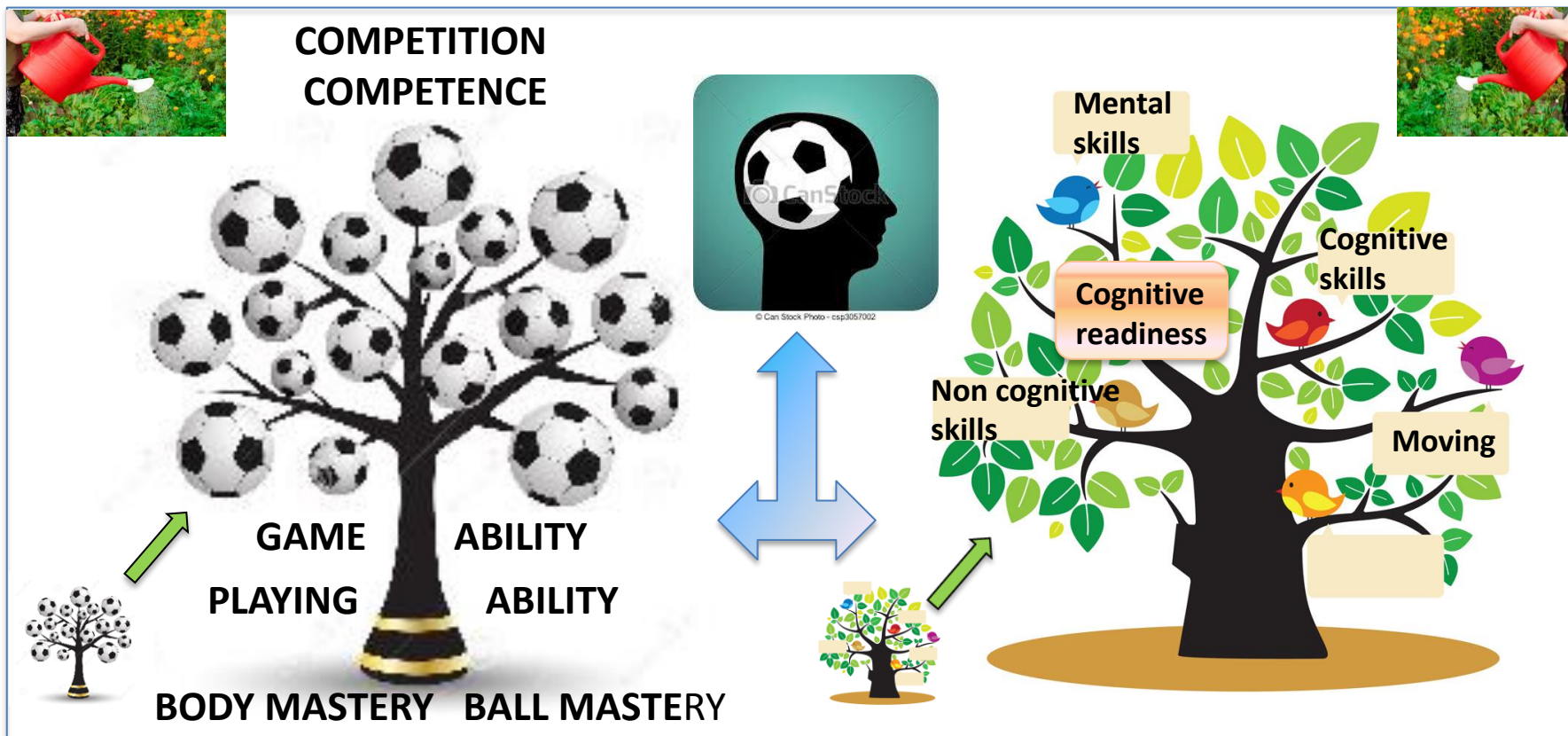
**WELLINGTON SOCCER CLUB**  
**ROYAL PALM BEACH FLORIDA**  
**is the US Cogitraining-Senseball**  
**referential club**

**Summer 2015: Cogitraining-Senseball training camps for  
players **and workshops** for coaches**

**We work with coaches from AC Milan, FC Metz, RSC Anderlecht, KRC  
Genk. Pro license and UEFA A and B coaches, present-day Belgian femal  
internationals and former male Belgian professional players with  
experience in the European Champion's League!!!**

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# The general Cogitraining-SenseBall work strategy



# LEARNING IN THE OLD MEANING= INVITE YOUNG PEOPLE TO TRANSFER YOUR KNOWLEDGE

...???

+ PROGRAMS

**SOCCER**



**PROGRAMS**  
to develop



**SCHOOL**





**KNOWLEDGE**

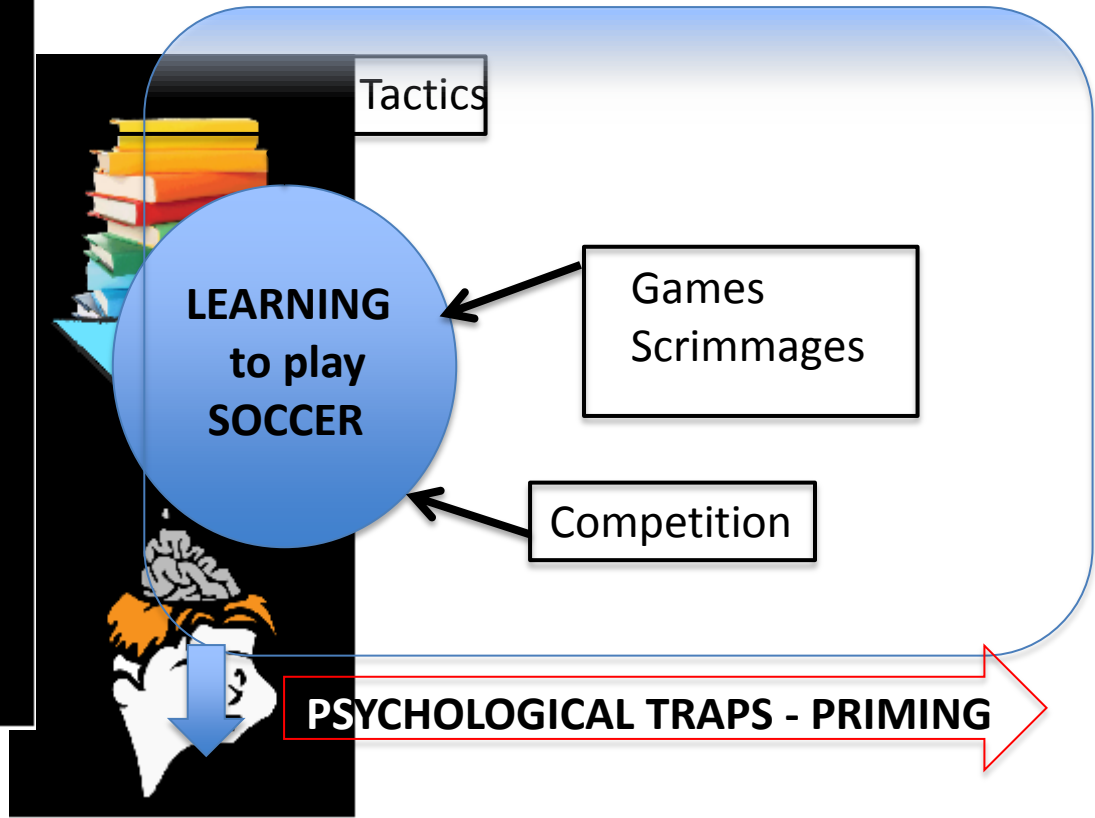
Training programs



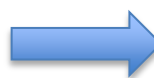
AT SCHOOL



IN SOCCER



WINNING



TALENT

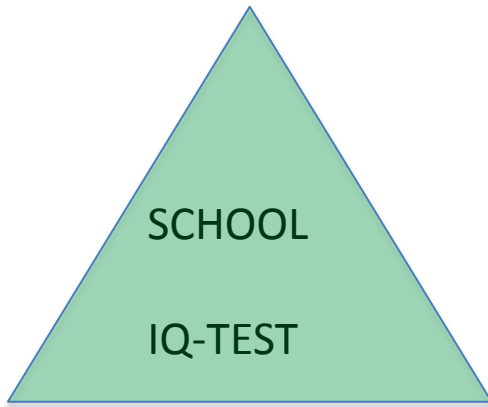


IDENTIFICATION

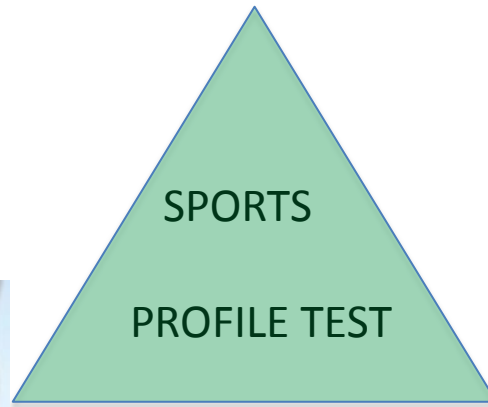
**TESTING: WHO ARE THE BEST???** MERITOCRACY

**DO WE CHOOSE FOR A LEARNING PROCESS OR A WINNING PROCESS???**

# TALENT



**Maturity differences**



**Priority to early matured athletes**

## **IQ and talent identification: reliable parameters???**

Does an **IQ-test** always determine exactly and precisely how intelligent someone is and is this a real good and permanent test?

