



Theoretical session: Tactical Creativity in Football

Prof. Dr. Daniel Memmert



**Deutsche
Sporthochschule Köln**

German Sport University Cologne
Institut für Kognitions- und Sportspielforschung

<http://www.dshs-koeln.de/iks>

<http://www.facebook.com/pages/IfKuSF>

What can you expect from the following hours?

- **From physical skills to Cognition!**
Change as continuity
- **6 Basics of optimal decision-making:**
anticipation, perception, attention, game intelligence, creativity & memory
- **Learning how to win! (workshop)**
Methods of creativity training

Whoever runs a lot, will win the game?

- The average distance covered by a team does not affect the final result.
- This allows for the conclusion, that the players not always make use of their maximal physical possibilities, but that they apply them depending on the score and in doses.

Lago et al. (2010). *European Journal of Sports Sciences*, 10, 103-109.

Change as Continuity!

FC Barcelona: No titel 2014!!!

„We defied the others by playing as we always have in the past ten years.“ (Trainer Gerardo Martino, FC Barcelona after the withdrawal from the CL 2014)



Change as Continuity!



Pass-analysis: vertical play

Anzeige
☐ nur Spieler
☒ Spieler + Zellen

Wege zeigen
☒ keine
☐ nächste
☐ letzte
☐ beide

Spieler-Auswahl
Team A
☒ keine
☐ Formation
☐ alle
Team B
☒ keine
☐ Formation
☐ alle

Anzeige der Spieler und/oder Voronoi-Zellen
☐ ☐

Zeitpunkt
 27:45 1665

Spielfeld-Orientierung
☐ y-Spiegelung

B 3

A 3

zur Analyse-Form
 schließen

Spiel-Prozess: Ausgewählte Spieler von Team A zeigen

☒ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

Pass-specific information (example)

Statistics

time: 27:41
 involved players: from A8 to A11
 length: 4 [s], 36 [m]
 starting and ending areas: mid-field, offense area

Success

number of by-passed opponent players: 6

Tactical context (net-based pattern analysis)

constellation types of tactical groups

©Daniel Memmert

offense B: type 17
 offense B: type 3

Pass-analysis: vertical play

Success: number of by-passed
opponent players:



23



47

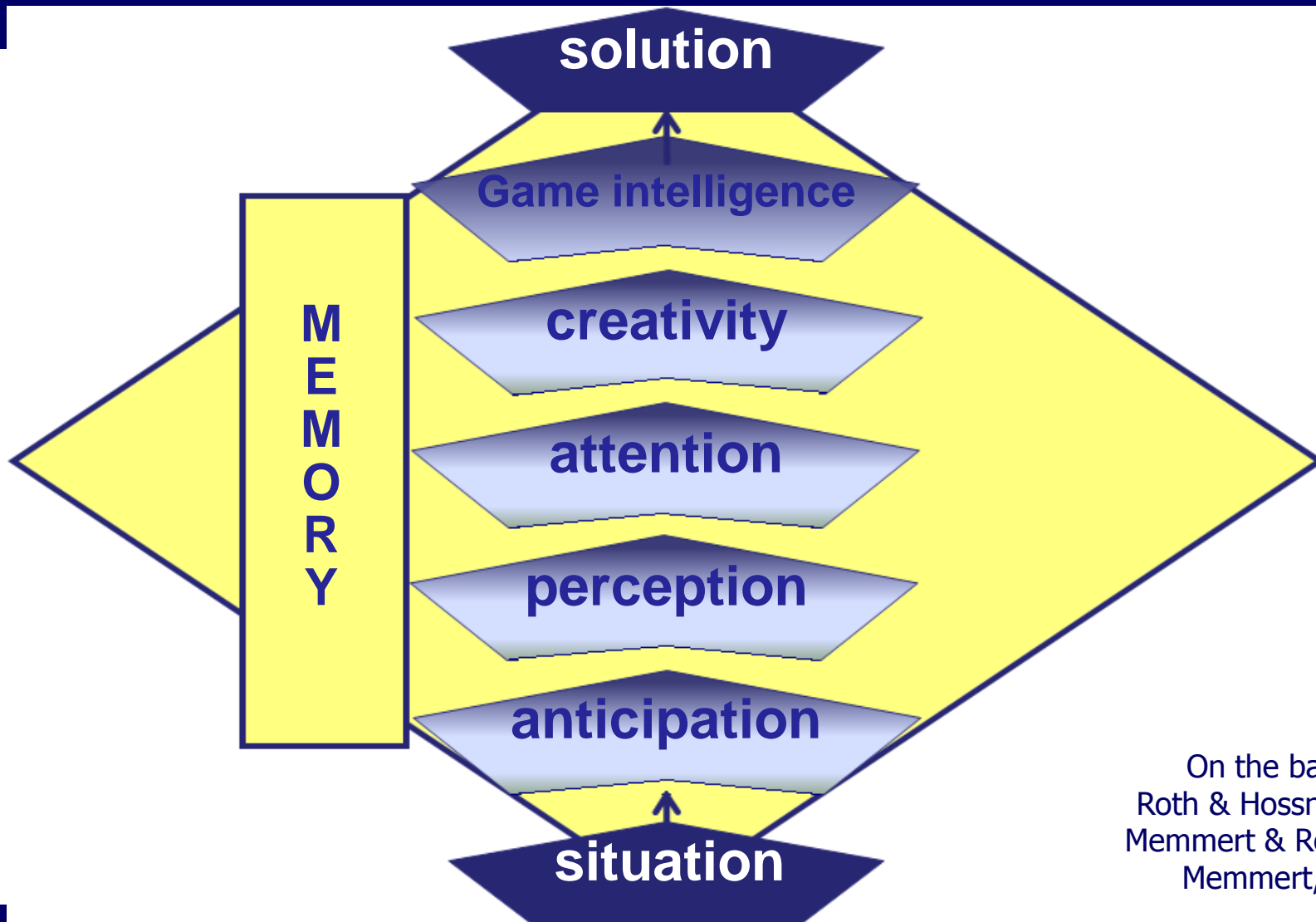
The swarm

- acts within the game philosophy
- sticks to the game-plan
- acts and reacts quickly and permanently
- acts and reacts consciously and unconsciously
- has several solution options
- acts economically

What can you expect from the following hours?

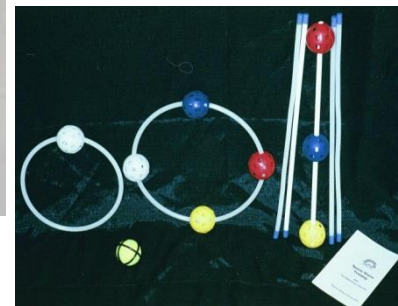
- **From physical skills to Cognition!**
Change as continuity
- **6 Basics of optimal decision-making:**
anticipation, perception, attention, game intelligence, creativity & memory
- **Learning how to win! (workshop)**
Methods of creativity training

