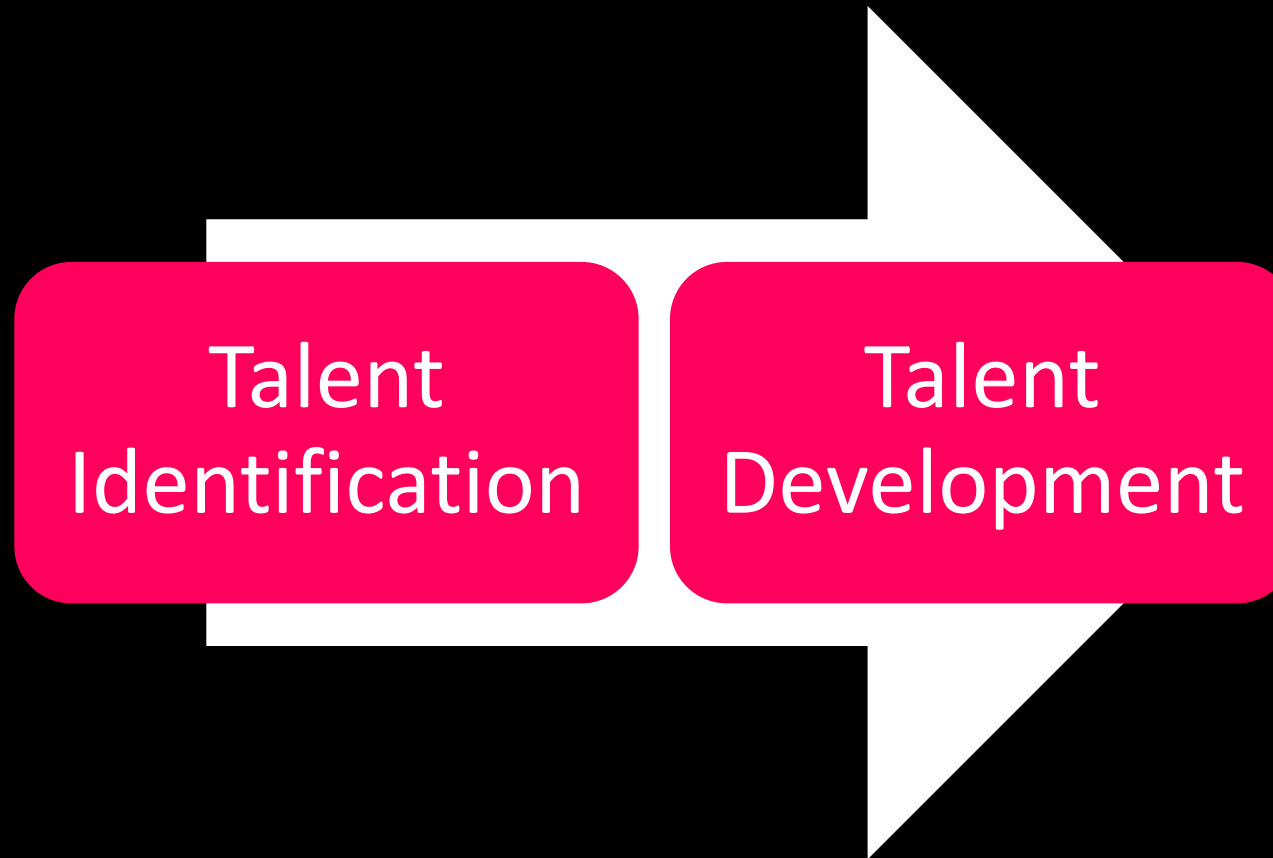


Talent Identification, Development & Bio-banding in Badminton

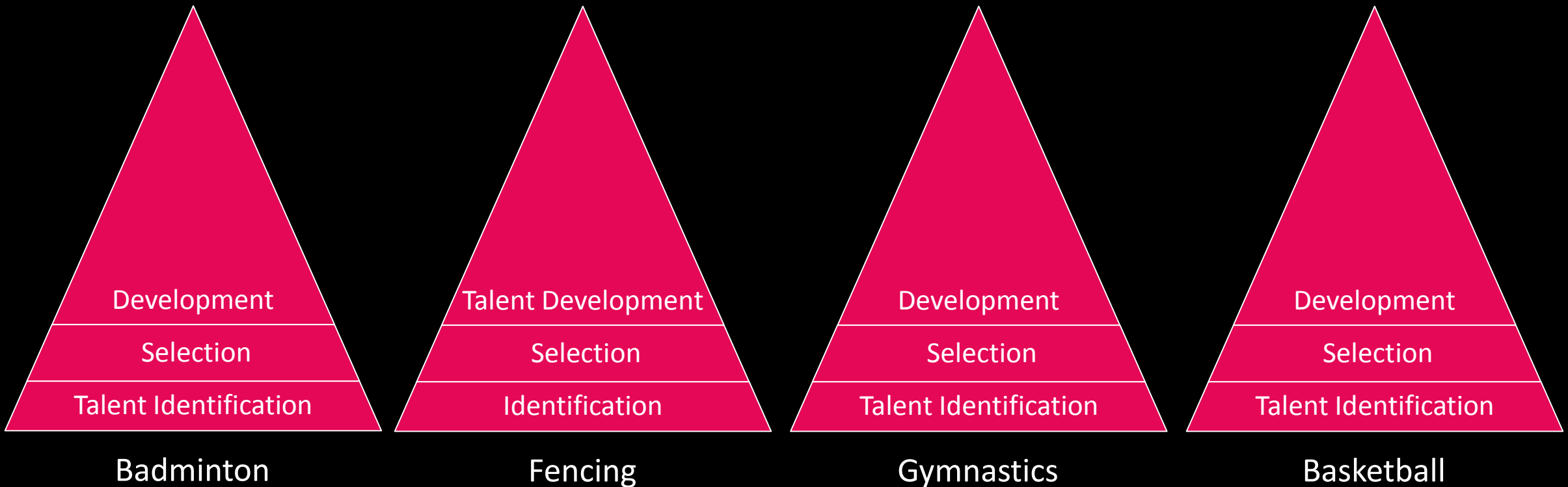
BWF World coaching conference 2019

Johan Pion (HAN / The Netherlands) & Tengku Fadilah Tengku Kamalden (UPM / Malaysia)

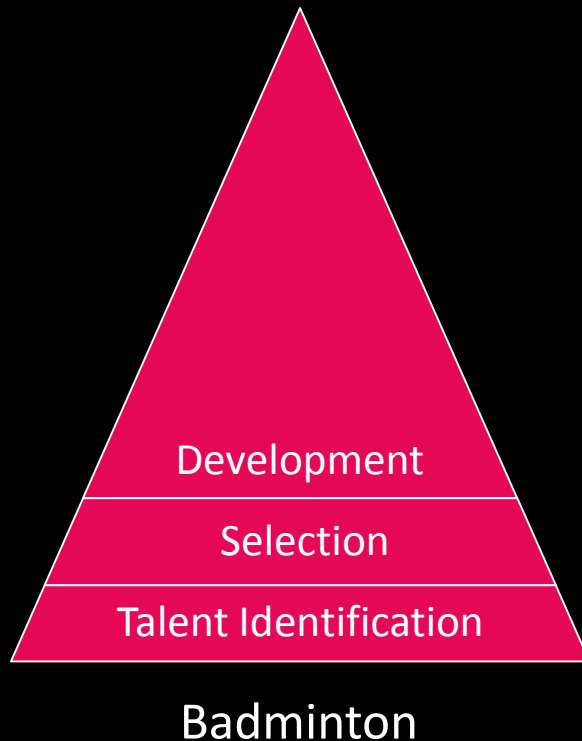
Talent Identification and Development



Talent Identification and Development



Talent Identification and Development



Talent Identification

- Coaches' eye
- Physical tests

Talent Selection

- Selection = Deselection
- Advantage for early maturers

Talent Development

- Early specialisation
- Over exposure injuries
- Motivation / Demotivation

Talent Identification and Development



Journal of Sports Sciences

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rjsp20>

The value of a non-sport-specific motor test battery in predicting performance in young female gymnasts

Barbara Vandorpe ^a, Joric B. Vandendriessche ^a, Roel Vaeyens ^a, Johan Pion ^a, Johan Lefevre ^b, Renaat M. Philippaerts ^a & Matthieu Lenoir ^a

^a Department of Movement and Sport Sciences, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

^b Department of Biomedical Kinesiology, Faculty of Kinesiology and Rehabilitation Sciences, KU Leuven, Leuven, Belgium

Available online: 23 Jan 2012

1. Neither the coaches' judgement nor the anthropometric and physical characteristics were sensitive enough to predict performance.
2. For the elite, a non-sport-specific motor test battery correlated strongly with the competition result, with more than 40% of the variation in competition performance being explained by the result on that test 2 years earlier.

Talent Identification and Development

Accepted Manuscript

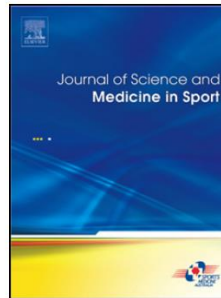
Title: The Use of the Körperkoordinationstest für Kinder in the Talent Pathway in Youth Athletes: A Systematic Review

Authors: J. O'Brien-Smith, R. Tribolet, M.R. Smith, K.J.M. Bennett, J. Fransen, J. Pion, M. Lenior

PII: S1440-2440(18)30219-6
DOI: <https://doi.org/10.1016/j.jsams.2019.05.014>
Reference: JSAMS 2080

To appear in: *Journal of Science and Medicine in Sport*

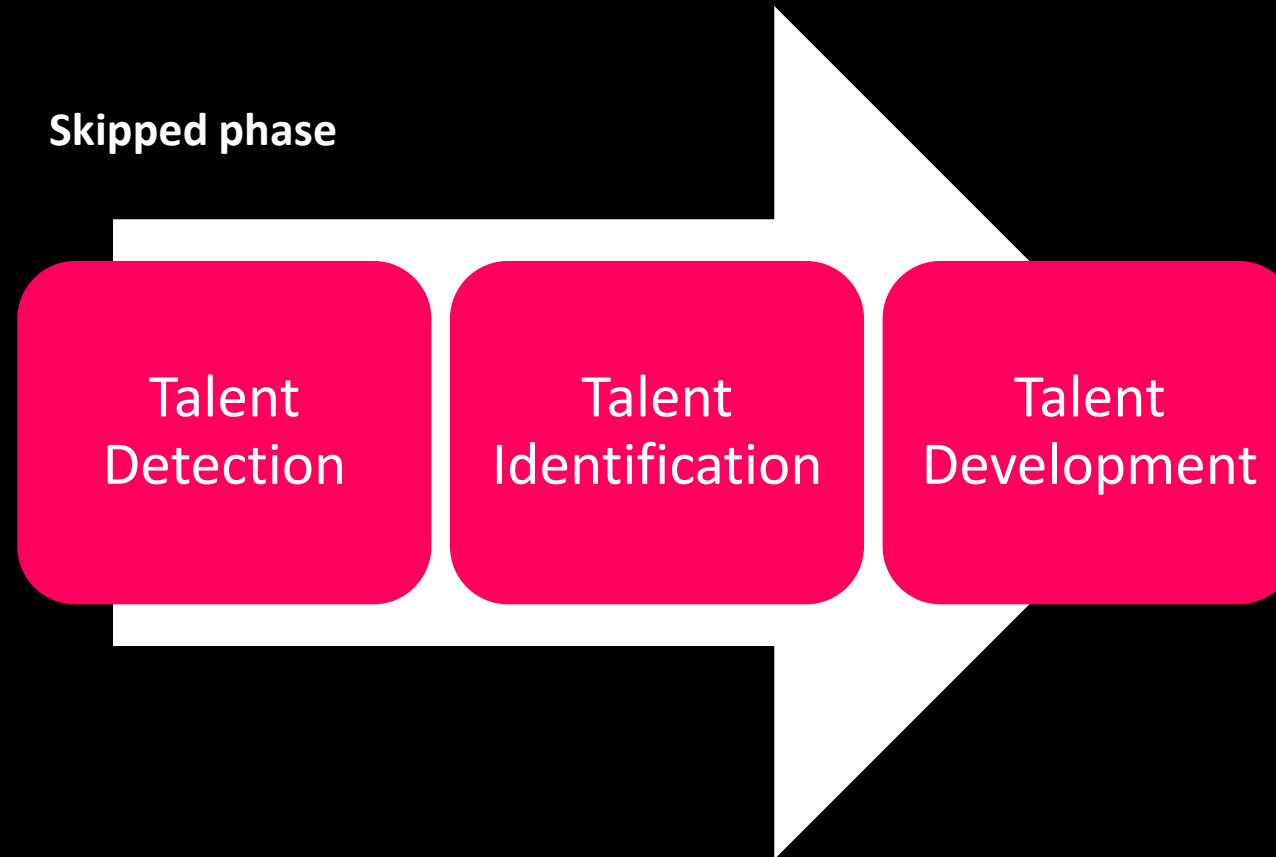
Received date: 5 June 2018
Revised date: 21 May 2019
Accepted date: 22 May 2019



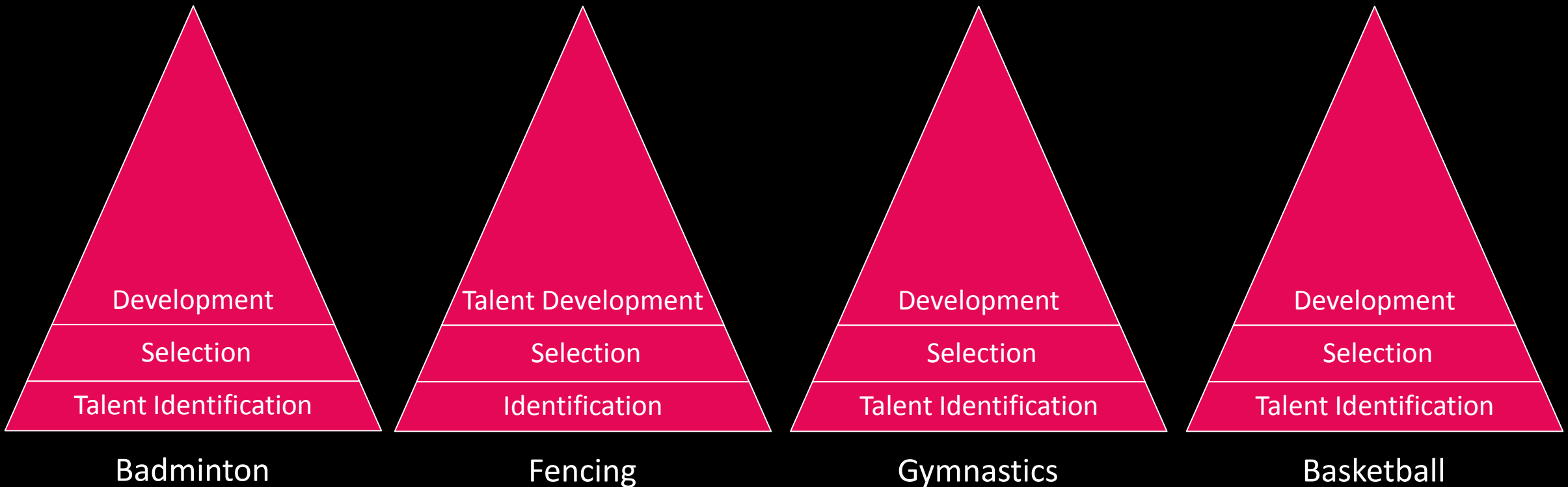
Detected champions at baseline

- **Judo** (European champion and bronze medal)
- **Gymnastics** (World champion)
- **Taekwondo** (World champion)
- **Basketball** (4th World Championships)
- **Alpine ski** (Silver youth olympics)
- **Volleyball** (Bronze European Championships)