**RESEARCH:** 79 children were divided into 3 groups according their IQ results. The best group scored an average of 119, the second group an average of 101 and the weakest group an average of 79.

All children take part of a test: half of the group gets a candy (a M&M) when they deliver correct answers on questions.

**FINDINGS:** the children with the highest score and the group in the middle rewarded with candy didn't change their IQ-score. The children in the weakest group rewarded with M&M raised their IQ-score from 79 to 97, the same level of the group in the middle!

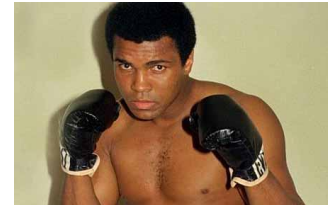
**THE QUESTION:** did these children have a low IQ or not? What score 79 of 97, represents their intelligence correctly??



**IQ and talent identification: reliable parameters???**

Does **TALENT IDENTIFICATION** always determine exactly and precisely how talented someone is and is this a real good and permanent test?

Who is considered to be the best boxer all times?



Tales of the tape: physical measurements to identify naturals applied on Ali.

- fist structure      YES or NO → NO
  - reach                YES or NO → NO
  - chest expansion YES or NO → NO
  - weight              YES or NO → NO
- } NOT A NATURAL

Muhammad Ali had **great speed** but **didn't have** the **physique**, the **strength** and the **classical moves**. In fact he boxed all wrong. Sonny Liston was a natural! Unimaginable Ali could beat Sonny. The matchup was so ludicrous that the arena where the fight took place was only half full!!

# IQ and **talent identification**: reliable parameters???

WHERE DID THE VICTORY COME FROM?



**Other no naturals?** Michael Jordan, Babe Ruth, Ronaldo (Brazil), Wilma Rudolph, Jackie Joyner-Kersey and .....



# MESSI



When I was 11 I had a growth hormone problem. But being smaller I was more agile. And I learnt to play with the ball on the ground because that's where it felt more comfortable. Now I realize sometimes bad things can turn out good.

As a boy “Messi” was named “La Pulga” (the flea) because of his height. But it appears Messi cared little about his stature and brushed off suggestions that size would prevent him from playing as a professional in the future. **His perception of the situation was helpful, positive and above all confident.**

Messi refused to let his physicality handicap him. In fact he used it to his advantage. “I am more agile”, he said. “I can learn to play with the ball on the ground better than everyone else.” I believe, despite the fact he was smaller, he felt taller than his teammates. He may have physically looked up on everyone but he chose to mentally look down on his opposition. He cared little for their body shape. **He only thought about his soccer, his ability, and how he wanted to play.**

Soccer Tough, Dan Abrahams

# Belgian top players

Several Belgian professional soccer clubs were having doubts about their player's skills and still these players have reached the top. **In the Belgian national team (4th in the FIFA ranking) 6 players were told they did not have the talent to go to the top!**

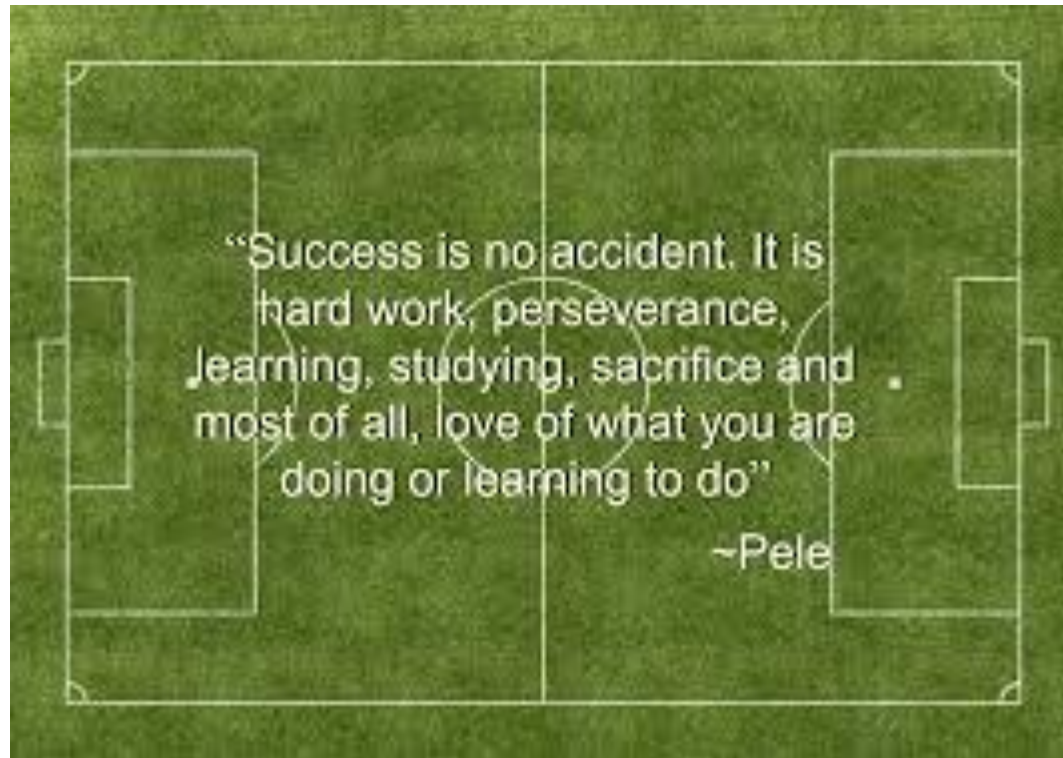
- Thibaut **Courtois** Chelsea
- Simon **Mignolet** FC Liverpool
- Mousa **Dembele** Tottenham
- Dries **Mertens** SC Napoli
- Naver **Chadli** Tottenham
- Steven **Dufour** RSC Anderlecht





## **CONCLUSION**

THERE ARE A NUMBER OF LESS VISIBLE COMPONENTS THAT MIGHT HAVE AN INFLUENCE ON THE ACADEMIC AND SPORTS SKILLS DEVELOPMENT!!!



# LEARNING AND THE BRAIN

Is the human brain only a program processor???

Affection

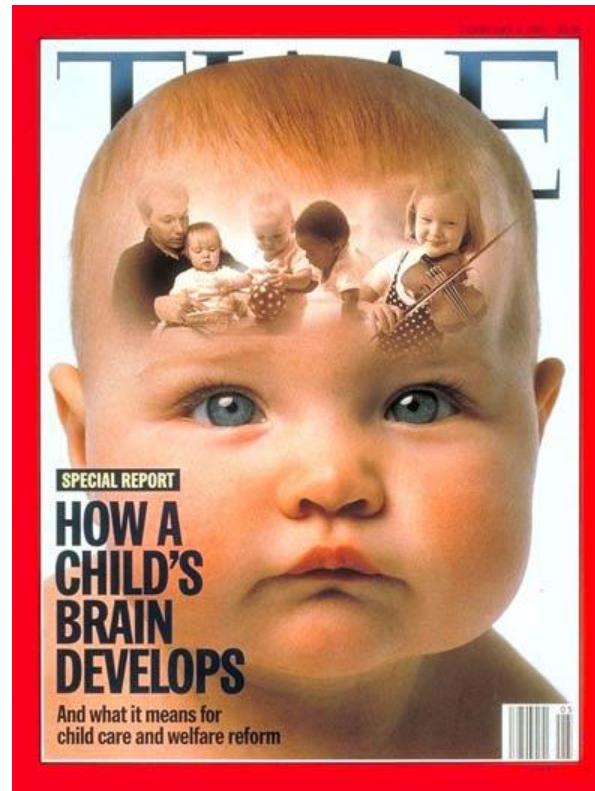
Emotion

Stress  
(allostasis)

Tools of the  
mind (non  
cognitive  
skills)

Memory (LT)

