



BWF WORLD COACHING CONFERENCE 2025

Paris, France

29 - 30 August 2025

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Mildred Loiseau Taupin

Anticipation & Decision Making in
High Performance Sport

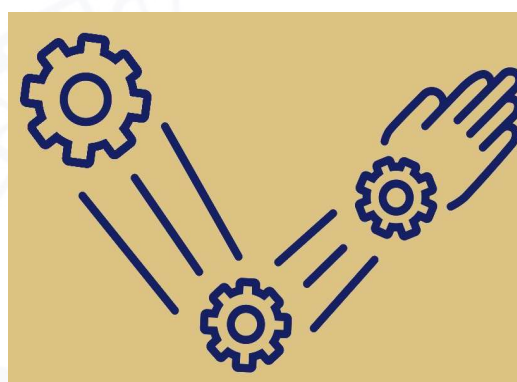
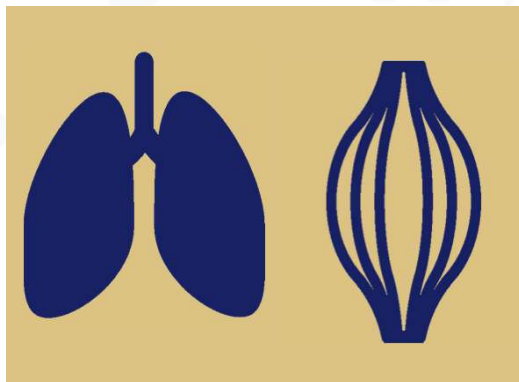
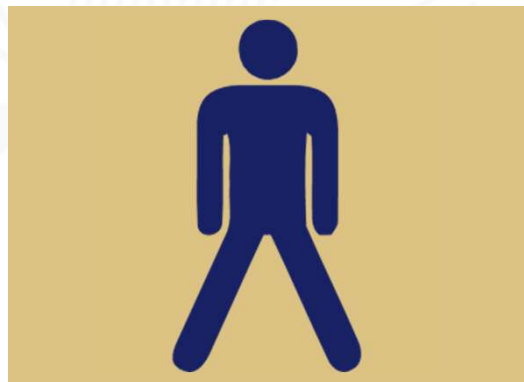
Anticipation, expertise and fatigue: A winning or losing trio in badminton?

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Introduction



Phomsoupha and Laffaye (2015)



Definitions

Judgments

Anticipation

◀ **Performance factor** in sports

Ashford et al., 2021

◀ Enabled by the coordination of **perceptual-cognitive skills** (+ motor skills)

Hodges et al, 2021

Judgments

= Sensori-motor task

Visual behavior
Attention

Anticipation

Ability to use

Knowledges

visual and non-visual,

contextual, and **kinematic** information

to **predict** what will happen

before or at the beginning of the opponent's action,

Decision-making

and make the **correct decision** using verbal

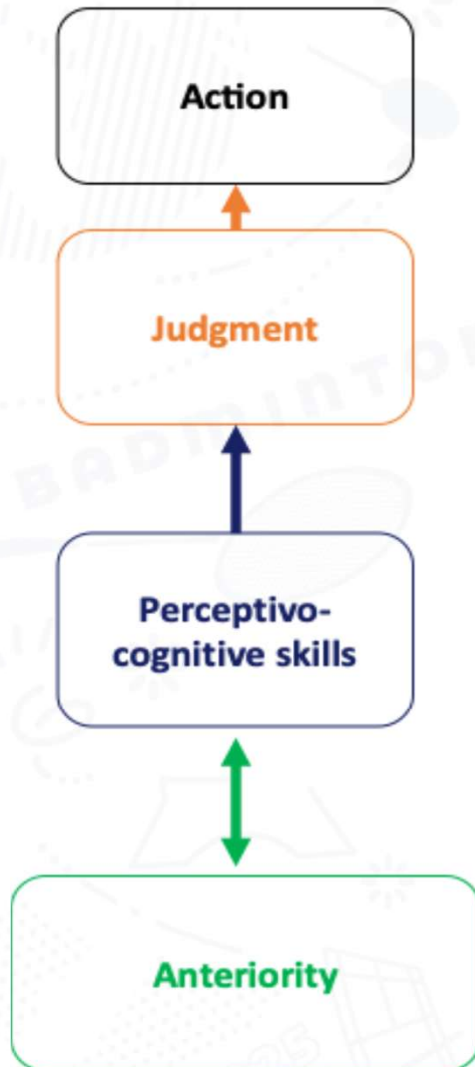
responses, pressing a button, or using motor skills.