Talent Detection



Talent Detection



Talent Detection

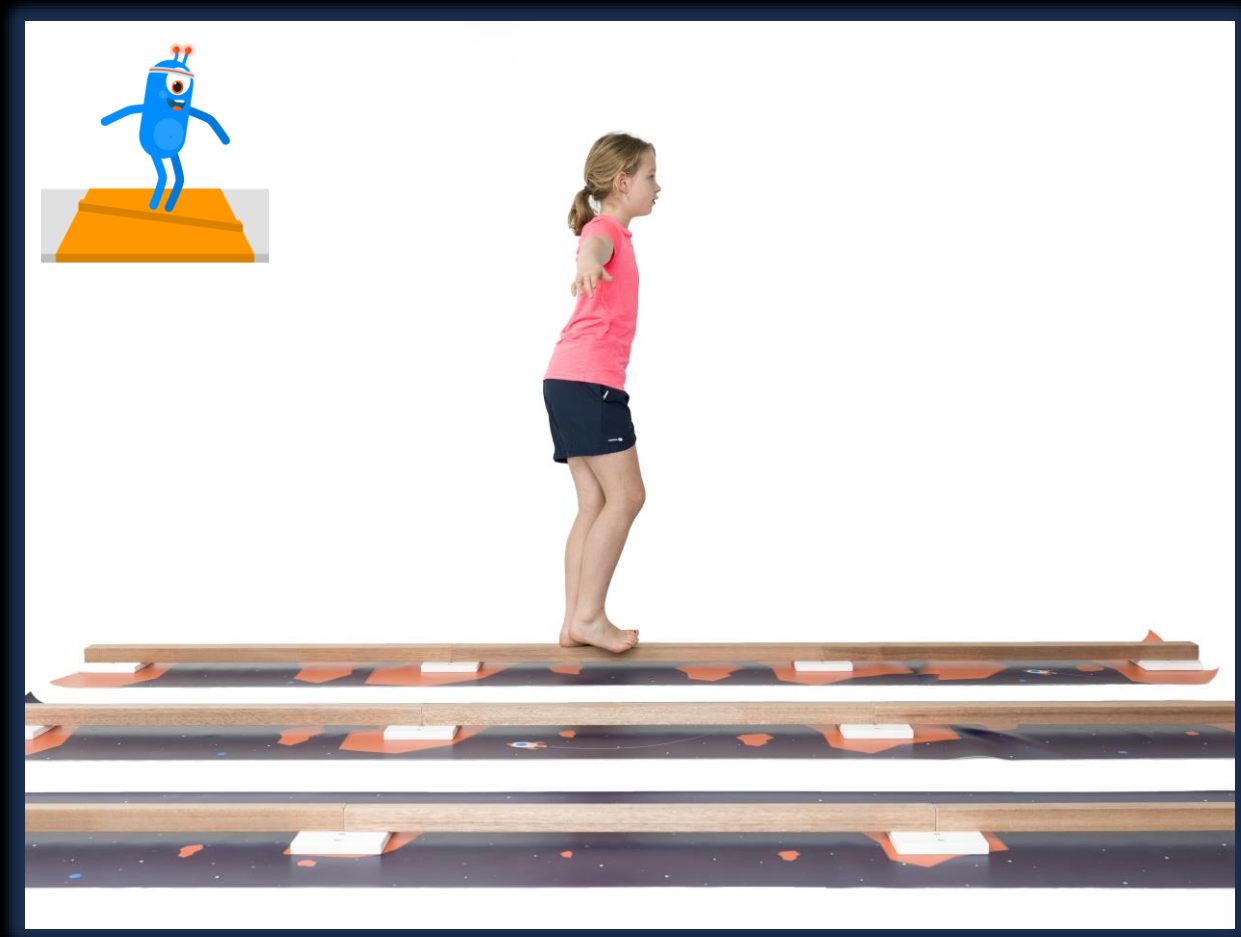
Talent Detection



Development of a Tool to Assess Fundamental Movement Skills in Applied Settings

Sebastiaan Platvoet^{1†}, Irene R. Faber^{2,3†}, Mark de Niet¹, Rianne Kannekens¹, Johan Pion^{1,4}, Marije T. Elferink-Gemser⁵ and Chris Visscher⁴*

HAN FMS-test



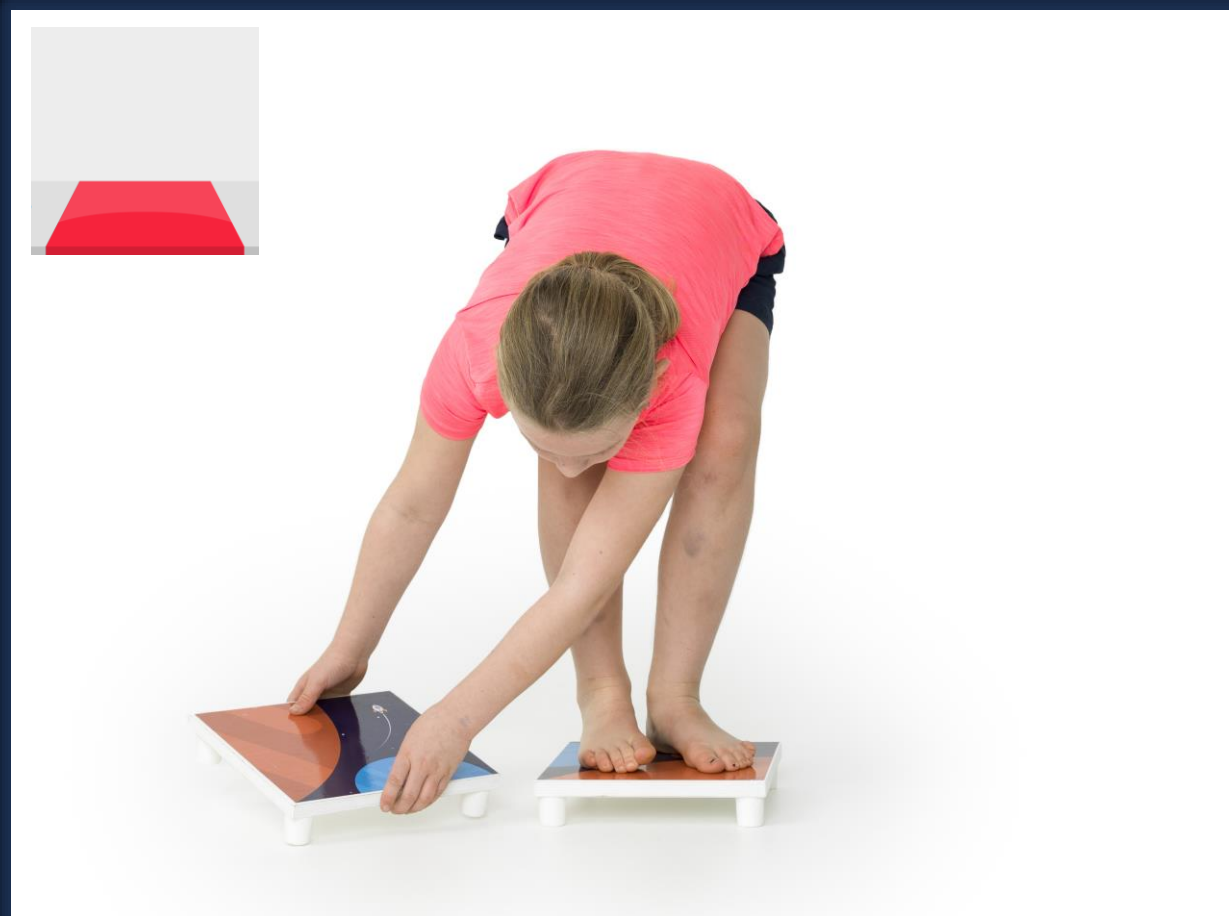
KTK Balance Beam

HAN FMS-test



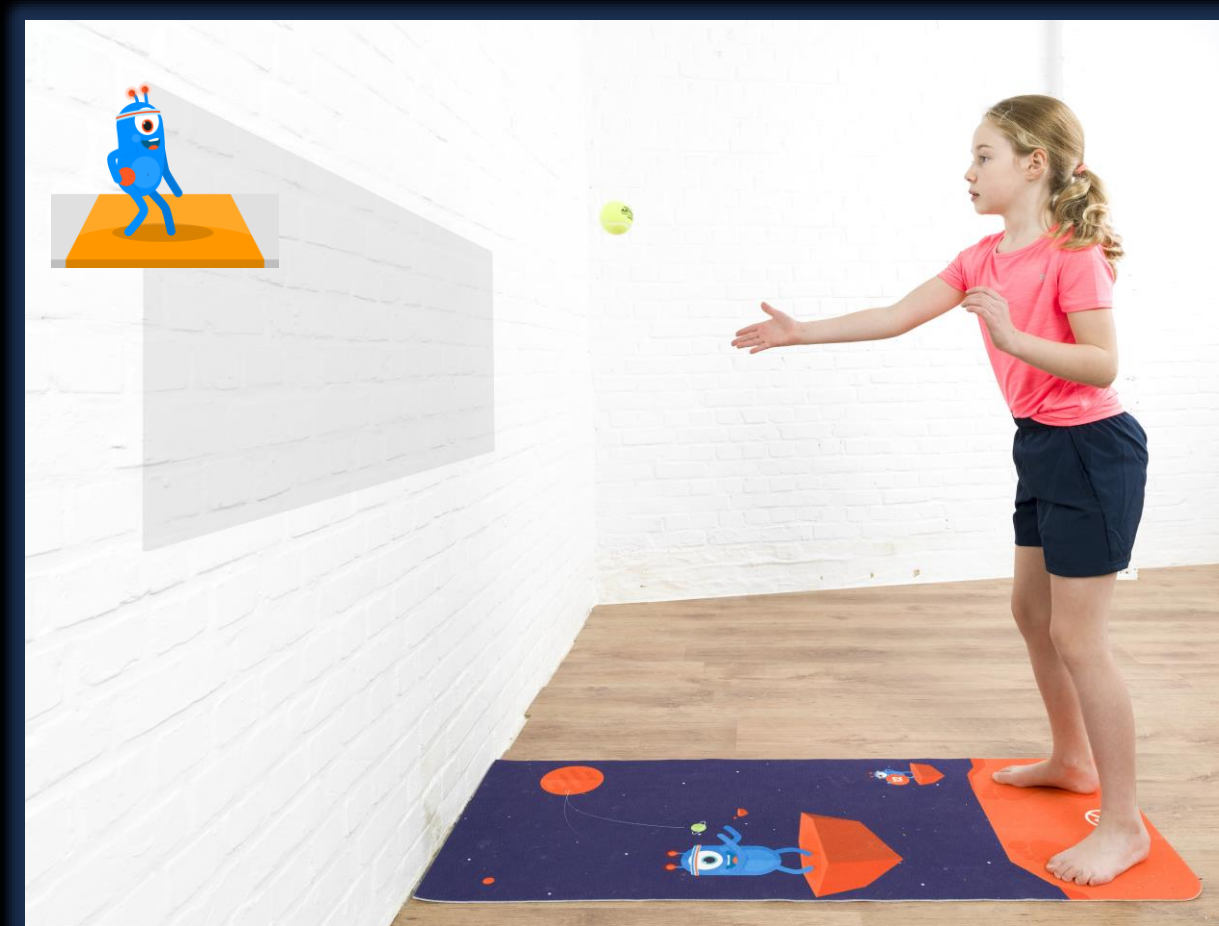
KTK Jumping Sideways

HAN FMS-test



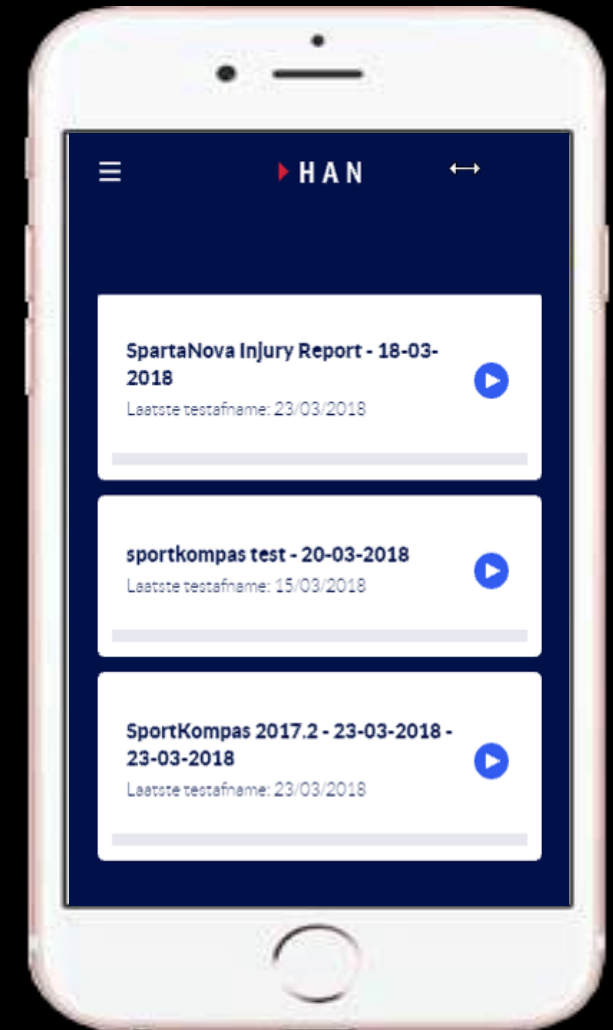
KTK Moving Sideways

HAN FMS-test

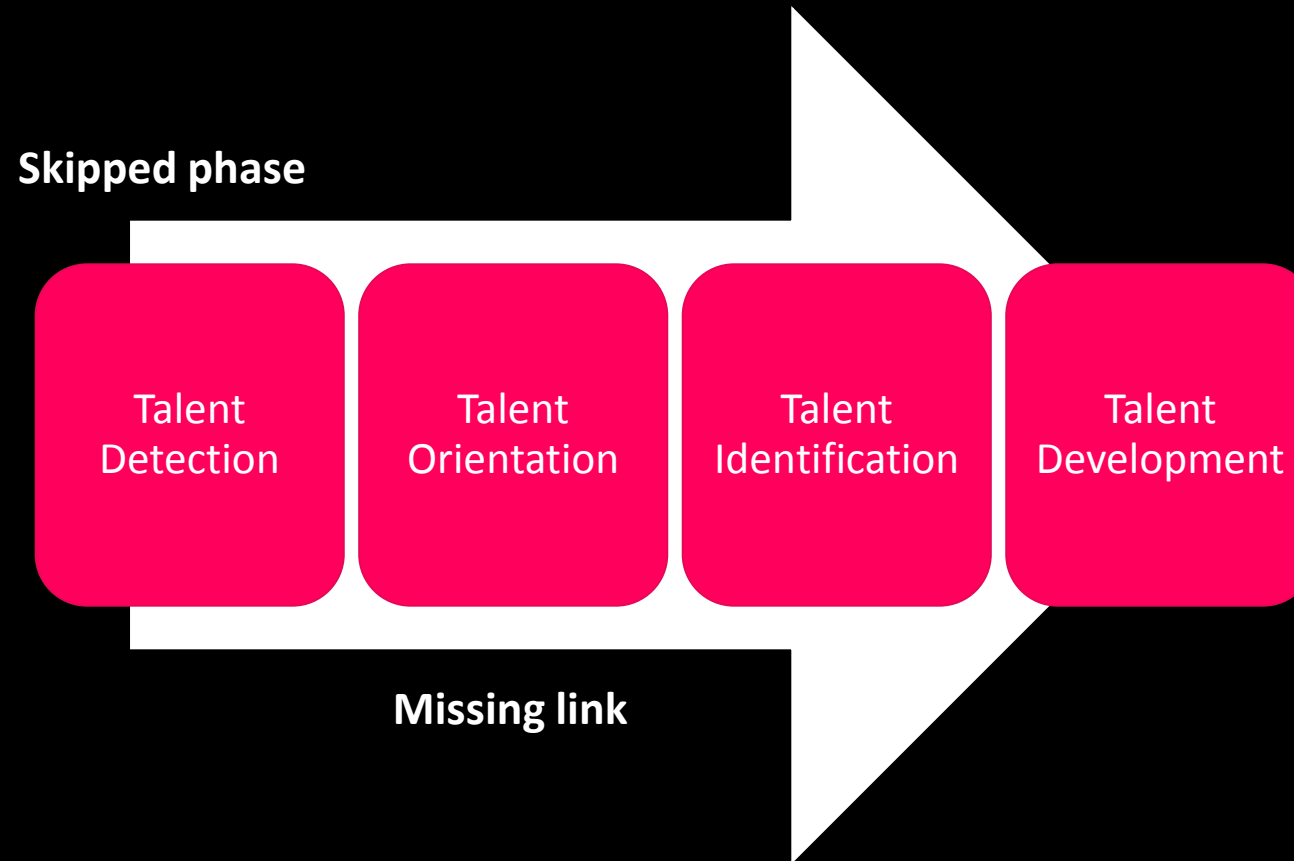


Eye Hand Coordination (Faber)