The role of the working memory



The influence of the  
unconscious mind

Choking: don't think  
too much

Mindset

Stereotyping

Organize your brain  
through moving

Create more neuronal networks through moving



## **NON COGNITIVE SKILLS**

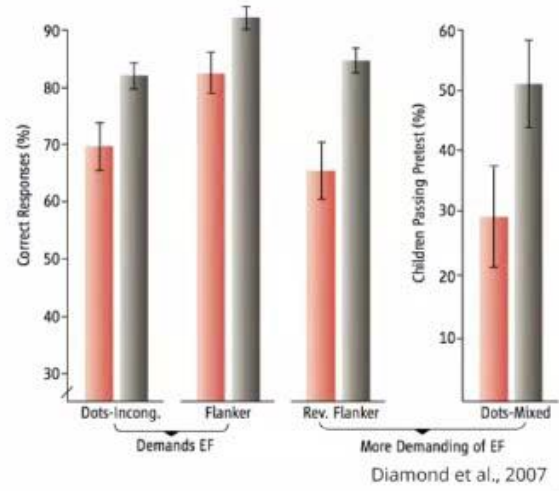
**These are the resources you need to develop **before** and **while** you are learning: persistence, self-control (attention and concentration), curiosity, conscientiousness (not influenced by material incentives to perform), grit, mental endurance (character) and self-confidence**



## The non cognitive skills in **TOOLS OF THE MIND**, kindergarten and prekindergarten curriculum

- Controlling impulses** → executive functions: Stroop test: **GREEN, RED** - and toy-car incident (contradictory information: c pronounced as k – 1 ball to share with others – pass the ball and don't follow the ball ...)
- Staying focused** on a task at hand
- Avoiding distractions and mental traps** (assumptions, beliefs, comparisons, desires, expectations)
- Managing emotions**
- Organizing thoughts**

## Task Performance



**HOW CAN WE CREATE A LEARNING FRAMEWORK THAT ANTICIPATES THE INFLUENCE OF NON COGNITIVE SKILLS?**

**SOCIAL INTERACTION → COGNITION → NON COGNITIVE SKILLS**





# Our principle: SYNCHRONISATION SYNCHRONISATION= SOCIAL INTERACTION WHY?

**Social interaction promotes general cognitive functioning = COGNITION**

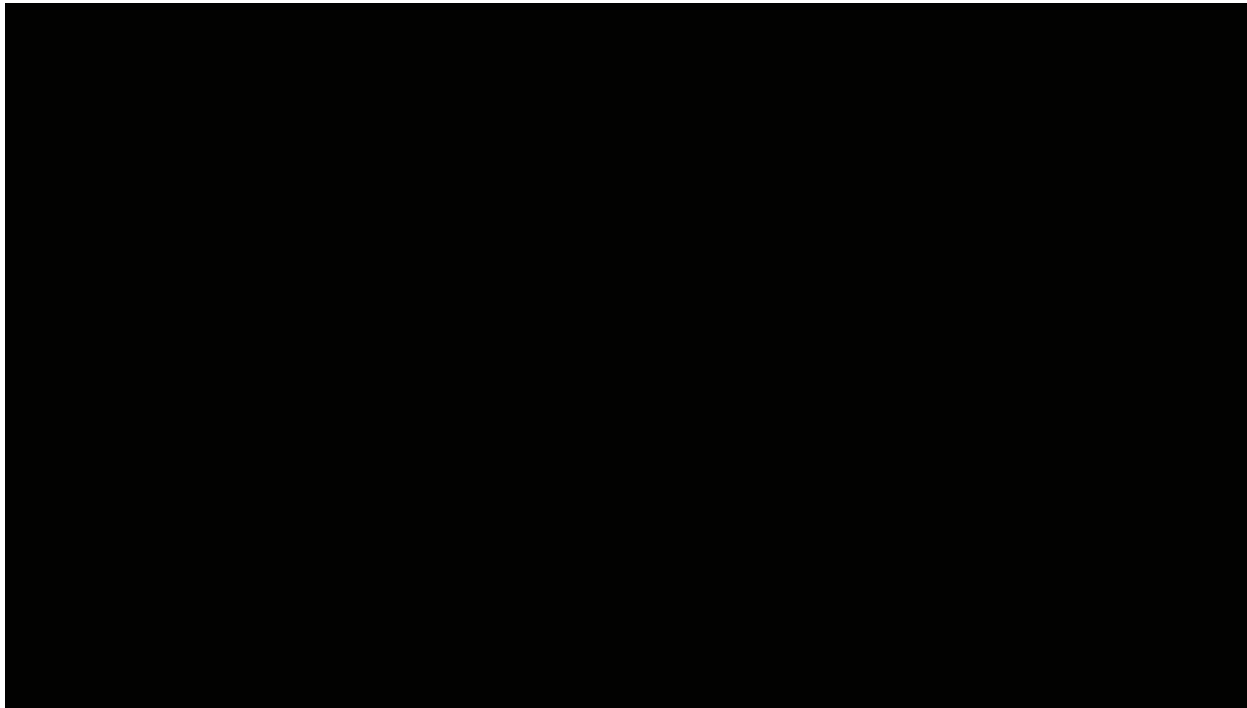
(Ybarra O., Burnstein E., Winkielman P., Keller M.C., Manis M., Chan E., Rodriguez J. in Soc Psychol Bull 2008 Feb. )

**The components of COGNITION: ALERTNESS, CONCENTRATION, PERCEPTUAL SPEED, LEARNING, MEMORY, PROBLEM SOLVING, CREATIVITY, AND MENTAL ENDURANCE.**

(Mozart's brain and the fighter pilot, Richard Restak, M.D.)



## HOW DO WE ORGANIZE SYNCHRONISATION IN OUR DRILLS?



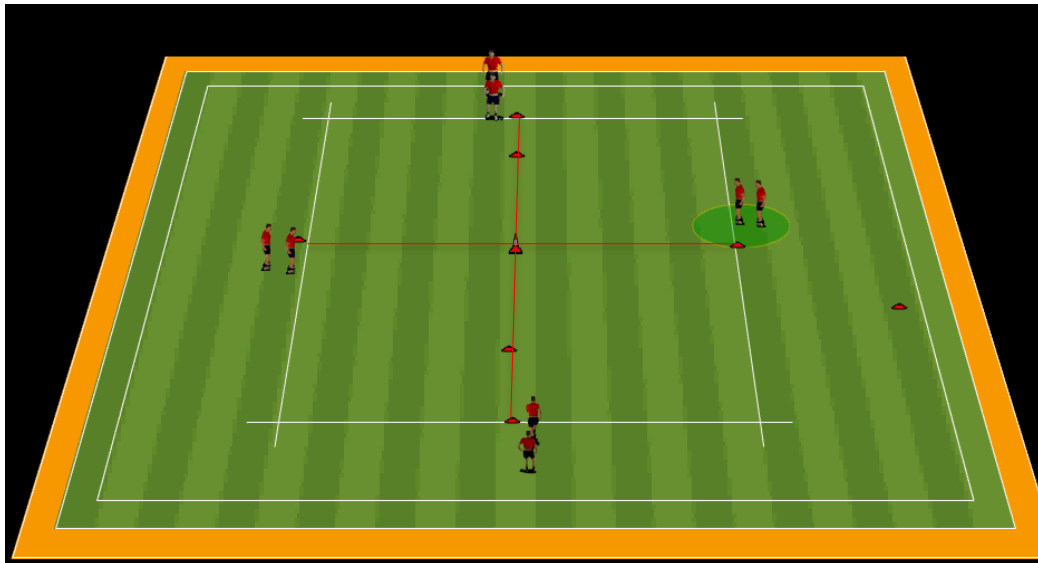


THROUGH THE CROSS NON COGNITIVE SKILLS WILL BE TRAINED

Crosswise positions + synchronization



**Self-control and cognition:** attention and concentration

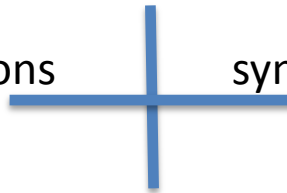


- You never can perform on your own.
- You also have to check how your teammates move into space (passing a cue is the sign to move together with another player).
- Arriving at the same time at the center cone and turning simultaneously.



THROUGH **THE CROSS** NON COGNITIVE SKILLS WILL BE TRAINED

Crosswise positions



synchronization



## Persistence



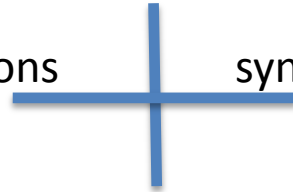
- There is no individual learning without the others.
- Your persistence is endorsed by the team.
- They will encourage you to participate.
- They will approve your efforts.