Motor behavior

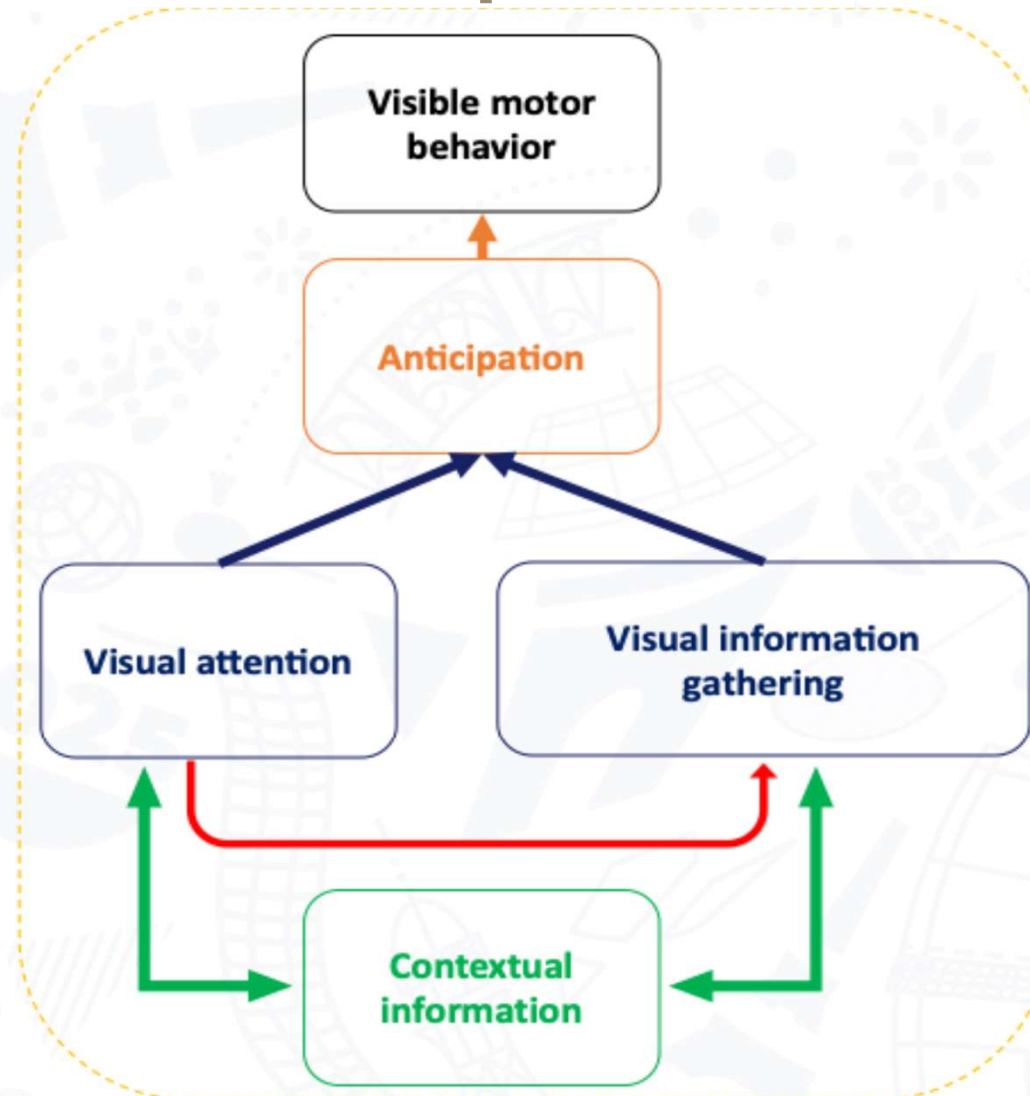
Morris-Binelli and Müller, 2017

Hodges et al., 2021

Judgments



Anticipation





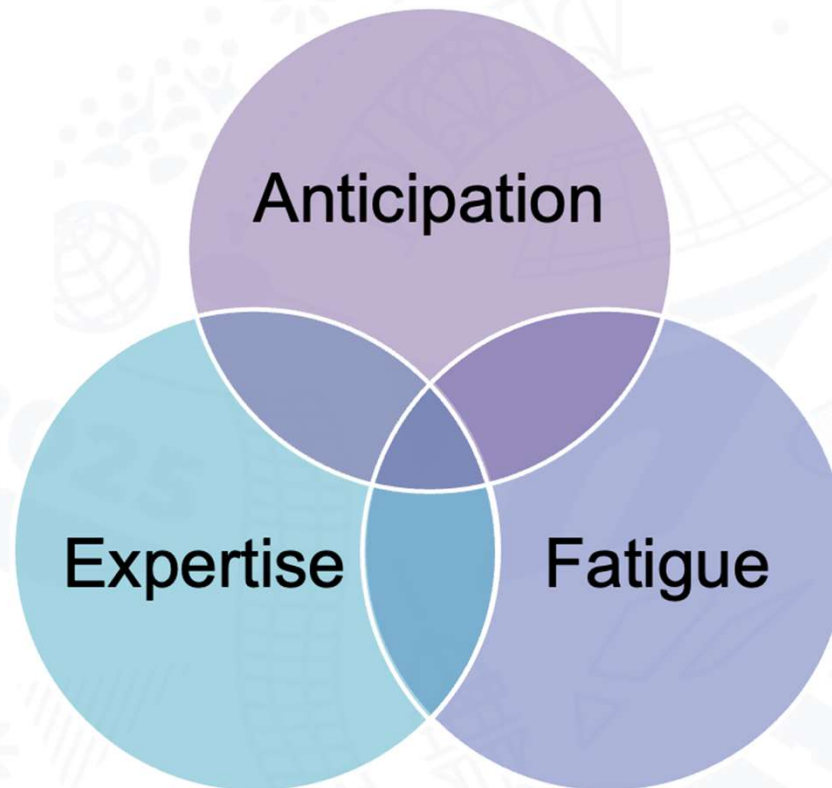
Scientific Project

Objectives



4 determinants:
Visual behavior
Attention
Knowledges
Motor behavior

Practical context



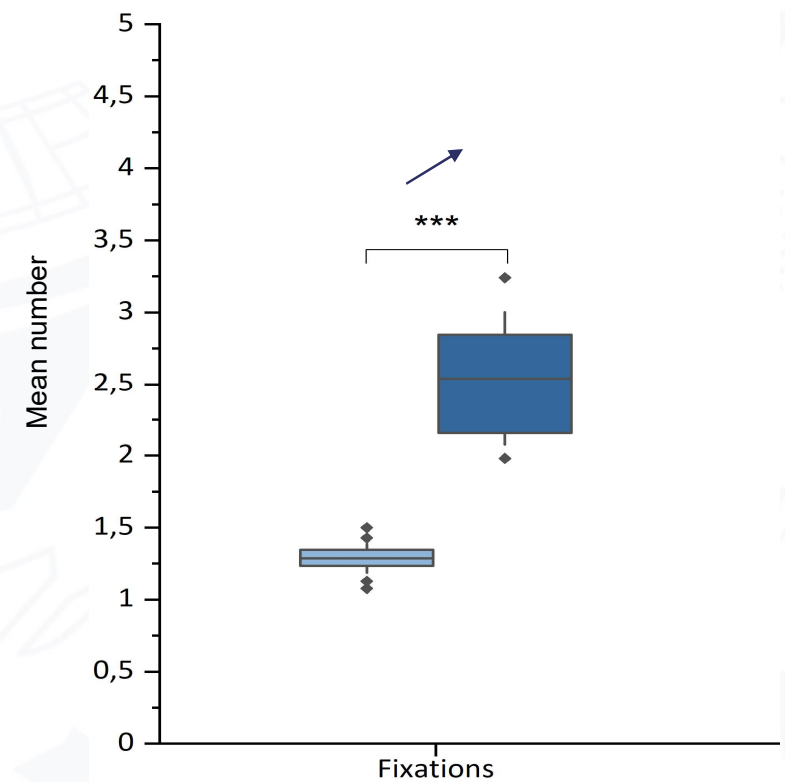
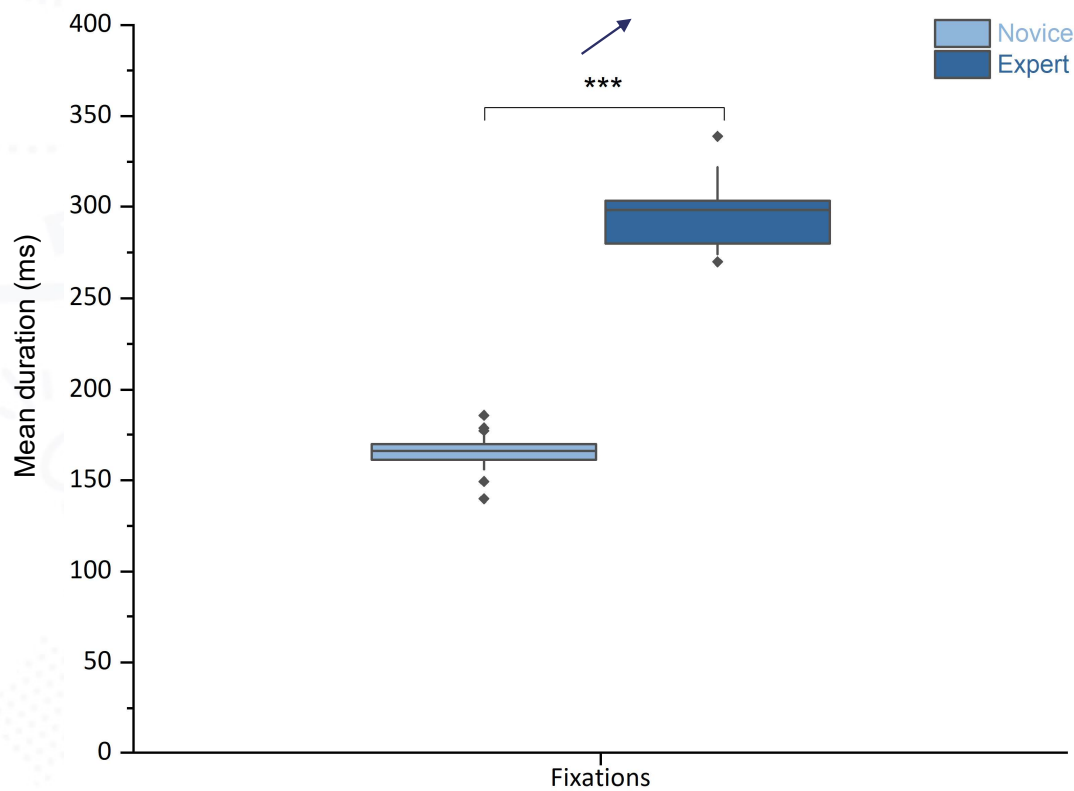
Loiseau Taupin et al., 2021
Loiseau Taupin et al., 2023