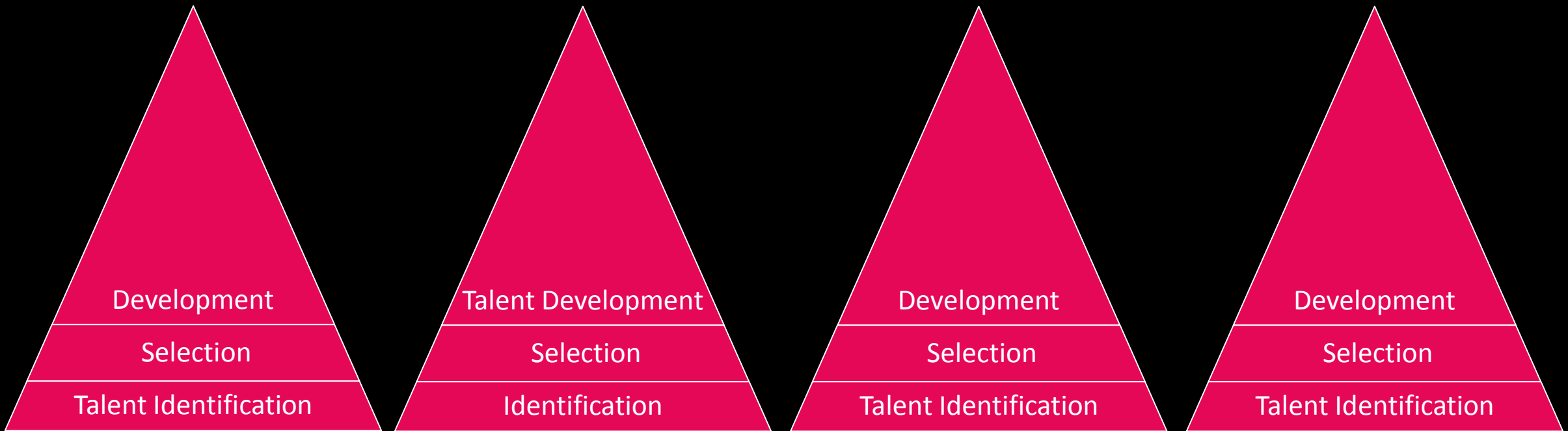
HAN FMS-test



Talent Orientation



Talent Orientation



Badminton

Fencing

Gymnastics

Basketball

Talent Orientation

Talent Detection



SPORT
KOMPAS

Primary schools (N > 20.000)

Elite sport schools (N > 2.000)

Clubs (N > 30.000)

2019

Primary schools N > 15.000

2020

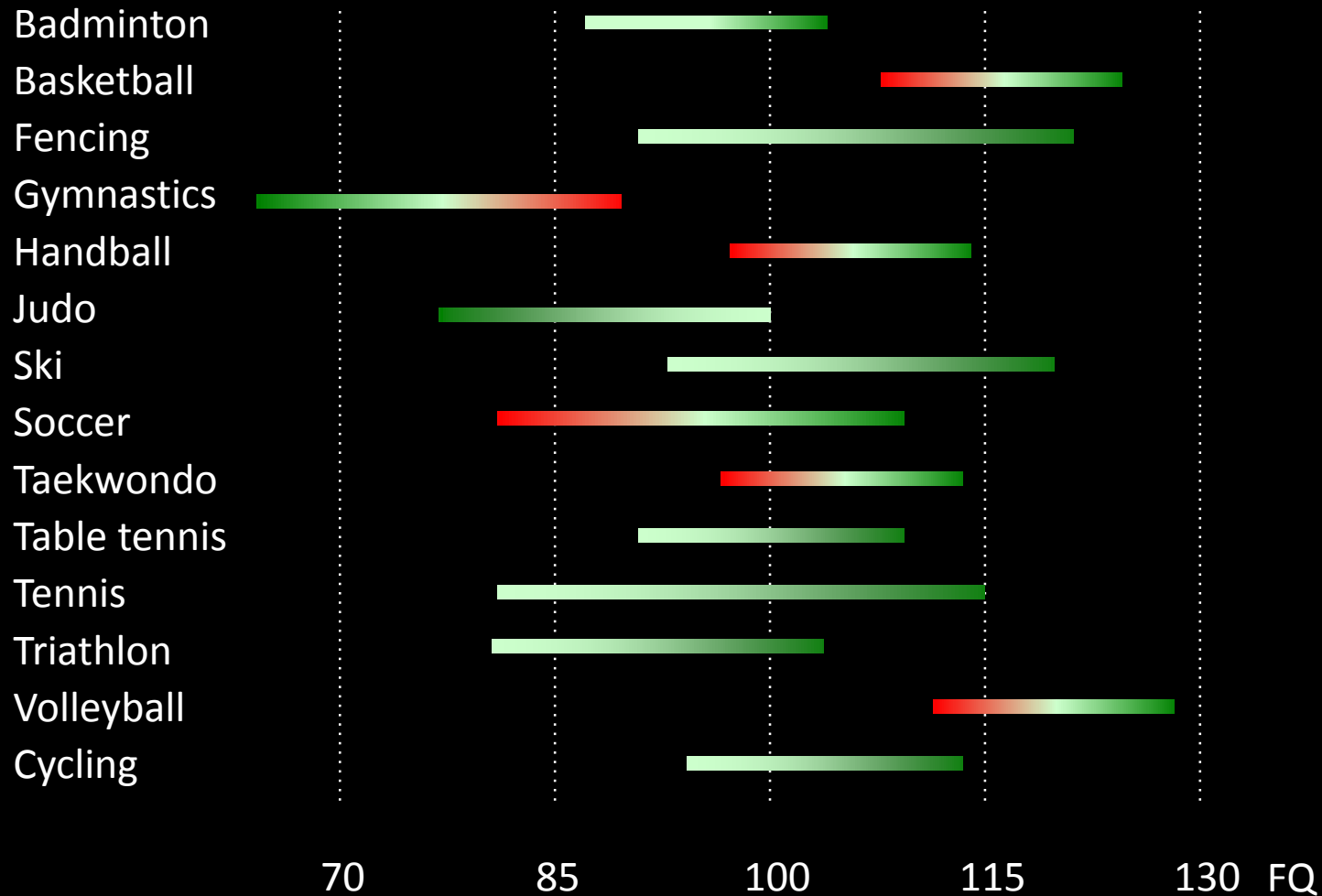
Primary schools N > 25.000

2022

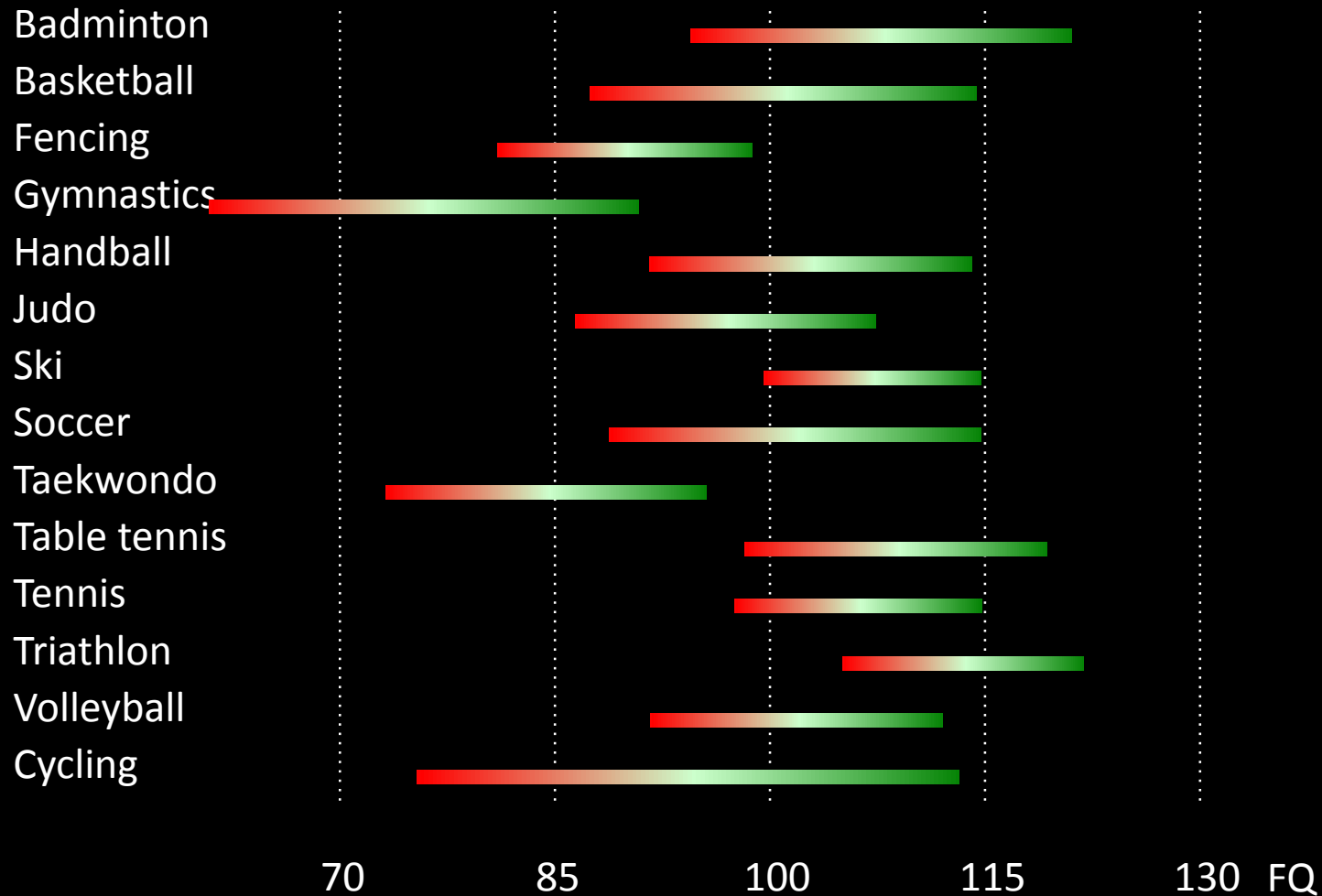
Primary schools N > 70.000



Talent Orientation: Stature



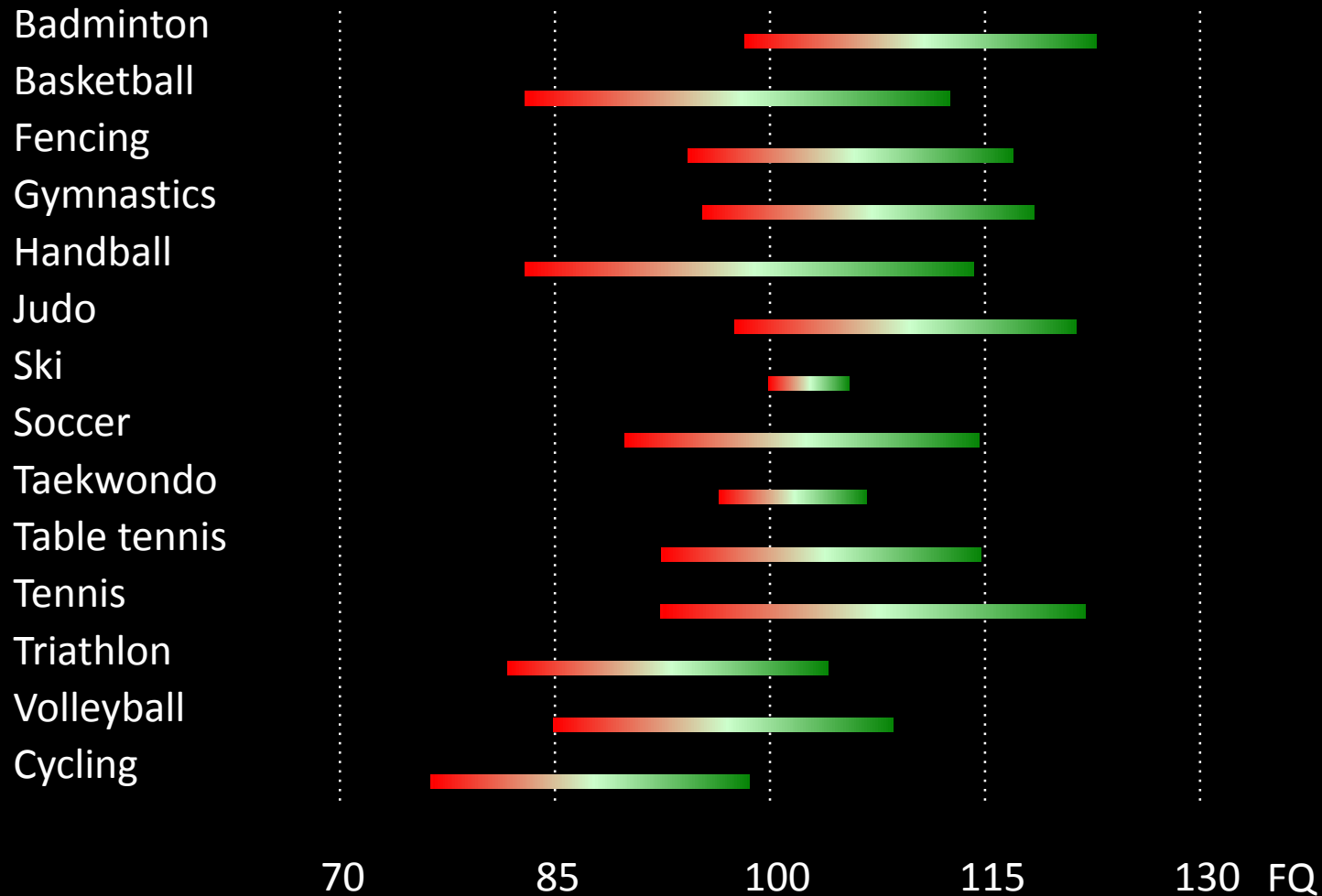
Talent Orientation: Endurance shuttle run