**Applauding and praising THE PLAYERS' EFFORTS**



THROUGH **THE CROSS** NON COGNITIVE SKILLS WILL BE TRAINED

Crosswise positions



synchronization



## Mental endurance



- We try to exclude too much thinking.
- We concentrate on many repetitions and try to avoid interruptions.
- A weak performance must be overruled by many good performances.
- Guide players into the performance flow.

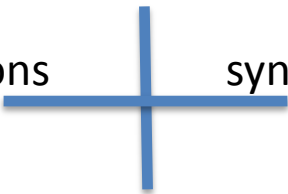




**Often called the best woman soccer player in the world, Mia Hamm says she was always asked, “Mia, what is the most important thing for a soccer player to have?” With no hesitation, she answered, “**Mental toughness.**”**

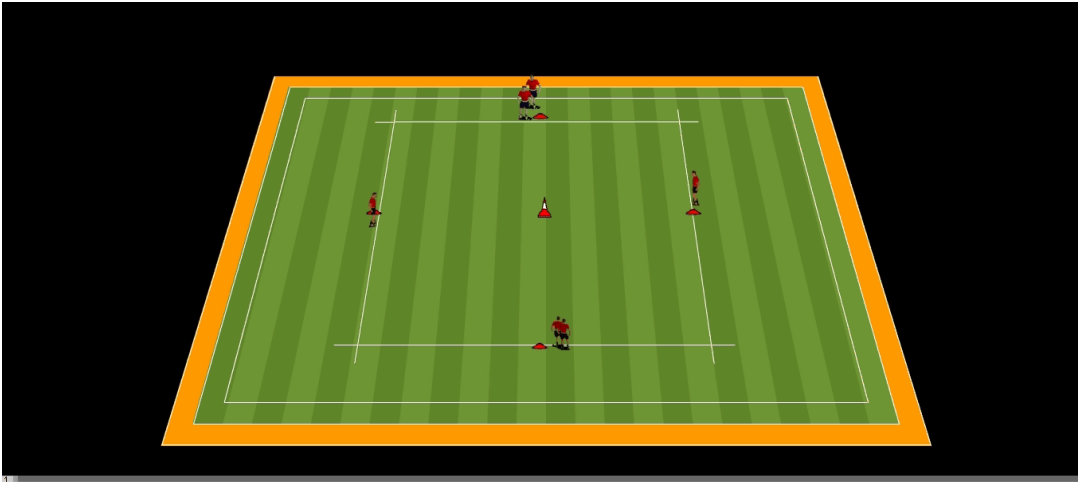


THROUGH **THE CROSS** NON COGNITIVE SKILLS WILL BE TRAINED

Crosswise positions  synchronization



## Curiosity

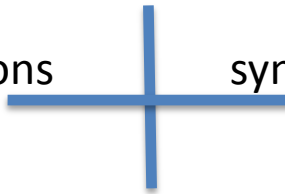


- We build up our drills in a way that we can add new parts without removing the learnt structures.
- We use different strategies (memorize a drill bound to a number) in a way that moving and thinking goes together.
- Sometimes we use instructions that can not be performed.



THROUGH **THE CROSS** NON COGNITIVE SKILLS WILL BE TRAINED

Crosswise positions



synchronization



## Conscientiousness



- We challenge our players to prove they are progressing.
- We emphasize more the group progress than the individual progress.
- We don't use standardized results to measure the level of performance.
- We focus on a growth mindset.

**HOW MANY PASSES DURING 2 MINUTES WITH 3 PLAYERS?**



**Jackie Joyner-Kersey: “For me the joy of athletics has never resided in winning, I derive just as much happiness from the process as from the results. I don’t mind losing as long as I see improvement or I feel I’ve done as well as I possibly could. If I lose, I just go back to the track and work some more.”**

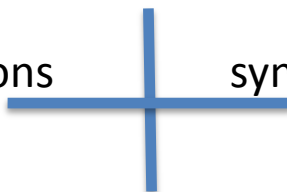


THROUGH **THE CROSS** NON COGNITIVE SKILLS WILL BE TRAINED



Crosswise positions

synchronization



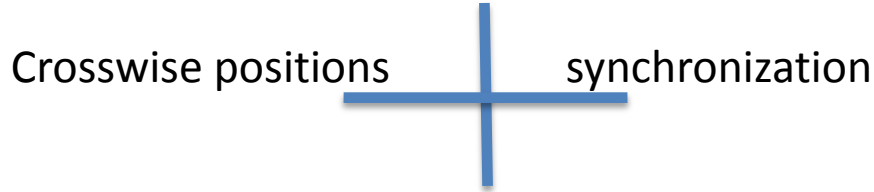
**Grit**



- We organize internal tournaments where players have to play with players that do not have the same skillfulness.
- We challenge our players to show their creativeness (time of ball possession, number of created scoring opportunities).
- Drills with cues to prove high level of precision.

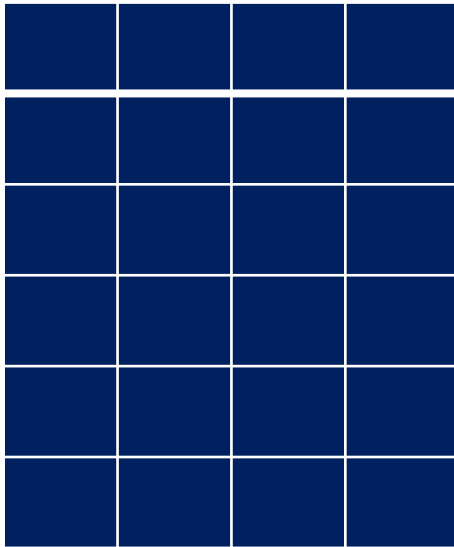


THROUGH **THE CROSS** NON COGNITIVE SKILLS WILL BE TRAINED



**Self-confidence:** self-belief fuels confidence. Belief develops from hard work, quality work, great visualization and great thinking.

Soccer Tough, Dan Abrahams



- We use strong images (cross, diamond, squares, grids).
- We externalize learning processes (cues).
- We work hard through many repetitions.
- We don't weaken our thinking by only thinking of winning, we focus on progress while learning

It is your memory, perception and imagination that drives your soccer image and subsequently your self-belief





**The Cogitraining and Senseball methodology focusing on motorial (technical), non cognitive and cognitive skills (tactics) development also goes from coach assisted learning to AUTONOMOUS LEARNING (other PP during NSCAA Convention)**

Even when players have developed new skills and competencies sufficient to perform a task with adult assistance, it may not mean that tomorrow **they will be ready to perform the task independently**. For most players, the transition from assisted to independent learning is **a gradual process** that involves moving from using a great deal of assistance to slowly taking over until **eventually no assistance is needed**. To facilitate this transition, a teacher/coach needs to **scaffold** a child/player's learning by first **designing and then following a plan for providing and withdrawing appropriate amounts of assistance at appropriate times**.



# THE MEMORY

- **The working memory: go to automated unconscious performance**
- **The long term memory: make use of your visual memory and your spatial navigation capacity both situated in the right part of the hippocampus**



High performance in sports is understanding how to use *the working memory* during performance and when to switch it off!!!

Performance requires two principles:

- « being in the zone », performing technical skills without thinking and unconsciously
- switch on the working memory to analyse a game situation, to find an anticipating strategy