Human process model of decision actions

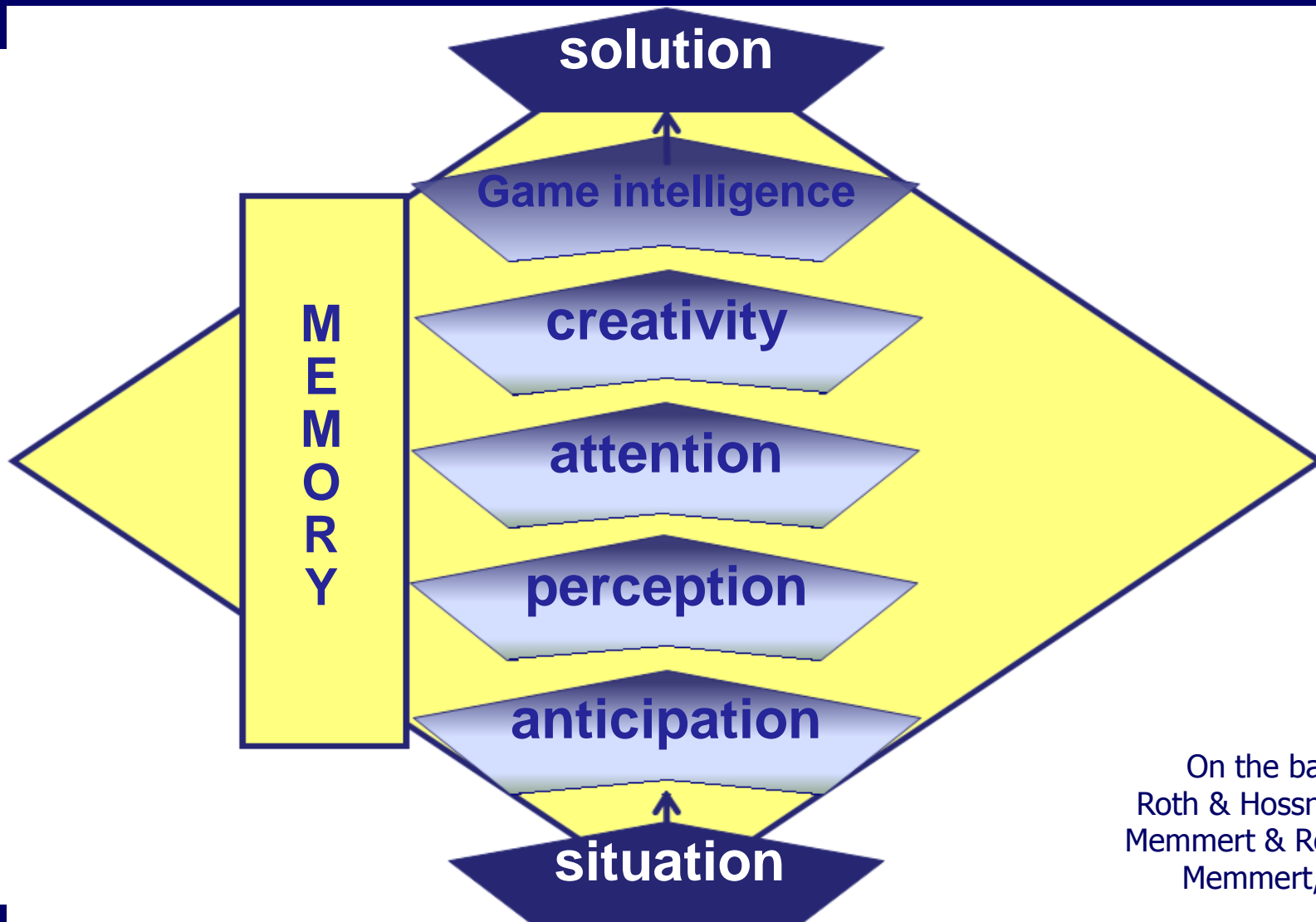


On the basis of
Roth & Hossner, 1999;
Memmert & Roth, 2003;
Memmert, 2008

Generall anticipation training

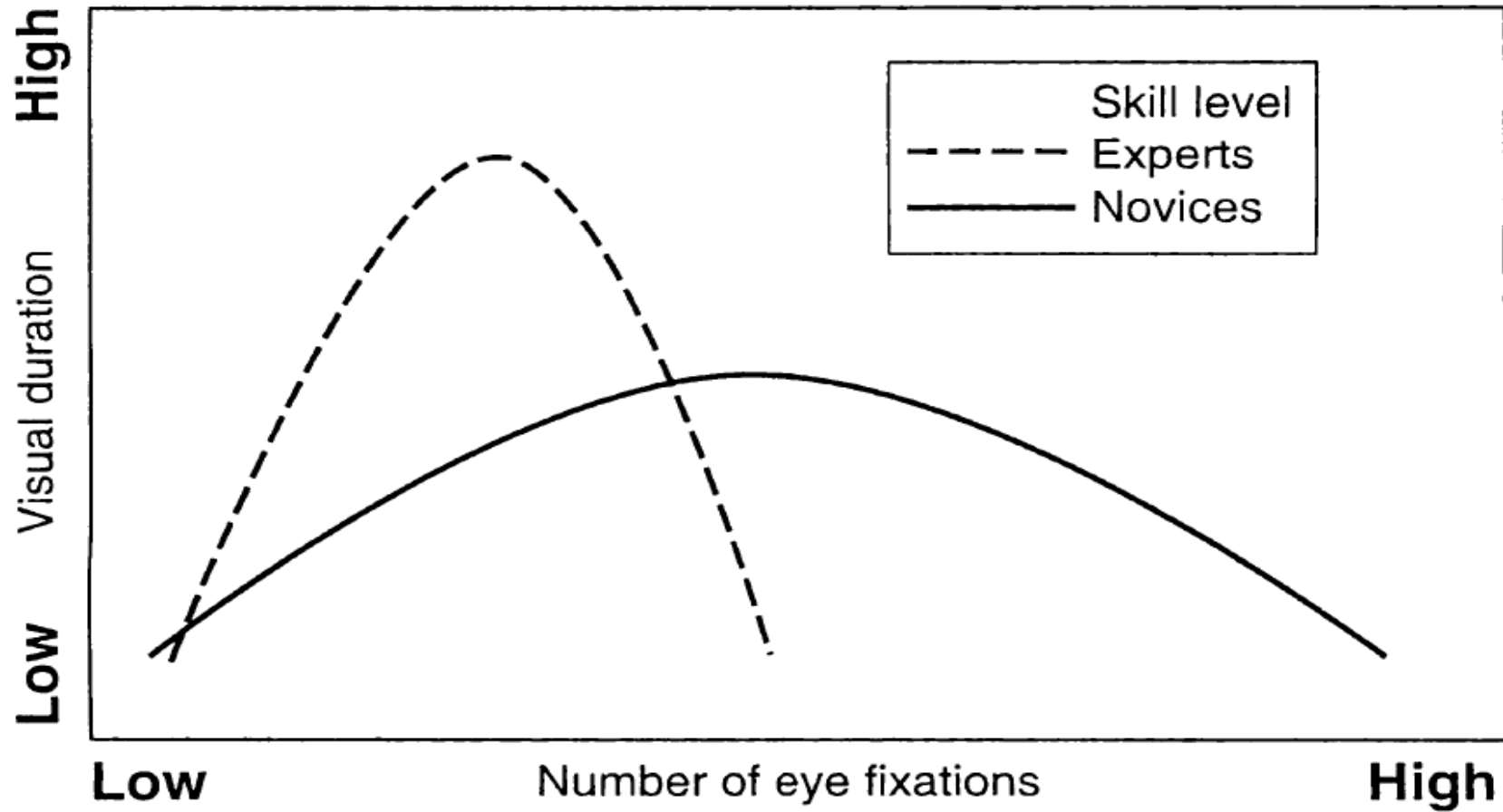


Human process model of decision actions

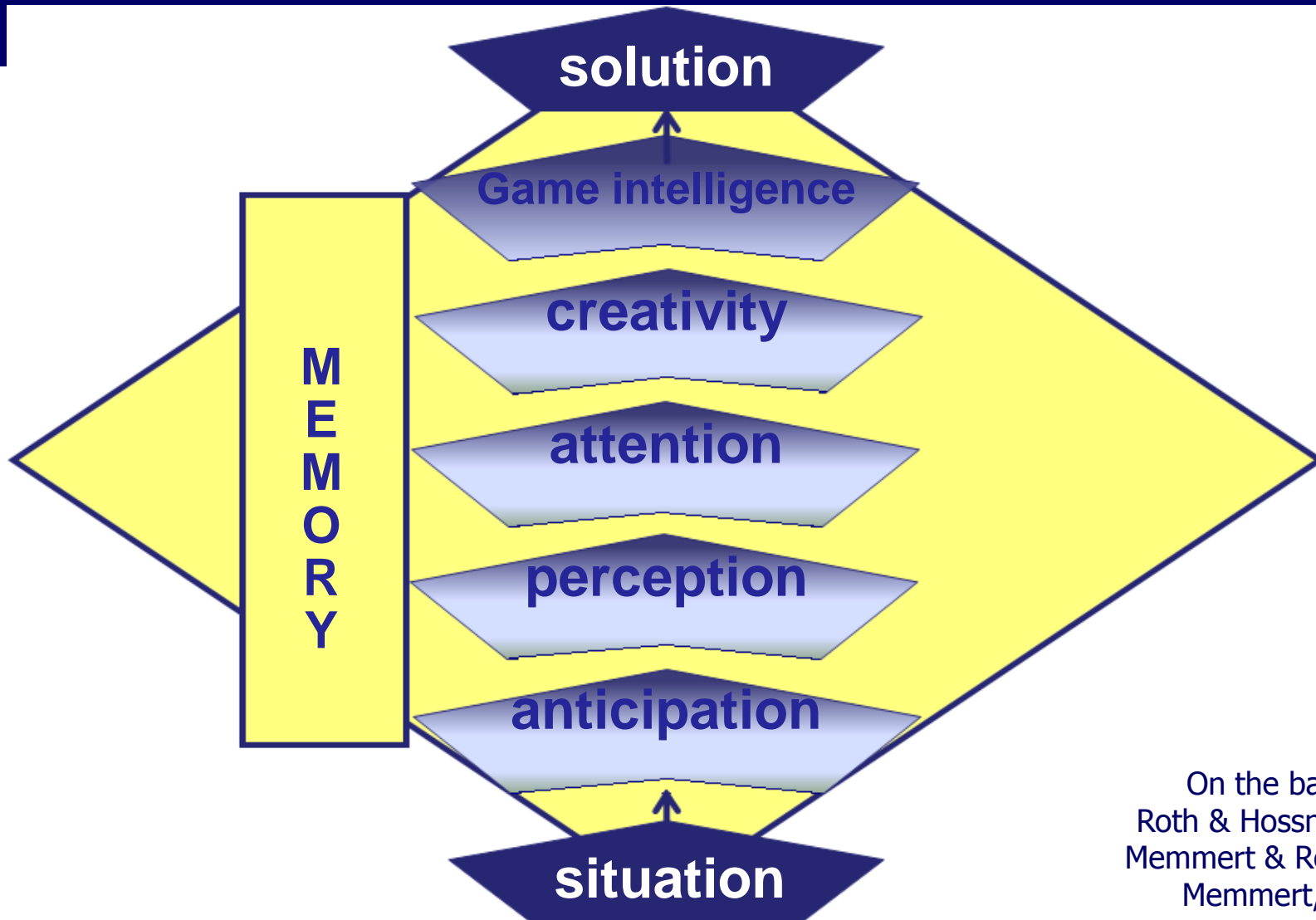


On the basis of
Roth & Hossner, 1999;
Memmert & Roth, 2003;
Memmert, 2008

Visual search behavior



Human process model of decision actions



On the basis of
Roth & Hossner, 1999;
Memmert & Roth, 2003;
Memmert, 2008

Dimensions of Attention

Attention is primarily determined by the selection of relevant stimuli and the selective structuring of the field of perception