SPORT
KOMPAS
I DO

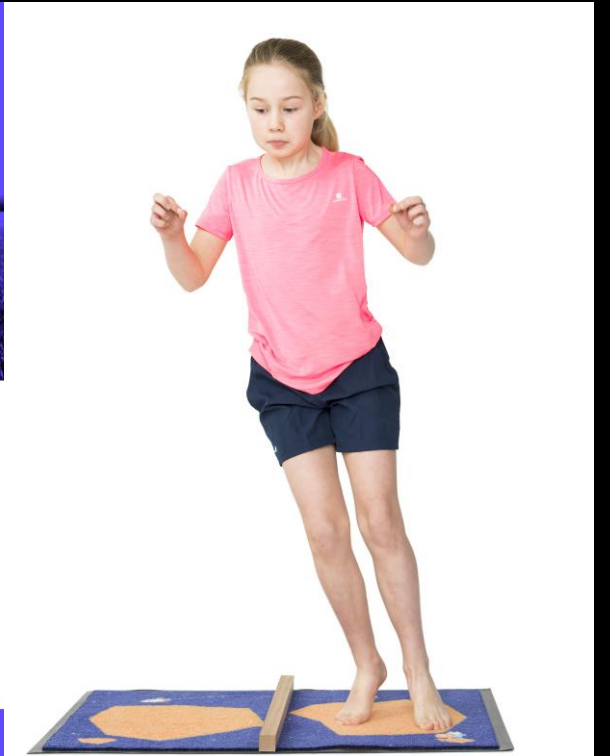


Talent Orientation: Jumping sideways

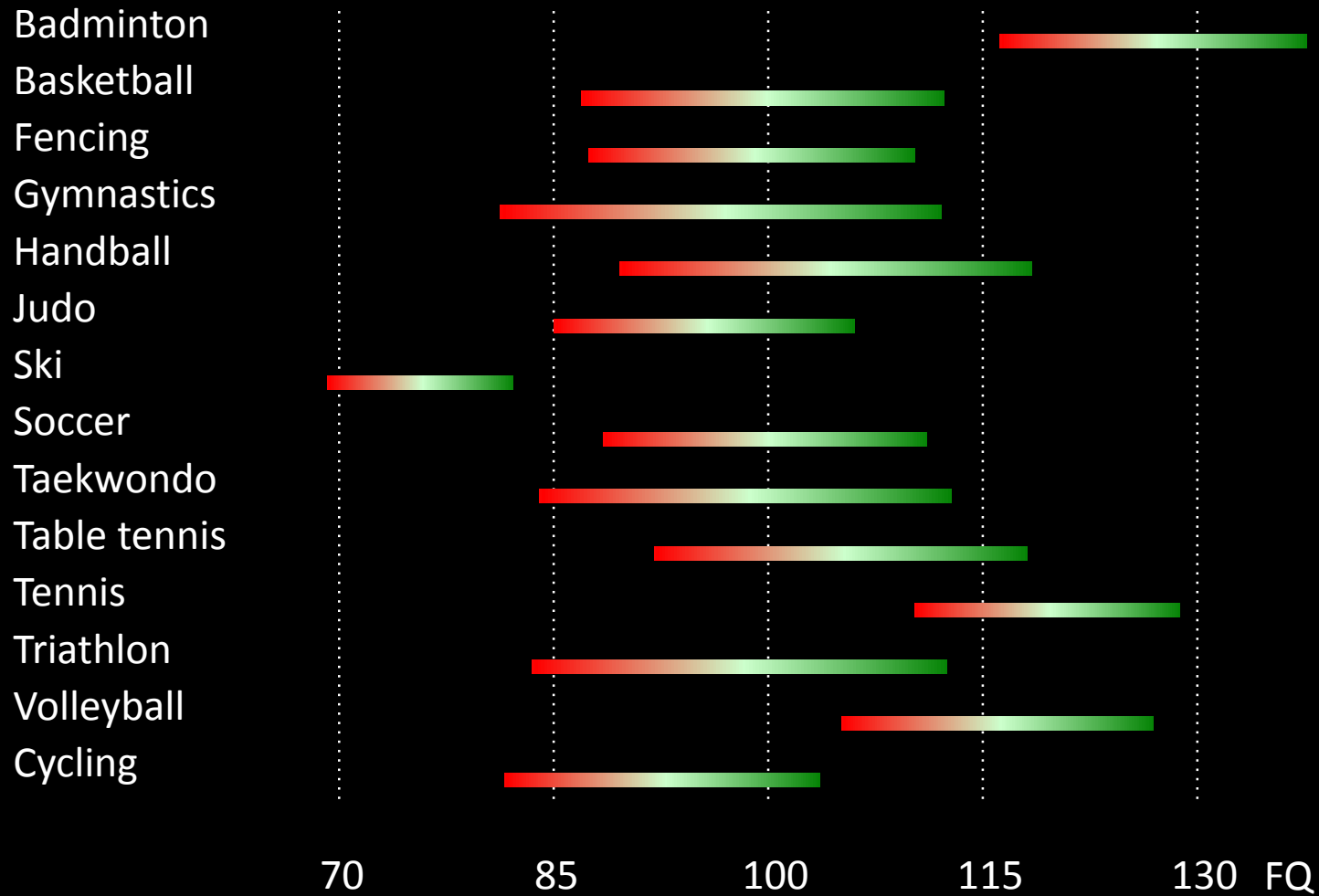


SPORT
KOMPAS

I DO



Talent Orientation: Throwing shuttles



SPORT
KOMPAS

I DO

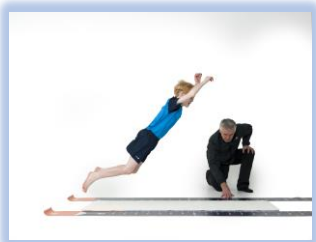


Benchmarks for orientation

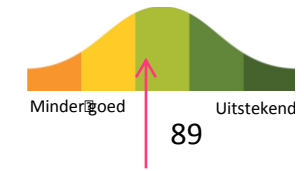
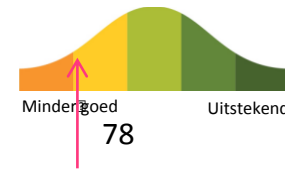
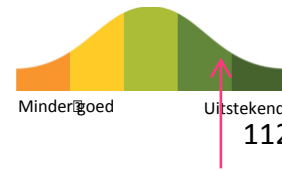
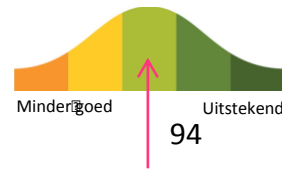
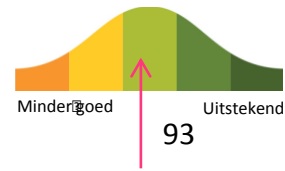
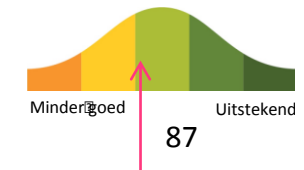
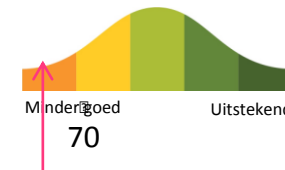
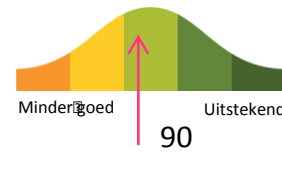
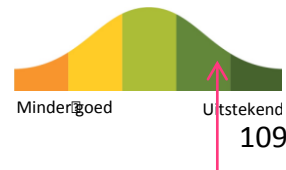
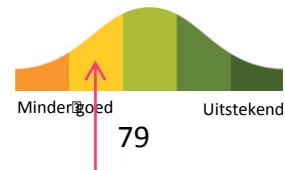
Boy 10y



Stature 135 cm



SBJ 147 cm



Tools for orientation



Talent Identification and Development in Badminton



Training the test examiners

University Putra Malaysia
and
HAN University of applied sciences

2016 n=20

and

2017 n=20

Talent Identification and Development in Badminton



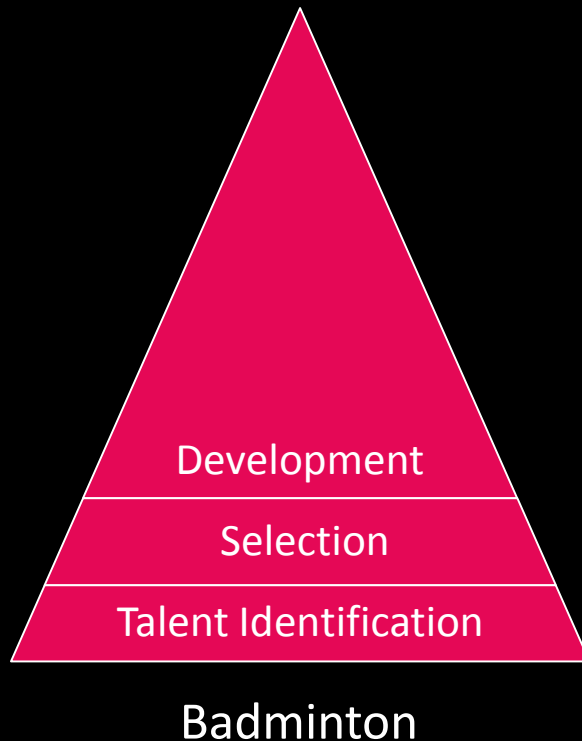
Quality control

University Putra Malaysia
HAN University of applied sciences
Ghent University

Video feedback

materials - procedures – examiners

Talent Identification and Development in Badminton



Talent Identification

- Coaches' eye
- Physical tests

Talent Selection

- Selection = Deselection
- Advantage for early maturers

Talent Development

- Early specialisation
- Over exposure injuries
- Motivation / Demotivation

Identifying the high potentials

TID Badminton									
Name	Player 26				Ranking				
Gender (M / F)	M		Date of birth	Year	Month	Day			
Age	16,405		Test date	2019	5	23			
Anthropometry									
Stature	163,0	139,0	157,6	166,7	175,7	179,4			
Body weight	56,9	32,9	47,0	56,9	66,9	84,3			
Sitting height	86,5	72,2	-28,0	112,6	253,5	934,0			
BMI	21,42	14,2	18,0	20,3	22,7	26,6			
Growth prediction									
Growth prediction (Khamis-Roche 1994)	163,7								
Growth potential (Khamis-Roche 1994)	0,7								
% adult height (Khamis-Roche 1994)	99,6								
Bio-Band									
Physical performance tests									
Sit and reach (cm)	42,0	25	30	35	40	49			
Sprint 5m (s)	1,030	1,380	1,226	1,146	1,065	0,990			
Sprint 30m (s)	4,190	5,25	4,92	4,646	4,37	4,19			
Shuttle run 10x5m (s)	15,930	20,04	18,26	17,393	16,53	15,37			
Counter Movement Jump (cm)	61,0	38,8	47,0	54,1	61,2	68,6			
Standing Broad Jump (cm)	250	154	197	224	250	266			
Curl ups (N/30s)	45	18	29	38	47	71			
Knee push ups (N/30s)	36	21	28	33	38	46			
Plate tapping (s)	11,01	26,64	16,69	13,008	9,33	8,85			
Endurance Shuttle Run (min)	12,2	9	11	12	14	15			
Coordination tests									
Balance beam KTK 6 - 4,5 - 3	72	25	46	58	70	72			
Jumping sideways KTK	125	78	93	103	113	125			
Moving sideways KTK	58	51	57	63	70	80			
Faber Eye/Hand	81	56	63	72	81	105			
Throwing Shuttles	46,07	32	35	39	43	46			

TID Badminton									
Name	Player 18				Ranking				
Gender (M / F)	M		Date of birth	Year	Month	Day			
Age	13,205		Test date	2019	5	22			
Anthropometry									
Stature	159,0	139,0	157,6	166,7	175,7	179,4			
Body weight	47,9	32,9	47,0	56,9	66,9	84,3			
Sitting height	801,0	72,2	-28,0	112,6	253,5	934,0			
BMI	18,93	14,2	18,0	20,3	22,7	26,6			
Growth prediction									
Growth prediction (Khamis-Roche 1994)	178,0								
Growth potential (Khamis-Roche 1994)	19,0								
% adult height (Khamis-Roche 1994)	89,3								
Bio-Band									
Physical performance tests									
Sit and reach (cm)	27,0	25	30	35	40	49			
Sprint 5m (s)	1,170	1,380	1,226	1,146	1,065	0,990			
Sprint 30m (s)	5,000	5,25	4,92	4,646	4,37	4,19			
Shuttle run 10x5m (s)	18,820	20,04	18,26	17,393	16,53	15,37			
Counter Movement Jump (cm)	45,5	38,8	47,0	54,1	61,2	68,6			
Standing Broad Jump (cm)	159	154	197	224	250	266			
Curl ups (N/30s)	36	18	29	38	47	71			
Knee push ups (N/30s)	24	21	28	33	38	46			
Plate tapping (s)	14,44	26,64	16,69	13,008	9,33	8,85			
Endurance Shuttle Run (min)	12,2	9	11	12	14	15			
Coordination tests									
Balance beam KTK 6 - 4,5 - 3	67	25	46	58	70	72			
Jumping sideways KTK	97	78	93	103	113	125			
Moving sideways KTK	58	51	57	63	70	80			
Faber Eye/Hand	57	56	63	72	81	105			
Throwing Shuttles	35,25	32	35	39	43	46			

Benchmarks junior elite
Tests in Elite Badminton School (Kuala Lumpur)
(april 2018 n=60 and april 2019 n=60)

HAN UNIVERSITY
OF APPLIED SCIENCES

T.I.D is not T.I.nD.er



TID Badminton

Name

Player 07

Ranking

Gender (M / F)

M

Date of birth

Year

2004

Month

3

Day

4

Age

15,216

Test date

2019

5

22

Anthropometry

	Lowest	-1 Z	mean	+1 Z	highest
Stature	170,0	139,0	157,6	166,7	175,7
Body weight	51,5	32,9	47,0	56,9	66,9
Sitting height	88,1	72,2	26,0	112,8	253,5
BMI	17,80	14,2	18,0	20,3	22,7

Growth prediction

Growth prediction (Khamis-Roche 1994)

176,3

Growth potential (Khamis-Roche 1994)

6,3

% adult height (Khamis-Roche 1994)

96,4

Bio-Band

Physical performance tests

	Lowest	-1 Z	mean	+1 Z	highest
Sit and reach (cm)	30,5	25	30	35	49
Sprint 5m (s)	1,190	1,380	1,226	1,146	1,065
Sprint 30m (s)	4,870	5,25	4,92	4,646	4,37
Shuttle run 10x5m (s)	17,700	20,04	18,26	17,393	16,53
Counter Movement Jump (cm)	45,7	38,6	47,0	54,1	61,2
Standing Broad Jump (cm)	209	154	197	224	250
Curl ups (N/30s)	22	18	29	38	47
Knee push ups (N/30s)	30	21	28	33	38
Plate tapping (s)	13,79	26,64	16,69	13,008	9,33
Endurance Shuttle Run (min)	12,1	9	11	12	14