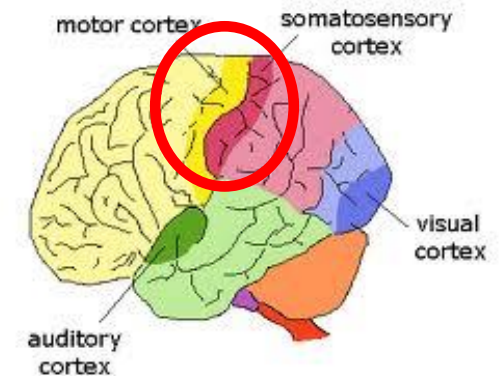
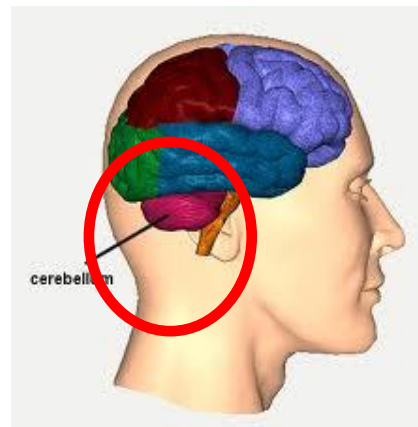
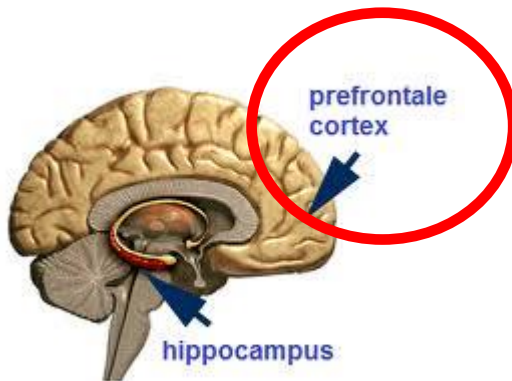
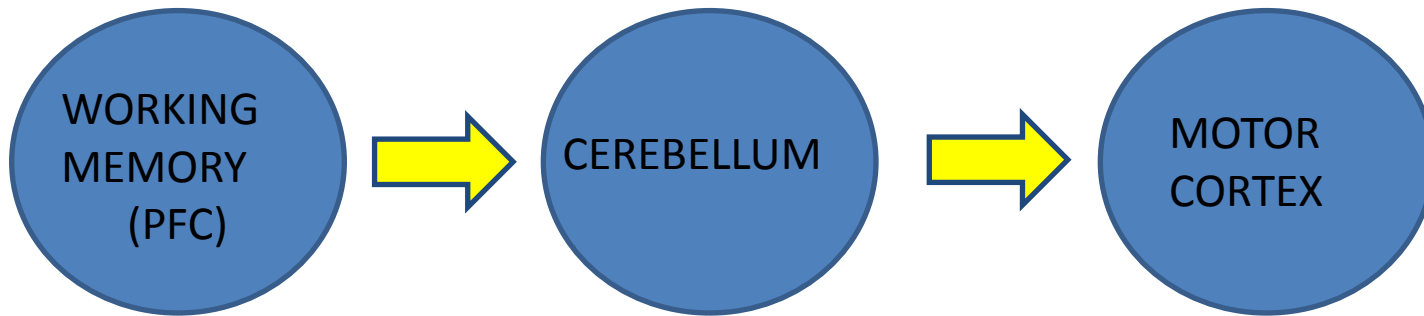
## HOW DOES THE WORKING MEMORY HELP YOU TO PERFORM BETTER

- Master the **priority** of information
- Helps you **concentrating** on what is the most important
- Delivers very **fast** the **correct answer**
- Helps you taking **risks** in a **smarter way**
- **Eases learning** at school, in any learning environment
- **Fast decisions**
- **Adapt** to new situations
- Stay **motivated** acquiring long term goals
- Helps you to go on **thinking positively** in a gray situation
- Helps you to follow your **moral compass**
- Helps you to be a **better athlete**.

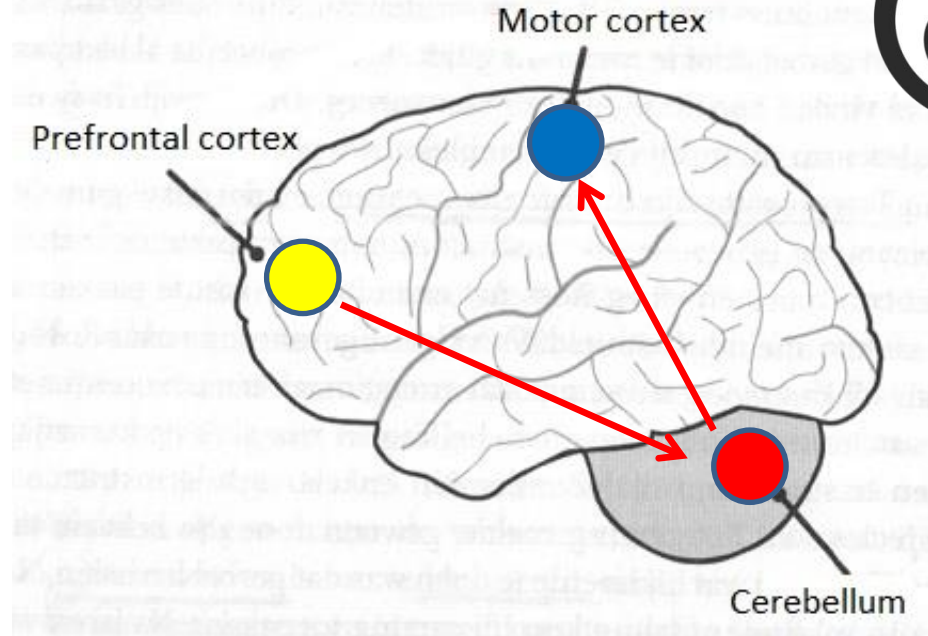
Explaining too much, a coach talking too much will block the brain zones coordinating movements and balance



## THE MOTORIAL WORKING MEMORY LOOP



# Brain Centred Training



## How does it work?

1. You hear a number of instructions that are going to be processed by the cognitive center of the brain, **the prefrontal cortex**
2. Your PFC fires a number of instructions to **the cerebellum**, the coordination center of the brain, to repeat the movements mentally
3. Finally your cerebellum sends the instructions to **the motor cortex** that instructs your muscles to move according to the instructions

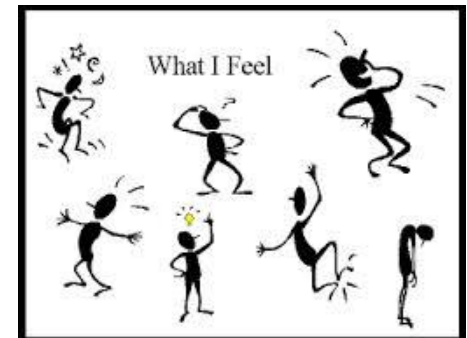
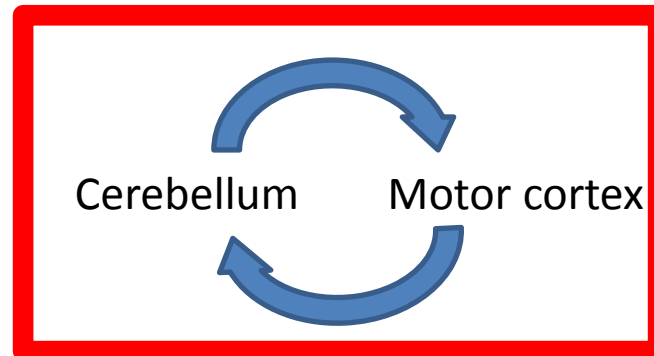
# Brain Centred Training



How can you go **into the zone learning a skill?**

1. **Don't talk too much** or don't give a checklist of instructions
2. Go straight to the **cerebellum – motor cortex loop** to create a **feeling** regarding the movement while performing
3. Make use of analog learning (kicking a ball in between two cones – external cues will help the brain to look for the correct performance – use the **SENSEBALL program**) and '**JUST DO IT**'. You don't need mentally insight!
4. **The working memory is not involved in the learning process!**

**USING THE CEREBELLUM-MOTOR CORTEX LOOP = GOING INTO THE ZONE**



Learning **with** the **motorial working memory loop**=  
explicit learning. **What can go wrong???**

Maxwell, J., Masters, R., Eves, F., 2003. 'The Role of Working Memory in Motor Learning and Performance' *Consciousness and Cognition* 12:376-402

- Learning a technical skill:
1. One group got a detailed explanation regarding the skill. They needed **the motor working memory loop** to **memorize** the verbal instruction= **explicit learning**
  2. Second group got no instruction. They had to practice the skill and each time they heard the **TUNE OF A METRONOME** they had to say random letters. In that way **the working memory was diverted** and not available while learning.