(cf. Berg & Imhof, 2001; Sturm, 2005; Heubrock & Petermann, 2001; Schweizer, Zimmermann & Koch, 2000).

- Sustain Attention (Mirsky, Anthony, Duncan & Kellam, 1991)
- Orienting of Attention (Posner, 1980)
- Selective Attention (e.g., Duncan, 1984; Van der Heijden, 1992)
- Breadth of Attention (Mendelsohn, 1976; Kasof, 1997)
- Inattentional Blindness (Most, Scholl, Clifford & Simons, 2005)
- etc.

Fig. 1

The 4 sub processes of attention

Selective Attention

E.g.: Ignoring the hail of catcalls of the opposing spectators just before a corner kick to pass the ball precisely to the strong head players.

Orienting of Attention

E.g.: By raising the arm, a team player on the opposite side of the field signals his readiness for a pass, whereon the ball holder directs his focus of attention onto this player to play a long pass.

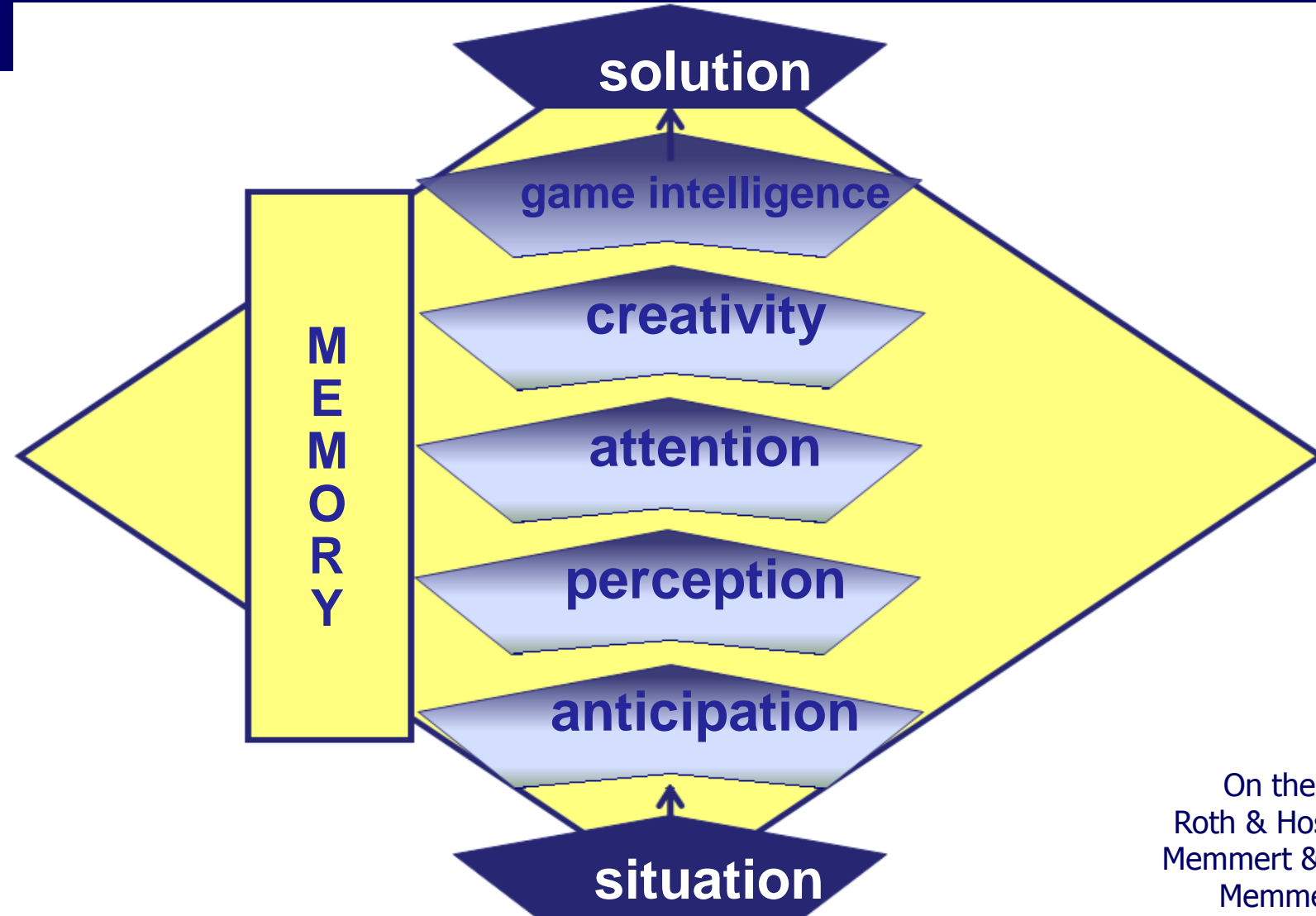
Divided Attention

E.g.: Safe shielding of the ball while scanning the field for free team mates.

Concentration

E.g.: Fixating the ball during a 60-meter-pass to catch the ball in a playable manner from the air.

Human process model of decision actions



On the basis of
Roth & Hossner, 1999;
Memmert & Roth, 2003;
Memmert, 2008

Creativity in professional soccer



„Creativity and a high qualitative performance should be the new German virtues.”
(National coach Jogi Löw, World Cup Winner 2014 in Brazil).

„Messi plays on a completely different level.”
(Neymar da Silva Santos Júnior).



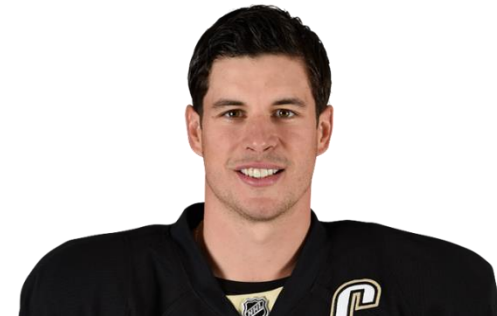
Creativity in other sports



Wayne Gretzky was known for his uncanny ability to see three moves ahead of the play at hand and hold the whole game in his mind.

"This insight, as Sidney Crosby, a 23 year old hockey player describes, is the ability to see not where everyone is when you look, (but) where everyone will be if you buy some time and hold the puck for another second."

