# Expertise in Sport: Human Adaptations to Practice and Instruction

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# Aims

- Outline relationship between practice and human achievement
- Summarise adaptations that arise as a result of engagement in practice
- Consider implications for talent search and development

# Practice History Profiles of Elite Performers

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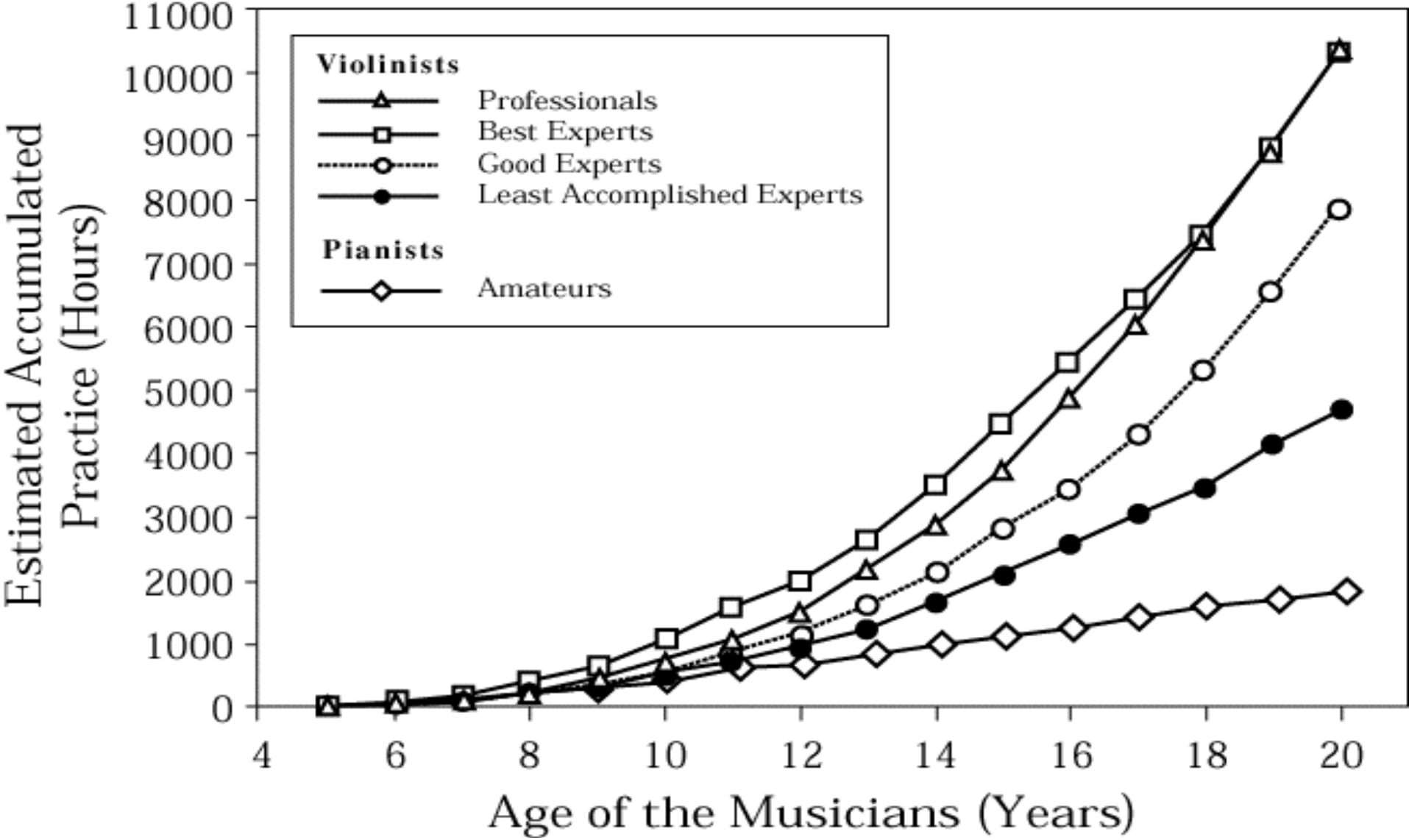
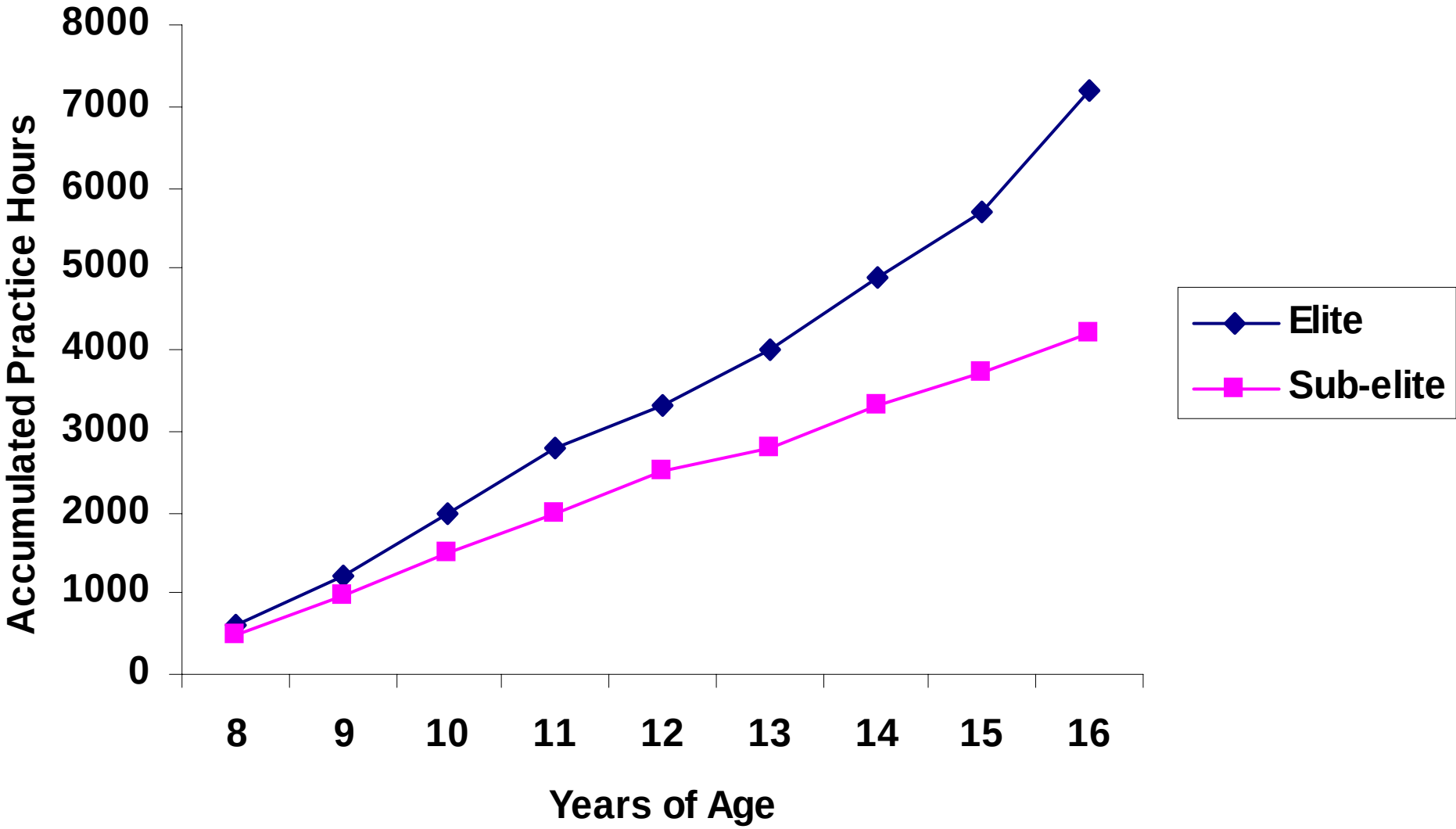



Ericsson et al. (1993) Psych Review




Ward et al. (2004, 2007) High Ability Studies


# 20-30 Hours Per Week
# 10 Years of Practice
# 6000-11000 Hours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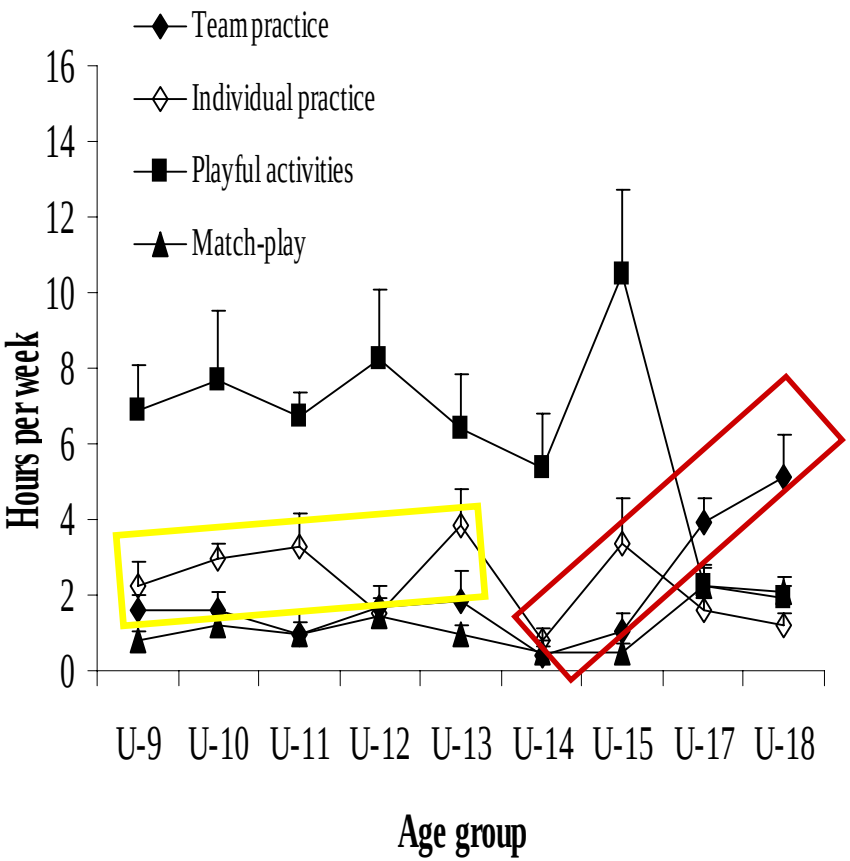
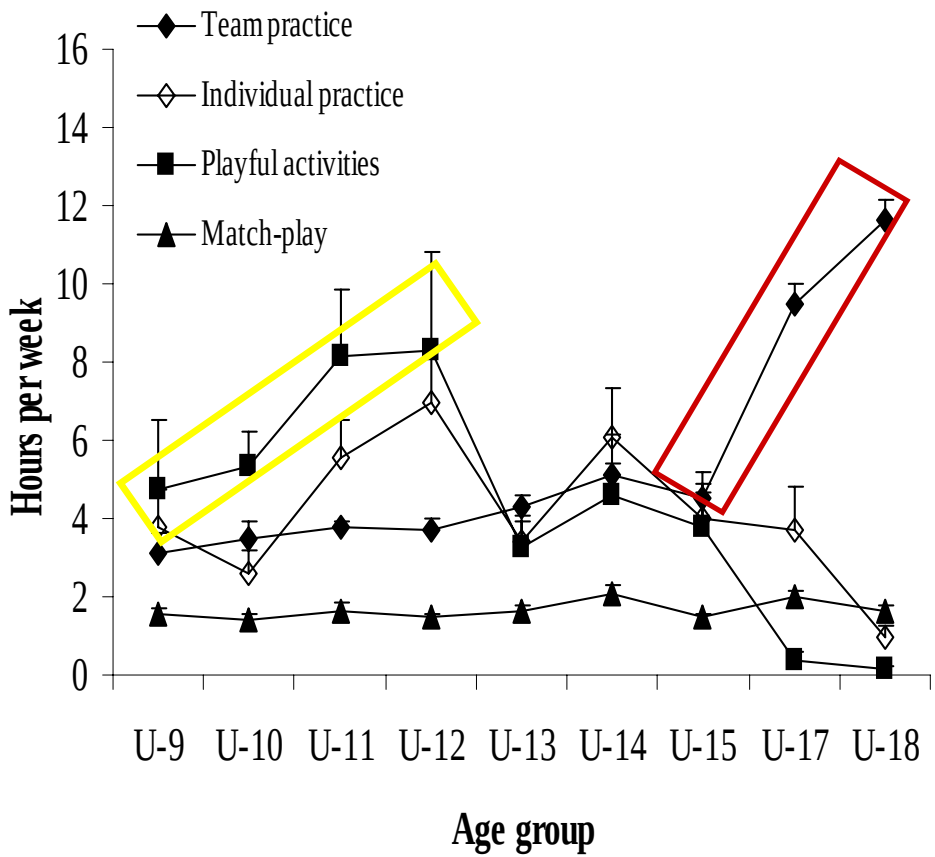
# Sub-elite Soccer Players