Coordination tests

	Lowest	-1 Z	mean	+1 Z	highest
Balance beam KTK 6 - 4,5 - 3	44	25	46	58	72
Jumping sideways KTK	98	78	93	103	125
Moving sideways KTK	56	51	57	63	80
Faber Eye/Hand	61	56	63	72	81
Throwing Shuttles	39,64	32	35	39	43

HAN

UPM

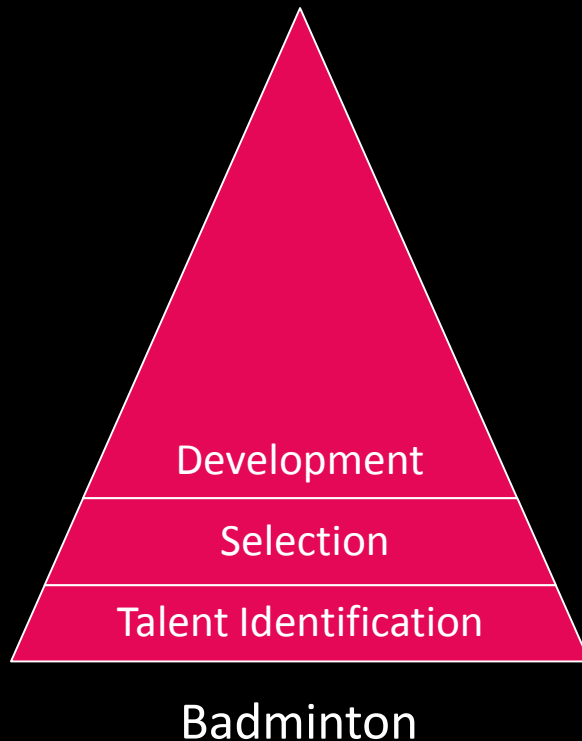
UNIVERSITI PUTRA MALAYSIA

GHENT UNIVERSITY

BWF

New players n=33 (September 2018)
 Baseline tests
 Benchmarked with junior elite players

Talent Identification and Development in Badminton



Talent Identification

- Coaches' eye
- Physical tests

Talent Selection

- Selection = Deselection
- Advantage for early maturers

Talent Development

- Early specialisation
- Over exposure injuries
- Motivation / Demotivation

Talent Identification in Badminton

Part 1: Anthropometry (boys n= 6 + 27 and girls n= 6 + 17)

Anthropometry						
		Lowest	-1 Z	mean	+1 Z	highest
Stature	159,0	135,0	142,5	151,8	161,1	176,0
Body weight	40,5	33,1	35,6	43,6	51,6	62,0
Sitting height	80,0	71,5	73,6	78,8	84,0	93,4
BMI	16,02	15,5	16,8	18,8	20,7	24,0

Talent Identification in Badminton

Part 2: Physical performance (boys n= 6 + 27 and girls n= 6 + 17)

Physical performance tests

		Lowest	-1 Z	mean	+1 Z	highest
Sit and reach (cm)	24,5	18	26	32	38	47
Sprint 5m (s)	1,090	1,380	1,270	1,191	1,113	1,050
Sprint 30m (s)	4,740	5,61	5,31	5,019	4,73	4,42
Shuttle run 10x5m (s)	19,600	20,42	20,08	19,063	18,04	17,15
Counter Movement Jump (cm)	40,6	30,0	36,2	43,1	49,9	56,9
Standing Broad Jump (cm)	169	151	157	180	203	236
Curl ups (N/30s)	19	19	24	33	42	47
Knee push ups (N/30s)	33	14	19	34	50	80
Plate tapping (s)	10,20	18,51	14,56	12,194	9,83	9,24
Endurance Shuttle Run (min)	9,0	5	8	9	11	13

Talent Identification in Badminton

Part 3: Motor competence (boys n= 6 + 27 and girls n= 6 + 17)

Coordination tests

		Lowest	-1 Z	mean	+1 Z	highest
Balance beam KTK 6 - 4,5 - 3	67	24	33	44	56	72
Jumping sideways KTK	83	47	65	77	89	99
Moving sideways KTK	34	24	25	36	46	55
Faber Eye/Hand	55	35	41	49	58	67
Throwing Shuttles	36,8	29	32	34	36	39

Boys ranked by Motor Quotient

Ranking	Name	Competition result	Stature	% adult stature	Predicted Stature	MQ	Sprint 5m	SB jump	CM jump
1	Reference Boy 12y Ranked 4th	5.4	148	88,1	168,0	112	1,190	192	41
2	Reference Boy 12y Ranked 5th	5.5	169	92,3	183,0	111	1,160	231	49
3	Reference Boy 12y Ranked 6th	5.6	159	86,9	183,0	108	1,080	190	52
4	Reference Boy 12y Ranked 2nd	5.2	158	90,3	175,0	106	1,160	236	54
5	Reference Boy 12y Ranked 3rd	5.3	144	85,7	168,0	106	1,380	200	47
6	Reference Boy 12y Ranked 1st	5.1	165	92,7	178,0	105	1,130	225	56
7	Ooi Yi Ping		144	83,7	172,0	104	1,150	191	43
8	Mohd Al Imran		176	92,6	190,0	101	1,300	180	46
9	Aaron Tai Wei Qin		135	81,8	165,0	100	1,230	186	38
10	Lim Xian Yang		135	80,8	167,0	98	1,230	186	41
11	Tan Jia Le		150	84,3	178,0	98	1,250	160	38
12	V. Tamilarasukumar		146	83,9	174,0	94	1,170	157	46
13	Muhammad Thaqif		149	86,6	172,0	91	1,160	189	43
14	M.Danish Hazriel		148	88,1	168,0	89	1,160	153	40
15	Clarence Teh Yuan Hong		161	89,4	180,0	89	1,090	169	41
16	Muhammad Faiq Haziq		155	88,6	175,0	88	1,130	204	50

Boys ranked by Sprint (5m)

Ranking	Name	Competition result	Stature	% adult stature	Predicted Stature	MQ	Sprint 5m	SB jump	CM jump
									
1	Reference Boy 12y Ranked 6th	5.6	159	86,9	183,0	108	1,080	190	52
2	Clarence Teh Yuan Hong		161	89,4	180,0	89	1,090	169	41
3	Muhammad Faiq Haziq		155	88,6	175,0	88	1,130	204	50
4	Reference Boy 12y Ranked 1st	5.1	165	92,7	178,0	105	1,130	225	56
5	Ooi Yi Ping		144	83,7	172,0	104	1,150	191	43
6	Muhammad Thaqif		149	86,6	172,0	91	1,160	189	43
7	M.Danish Hazriel		148	88,1	168,0	89	1,160	153	40
8	Reference Boy 12y Ranked 2nd	5.2	158	90,3	175,0	106	1,160	236	54
9	Reference Boy 12y Ranked 5th	5.5	169	92,3	183,0	111	1,160	231	49
10	V. Tamilarasukumar		146	83,9	174,0	94	1,170	157	46
11	Reference Boy 12y Ranked 4th	5.4	148	88,1	168,0	112	1,190	192	41
12	Aaron Tai Wei Qin		135	81,8	165,0	100	1,230	186	38
13	Lim Xian Yang		135	80,8	167,0	98	1,230	186	41
14	Tan Jia Le		150	84,3	178,0	98	1,250	160	38
15	Mohd Al Imran		176	92,6	190,0	101	1,300	180	46
16	Reference Boy 12y Ranked 3rd	5.3	144	85,7	168,0	106	1,380	200	47

Talent Identification in Badminton

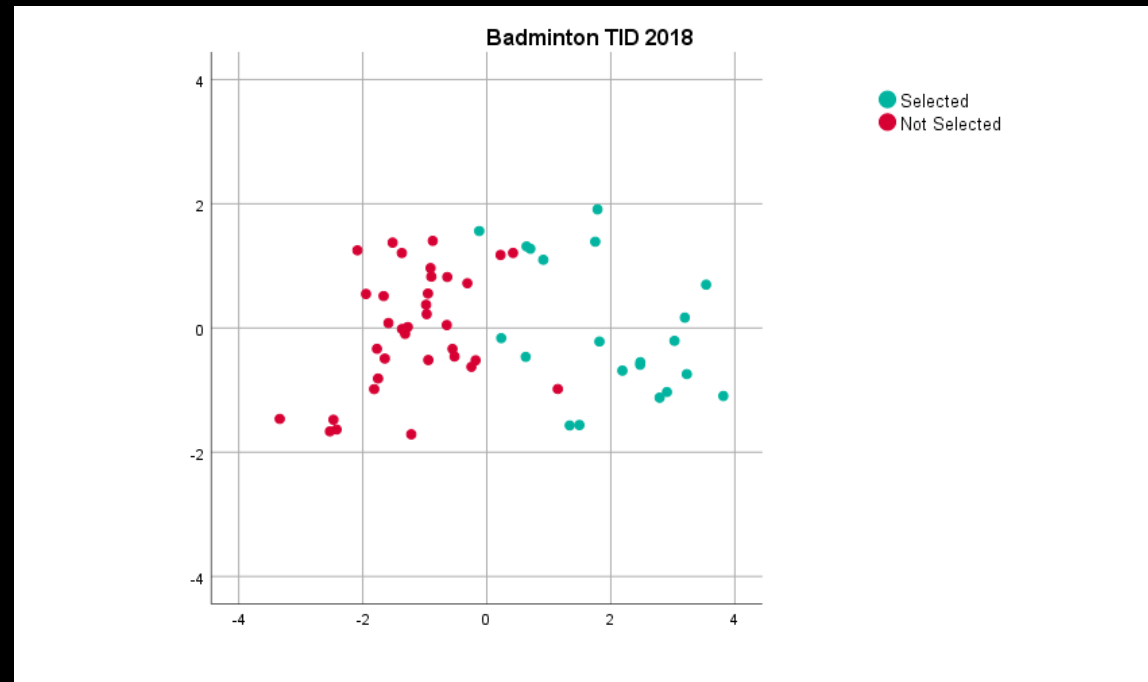
Statistical validation

Risk for false positives

- player 10
- player 22
- player 29
- player 48
- player 52
- player 57

Risk for false negatives

- player 15
- player 11
- player 20
- player 30



76% correctly classified when applying the test battery

Talent Identification in Badminton

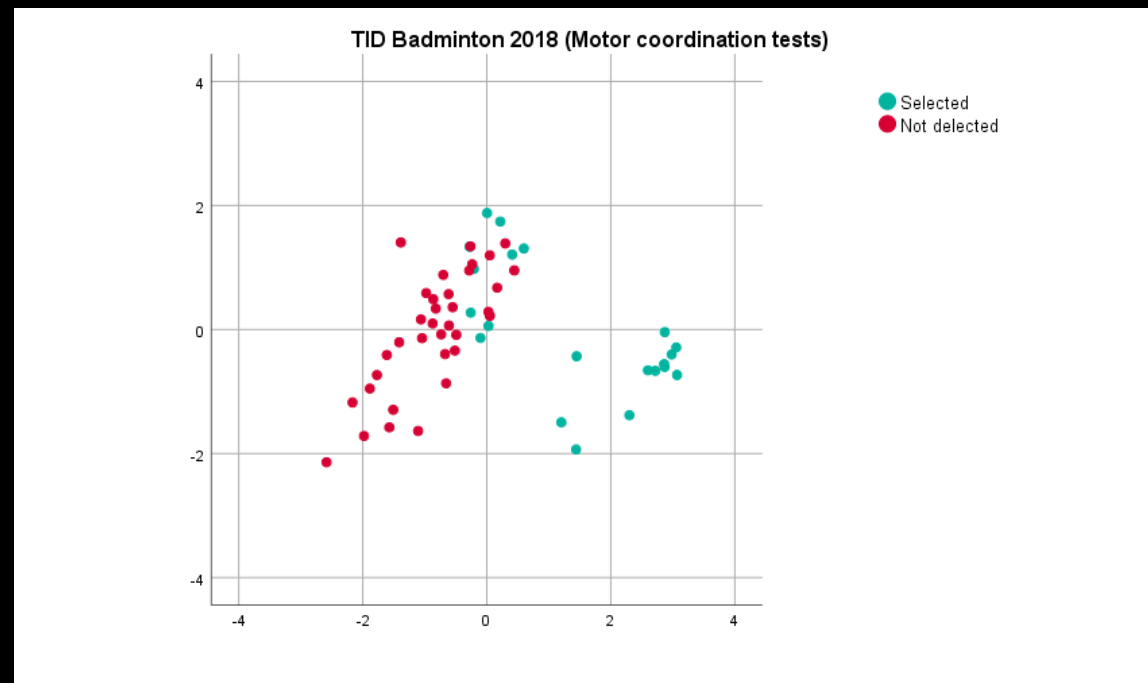
Risk for false positives

- player 10
- player 14
- player 17
- player 22
- player 29
- player 35
- player 48
- player 51
- player 52
- player 57

Risk for false negatives

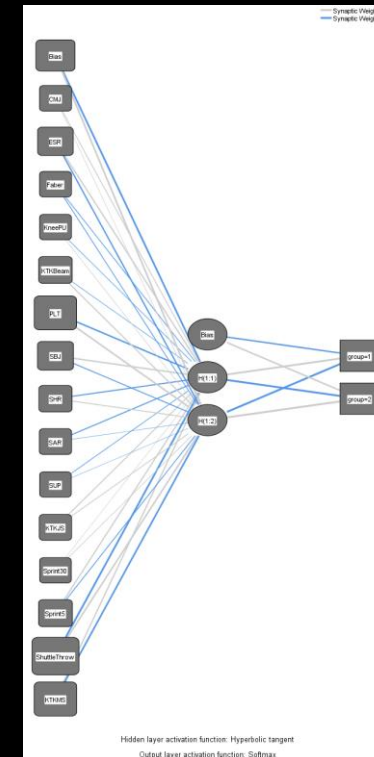
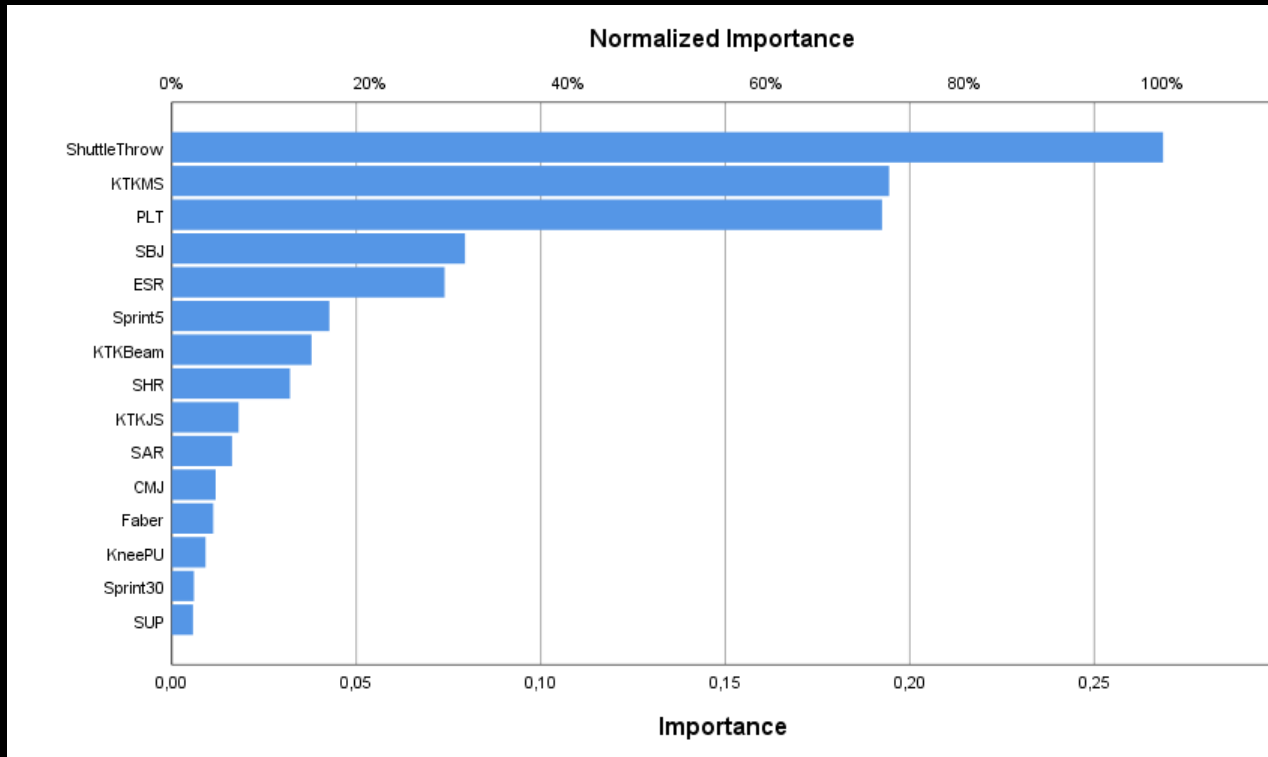
- player 11