Methods



Results

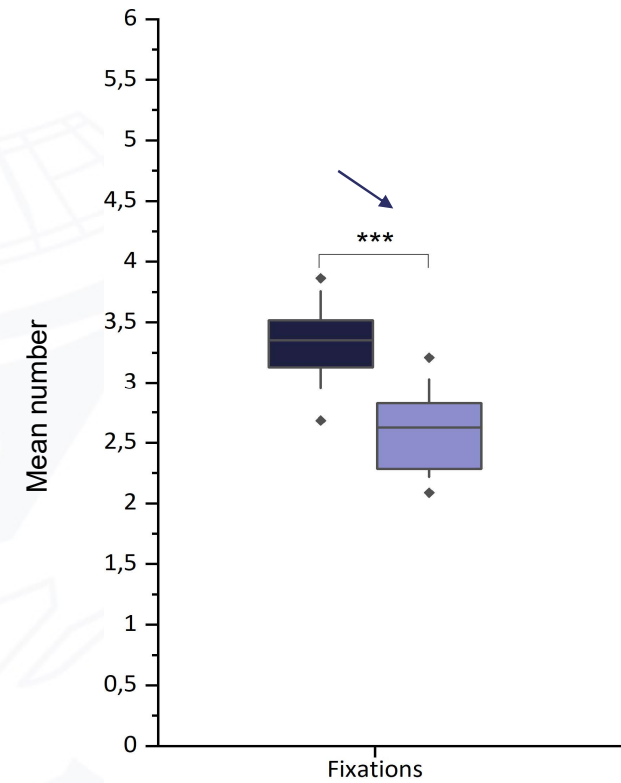
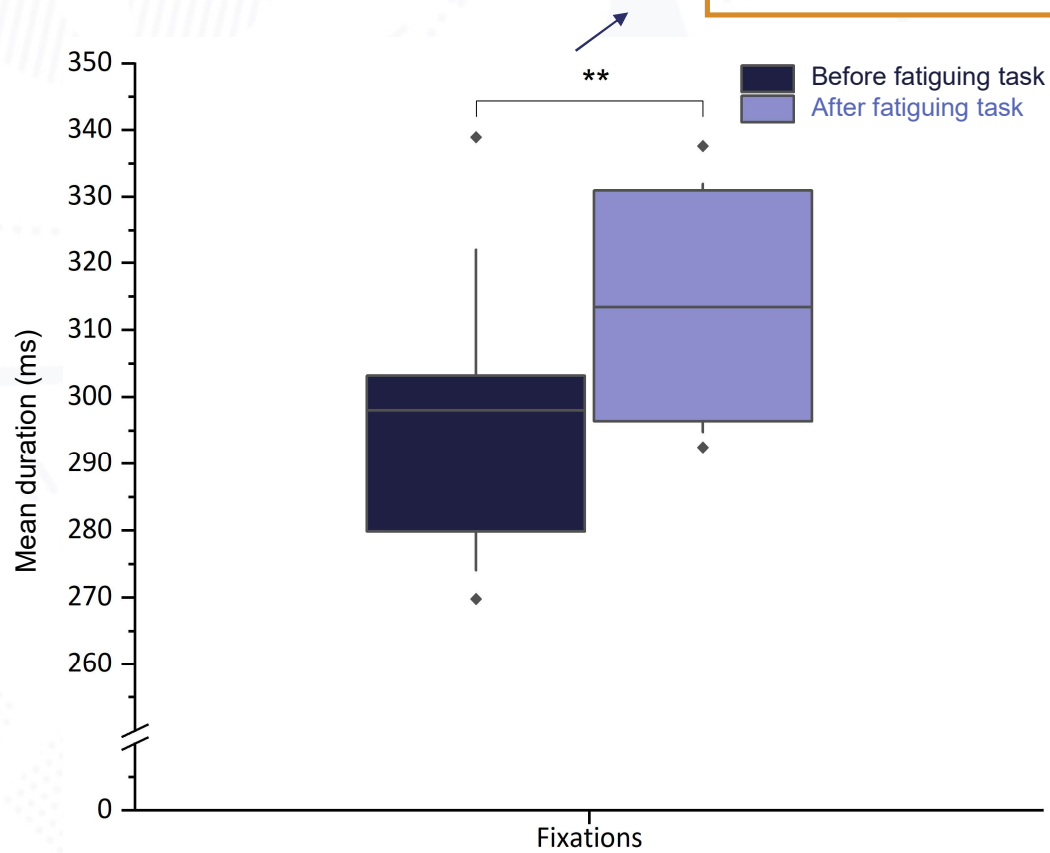
Experts: faster, longer fixations and more frequently



Results

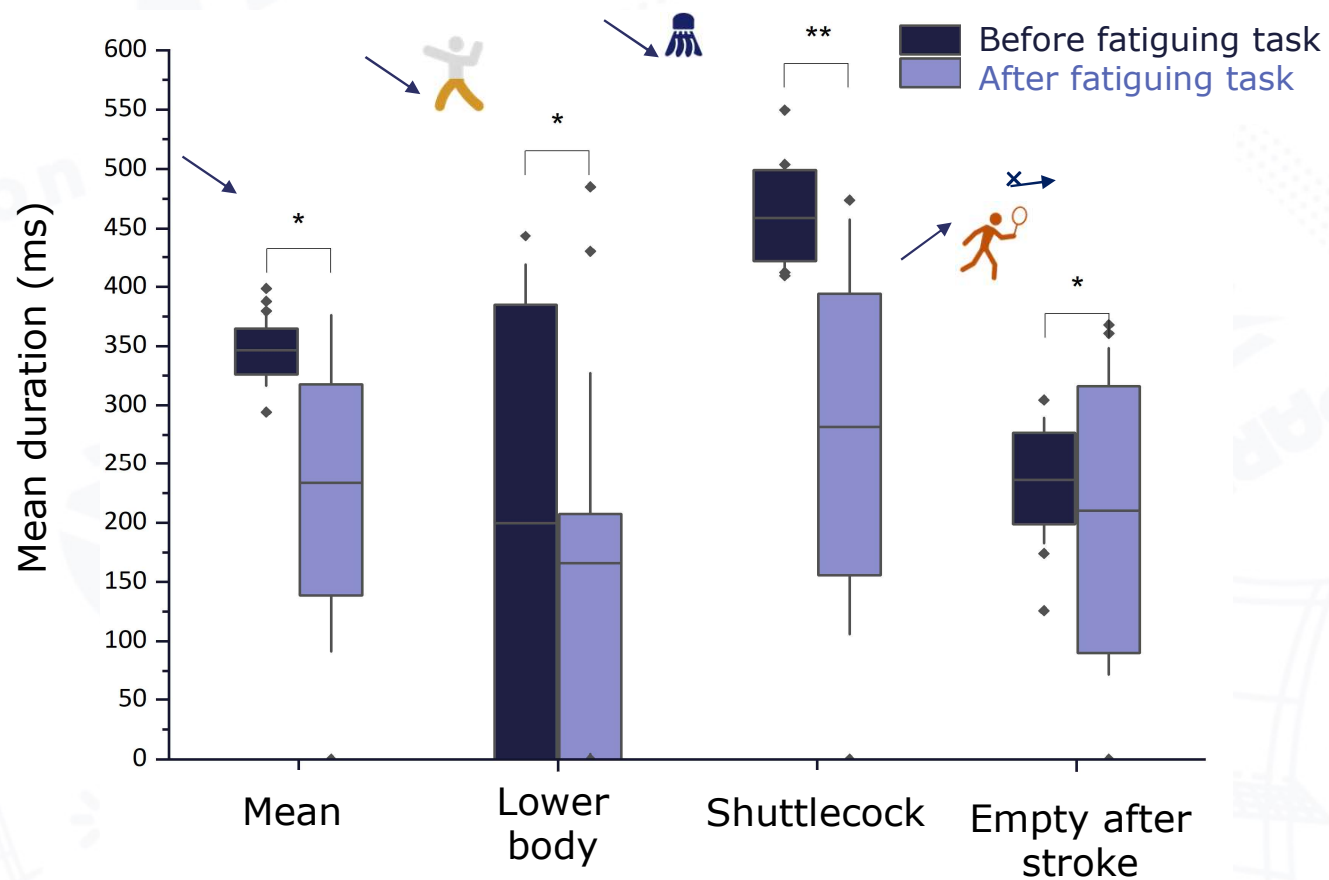
Fatigue and novices: No effect

Fatigue and experts:
faster, longer fixations and less frequently



Results

Fatigue and experts:
faster, shorter fixations and,
dependent on areas of interest