# Brain Centred Training



Learning **with** the **motorial working memory loop**=  
explicit learning. **What can go wrong???**

Training program: 5 days a skill session with 100 repetitions

Final test: adding stress = good performance rewarded with money – expert would assess their performance

Result: both groups were under stress, but ‘explicit learning group’ showed **a decrease of learning**. Other group could use his working memory to keep control over their stress and their **performance remained the same**



## Learning a new skill without the **INVOLVEMENT** of THE WORKING MEMORY A TRAINING METHOD

**The Basic skills factor:** research Vandervert, L. R., Schimpf, P. H., Liu, H. 2007  
'How working Memory and the Cerebellum Collaborate to Produce Creativity and Innovation' Creativity Research Journal 9:1-18

Learn each **skill** separately and **implant it in your brain till you feel it**. Conscious learning of a separate skill drills it into the motor cortex. Next the cerebellum learns these routines through many repetitions and creates learning layers . These layers will be built and piled up. In that way the skill will be automated and you can make use of it in an efficient way! (the myelination process)

**TO DO THIS YOU DON'T NEED TO MAKE USE OF YOUR WORKING MEMORY!**

IN A GAME YOU USE YOUR WORKING MEMORY TO CHOOSE THE RIGHT COMBINATION  
UNDER STRESS

# *The long term memory*

Research Free University Amsterdam

**Messi** has not got a better perception than other players or he perceives more than others. He simply has **more solutions in his memory!**

**How can we put more soccer solutions in the brain?**

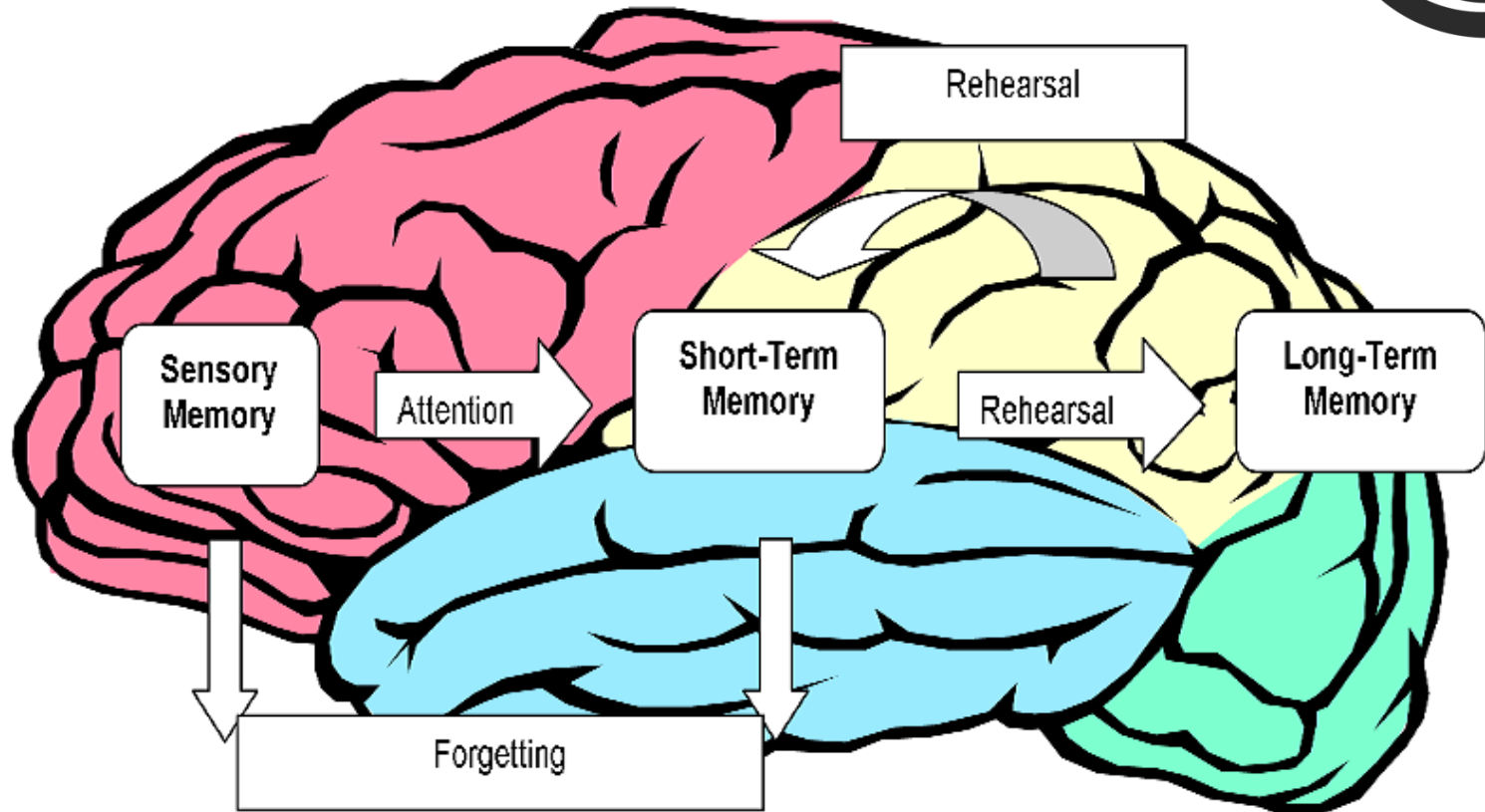


## *THE BRAIN AND LT MEMORY*

Football players having an excellent memory for game situations will go to the highest level, *The Art and Science of Remembering Everything*, 2011 Joshua Foer

**DO WE TRAIN MEMORY IN FOOTBALL?**

# THE BRAIN AND LT MEMORY





## THE BRAIN AND LT MEMORY



Every sensorial impression that according to the attention system is interesting, goes first to the **short term memory**. Further storing depends on the **rate of attention** and the **number of times someone concentrates on the same impression**. In that way you create a pattern of solid connexions, the so called **engrams= long term memory**



## THE BRAIN AND LT MEMORY



Learning skills is simply a matter of memorizing them.

According to Anders Ericsson expertise is what we could call an assembly of big quantities of knowledge, **pattern recognition** and planning mechanism a human being has built out during years in a particular field.

**An exceptional memory is not a by-product of expertise or competence, IT IS THE CORE OF EXPERTISE!!!**



## THE BRAIN AND LT MEMORY



### HOW COULD WE ENDORSE MEMORIZING DURING TRAINING SESSIONS?

- REPETITIONS WITH VARIATIONS
- **It's about chunking** : breaking down a skill into its component parts, and practicing and repeating each action involved in that skill. It's about the systematic firing of the signals that build the trusty high-speed skill circuits you're using to PERFORM in general !



## *THE BRAIN AND LT MEMORY*



**CREATE A NETWORK OF PATTERNS** (Visual structures) TO STORE YOUR EXPERIENCES IN YOUR BRAIN.

**THE MORE ASSOCIATIVE HOOKS** NEW TASKS OR MOVEMENTS HAVE THE **BETTER** THEY WILL BE **STORED** IN THE BRAIN. IN THIS WAY YOU CREATE RETRIEVAL STRUCTURES THAT MAKE IT POSSIBLE **TO SPEED UP YOUR DECISION MAKING!!**





## *THE BRAIN AND LT MEMORY*



KEEP IN MIND THAT THE MEMORY WORKS THE BEST AS THE ENVIRONMENTAL CONDITIONS DURING REMEMBERING ARE A COPY OF THE ENVIRONMENTAL CONDITIONS YOU USED WHEN YOU WERE STORING YOUR MOVEMENTS, SKILLS, INFORMATION.

## Moving correctly and you will produce BDNF

**BDNF** (brain-derived neurotrophic factor= the switch system of the cells, the infrastructure, the uninterrupted connexion of new brain cells) creates an important biological link between **thoughts**, **emotions** and **movements**. **BDNF** has also got influence on the **memory** and **learning** in general!

**BDNF** is produced during **AEROBIC** moving and complex activities.

**BDNF** is the FERTILIZER of the brain.

No one produces **BDNF** during heavy physical performances!!

Running **20 minutes on a treadmill** at high intensity of about 70 to 80% of your maximal heart rate, you are going to **perform POORLY** while **testing complex learning**.

**High physical load and learning** (memorizing) do not go together well.

In 2007 German researchers discovered that people after they had moved, were going to learn new vocabulary 20% faster than before and the learning speed was straight bound to the level of BDNF they had produced!!!