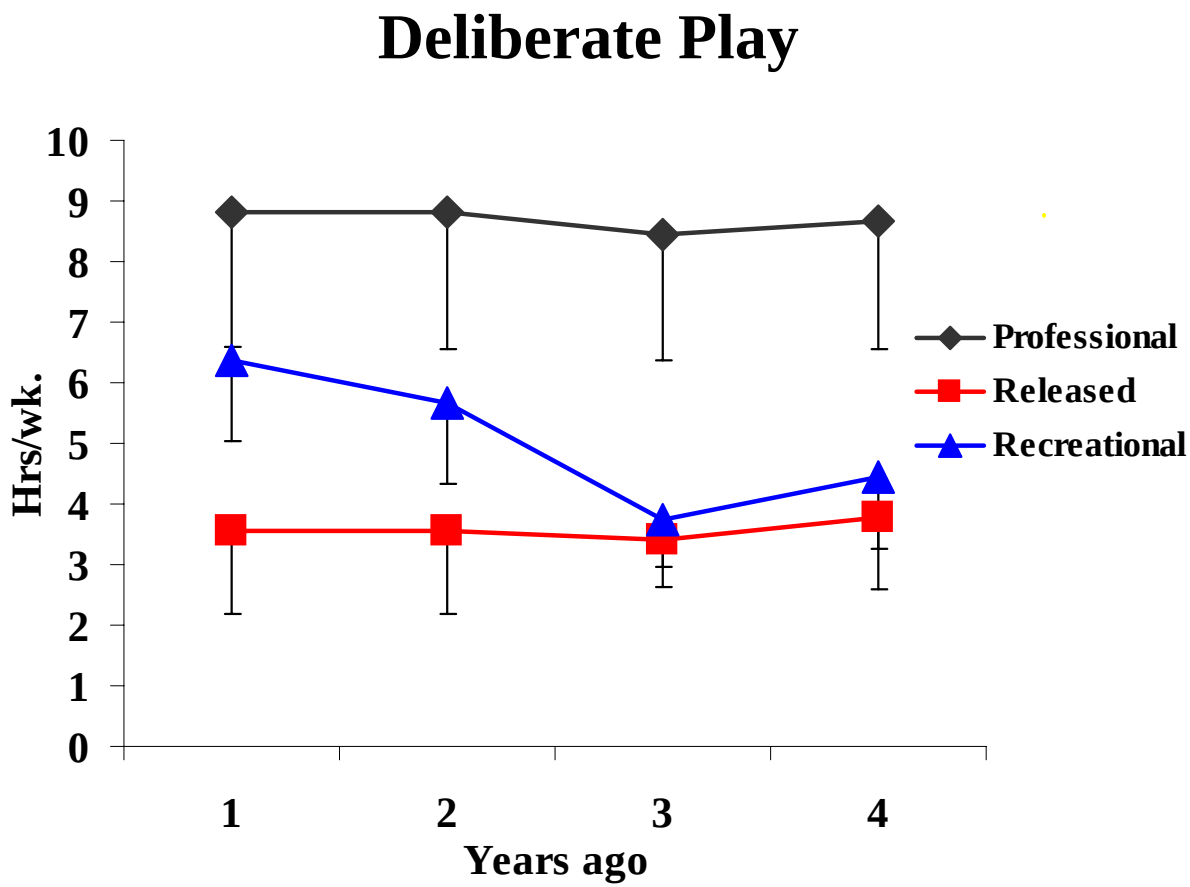



# Elite Soccer Players




Ward et al. (2004, 2007) High Ability Studies

# Non-Coach Led Practice Activity (13-16 years)

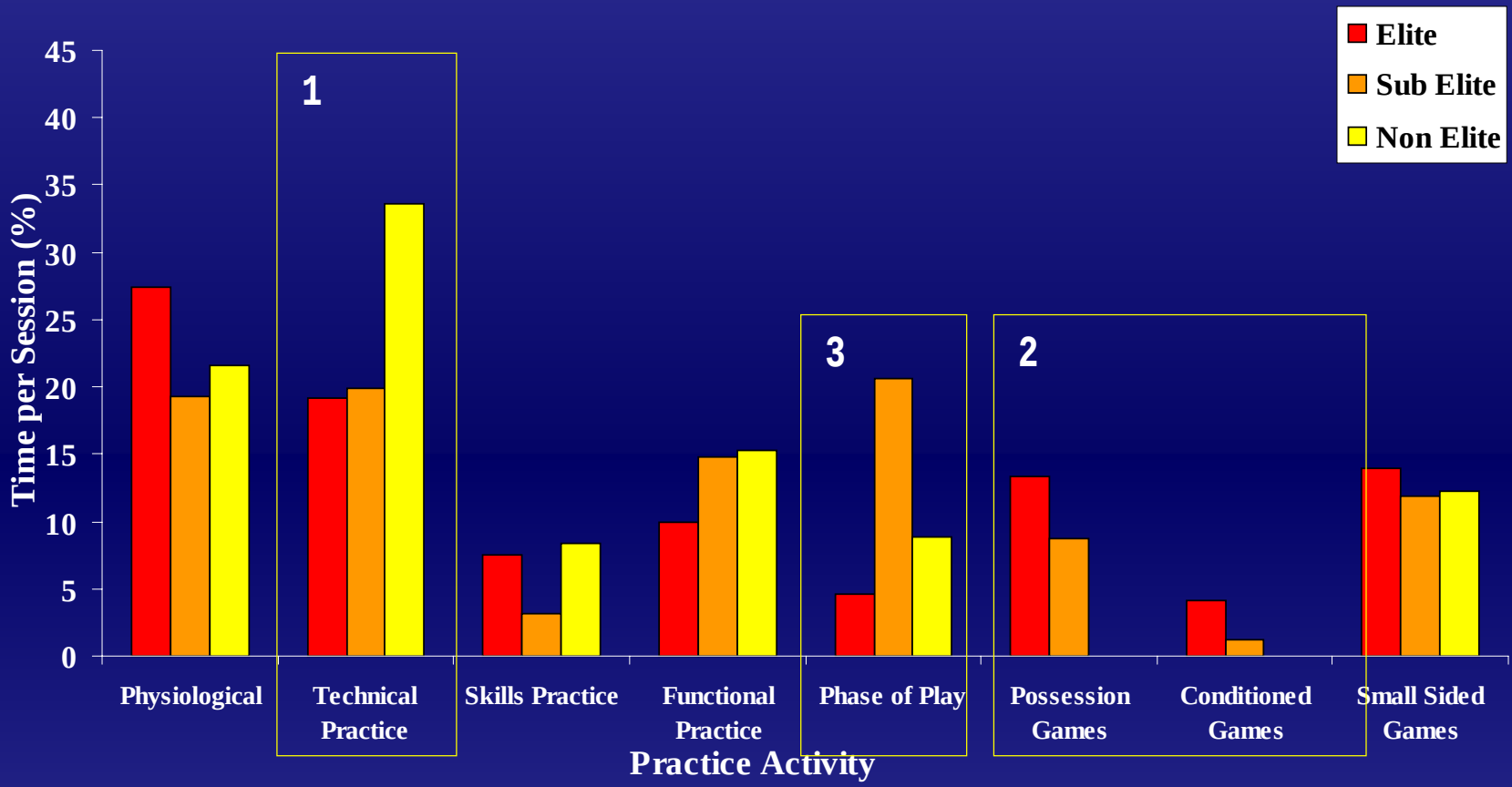



Ford et al. (2008) High Ability Studies

# Non-Coach Led Practice Activity (6-12 years)


Ford et al. (2008) JSEP

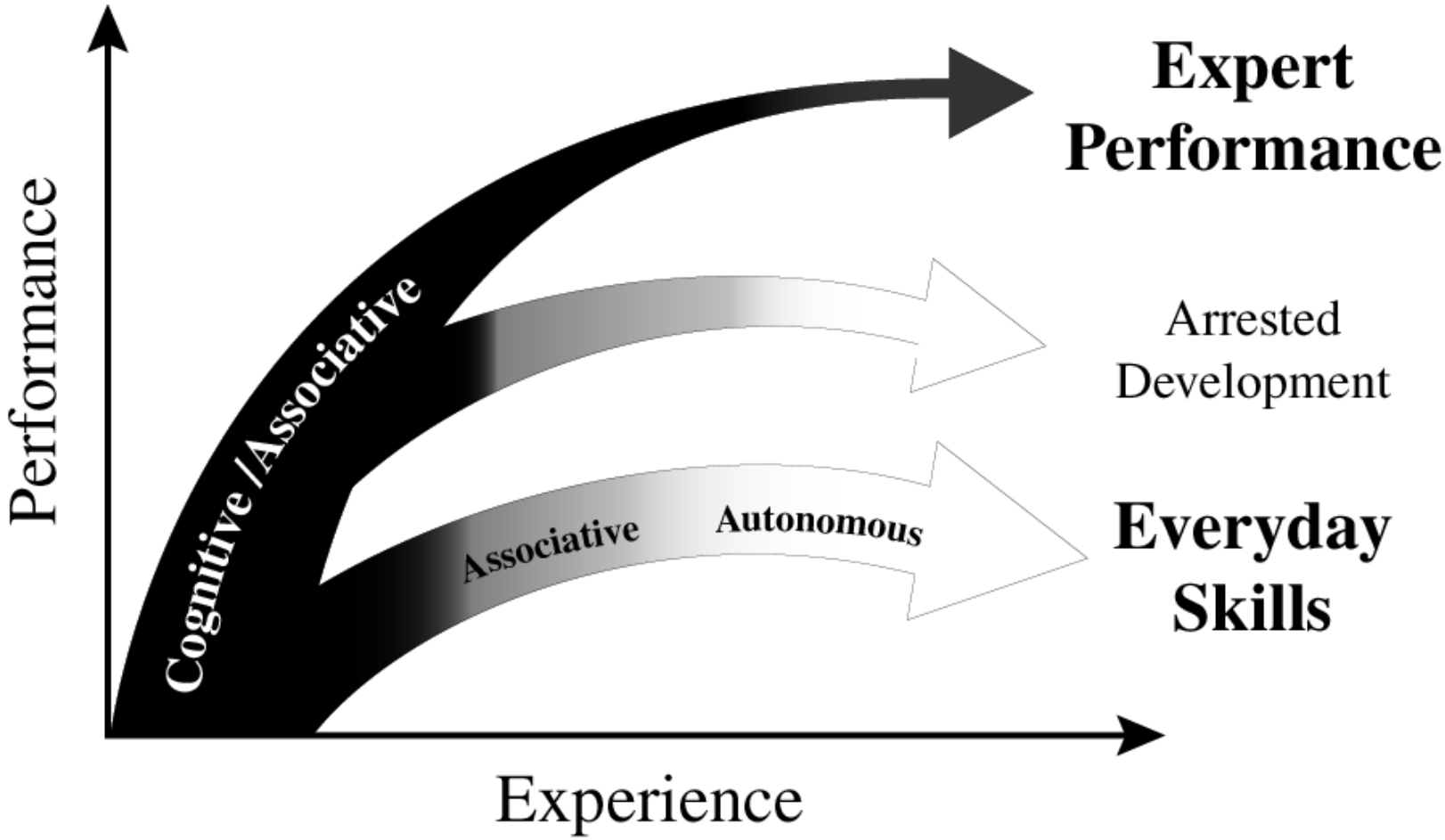
# Time-Motion Analysis of Practice




**Percentage of time in varying soccer-specific training activities for U16s**

# Practice History of English Academy Soccer Player

- 9-10 years
- 800 hours per year
- 16 hours per week