Importance of motor tests



80% correctly classified when applying the motor tests

Importance of characteristics (Artificial Neural Network – MLP)



Bio – banding in Badminton

Growth prediction

Growth prediction (Khamis-Roche 1994)

164,0

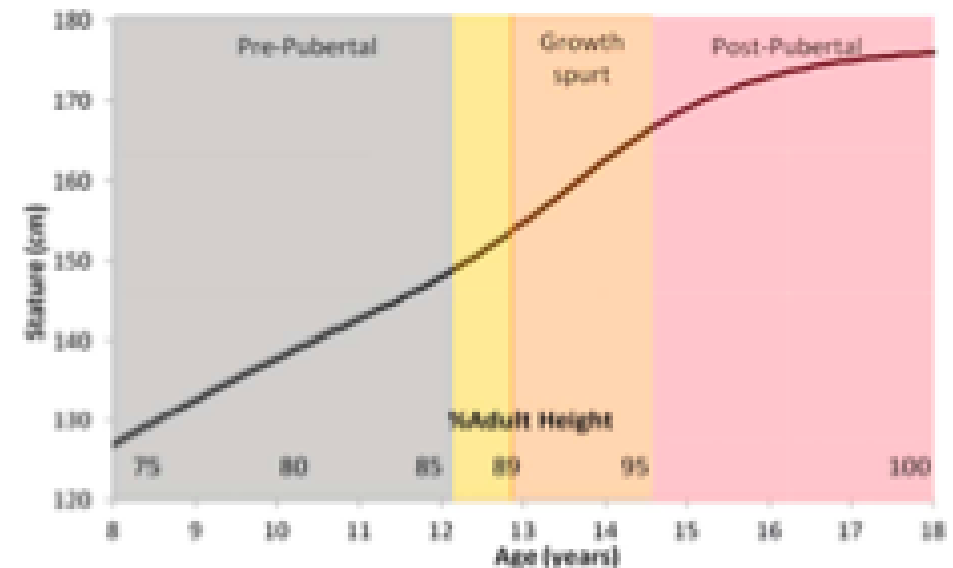
Growth potential (Khamis-Roche 1994)

14,0

% adult height (Khamis-Roche 1994)

91,5

Bio-Band



Bio-banding in badminton

Early maturing boys and girls tend to become taller and heavier earlier

There tends to be a bias towards earlier maturers in sports which require size and strength

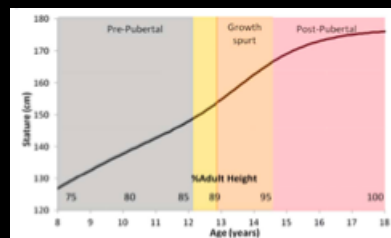
Early maturing girls and boys are more likely to obtain:

- more playtime
- important roles (leadership)
- specialised coaching

Early maturers are likely to experience early success as they face less physical challenges

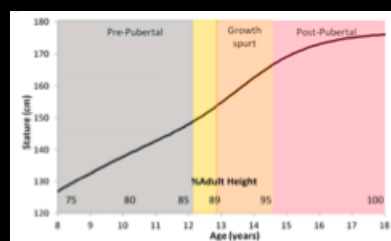
They are however ill prepared for future competition against physically matched opponents

Maturity status boys (12y)



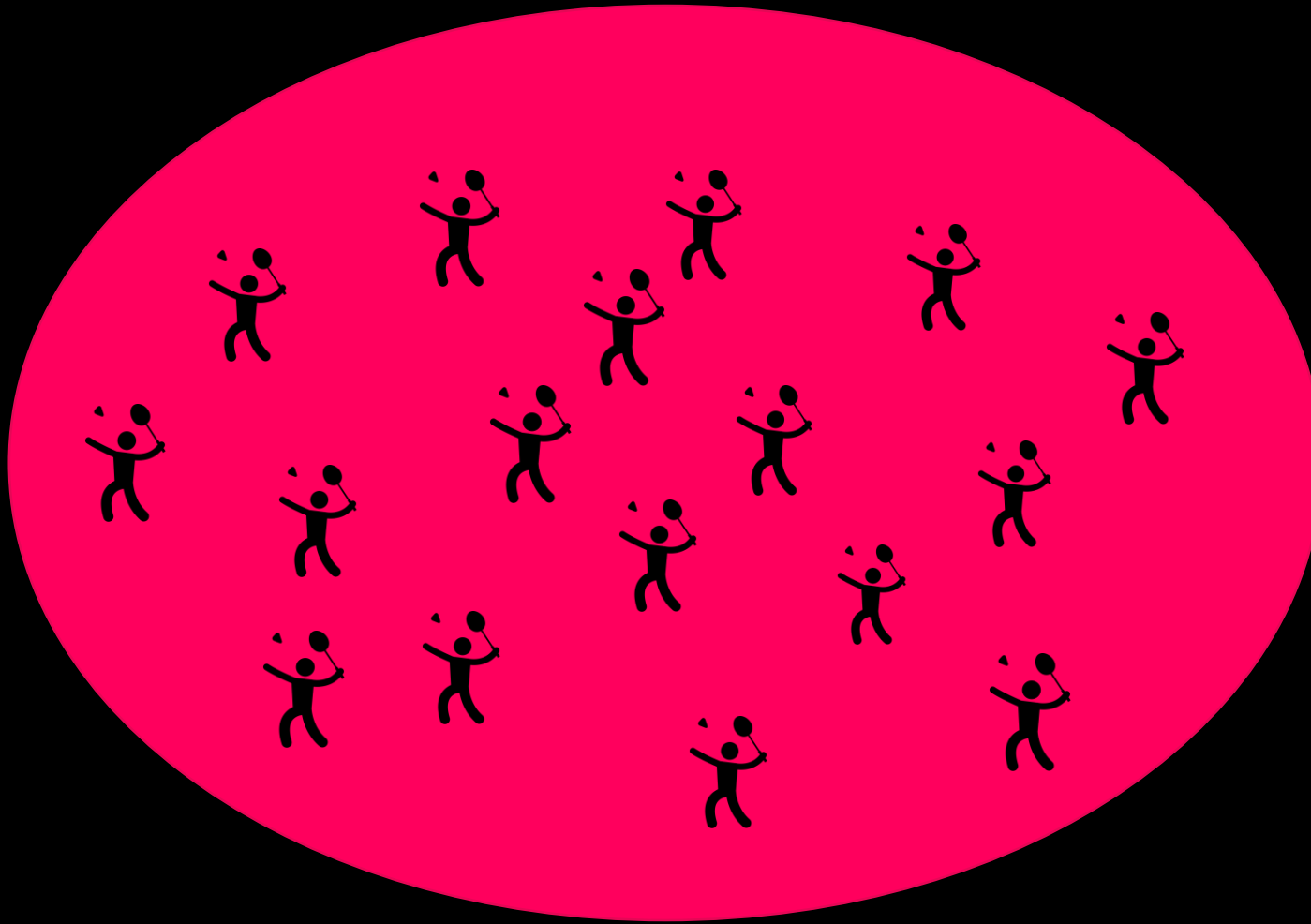
Ranking	Name	Competition result	Stature	% adult stature	Predicted Stature	MQ	Sprint 5m	SB jump	CM jump
1	Reference Boy 12y Ranked 1st	5.1	165	92,7	178,0	105	1,130	225	56
2	Mohd Al Imran		176	92,6	190,0	101	1,300	180	46
3	Reference Boy 12y Ranked 5th	5.5	169	92,3	183,0	111	1,160	231	49
4	Reference Boy 12y Ranked 2nd	5.2	158	90,3	175,0	106	1,160	236	54
5	Clarence Teh Yuan Hong		161	89,4	180,0	89	1,090	169	41
6	Muhammad Faiq Haziq		155	88,6	175,0	88	1,130	204	50
7	Reference Boy 12y Ranked 4th	5.4	148	88,1	168,0	112	1,190	192	41
8	M.Danish Hazriel		148	88,1	168,0	89	1,160	153	40
9	Reference Boy 12y Ranked 6th	5.6	159	86,9	183,0	108	1,080	190	52
10	Muhammad Thaqif		149	86,6	172,0	91	1,160	189	43
11	Reference Boy 12y Ranked 3rd	5.3	144	85,7	168,0	106	1,380	200	47
12	Tan Jia Le		150	84,3	178,0	98	1,250	160	38
13	V. Tamilarasukumar		146	83,9	174,0	94	1,170	157	46
14	Ooi Yi Ping		144	83,7	172,0	104	1,150	191	43
15	Aaron Tai Wei Qin		135	81,8	165,0	100	1,230	186	38
16	Lim Xian Yang		135	80,8	167,0	98	1,230	186	41

Maturity status girls (12y)



Ranking	Name	Competition result	Stature	% adult stature	Predicted Stature	MQ	Sprint 5m	SB jump	CM jump
1	Reference Girl 12y Ranked 1st	5.1	158	98,8	160,0	110	1,280	207	46
2	Reference Girl 12y Ranked 6th	5.6	165	98,2	168,0	112	1,410	186	41
3	Reference Girl 12y Ranked 2nd	5.2	169	97,7	173,0	116	1,190	197	43
4	Ang Jia Yee		155	96,3	161,0	95	1,210	166	35
5	Adiyna Anuar		150	94,9	158,0	91	1,190	170	36
6	Reference Girl 12y Ranked 4th	5.4	149	94,9	157,0	98	1,410	165	41
7	Carmen Ting Wei Wen		151	94,4	160,0	104	1,240	165	37
8	Hazel Chang Shu Ning		162	94,2	172,0	86	1,160	157	34
9	Reference Girl 12y Ranked 3rd	5.3	153	93,9	163,0	104	1,380	170	36
10	Ang Cing Xi		151	93,8	161,0	91	1,150	179	49
11	Reference Girl 12y Ranked 5th	5.5	153	92,7	165,0	102	1,270	199	43
12	Siti Zulaikha		150	91,5	164,0	106	1,230	178	47
13	Ong Xin Yee		148	91,4	162,0	99	1,220	139	34
14	Tan Zhing Hui		150	89,8	167,0	91	1,260	154	38
15	Nurul Athirah		140	88,6	158,0	96	1,190	150	37

Talent pool (boys 12y)



Talent pool (boys 12y)

Ranked by performance (Sprint 5m)



1.00 s.

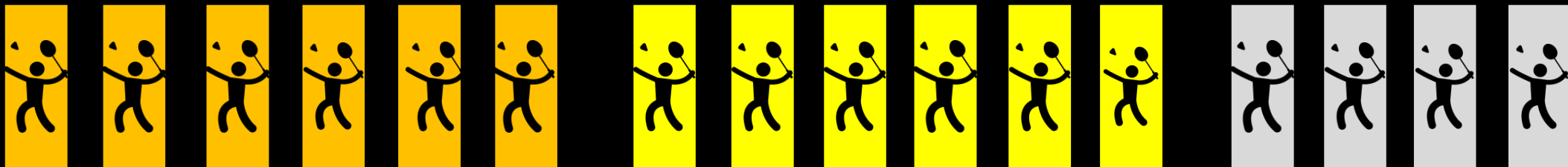
1.10 s.

1.20 s.

1.30 s.

Sprint 5m. in s.

Ranked by maturity status (Khamis – Roche)



1.05 s.

1.08 s.

1.14 s.

1.18 s.

1.19 s.

1.32 s.

1.07 s.

1.09 s.

1.14 s.

1.16 s.

1.17 s.

1.23 s.

1.08 s.

1.19 s.

1.24 s.

1.26 s.

95%.

89%.

85%.

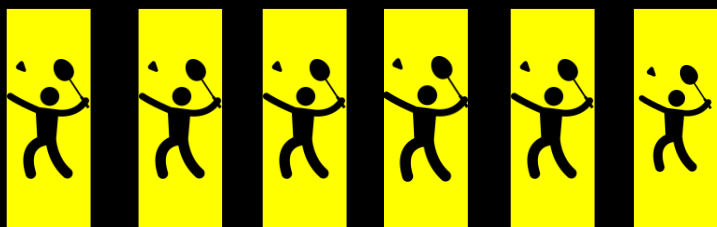
Predicted adult stature in %

Development Talent pool (boys 12y)



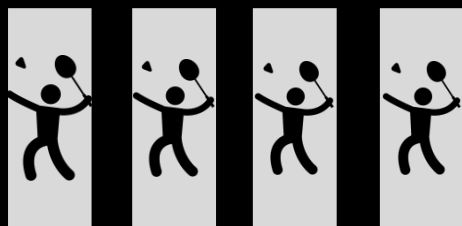
1.05 s. 1.08 s. 1.14 s. 1.18 s. 1.19 s. 1.32 s.

89% - 95% of predicted adult stature.
High risks for injuries during growth spurt.
Reduce load to facilitate structural changes



1.07 s. 1.09 s. 1.14 s. 1.16 s. 1.17 s. 1.23 s.

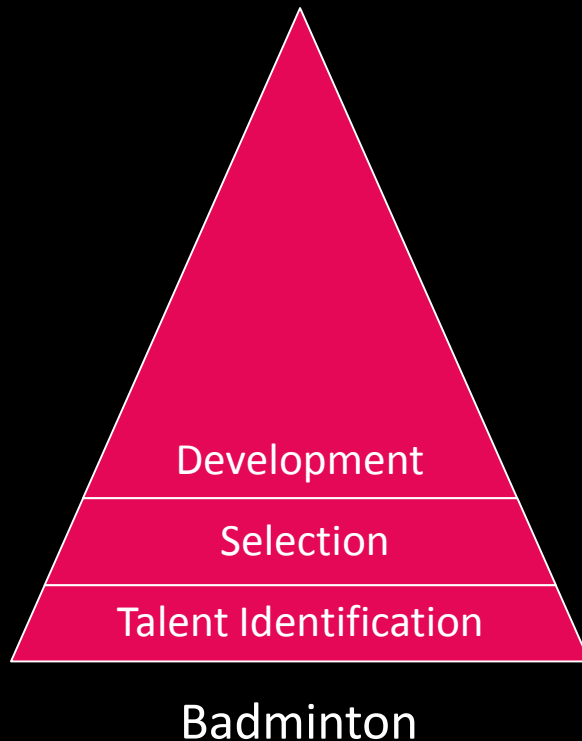
85% - 89% of predicted adult stature.
Risks for injuries during first growth spurt.
Focus on neural adaptations and motor learning



1.08 s. 1.19 s. 1.24 s. 1.26 s.