Results

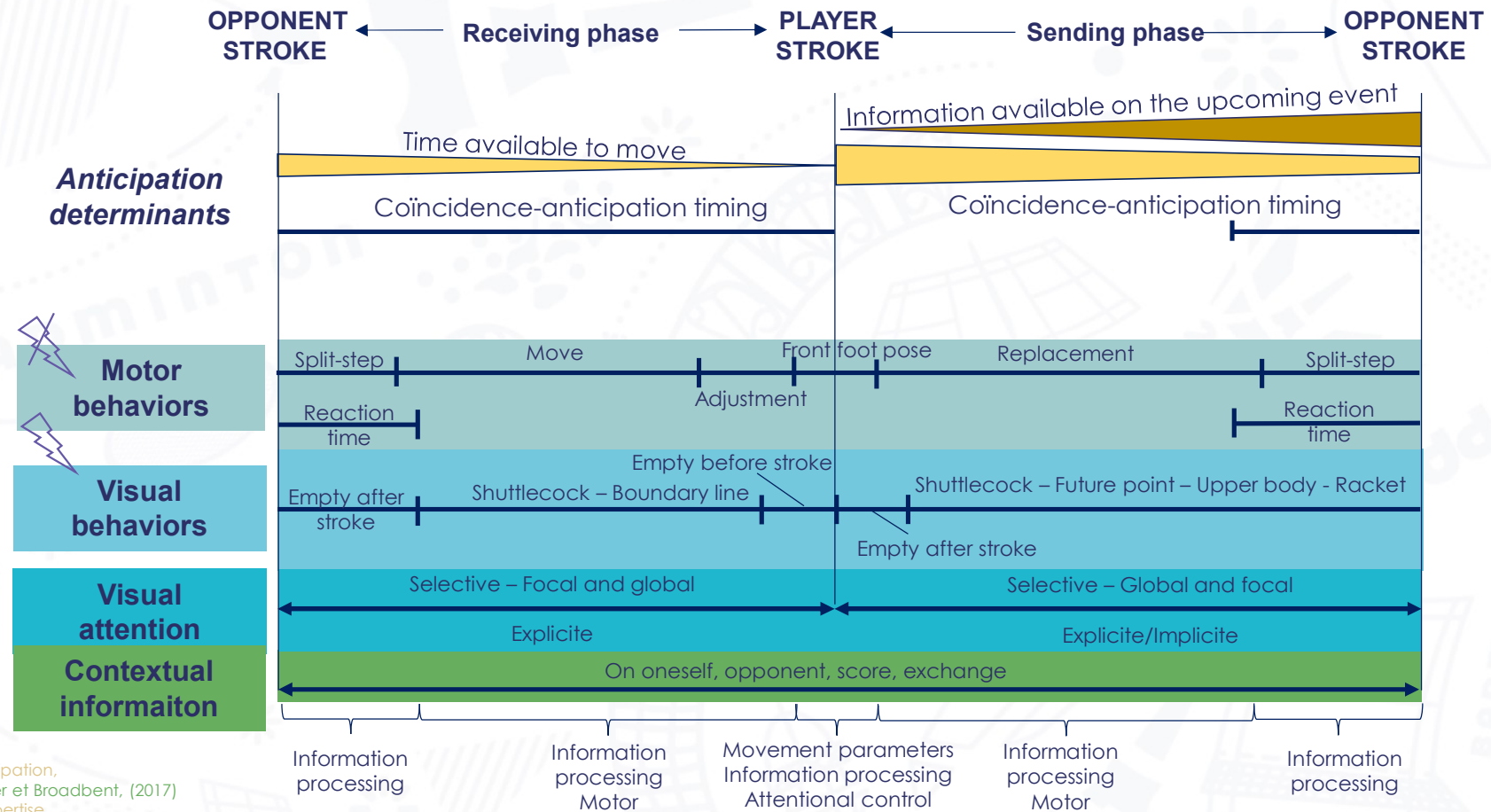
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**Fatigue and novices:
No effect**

**Fatigue and experts:
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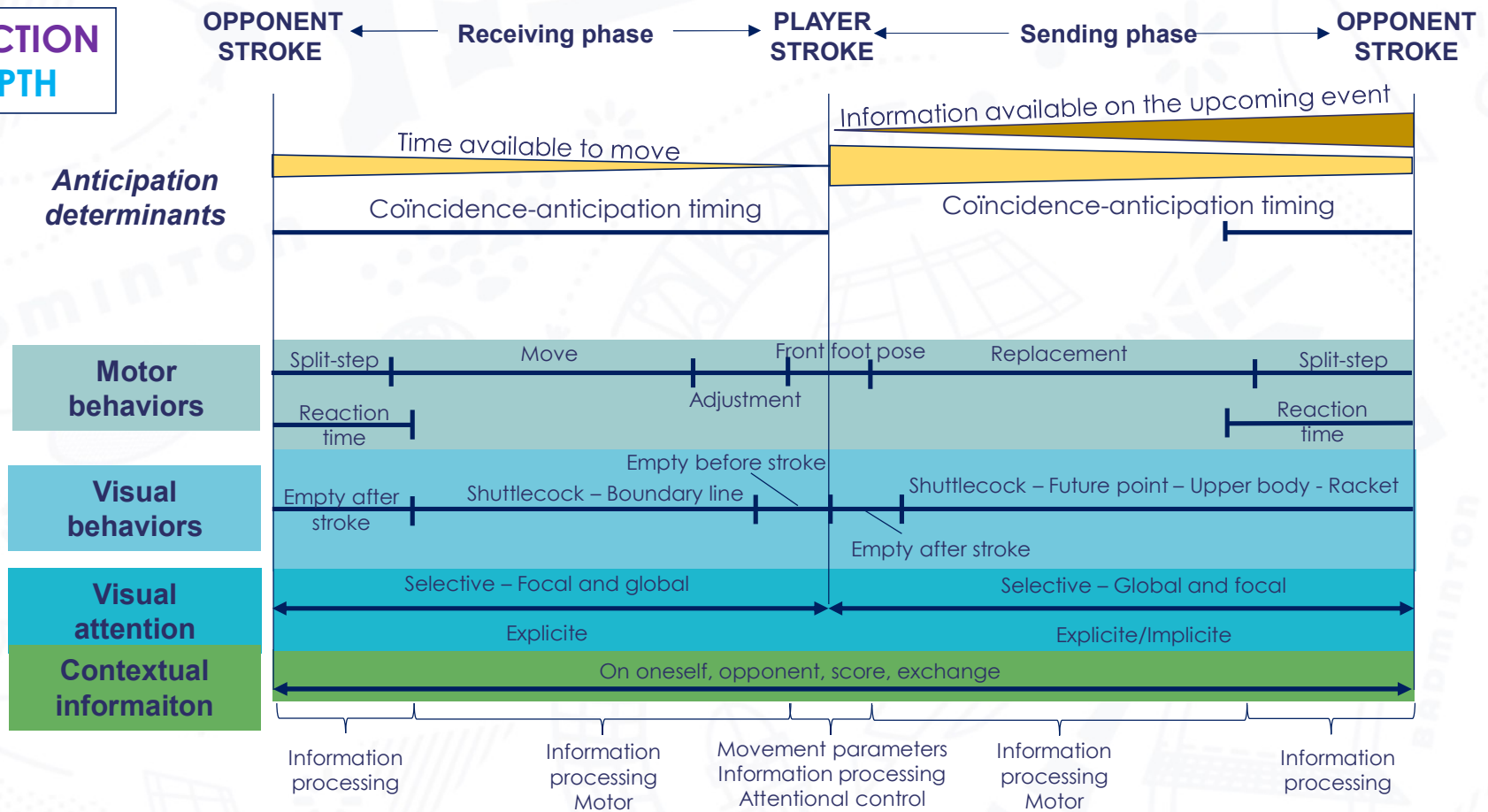
**Fatigue and experts:
faster, shorter fixations and, dependent on areas of interest**