(Allen, 2004, cited from Walinga, 2007)



Creativity in other sports



"Paganini's explanation for Federer's success is that his personality controls the athlete inside of him. He is an artist who is impressively creative and he transfers his strong emotionality into the game."

Definition

- 1. Tactical intelligence =**
convergent tactical thinking
- 2. Tactical creativity =**
divergent tactical thinking

Tactical intelligence

Convergent tactical thinking =

Refers to the ability to find the optimal, „right“ solution in given game situations

Tactical creativity

“The ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful)”
(Sternberg & Lubart, 1999, p. 3)

... inventive, original, productive, designing, artistic, elaborate, innovative, ressourceful, imaginative, ingenious, fancy, groundbreaking, trend-setting ...



Tactical game intelligence

- „only“ intelligent players are not *necessarily* creative
(but the probability is higher!)
- the correct, but predictable
⇒ often standard solution

Tactical creativity

Placing the convergent in front
of the divergent thinking:

. . . inventive, original, productive, designing, artistic, elaborate,
innovative, resourceful, imaginative, ingenious, fancy,
groundbreaking trend-setting...



Definition Creativity

“The ability to produce work that is both **novel** (i.e. original, unexpected) and **appropriate** (i.e. useful)”
(Sternberg & Lubart, 1999, p. 3)

“The ones who can only come up with few and repetitively the same action possibilities will hardly be successful in the long run. Flexible solutions for situations, particularly those which appear extraordinary and surprising to the opponent, need to be trained.”
(Roth, 2005, S. 343)