Under 85% of predicted adult stature.
Low risks for injuries before the growth spurt.
Provide a broad development

Talent Identification and Development in Badminton



Talent Identification

- Coaches' eye
- Physical tests

Talent Selection

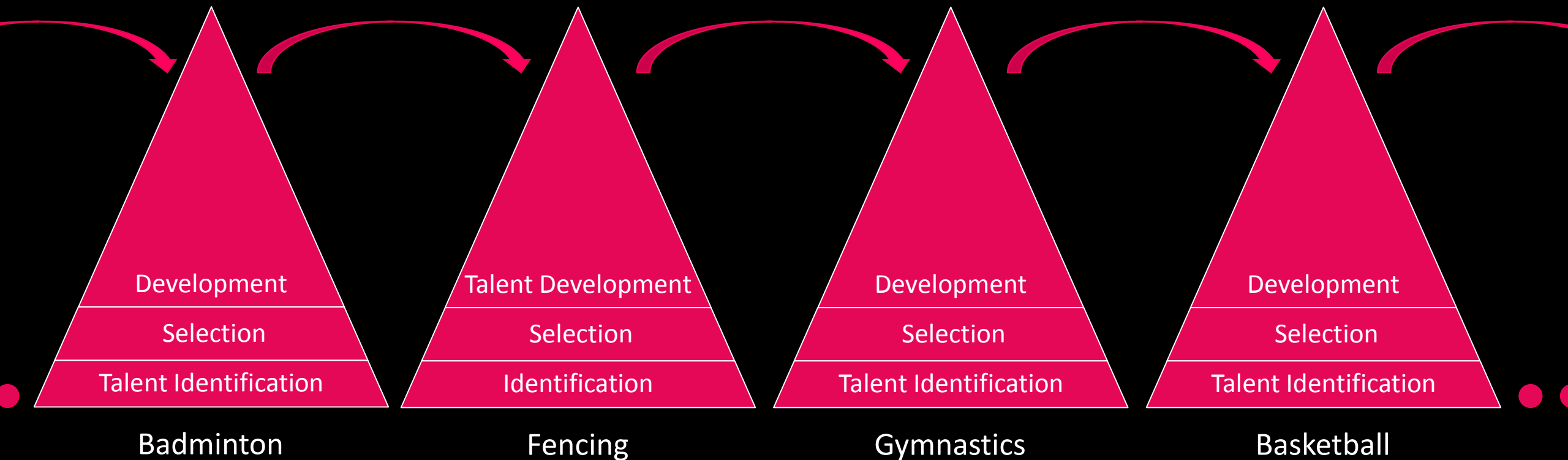
- Selection = Deselection
- Advantage for early maturers

