

Please cite the Published Version

Read, D , Till, K, Dalton-Barron, N, Beasley, G and Jones, B (2018) A comparison of the maximum locomotor intensities in age-grade international and academy rugby union. In: The 23rd Annual European College of Sports Science (ECSS) Congress, 04 July 2018 - 07 July 2018, Dublin, Ireland.

Publisher: International Council of Sport Science and Physical Education

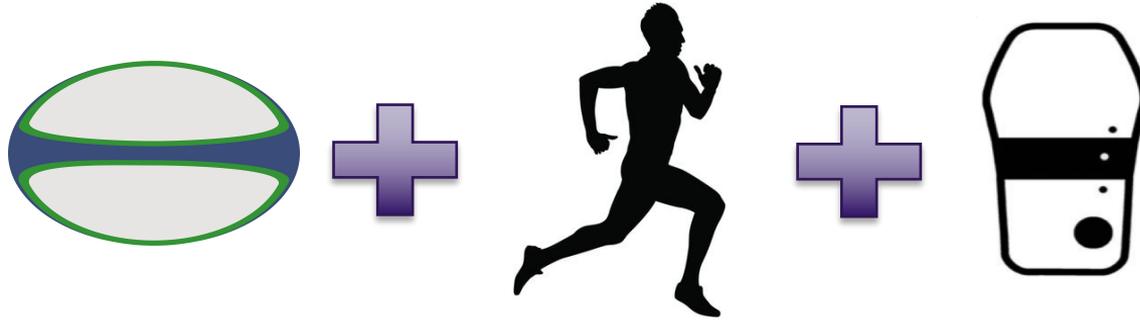
Downloaded from: <https://e-space.mmu.ac.uk/625798/>

Usage rights:  In Copyright

Enquiries:

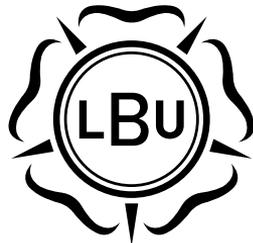
If you have questions about this document, contact openresearch@mmu.ac.uk. Please include the URL of the record in e-space. If you believe that your, or a third party's rights have been compromised through this document please see our Take Down policy (available from <https://www.mmu.ac.uk/library/using-the-library/policies-and-guidelines>)

A COMPARISON OF THE MAXIMUM LOCOMOTOR INTENSITIES IN AGE-GRADE INTERNATIONAL AND ACADEMY RUGBY UNION



Dale Read^{1,2}, Kevin Till^{1,2}, Nicholas Dalton-Barron^{1,3}, Grant Beasley⁴ & Ben Jones^{1,2,5}

¹Leeds Beckett University, ²Yorkshire Carnegie Rugby Union Football Club, ³Catapult Sports, ⁴The Rugby Football Union, ⁵The Rugby Football League



LEEDS
BECKETT
UNIVERSITY





England
Rugby

Amateur Club

School

U18 Rugby
Union in
England

Academy

International

The
'Performance Pathway'