Expert Anticipation: Modelling Proposal



Reaction time and anticipation, Triolet et al., (2013) ; Alder et Broadbent, (2017)
 Areas of interest and expertise, Müller et Abernethy, (2012) ; Williams et al., (2000) ; Postma et al., (2014)
 Visual behavior and attention, Vater et al., (2019)
 Expertise, Prinz (1997) ; Williams, (2000)

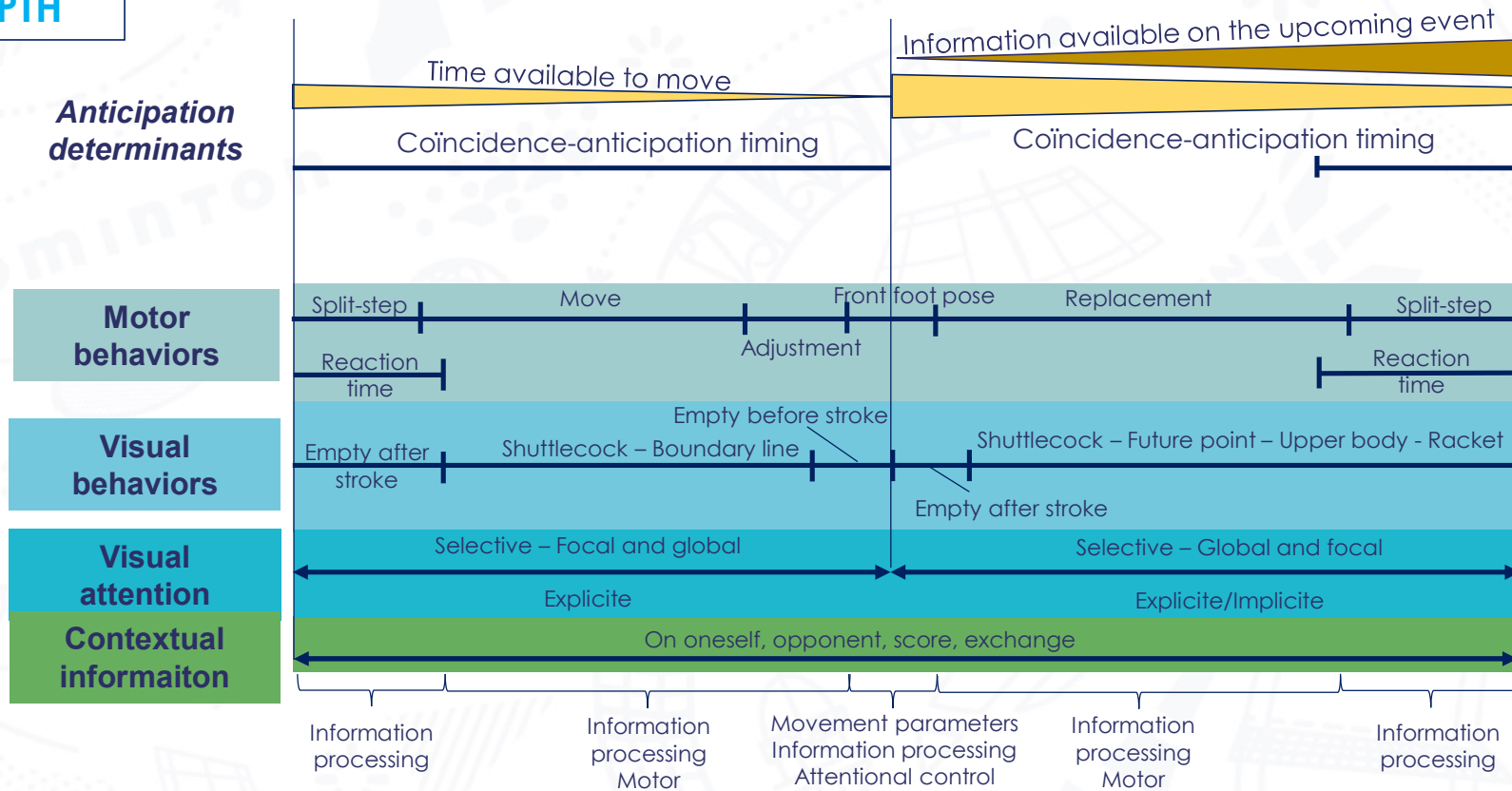
Expert Anticipation: Modelling Proposal



Shuttle Trajectory



OPPONENT STROKE ← Receiving phase → PLAYER STROKE ← Sending phase → OPPONENT STROKE

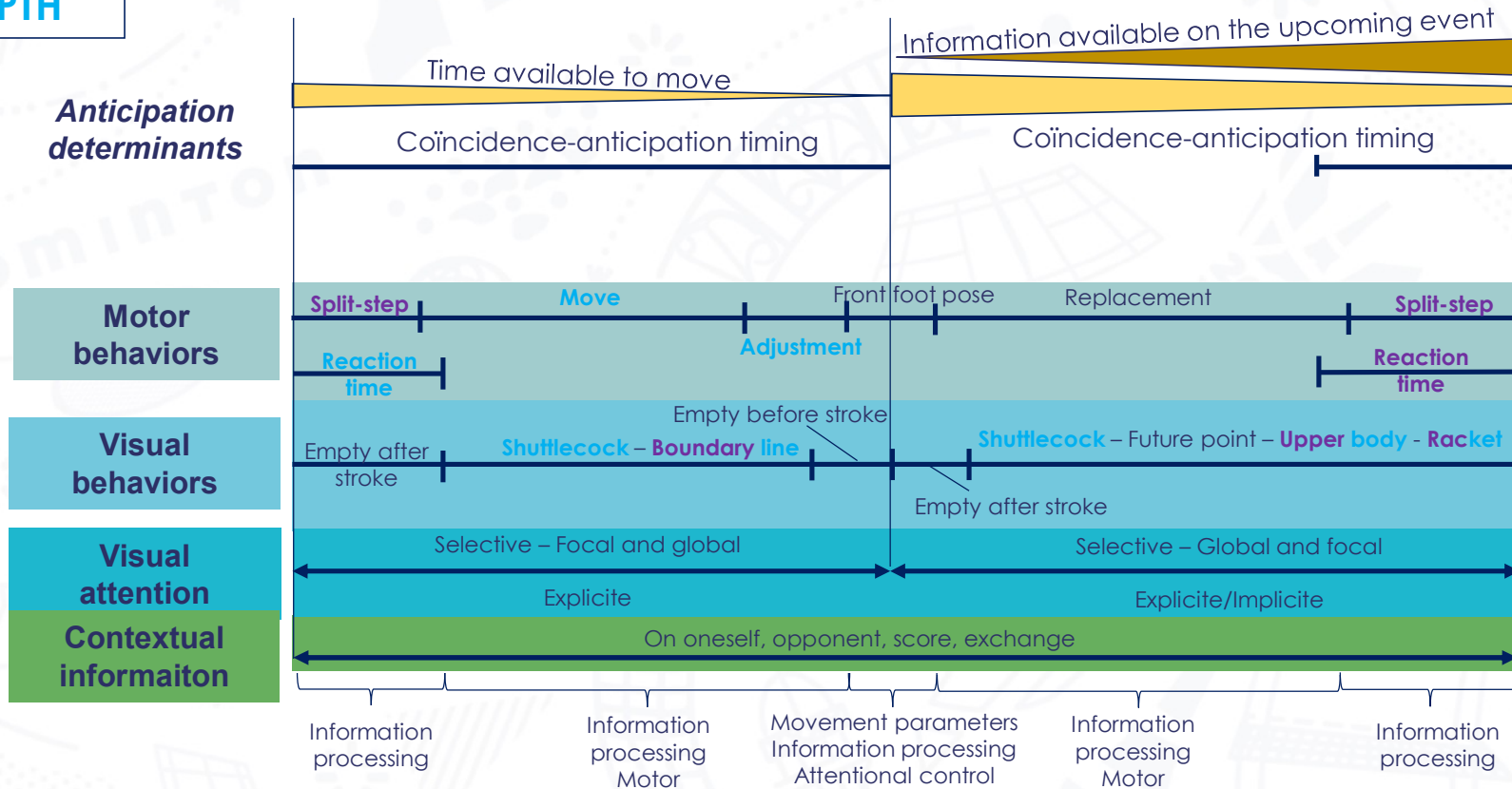


Split-step
Elliott et al., (2003)
Expertise
Abernethy et al., (2007)
Murphy et al., (2018)