Talent Development

- Early specialisation
- Over exposure injuries
- Motivation / Demotivation

Talent Identification and Development

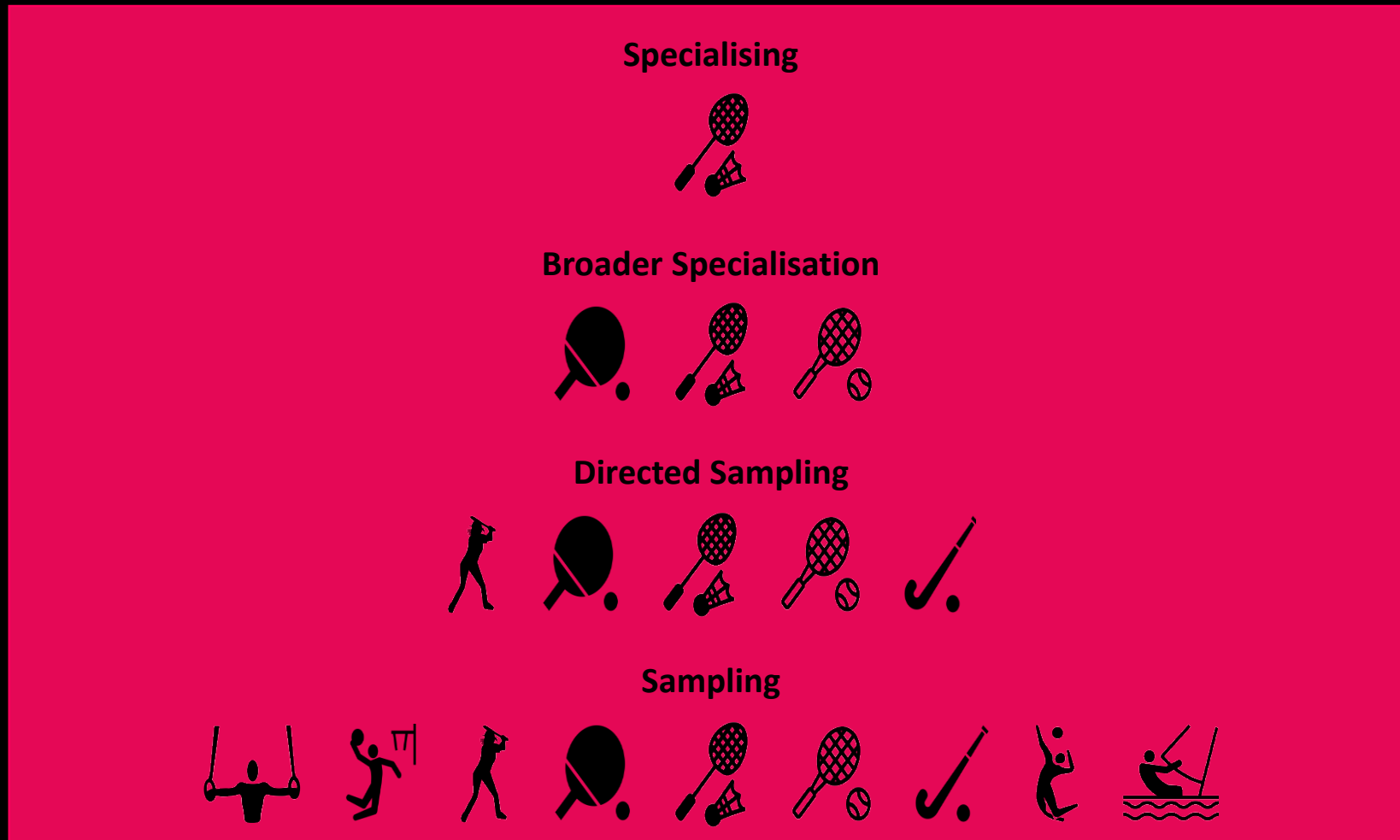
Talent Transfer



Talent Orientation

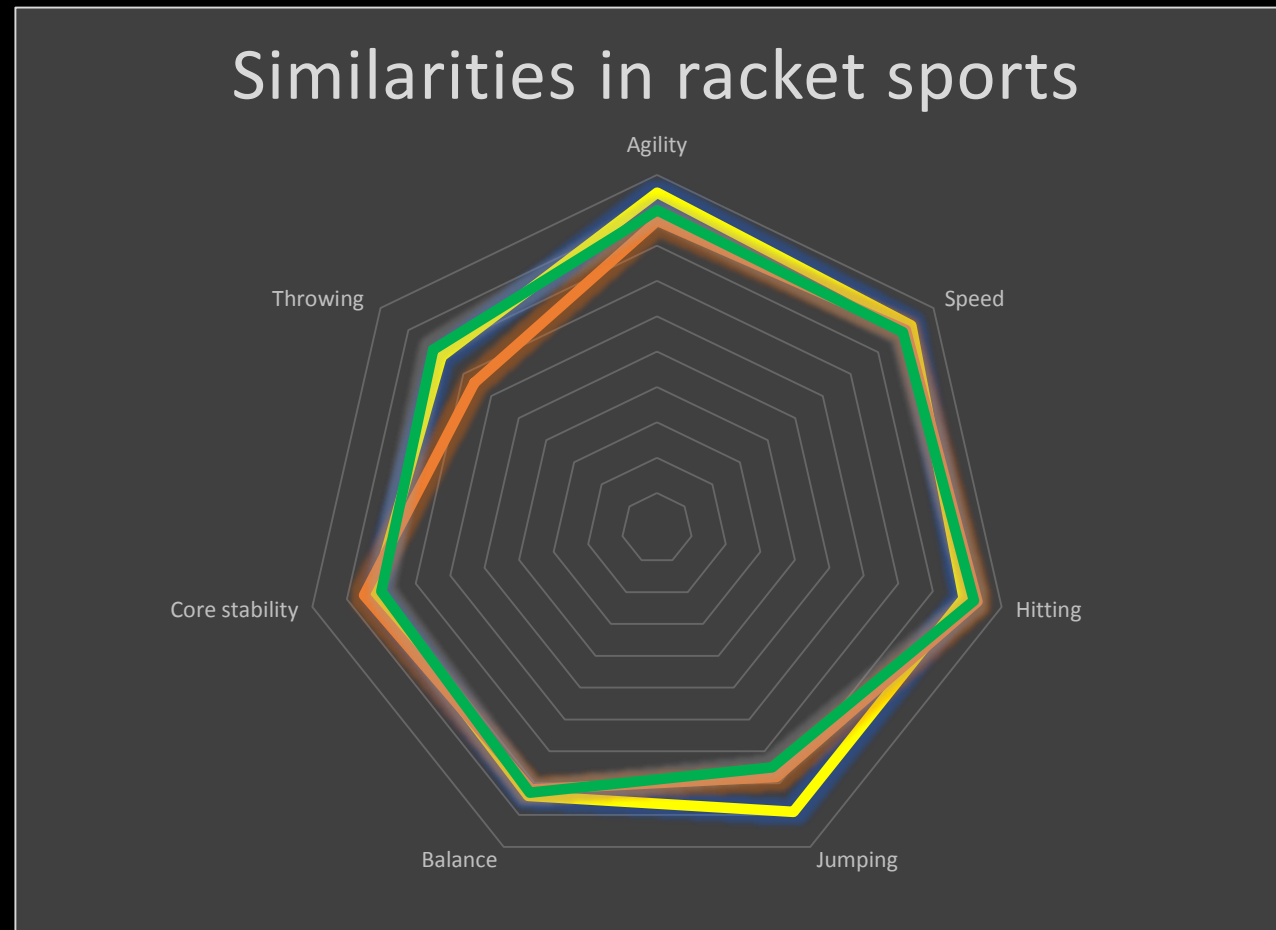
Talent Detection

Talent Development in Badminton



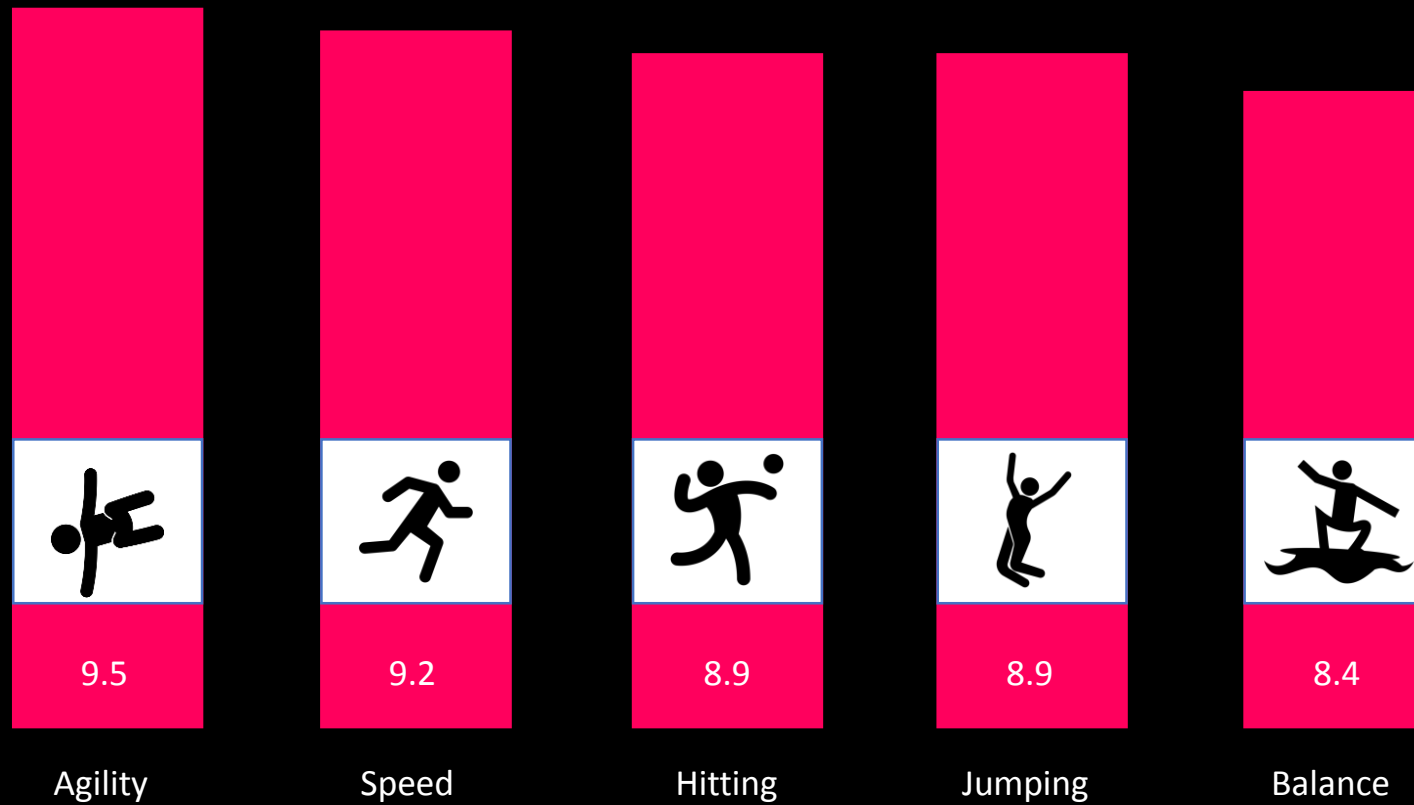


Similarities in racket sports



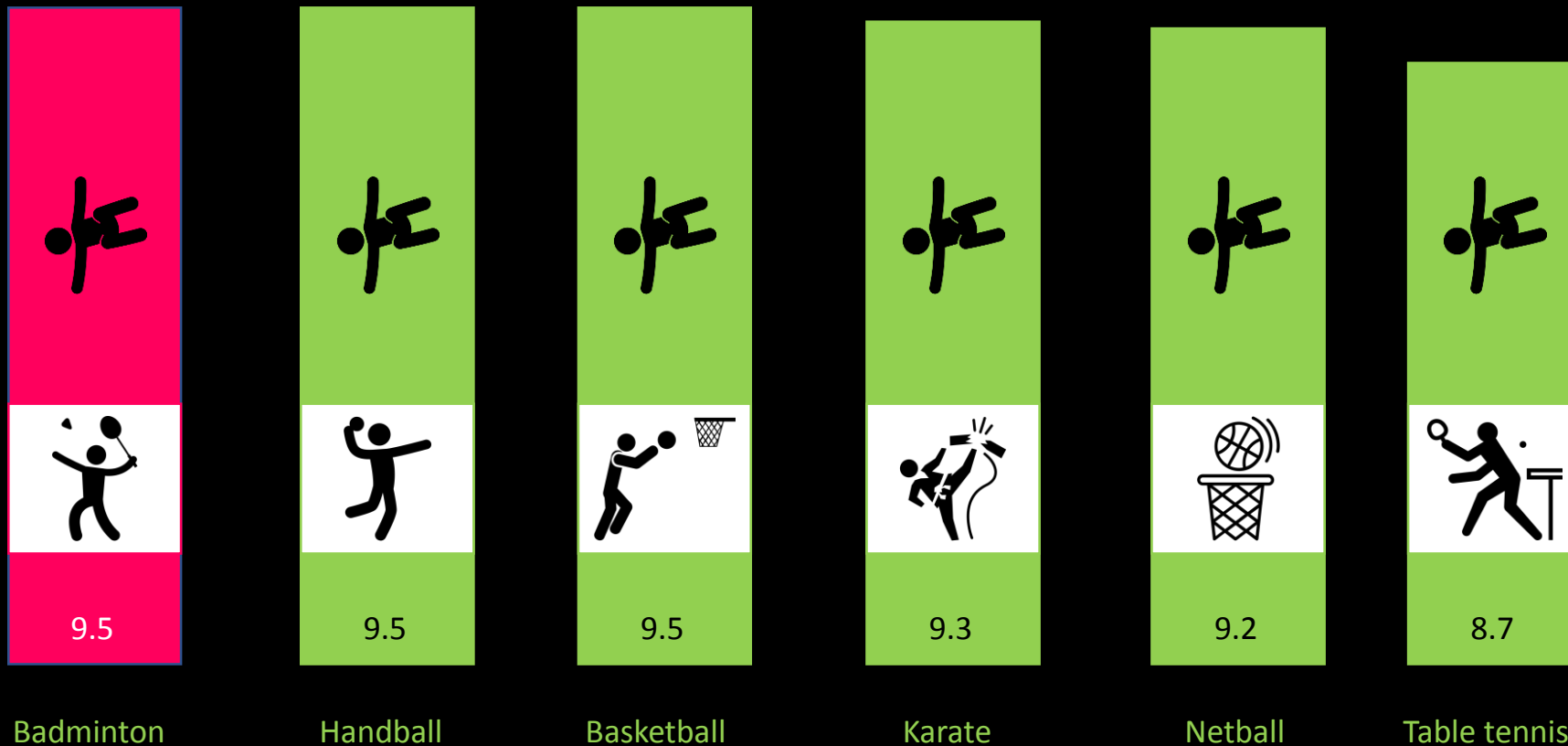
Badminton
Table tennis
Tennis

Talent Development in Badminton



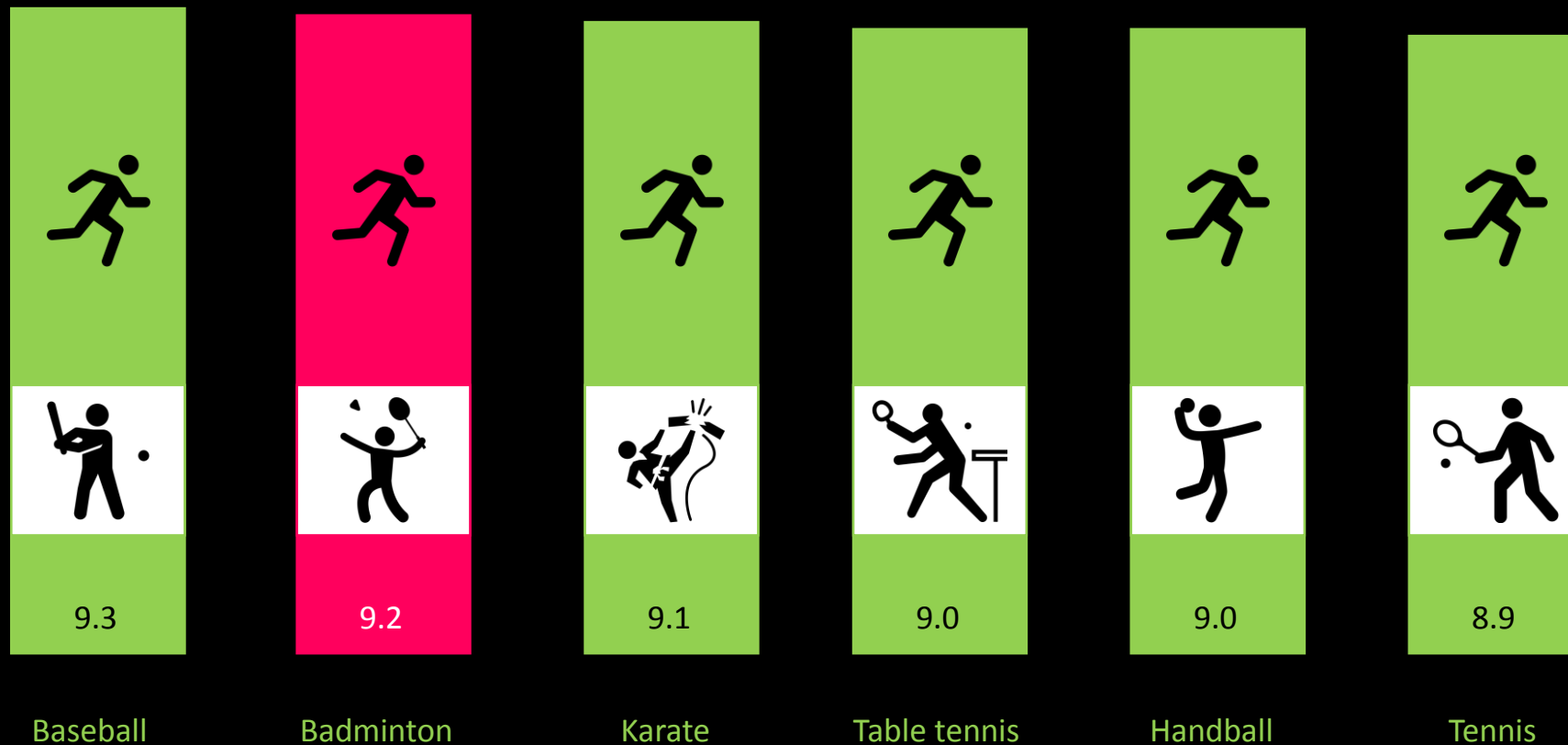
Talent Development in Badminton

Locomotion: Agility



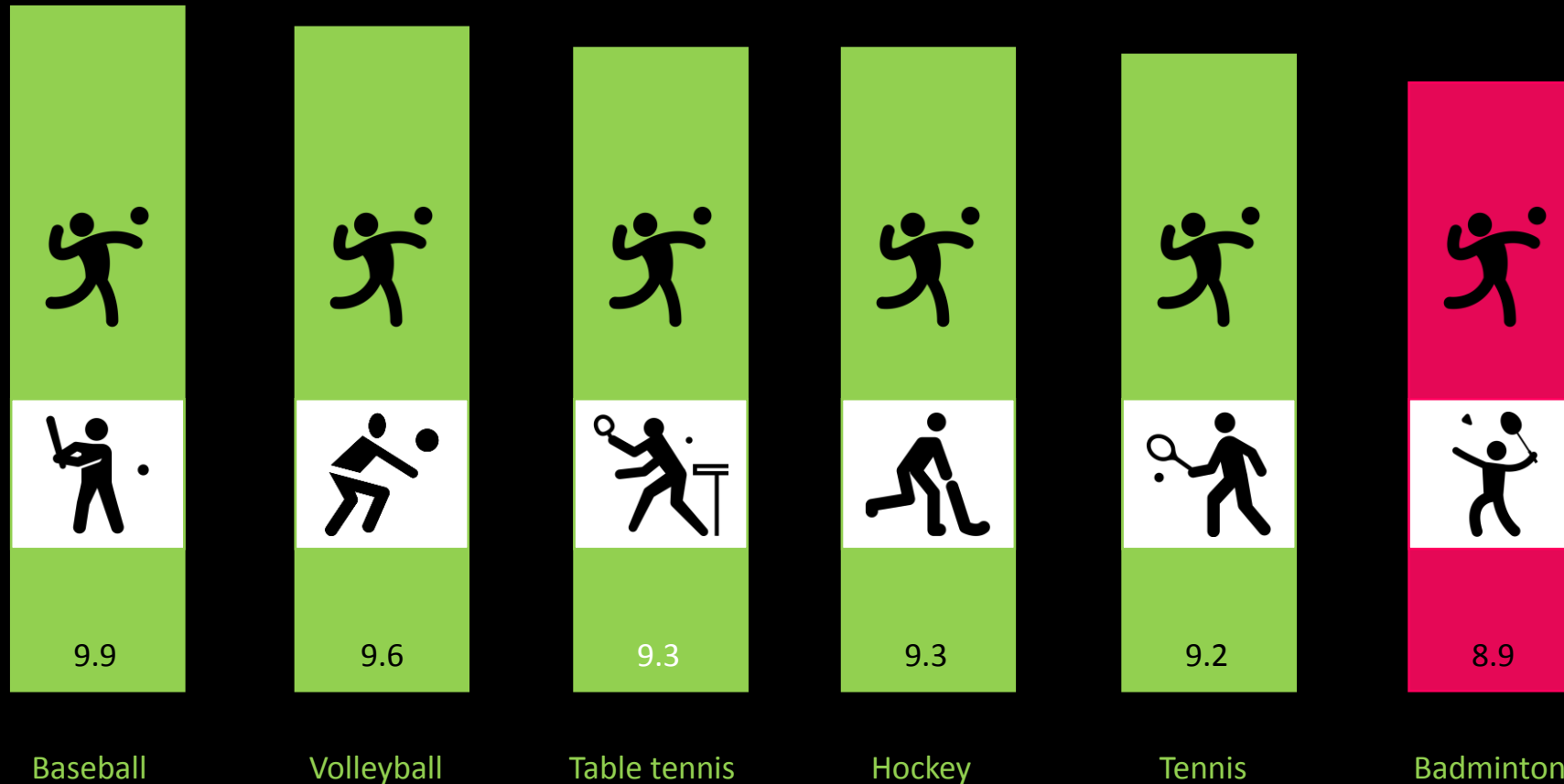
Talent Development in Badminton

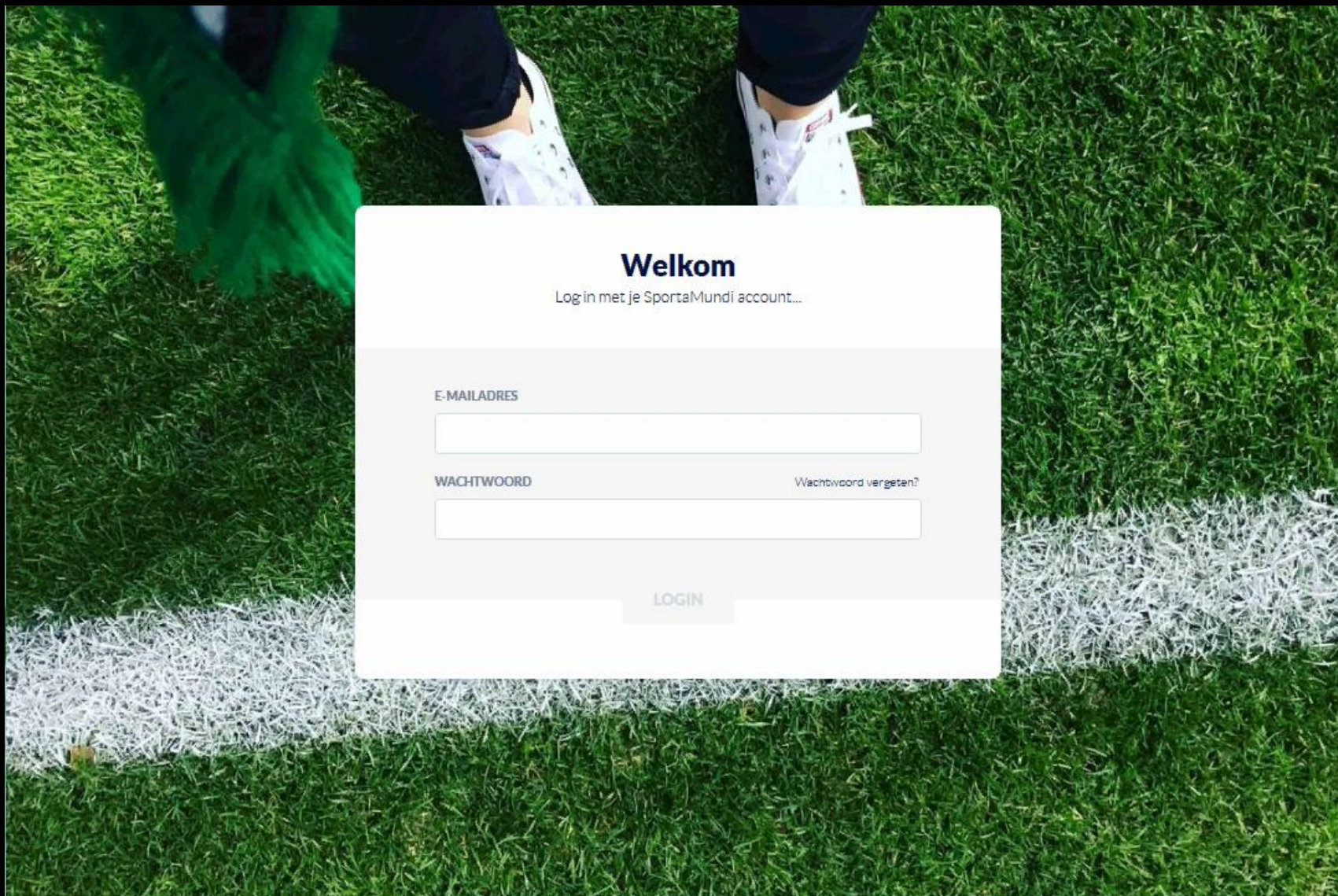
Locomotion: Speed



Talent Development in Badminton

Object control: Hitting





Let's Play

SPORT EN BEWEGEN, 'SWERELDS GROOTSTE TAAL

De Sportsinspirator community is 's werelds eerste online videoplatform in de sport, waar op basis van een wetenschappelijk concept, inspiratie voor sport- en beweegactiviteiten gemakkelijk en gratis vindbaar is gemaakt!

Veel inspiratie gewenst,
Het Sportsinspirator team



https://youtu.be/Y1CHCdsabDs?&theme=dark&color=white&autoplay=1&autohide=1&modestbranding=1&fs=0&showinfo=0&rel=0&iv_load_policy=3&controls=0&loop=1&playlist=Y1CHCdsabDs&mute=1



Take home message 1

Minimise Talent loss



Take home message 2

**Change the selection
system into a
development system**



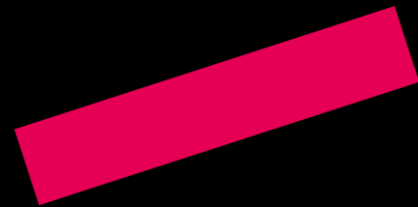
Take home message 3

**Enlarge the talent pool
implement motor test in all
clubs**



Take home message 4

**Keep the deselected
players in a ‘futures’ pool**



Take home message 5

**Avoid deselection of late
maturers
apply Bio-Banding**



Take home message 6

**Provide a broad follow
up program
and prevent injuries**



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