Tactical creativity

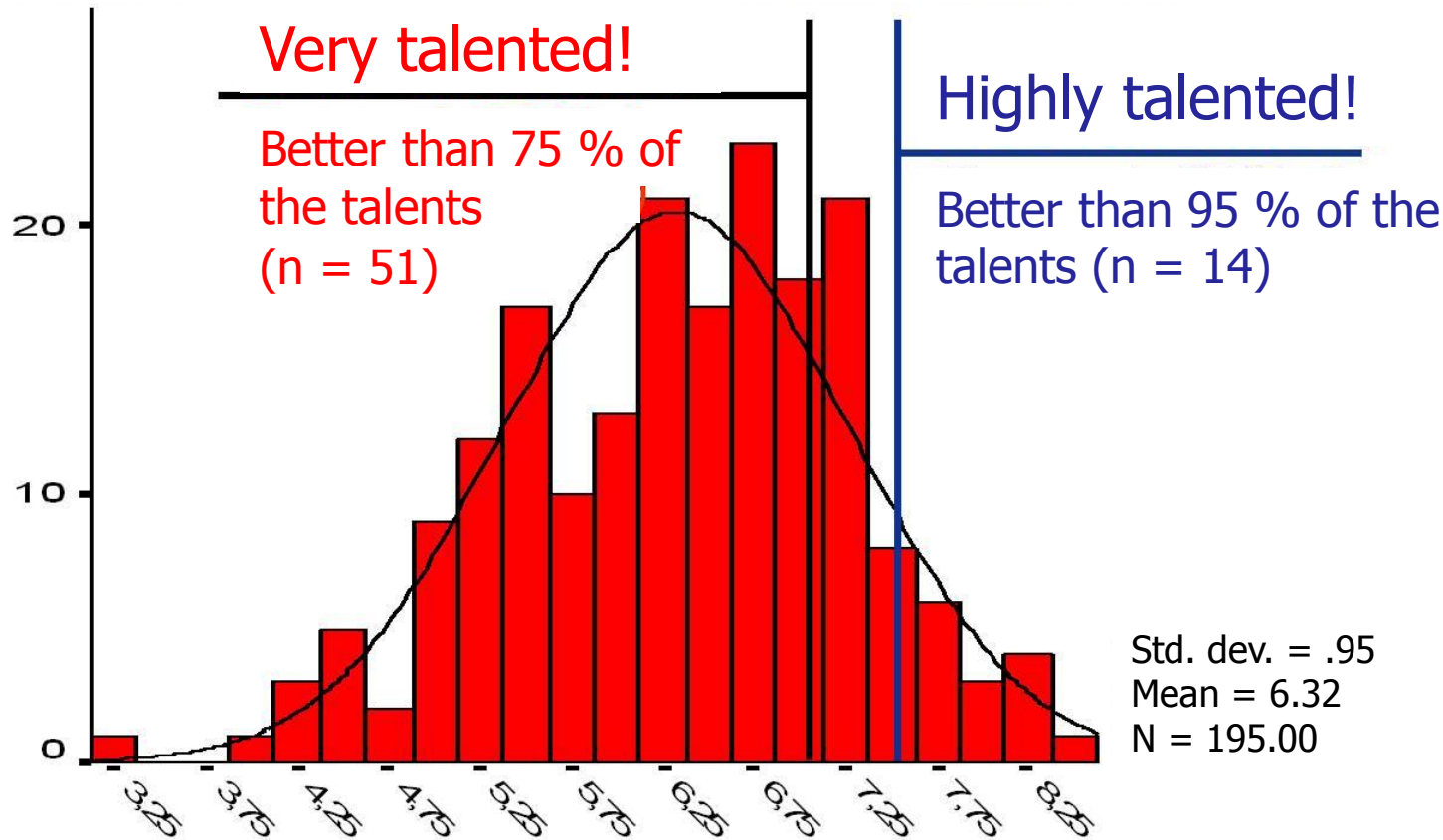


Operationalisation of divergent tactical thinking

- Fluidity – number of **appropriate** solutions
- Originality – static rarity / suitability
- Flexibility – different solutions for similar situations