  - team practice = 4 hrs
  - individual practice = 5 hrs
  - deliberate play = 7 hrs
- 7500 hours


Performance
Cognitive /Associative
Associative
Autonomous
Expert Performance
Arrested Development
Everyday Skills
Experience

# Adaptations to Practice: Plasticity and Adaptability

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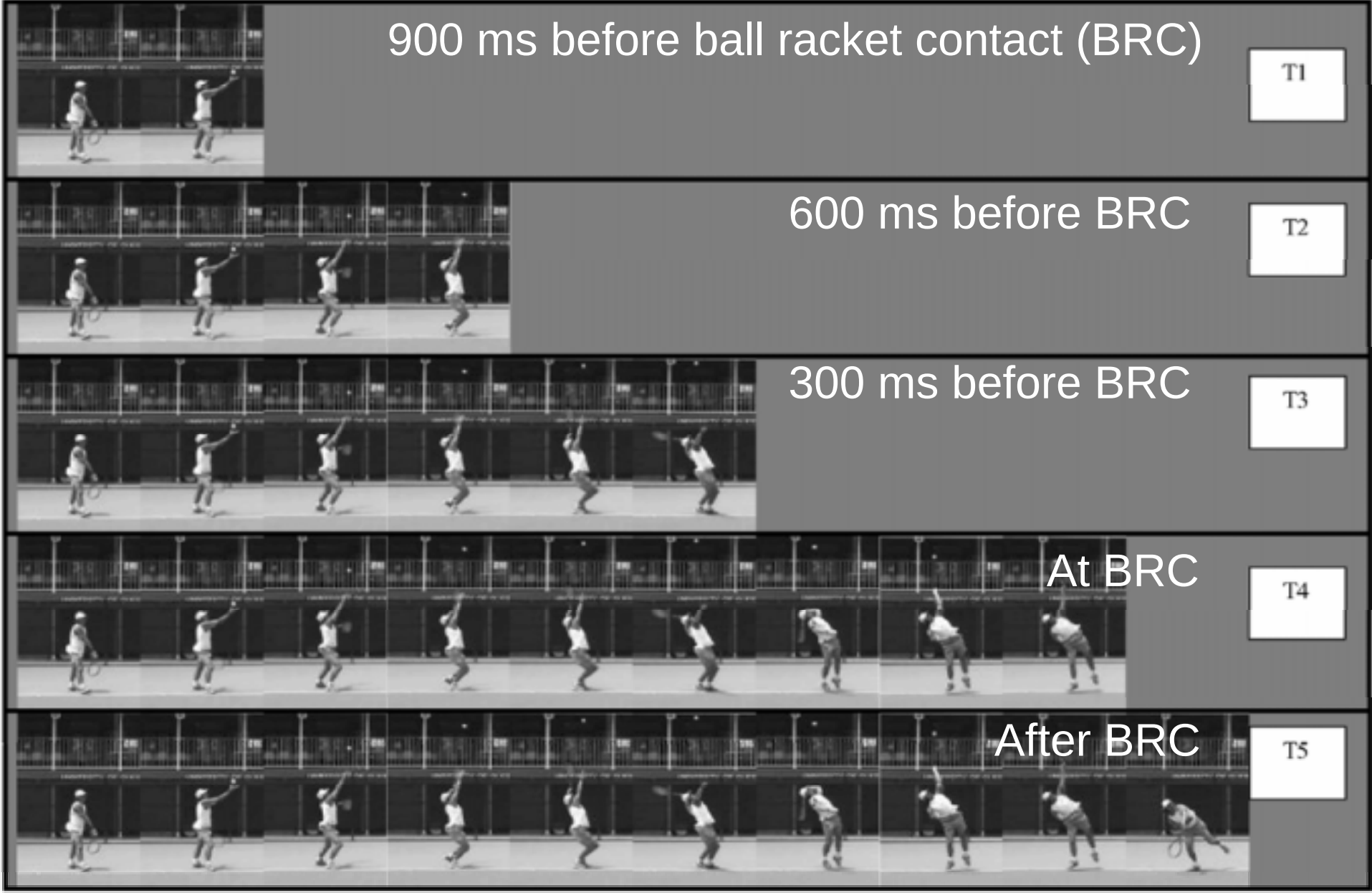
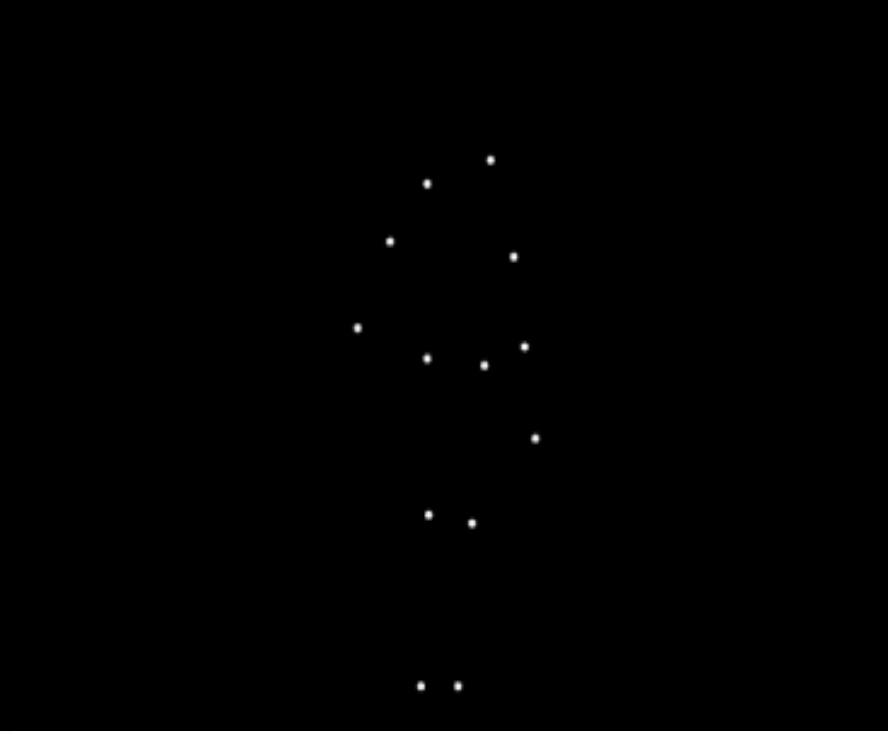
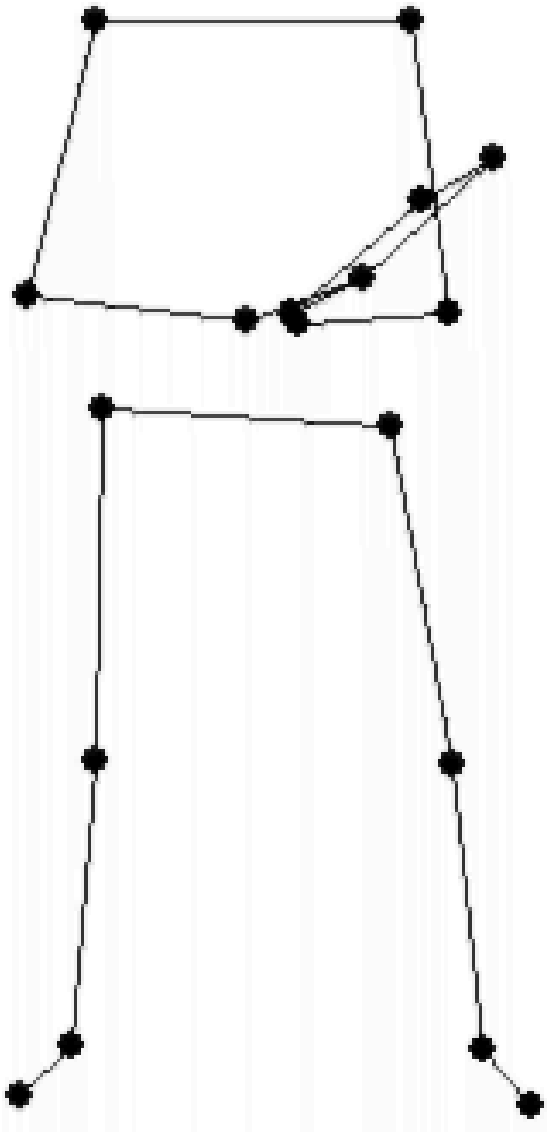
# Key Findings on Perceptual-Cognitive Expertise

- **Ability to pick-up advance visual cues**




Farrow et al. (2003)