Shuttle Trajectory

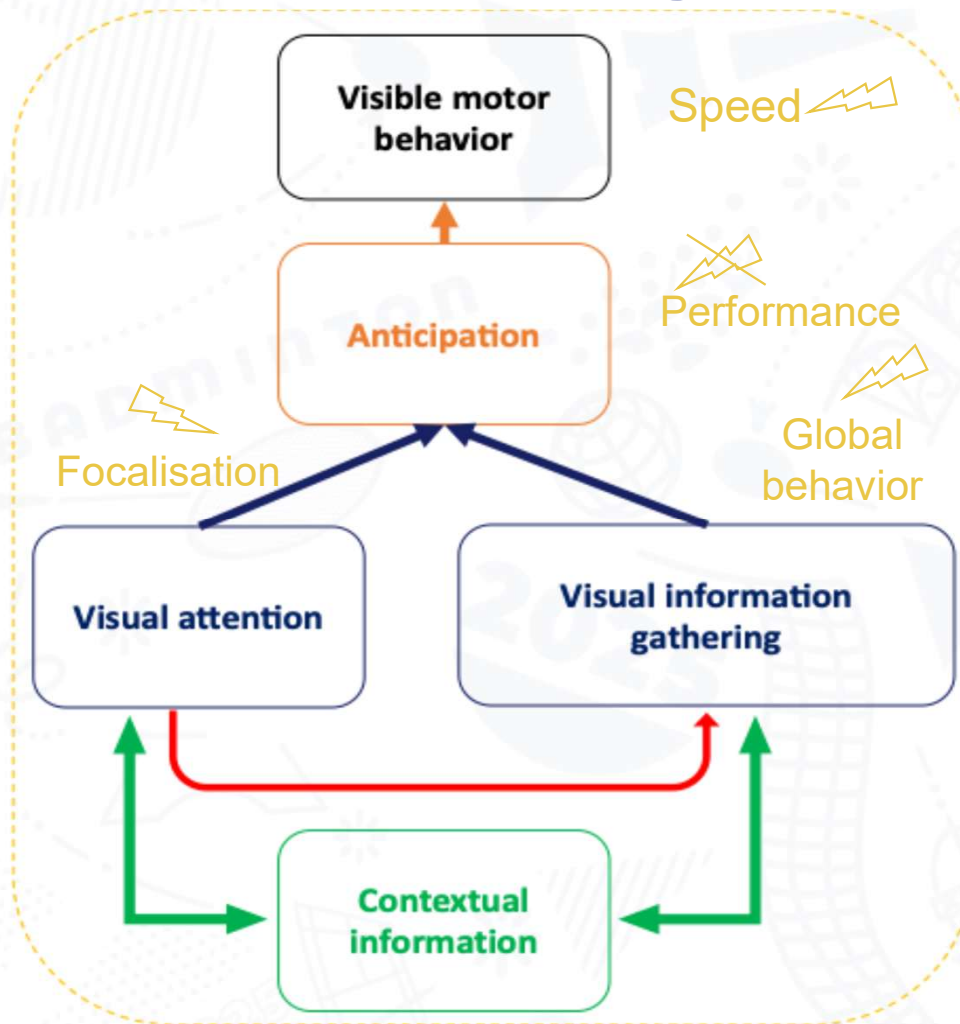


OPPONENT STROKE ← Receiving phase → PLAYER STROKE ← Sending phase → OPPONENT STROKE



Split-step
Elliott et al., (2003)
Expertise
Abernethy et al., (2007)
Murphy et al., (2018)

Effects of Fatigue: Modelling Proposal



Fatigue



= compensatory mechanisms

Motor behavior and fatigue model

Enoka et Duchateau (2016) ; Knicker et al., (2011)

Visual behavior and attention

Farrow et Abernethy (2003); Williams et Ford (2008)

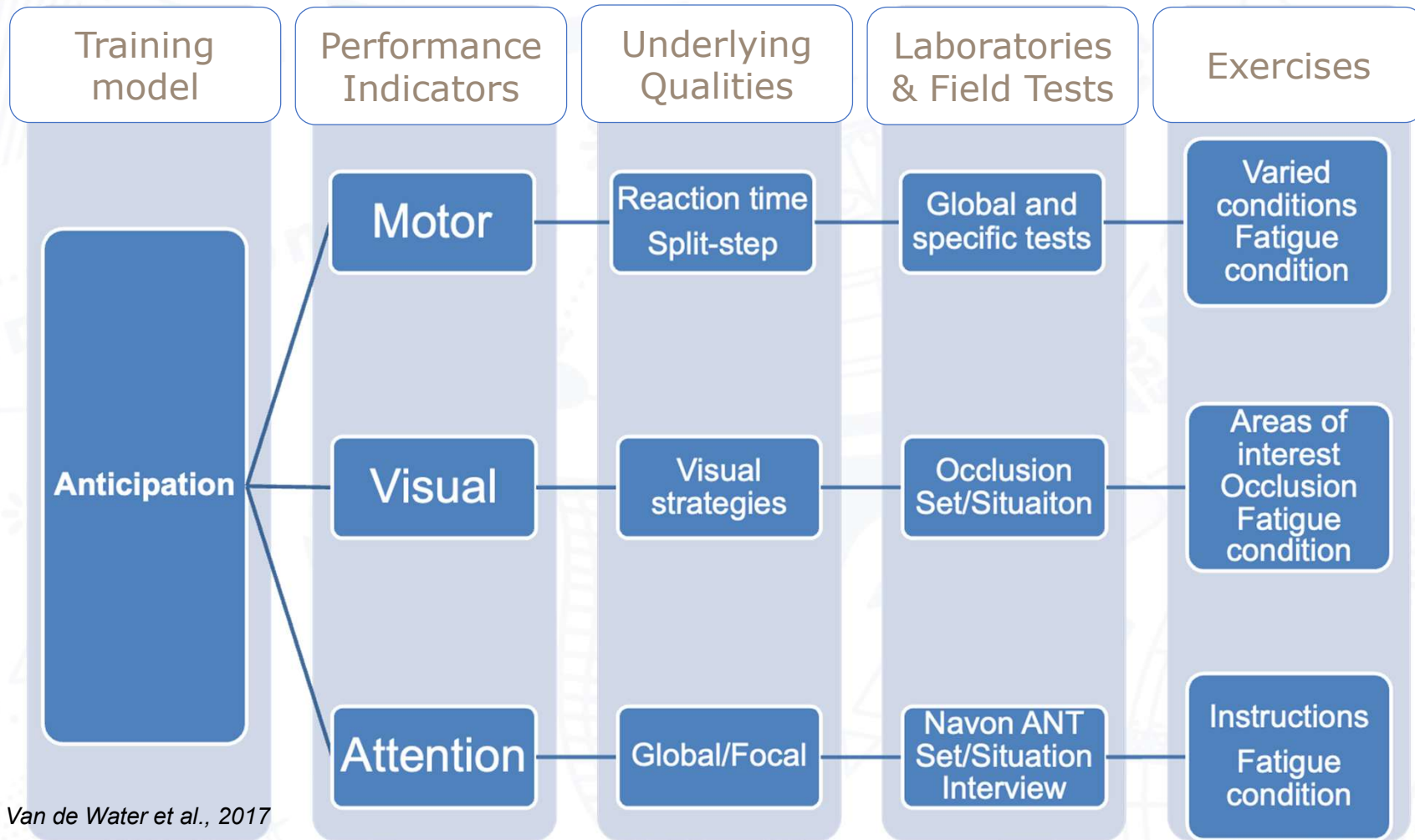
Motivation and attention

Wulf et Lewthwaite (2016)