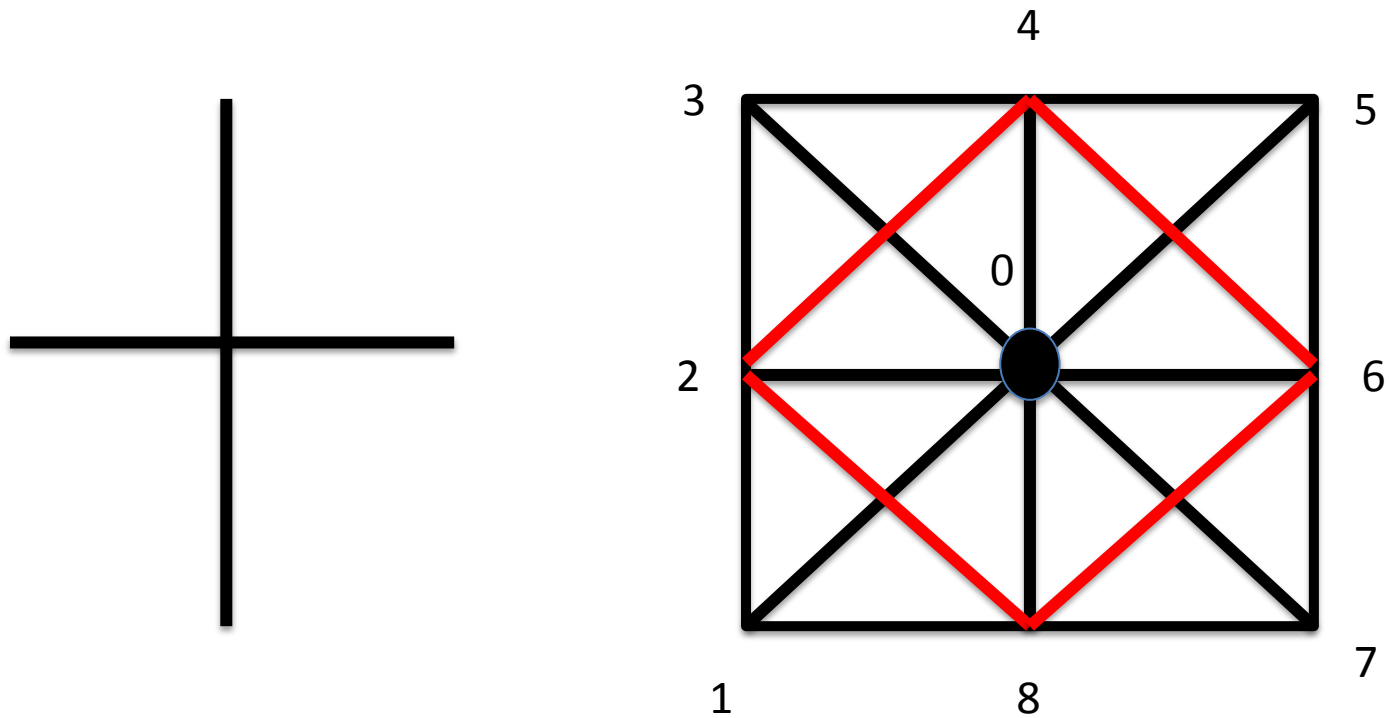


## THE BRAIN AND LT MEMORY

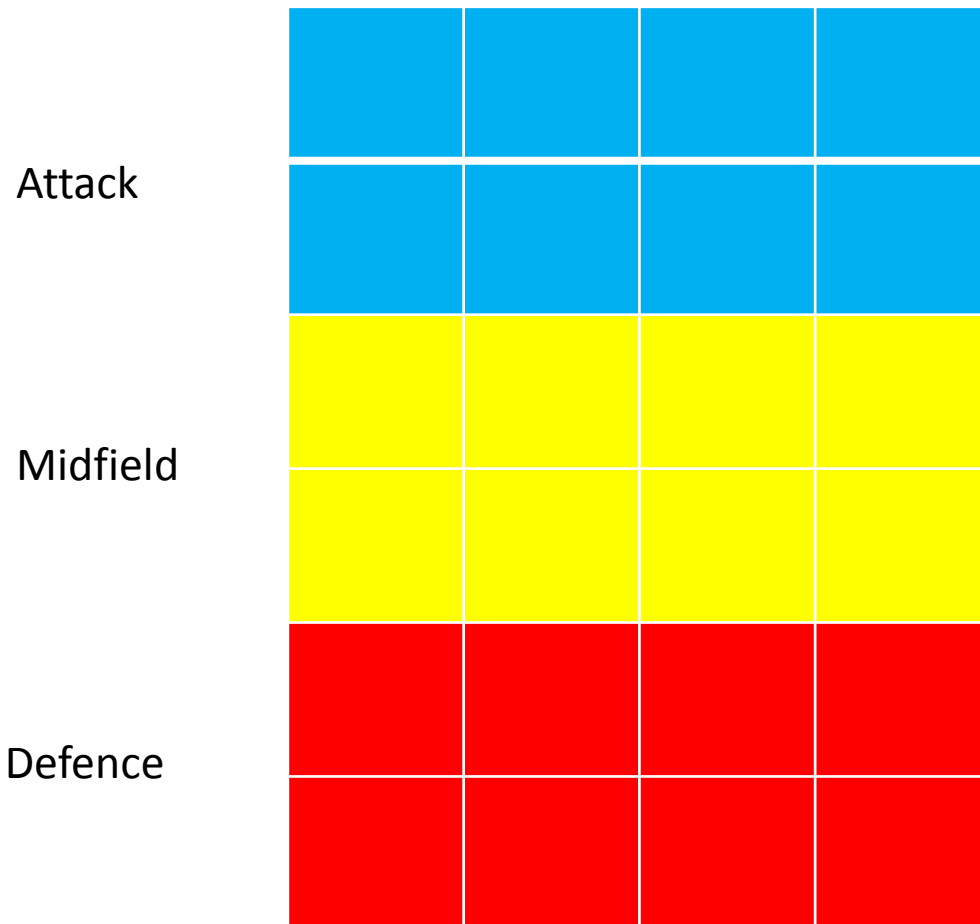


- No continuous high physical load (intermittent working) → be sure **BDNF** is produced
- Using visual cues → **patterns** that continuously come back
- Always create the same environmental conditions
- Make use of **CHUNKING**
- Repeat your skills with variations – stimulate the production of **MYELIN**
- Be aware of the effect of **associations**

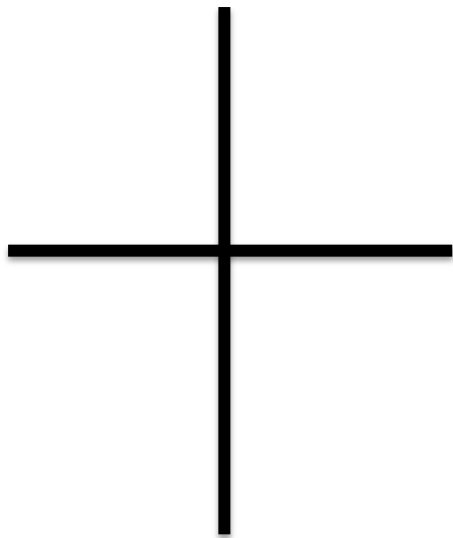
## Chunking: the hooks in our spatial organisation