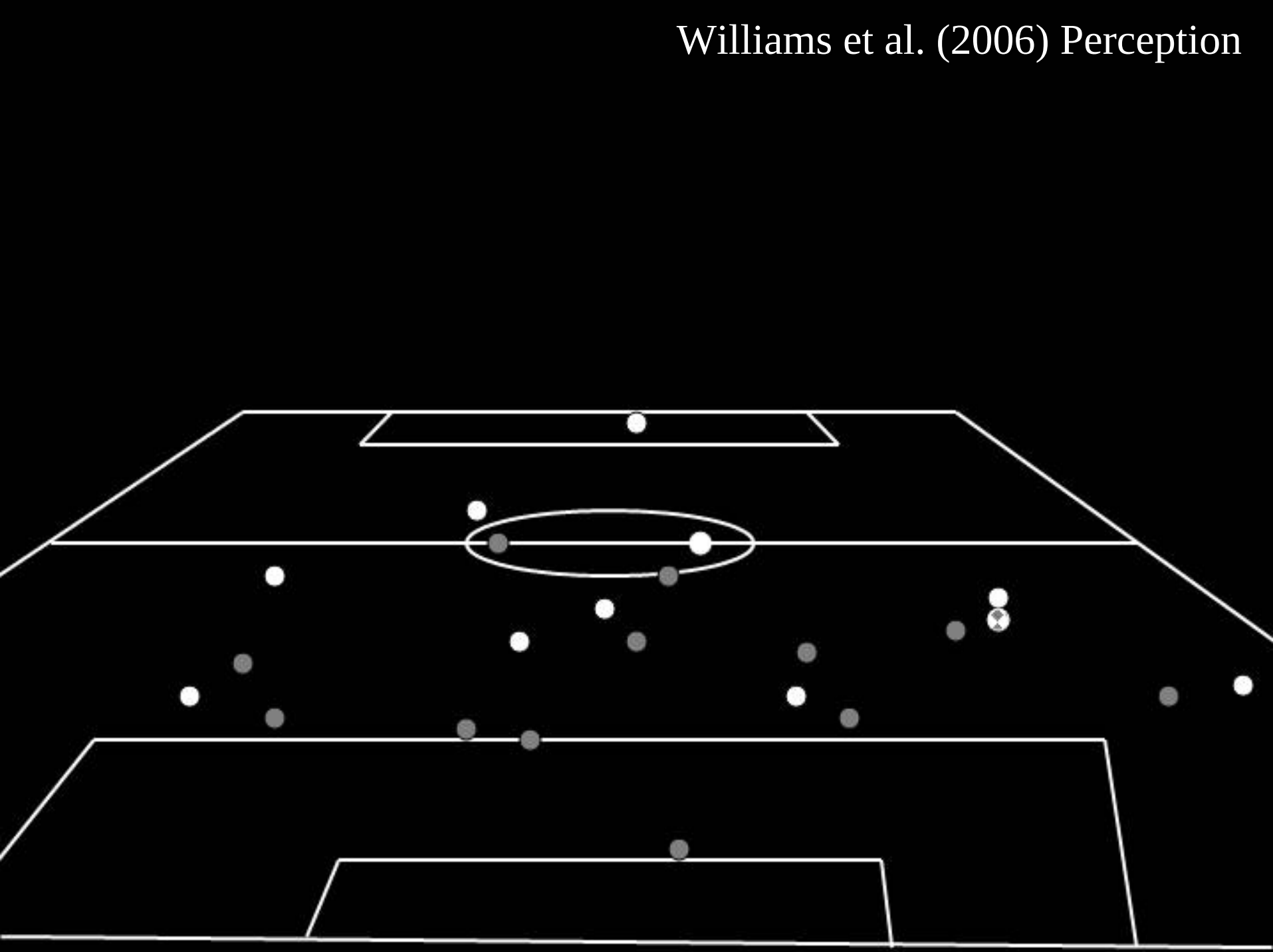
Huys et al. (in press) Perception and Psychophysics, JMB

Williams et al. (in press) HMS

# Key Findings on Perceptual-Cognitive Expertise

- Ability to pick-up advance visual cues
- Superior pattern recognition skills

Williams et al. (2006) Perception



# Key Findings on Perceptual-Cognitive Expertise

- Ability to pick-up advance visual cues
- Superior pattern recognition skills
- More effective visual search strategies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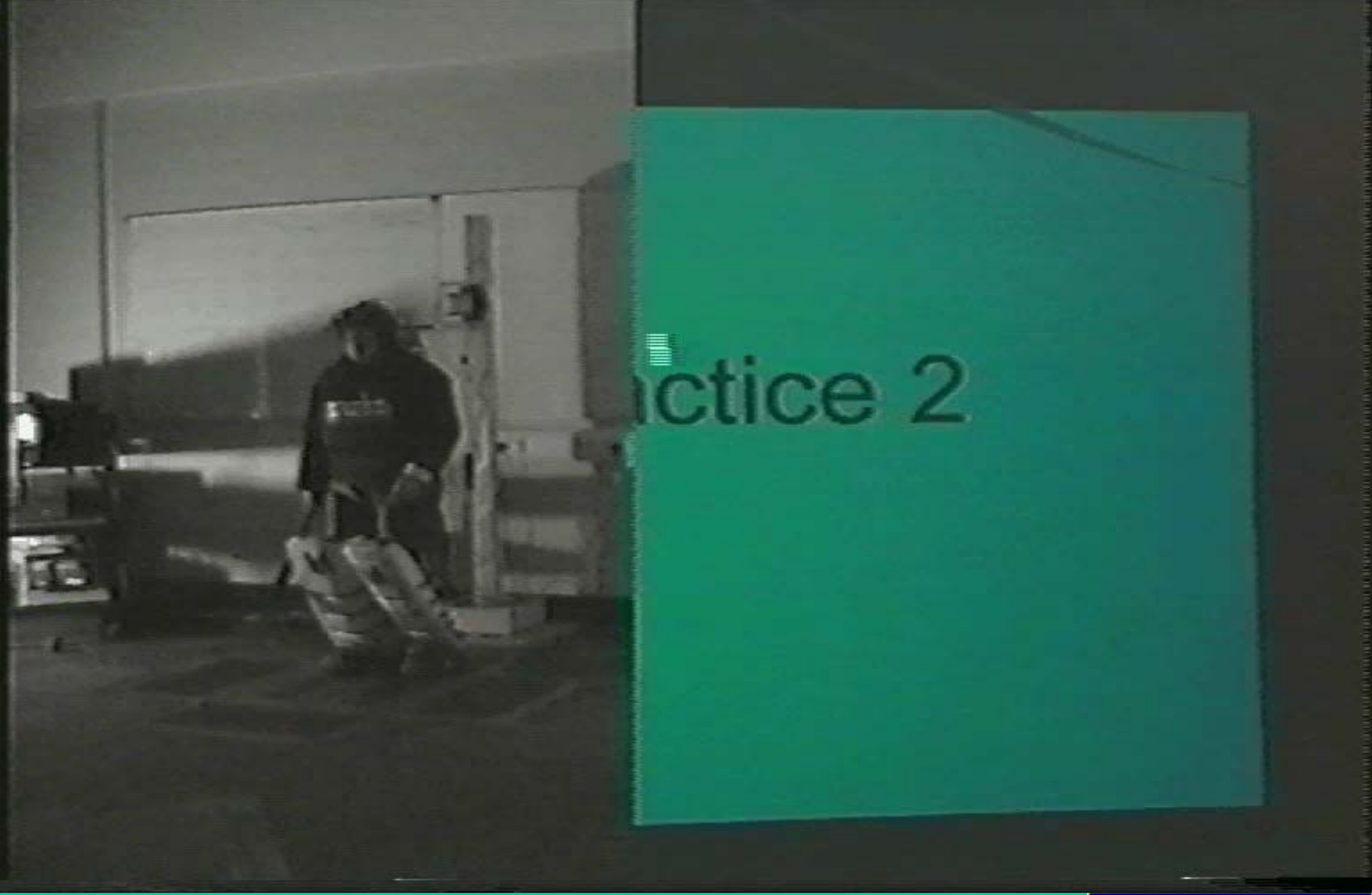
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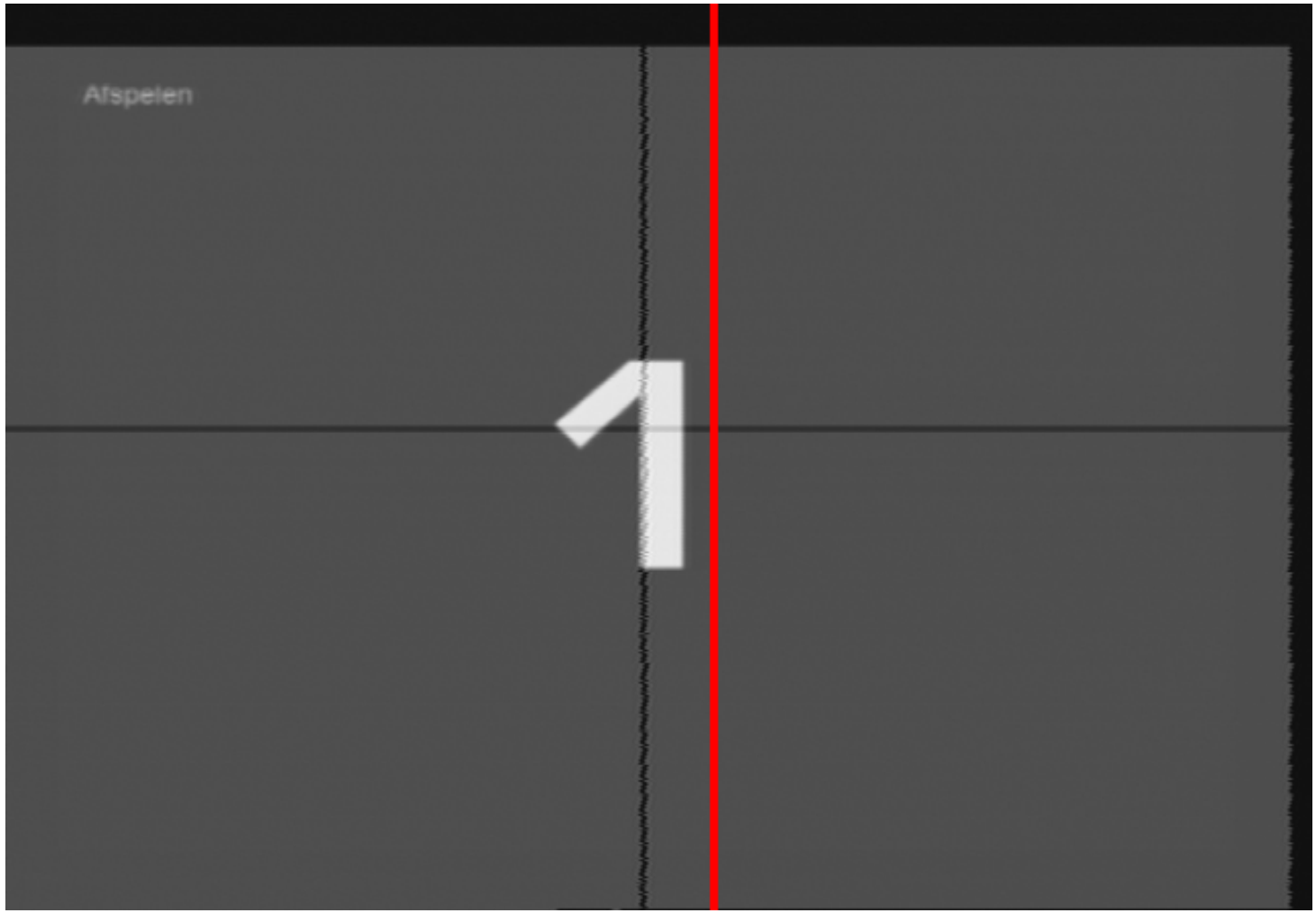
# Key Findings on Perceptual-Cognitive Expertise

- Ability to pick-up postural anticipation cues
- Superior pattern recognition skills
- More efficient visual search behaviour
- More refined event probabilities/expectations