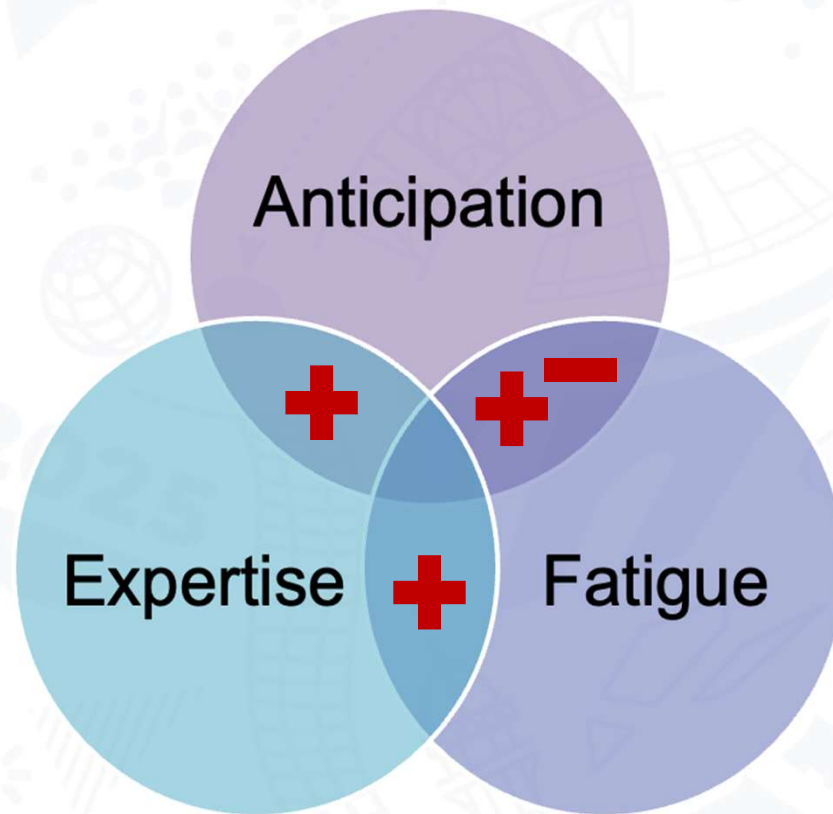
Brain circuitry of effort

Borderies et al., (2020); Bouret (2021)

Anticipation training: modeling proposal



Anticipation , Expertise & Fatigue: A winning or losing trio in badminton?





Additional Resources for Further Reading

Additional Resources

References – in English

- Loiseau Taupin, M., Ruffault, A., Slawinski, J., Delabarre, L., & Bayle, D. (2021). Effects of Acute Physical Fatigue on Gaze Behavior and Performance During a Badminton Game. *Frontiers in Sports and Active Living*, 3, 725625. <https://doi.org/10.3389/fspor.2021.725625>
- Loiseau Taupin, M., Ruffault, A., Slawinski, J., & Bayle, D. (2024). Effects of Acute Physical Fatigue on Gaze Behavior in Expert Badminton Players. *Journal of Sport & Exercise Psychology*, 46(1), 1-10. <https://doi.org/10.1123/jsep.2023-0075>

References – in French

- Loiseau Taupin, M. (2021). *Déterminants Moteurs et Visuels du Jugement d'Anticipation en Badminton : Effets de la Fatigue et de l'Expertise*. [Université de Paris]. <https://insep.hal.science/tel-03933892v1>
- Loiseau Taupin, M. (2022, juin 17). *Champions sportifs : Anticiper pour mieux performer*. The Conversation. <http://theconversation.com/champions-sportifs-anticiper-pour-mieux-performer-184019>

Thank you for your attention



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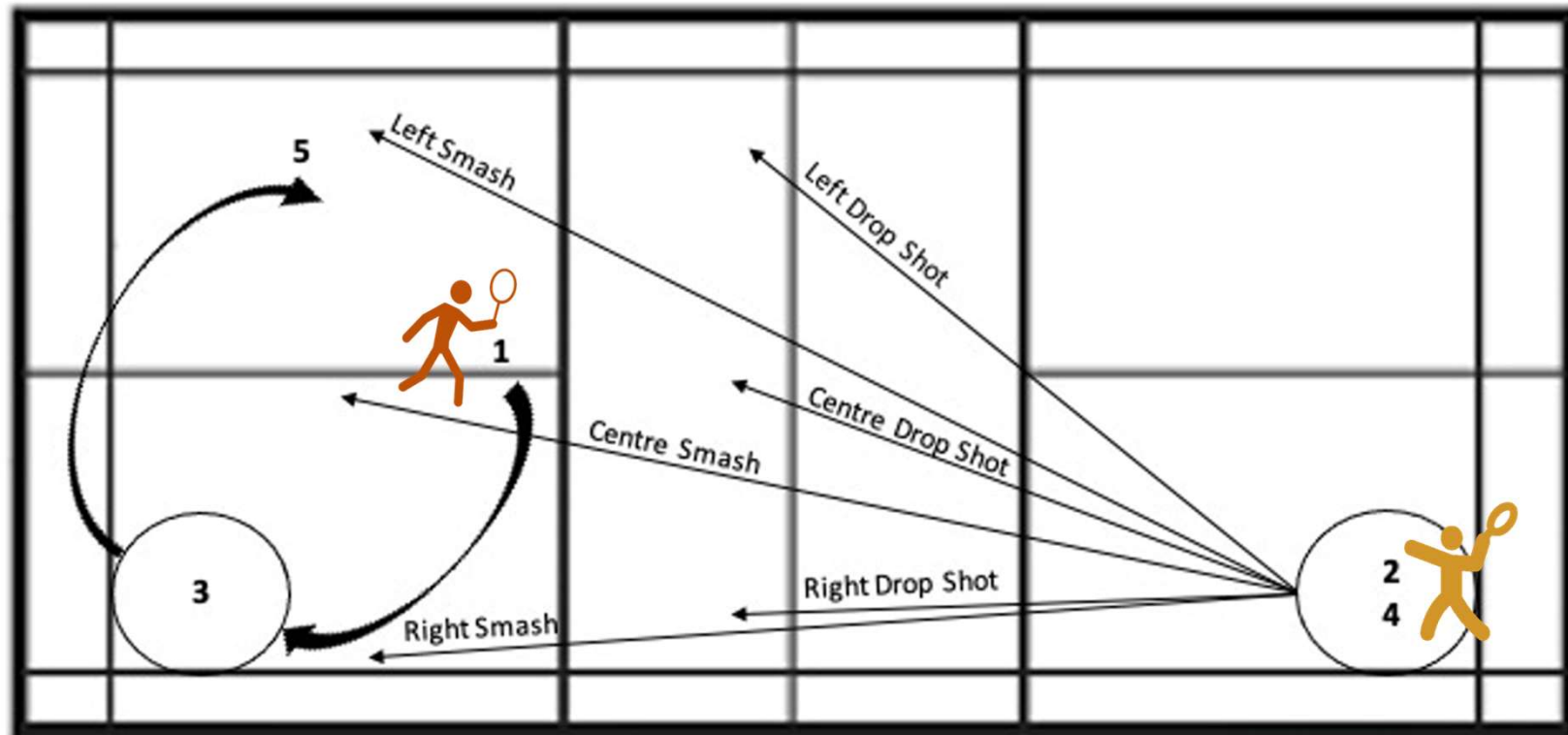