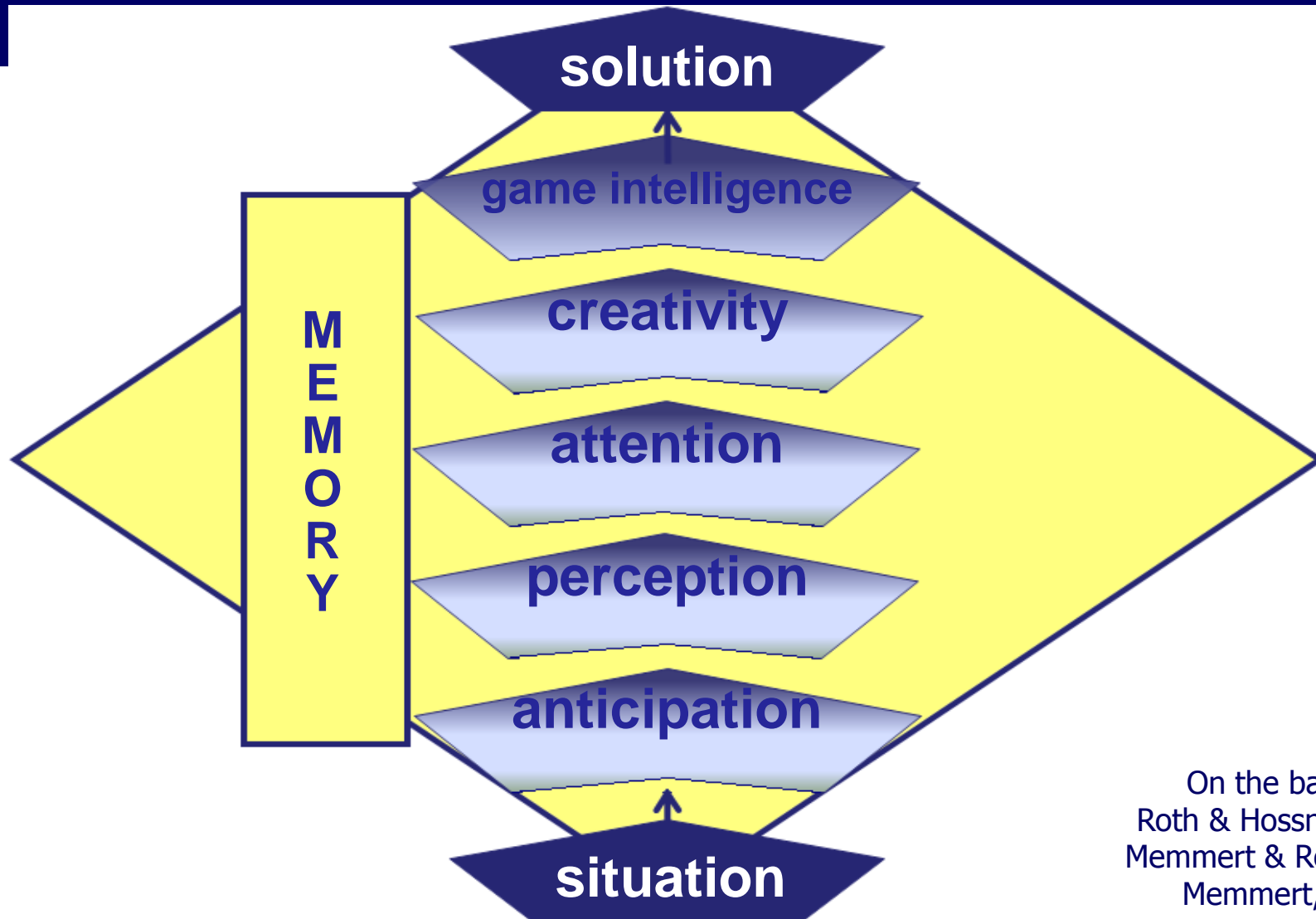
German Football Association: Talent / creativity diagnostic

Differentiation and normal distribution are given!



Memmert (2010), *Journal of Sports Science and Medicine*

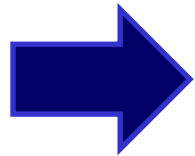
Human process models of decision actions



On the basis of
Roth & Hossner, 1999;
Memmert & Roth, 2003;
Memmert, 2008

Working Memory

- For many cognitive tasks, memory is necessary which both holds goals, important perception results, retrieved information from the long-term memory ready and which coordinates the processing of all these pieces of information.
- Nearly all cognitive achievements require temporary request-dependent supply of information.



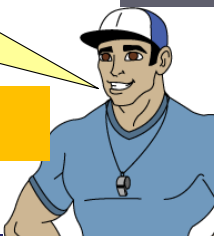
The working memory is thus a key system for the comprehension of complex, cognitive activity (Engle, 2002).

Working memory in sport



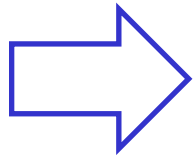
Video analyses of opposing teams have shown that their defense confront back area players very offensively. Therefore, we must move the defense and often act with two circuits, as the defense is very prone to bounce passes on the circle. Of course we shouldn't look for the bounce pass player in each and every situation, but rather must adapt our decisions to the given situation.

Please press enter when you have finished reading!



Cognitive Diagnostics in Team and Racket Sports

Until a short while ago cognitions in sport haven't received much attention and the focus was directed to the diagnostic and training of physicality and stamina. (Starkes, Helsen, & Jack (2001). Nowadays more and more sport scientists acknowledge the immense importance of cognitive abilities for top performances in sport.



To selectively improve and train cognitive abilities, adequate instruments for diagnosis are necessary.

Summary

Identification of the problem	Anticipation, Perception & Attention	Memory
Development of solution ideas	Divergent, tactical thinking	
Reduction of solution ideas	Convergent, tactical thinking	

What can you expect from the following hours?

- **From physical skills to Cognition!**
Change as continuity
- **6 Basics of optimal decision-making:**
anticipation, perception, attention, game intelligence, creativity & memory
- **Learning how to win! (workshop)**
Methods of creativity training