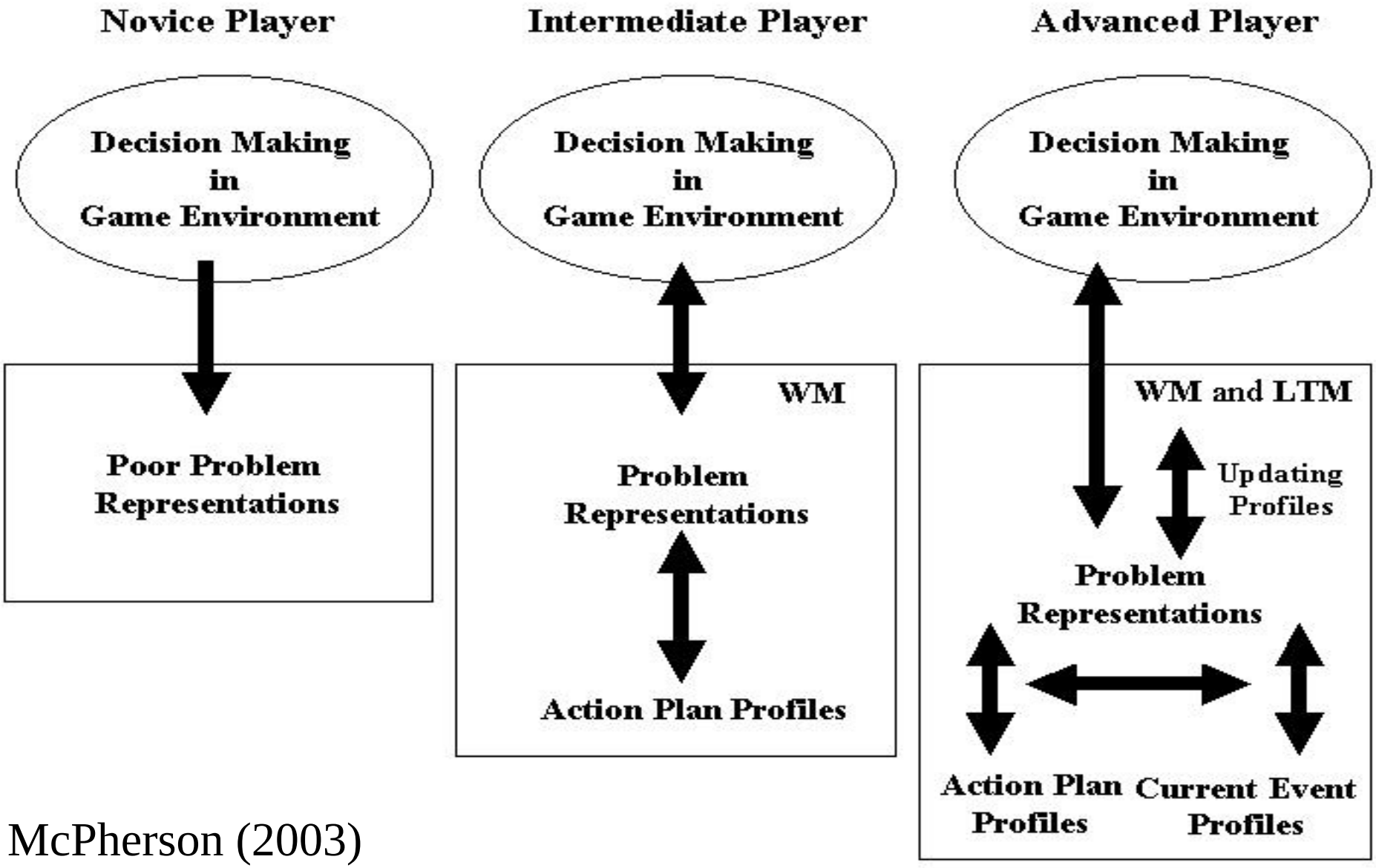

Ward & Williams (2003) JSEP

# Key Findings on Perceptual-Cognitive Expertise

- Ability to pick-up postural anticipation cues
- Superior pattern recognition skills
- More efficient visual search behaviour
- More refined event probabilities/expectations
- Enhanced tactical decision-making




Vaeyens et al. (2007a,b) JMB, JSEP




McPherson (2003)

# Implications for Talent Search and Development

# Implications for Talent Search

- Expertise multi-faceted – difficult to define, particularly in team sports
- No real ‘gene’ or measurable performance indicator that will predict success at early age
- Human system adapts to training
- Motivation and sustained commitment – **heritable differences may present limits on achievement**

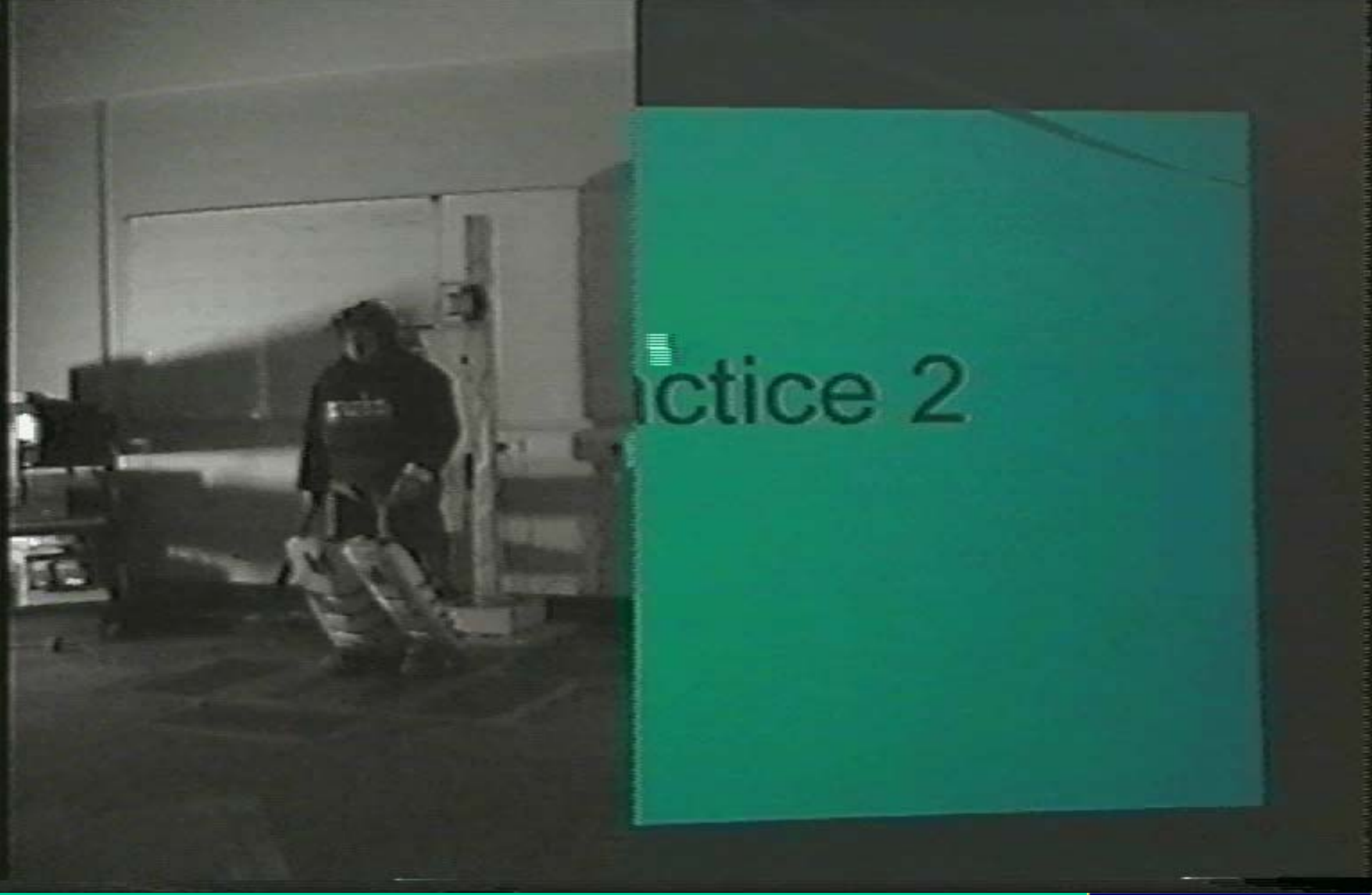
# Implications for Talent Development

- Retain and recruit as many athletes as possible
- Motivation, commitment and enjoyment key
- Practice opportunities need to be **appropriate** and **abundant**
- Provide appropriate **systems** and support **networks**

# What is ‘appropriate’ practice?

- Circularity of coaching doctrine - intuition, tradition and emulation
- Coaching practice often informed by ‘myths’
- Practice must be based on empirical evidence