R^G



Methods

Proposed training scenario
Unfavorable force ratio situation



PARIS



Etude 1

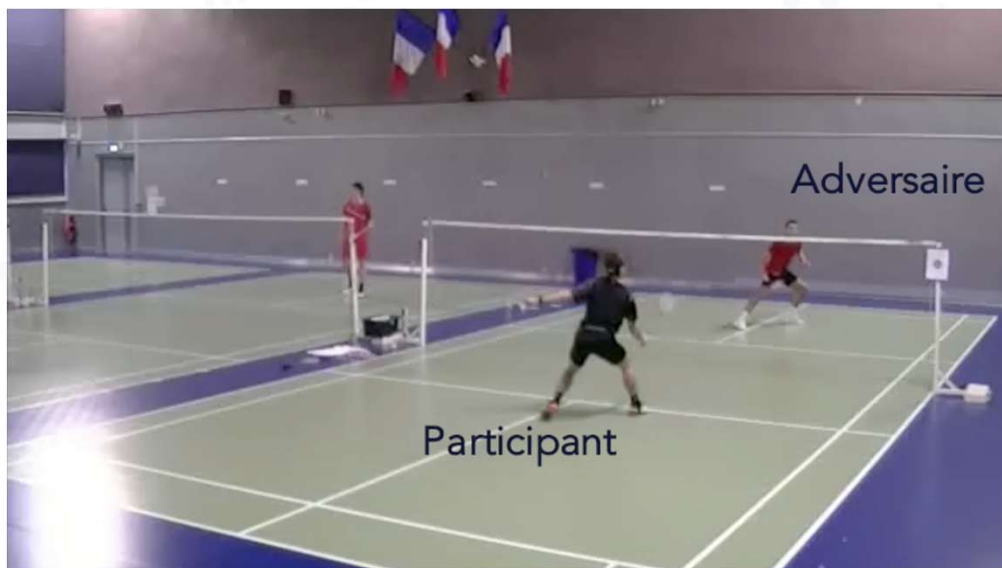
Variables mesurées



Comportements moteurs



Comportements visuels



Pupil
Labs



Mesures et matériel

Zone vide après le contact



Future point d'impact
volant-raquette



Zone vide avant le
contact



Zone vide
après le contact



Raquette



Haut du corps

Bas du corps

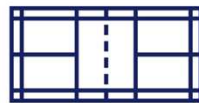


Participant

Zone vide



Lignes du terrain



Chia et al., (2017)
Hagemann et al., (2006)



I. Empty area after participant's stroke

A. Shuttlecock

F. Anticipation area

H. Empty area before participant's stroke

G. Empty area after opponent's stroke

B. Racket



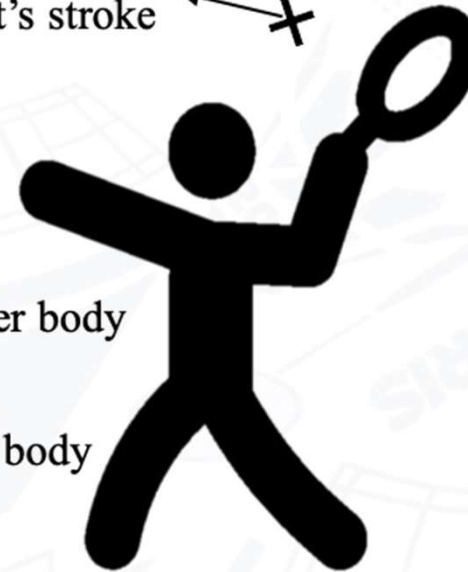
Participant

J. Empty area

C. Upper body

D. Lower body

E. Boundary lines



Opponent

Description expertise – Résultat E1

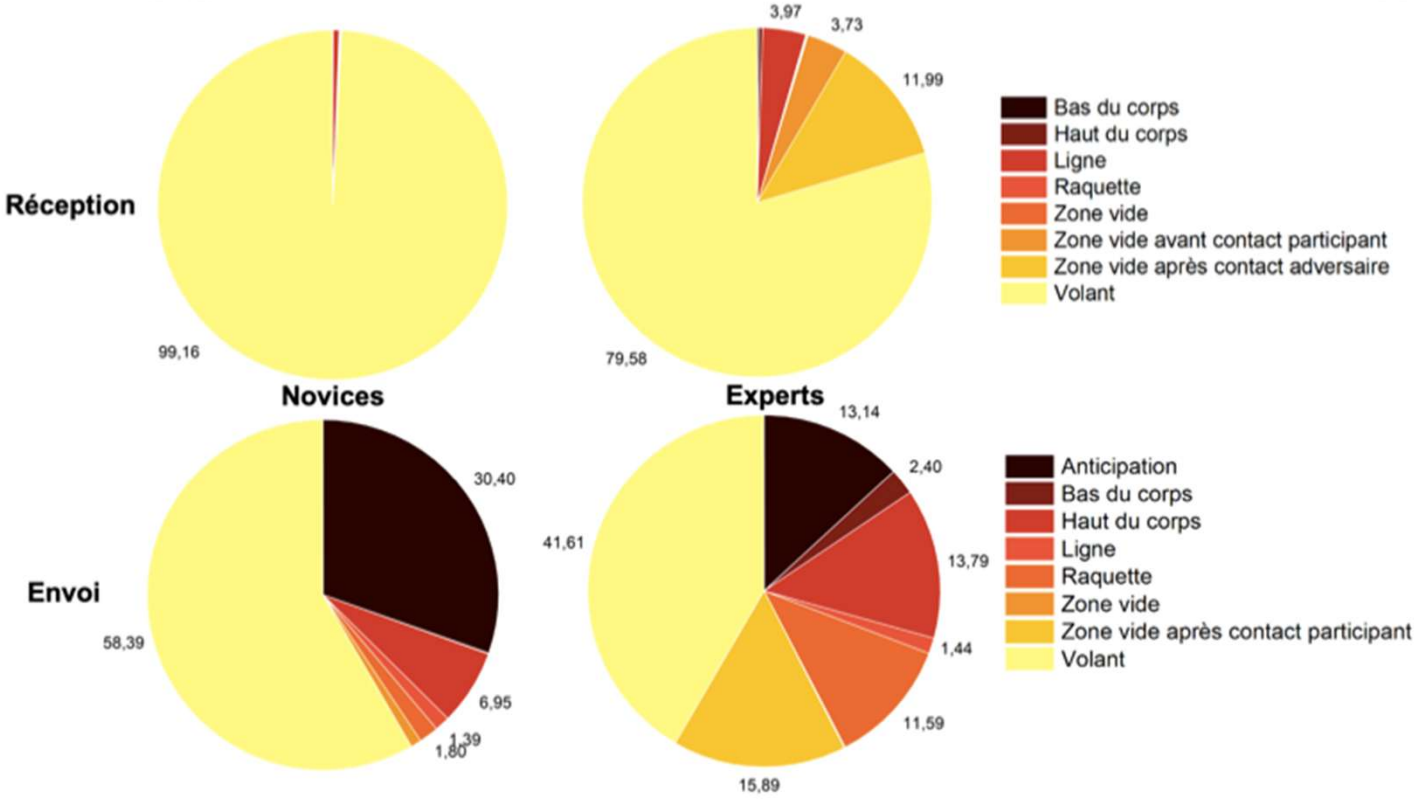


Figure 1.2 – Temps passé sur chaque zone d'intérêt en fonction du temps total de fixations selon la phase d'envoi et la phase de réception et selon le niveau d'expertise. Les résultats sont présentés en pourcentage de temps passé.