# THE BRAIN AND LT MEMORY



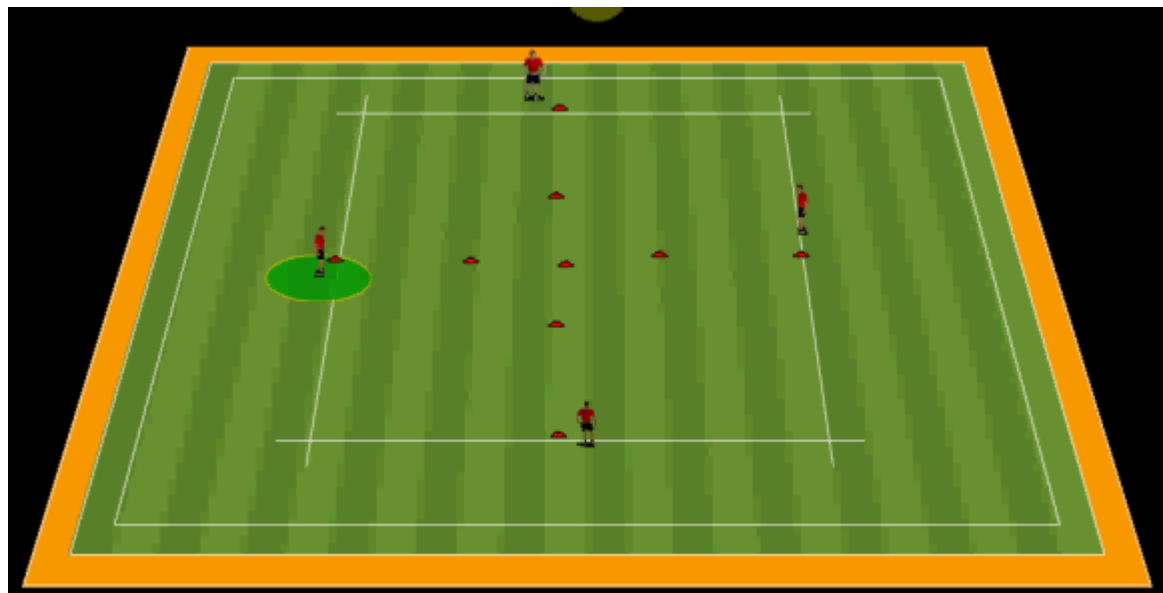
# THE BRAIN AND LT MEMORY



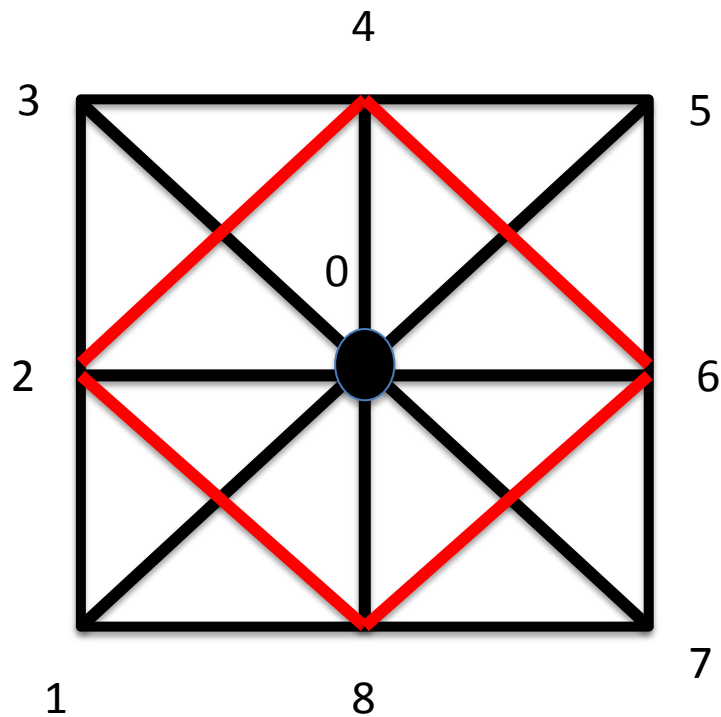
Moving

Angle

Timing

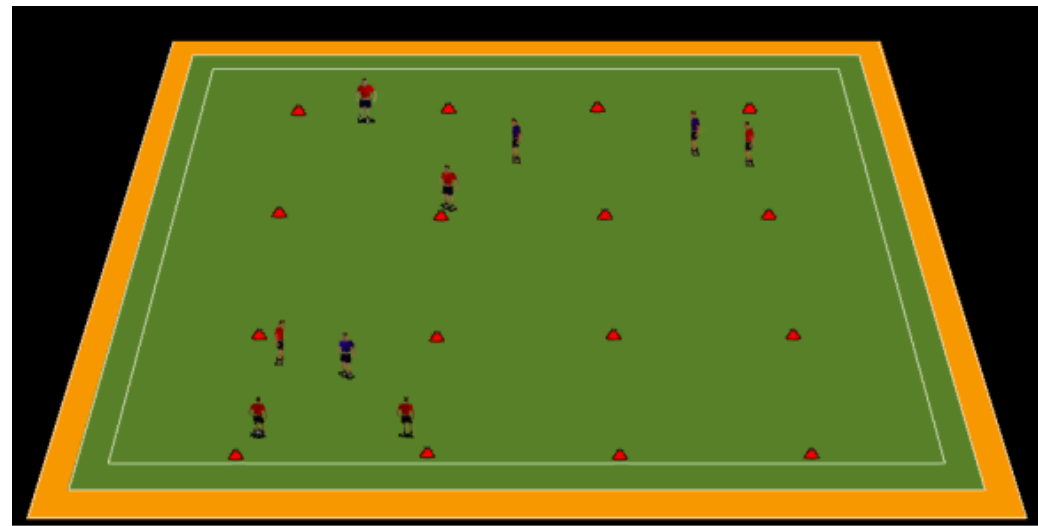
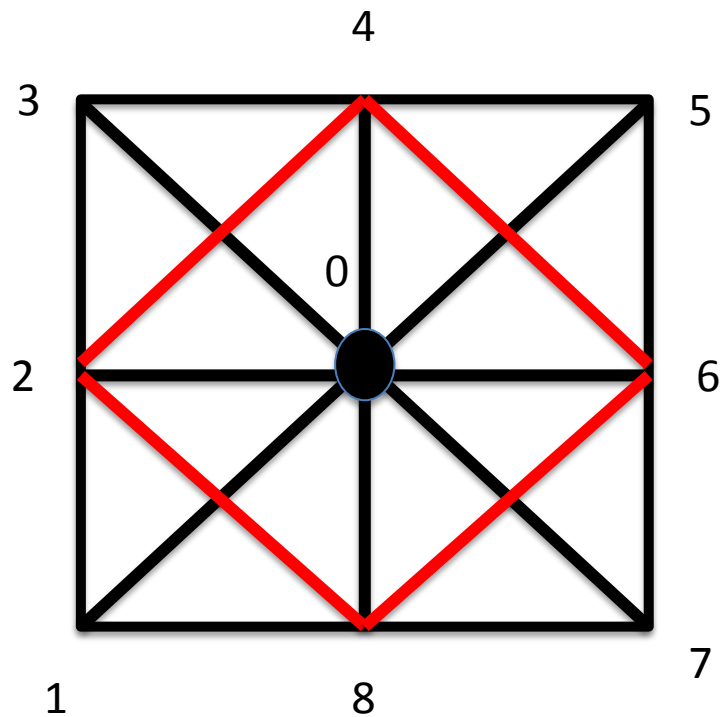


# THE BRAIN AND LT MEMORY

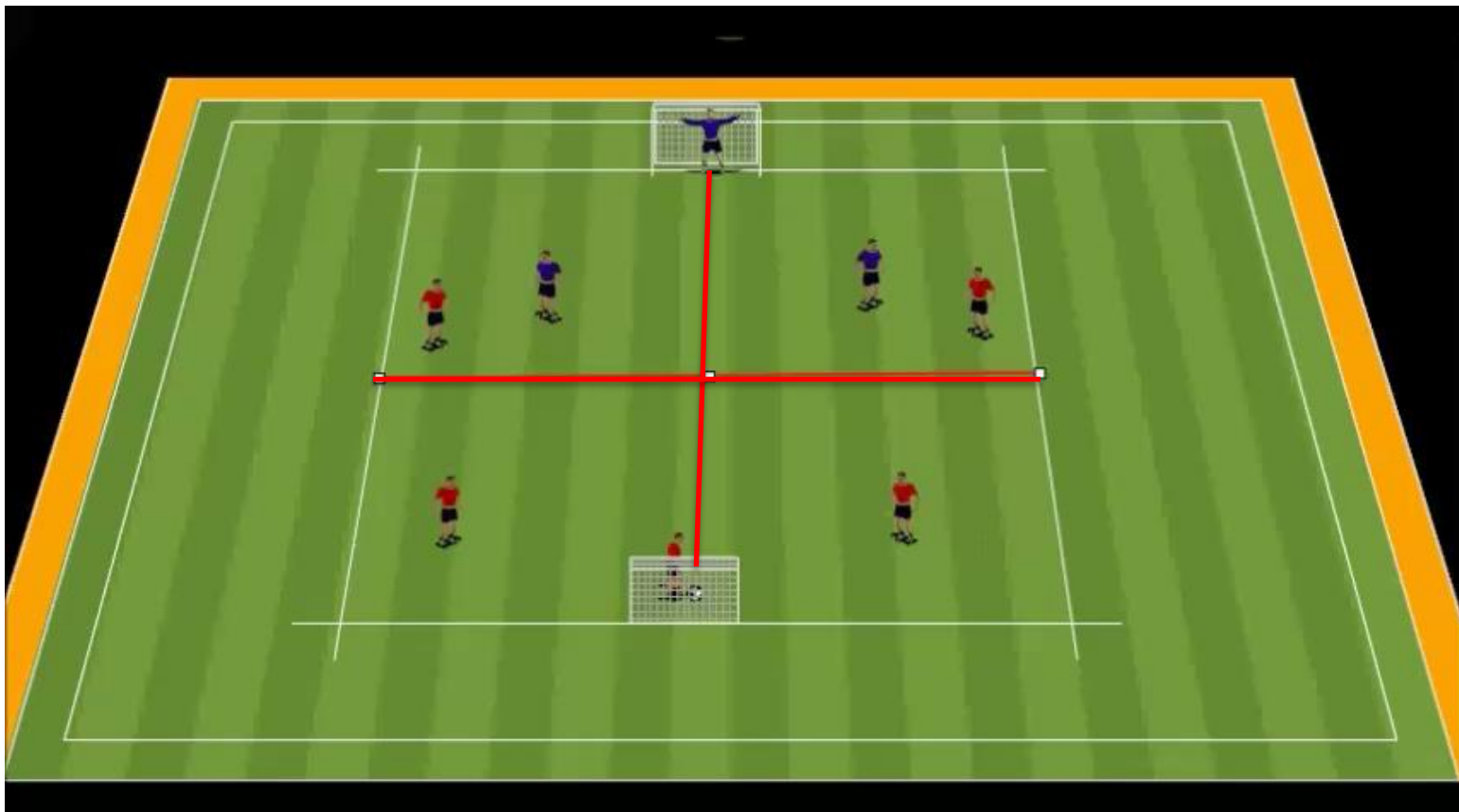




# THE BRAIN AND LT MEMORY



# THE BRAIN AND LT MEMORY





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