An Example
From Hockey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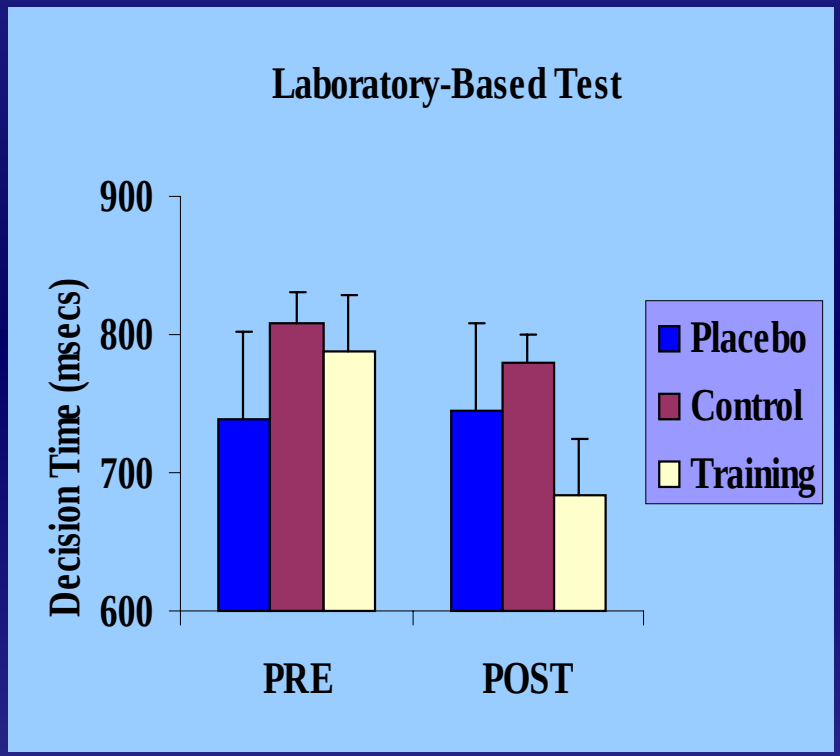
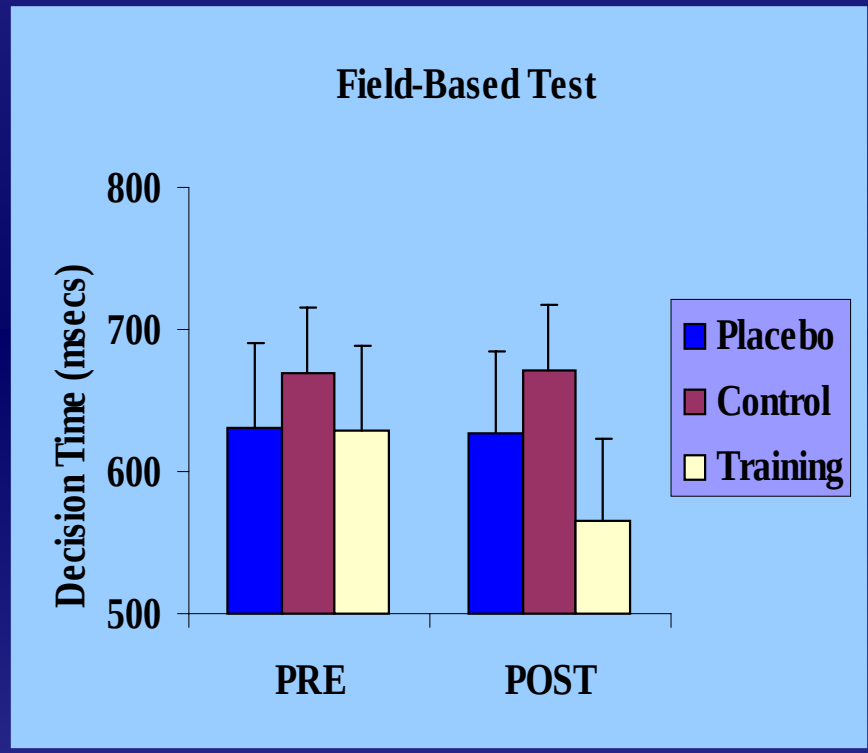
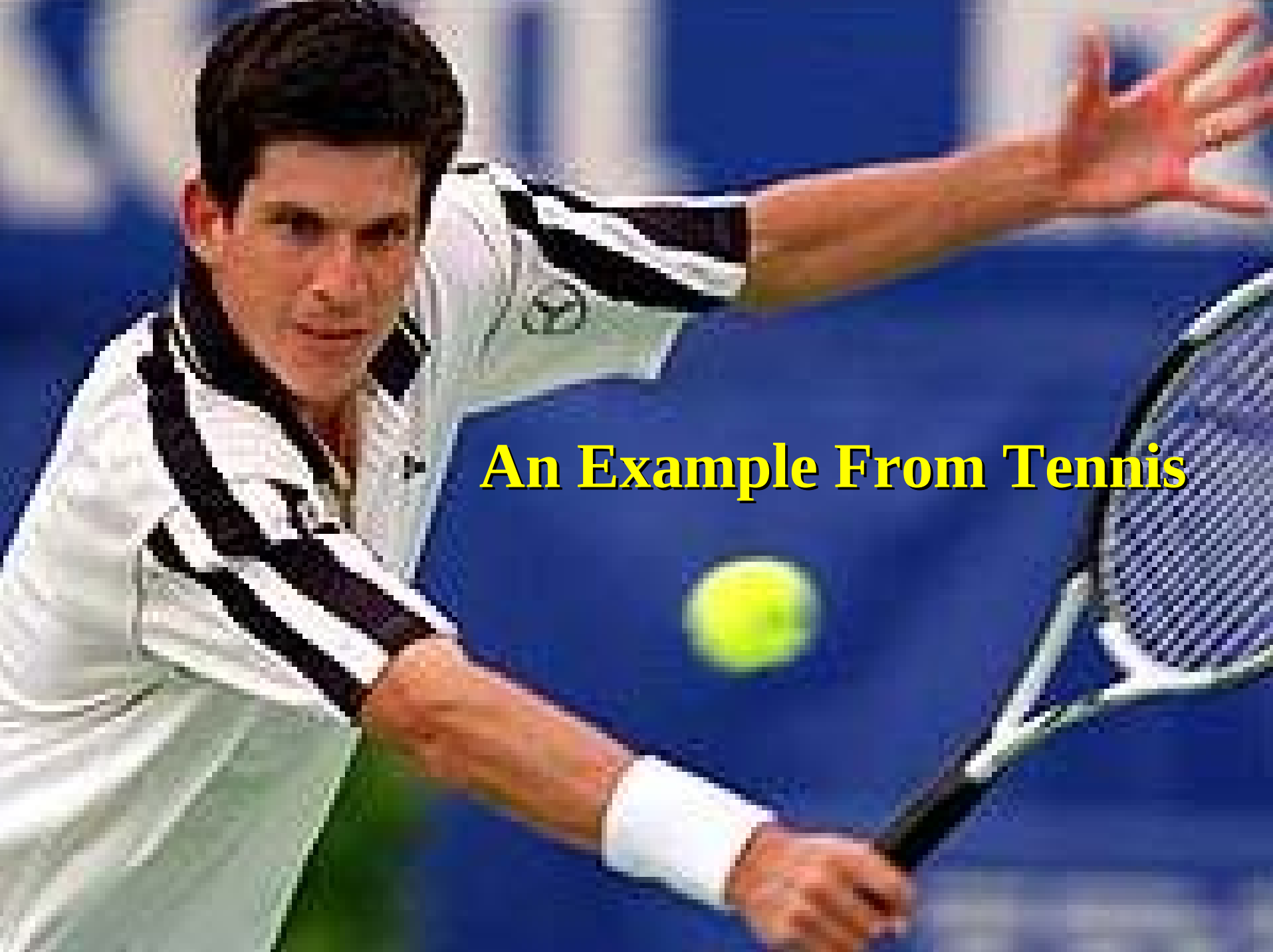
# Anticipation Performance on Laboratory- and Field-Based Tests Pre and Post Training



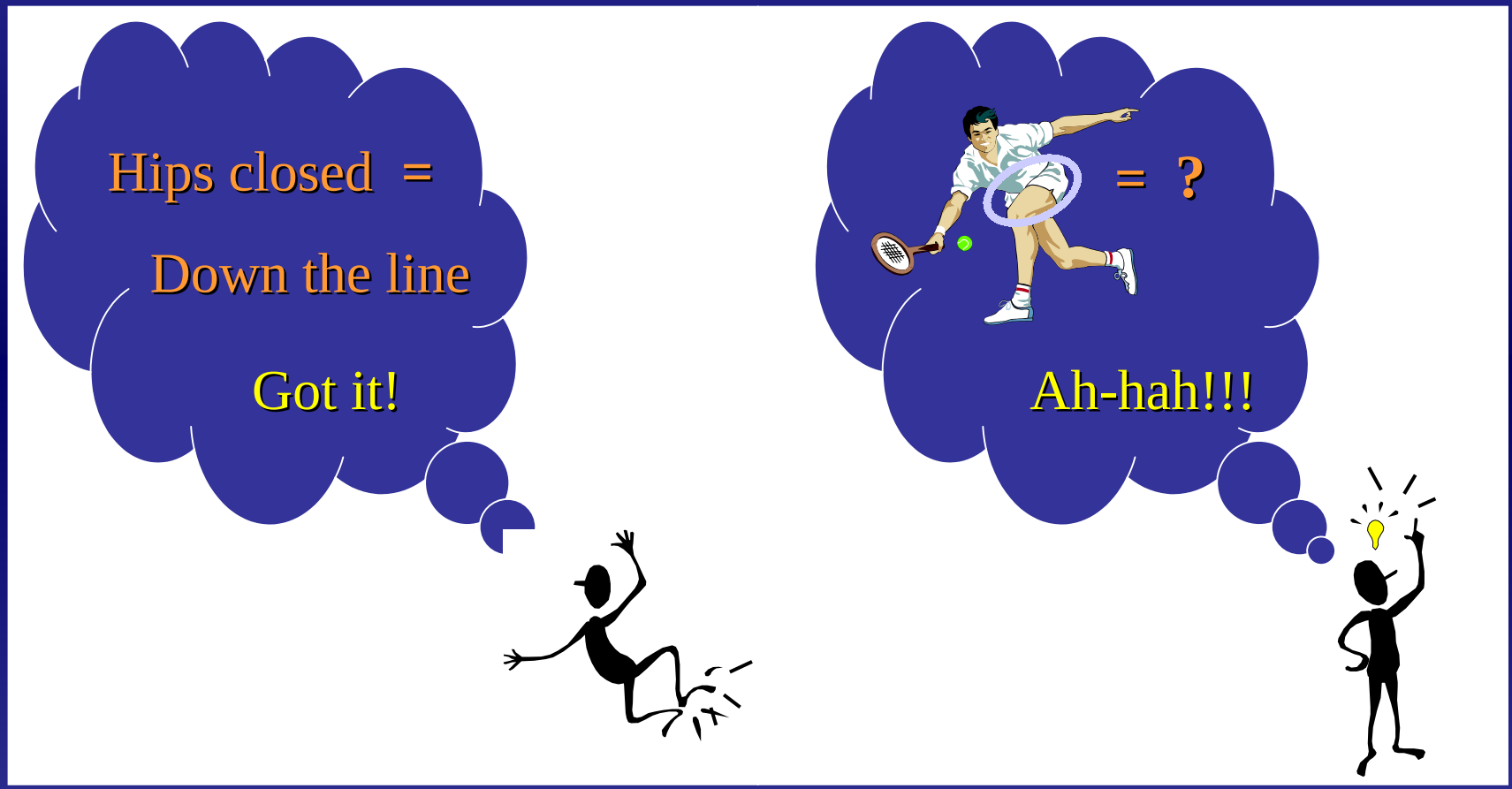




An Example From Tennis

# Delivery of Training

Explicit instruction

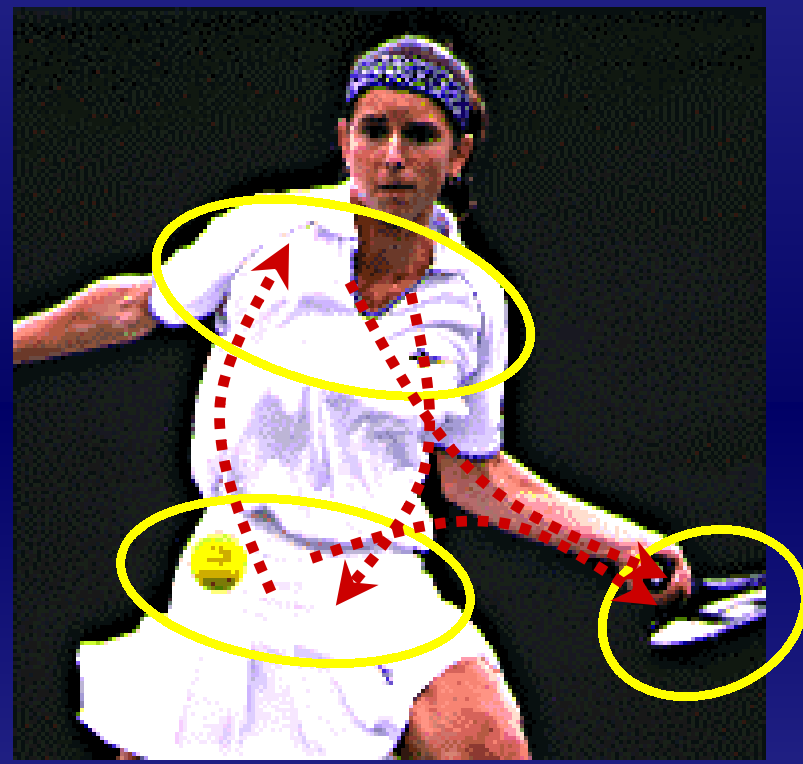
Problem focused training



# Key Information Sources

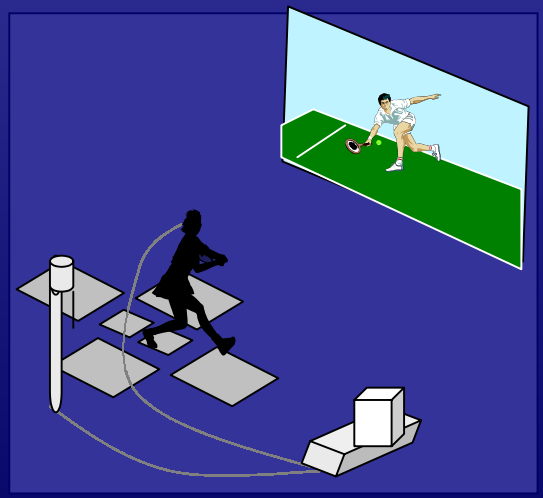
- **Experts focus upon**
  - Hip position and rotation
  - Shoulder position and rotation
  - Racket orientation and position

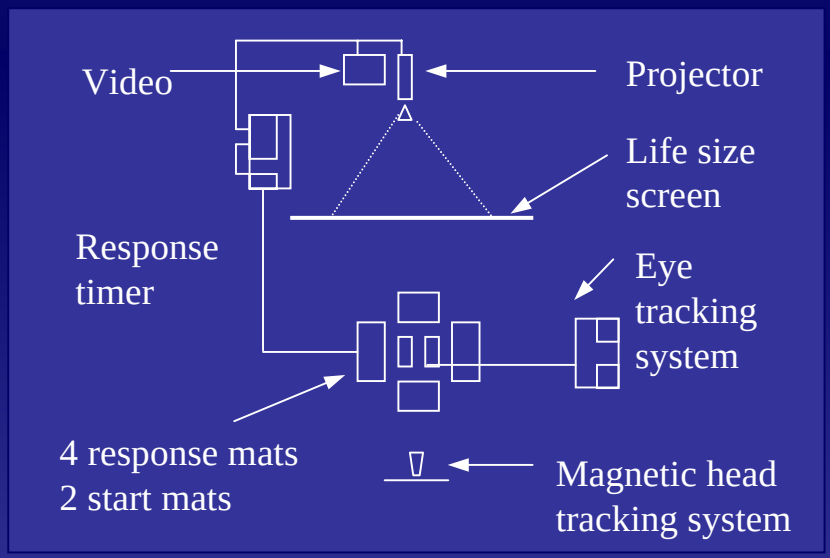
**Proximal to distal cues**



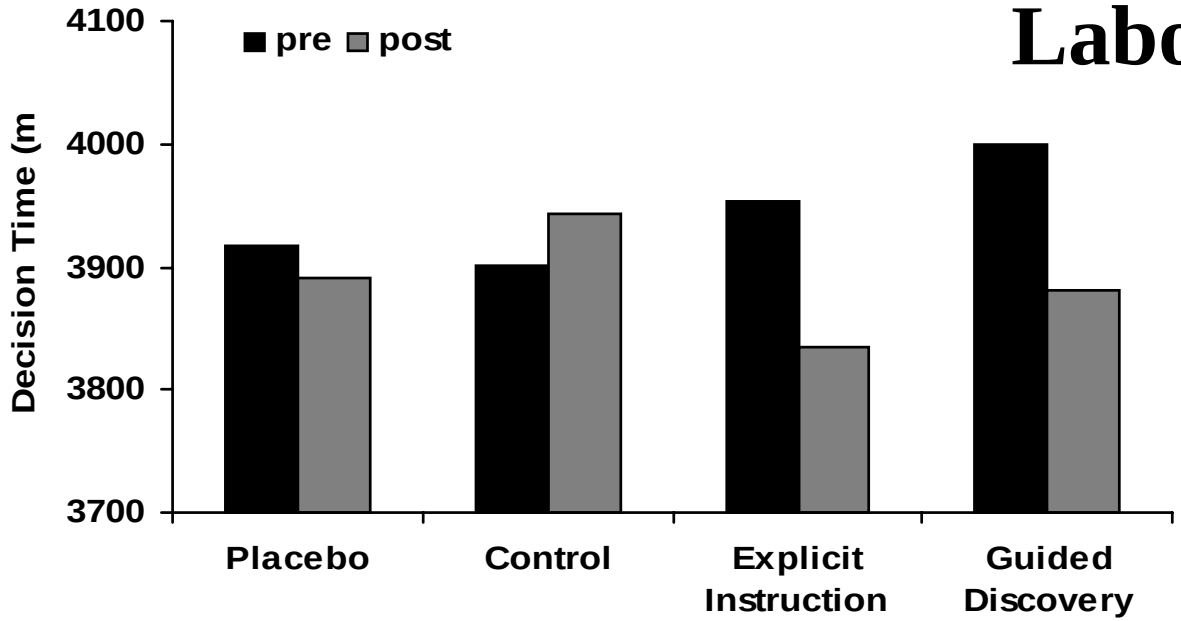
# Measuring Effectiveness

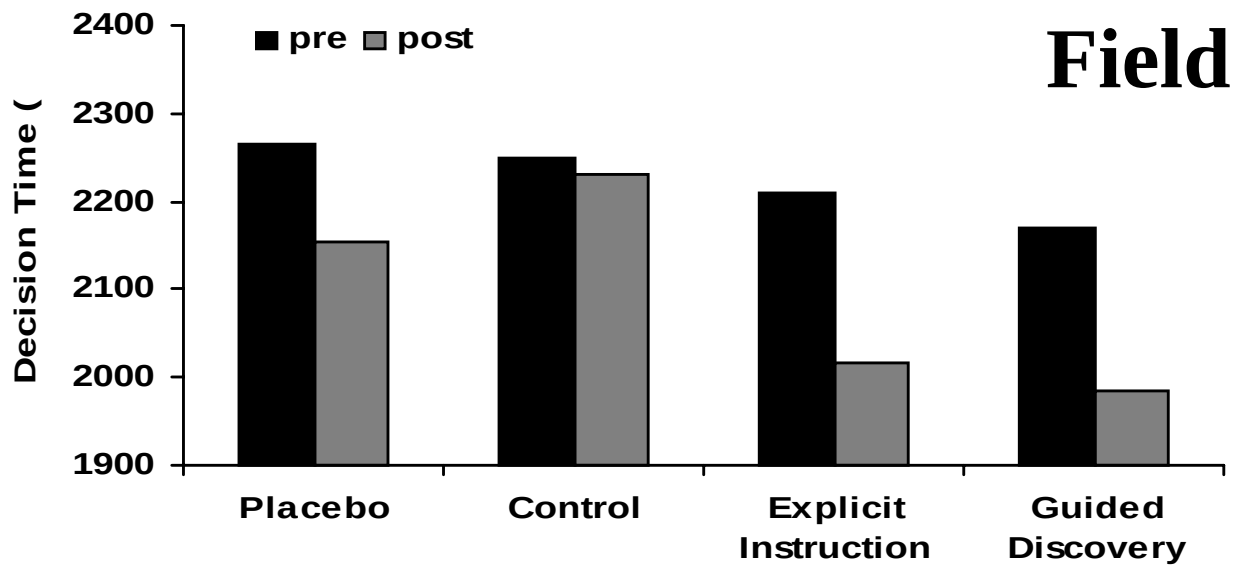
## Off-court





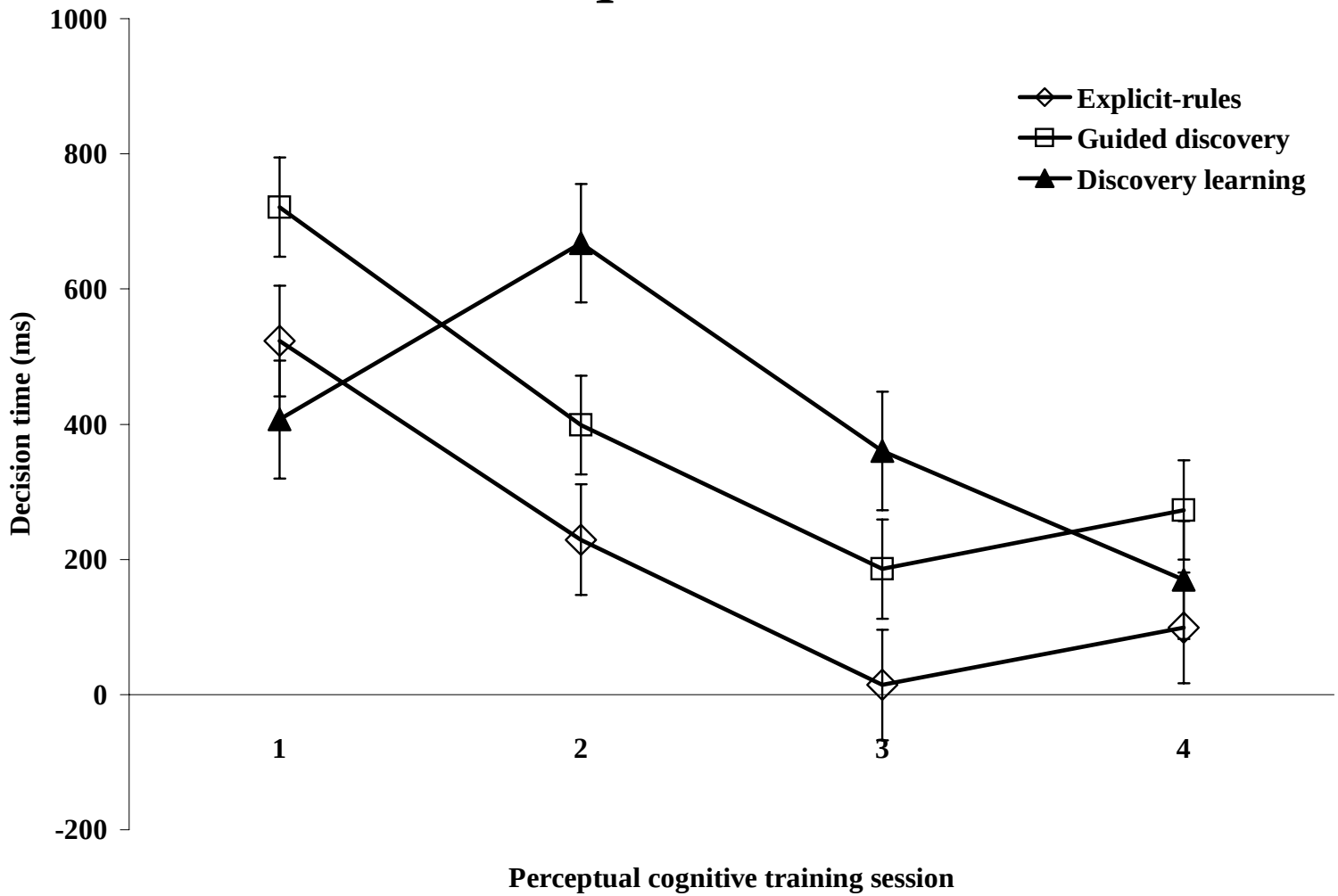

## On-court


Laboratory
pre
post
Decision Time (m
4100
4000
3900
3800
3700
Placebo
Control
Explicit Instruction
Guided Discovery

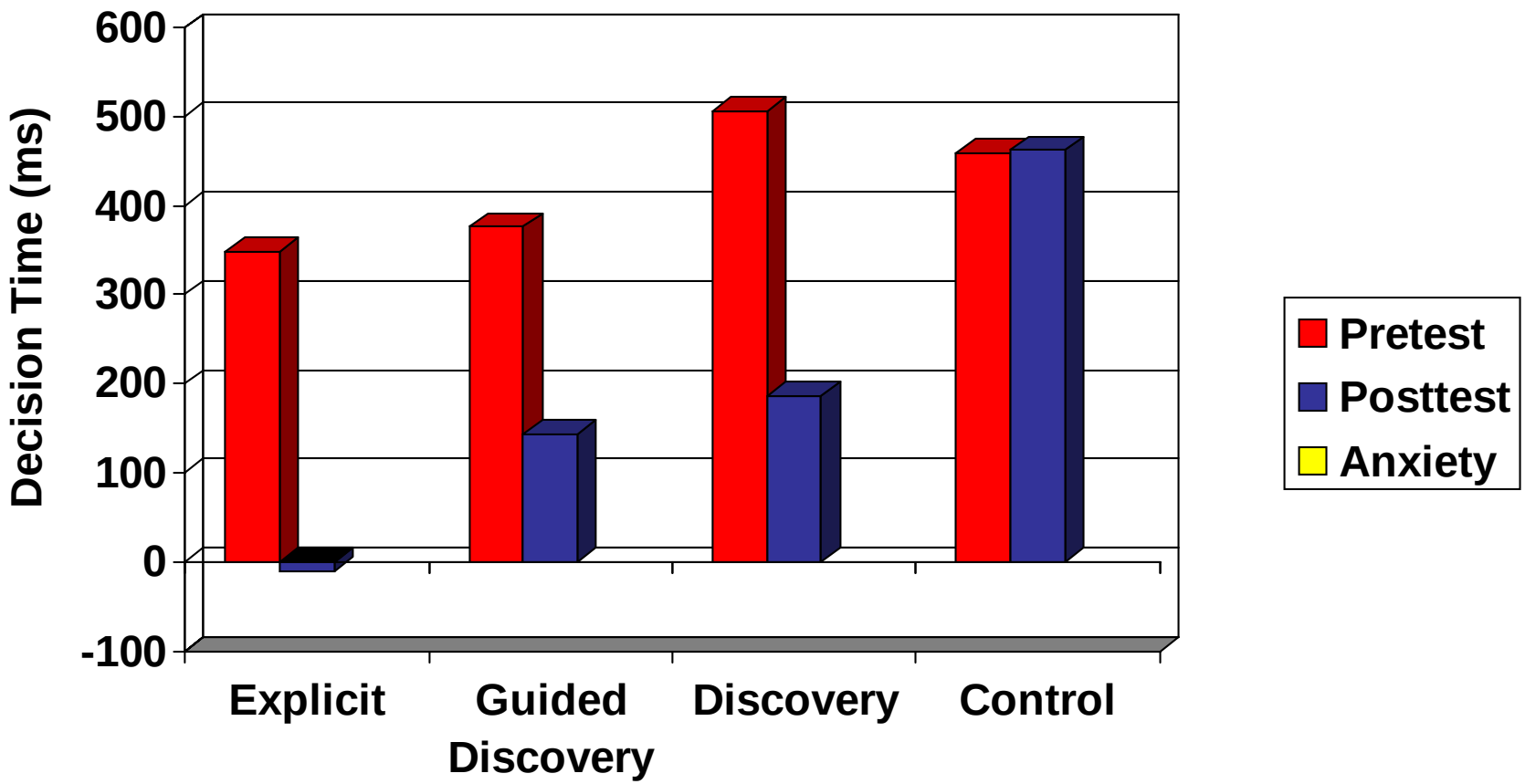

Field
pre
post
Decision Time (
2400
2300
2200
2100
2000
1900
Placebo
Control
Explicit Instruction
Guided Discovery

# Acquisition Trials

(a)



# Pre, Post and Anxiety



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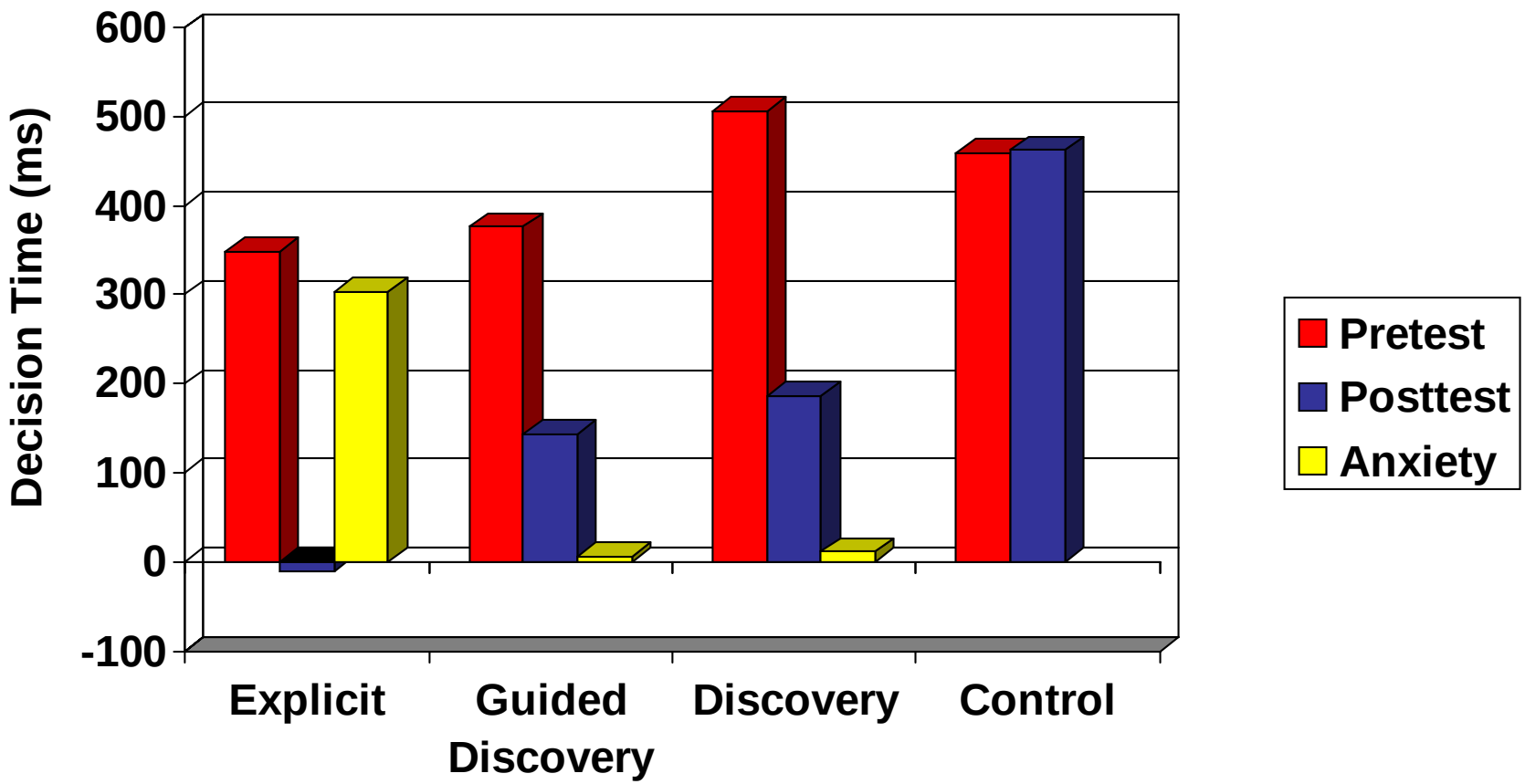
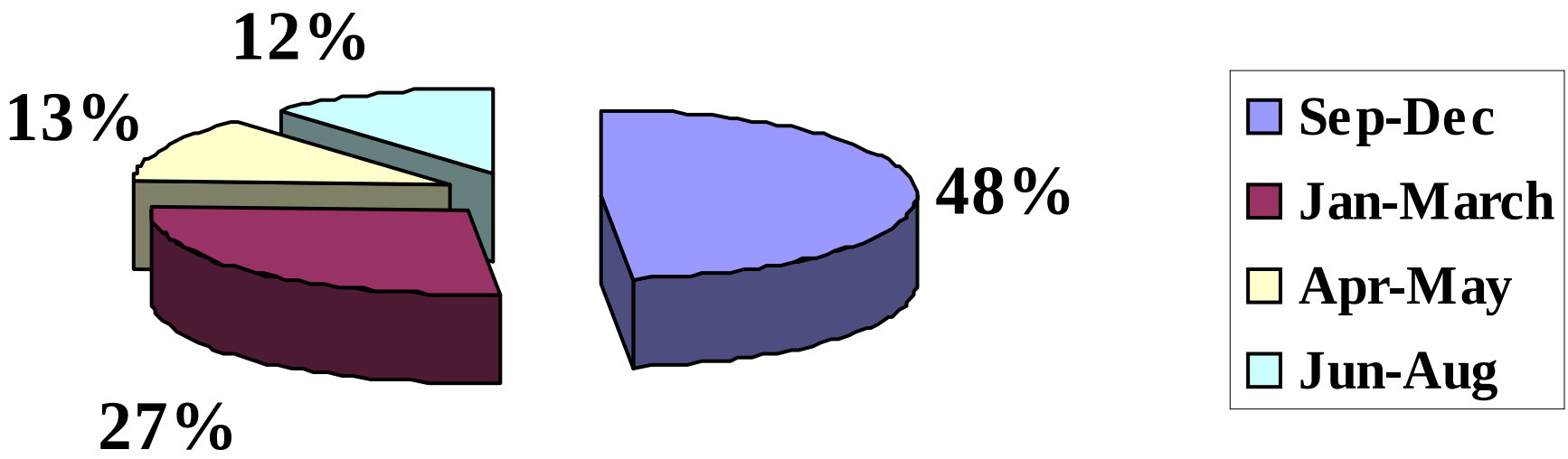


# What is an ‘appropriate’ system or support network?

- Specialisation vs. diversification
- Play vs. practice
- Biological maturity vs. latent talent

# Seasonal Birth Date Bias in Elite Soccer




**6078 Premier League Academy Players (9-16 years)**

# Seasonal Birth Date Bias in Elite Soccer

| Country | Months 1-3 | Months 9-12 |
|---|---|---|
| England | 50.0 | 17.1 |
| France | 43.9 | 14.6 |
| Germany | 50.5 | 3.8 |
| Italy | 46.8 | 3.9 |
| Netherlands | 36.8 | 15.8 |
| Spain | 47.2 | 2.7 |
| Total | 45.9% | 9.0% |

National youth teams U15, U16, U17, U18 - Helsen et al. (2005), JSS

# What is an ‘appropriate’ system or support network?

- Specialisation vs. diversification
- Play vs. practice
- Biological maturity vs. latent talent
- Talent search vs. talent development

# Conclusions

- No ‘genes’ that differentiate elite from near elite athletes – no holy grail!

“Expertise arises as a result of specific adaptations to the constraints of the performance environment”

Ericsson & Williams (2007) JEP: Applied

- Motivation and persistence key
- No short cuts – practice, practice, practice!
- Focus on effective models and systems of talent development