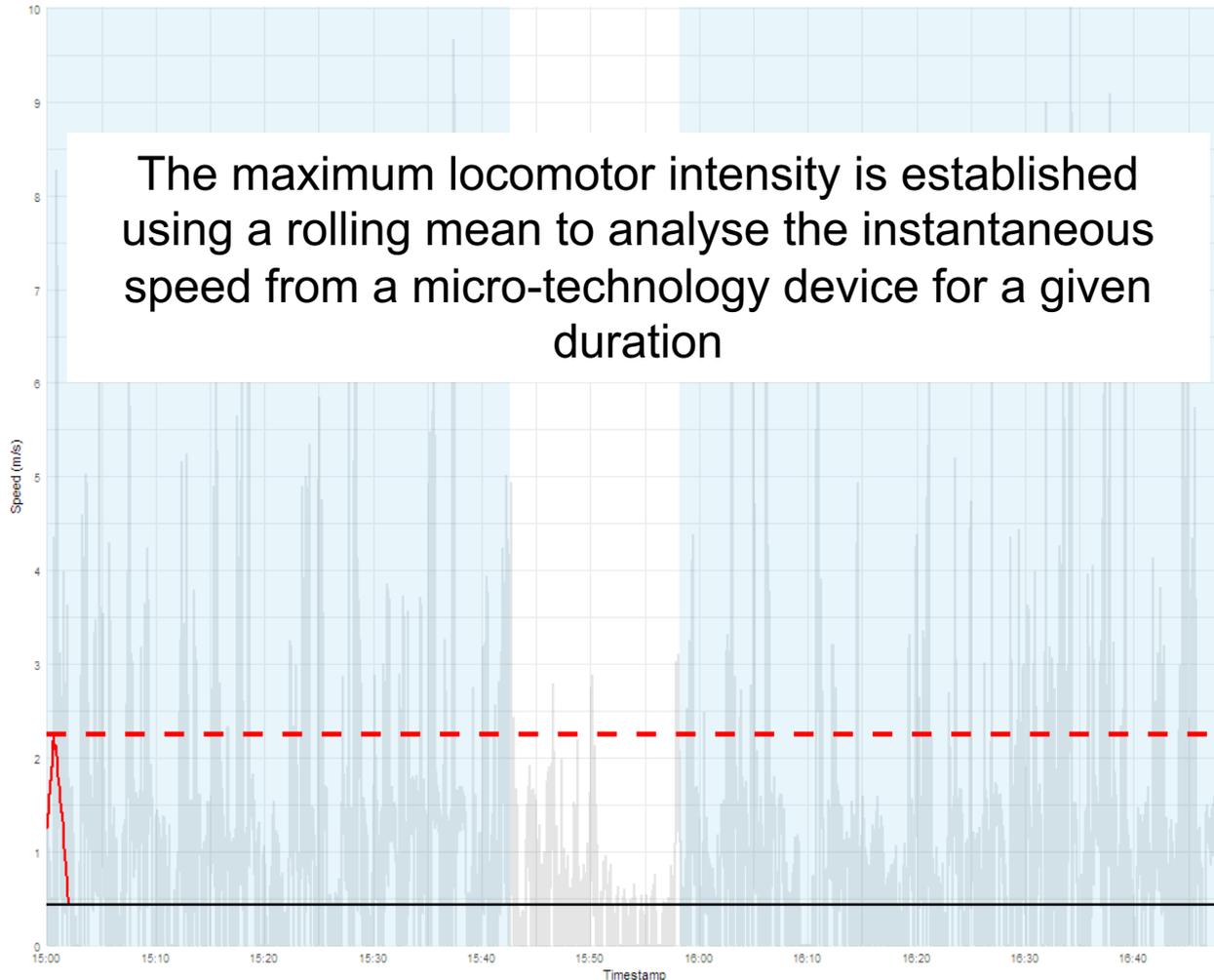


@nickdalts



LEEDS
BECKETT
UNIVERSITY

The maximum locomotor intensity is established using a rolling mean to analyse the instantaneous speed from a micro-technology device for a given duration



1. To **quantify** the maximum locomotor intensities from U18 **international and academy** rugby union matches
2. To **compare** the maximum locomotor intensities between U18 **international and academy matches** using two variables (relative distance and high-speed relative distance)
3. To **compare** the maximum locomotor intensities between U18 international and academy **players that represented both playing levels**



17.7 ± 0.5
years

17.6 ± 0.6
years

1
nation

142
participants

10-Hz
S5 Optimeye
Catapult

185.4 ± 7.3
cm

182.6 ± 9.5
cm

232
observations

7.17 Firmware
5.17 Sprint
software

7
academies

93.2 ± 13.2
kg

92.6 ± 11.7
kg

16
participants
represented
both playing
levels

Front row
2nd & Back
Scrum halves
Outside backs



1. Identify 'playing time' only

- Remove warm up, HT, bench, etc.
- 10-min minimum for inclusion

(Delaney et al., 2015, Read et al. 2018)

2. Export the instantaneous speed at 10-Hz

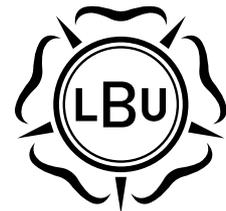
3. Use R to 'clean' the data

- $>10 \text{ m}\cdot\text{s}^{-1}$
- <6 satellites
- >2.0 Horizontal dilution of precision

(Weston et al., 2015)

4. Use R to analyse data

- Relative distance & high-speed relative distance ($>5.5 \text{ m}\cdot\text{s}^{-1}$)
- Rolling (0.1 s) mean
- 15 s, 30 s, 1, 2, 2.5, 3, 4, 5, 10-min (Read et al., 2018)



**LEEDS
BECKETT
UNIVERSITY**

Linear mixed model

- Random: 'players code' and 'match code'
- Fixed: 'group' (international/academy and position)
- SWC established for each variable (0.2 between-subject standard deviation)
 - (RD = 3.8%; HS·min⁻¹ = 7.9%)
- Differences shown as Cohen's *d* effect size (ES) ±90% confidence intervals
- Magnitude-based inferences calculated
 - 'Unclear' when crossing the upper and lower bound of the SWC

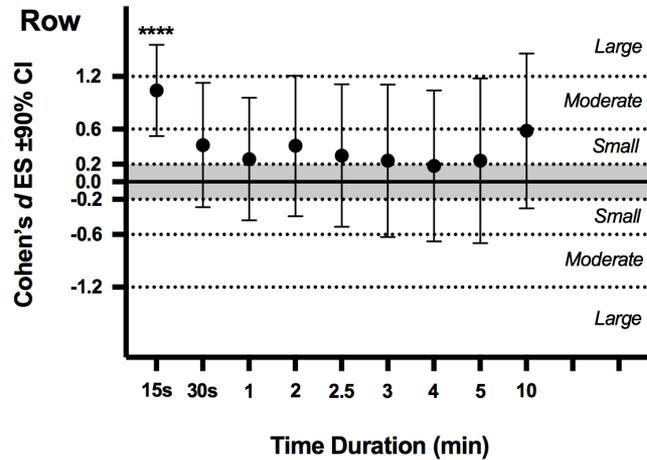
1. Maximal relative distance ($\text{m}\cdot\text{min}^{-1}$) (A) and high speed ($>5.5 \text{ m}\cdot\text{s}^{-1}$) relative distance ($\text{m}\cdot\text{min}^{-1}$) (B) for international and academy rugby union players by position and time duration.

A	Front Row		Second & Back Row		Scrum Half		Outside Backs	
	International	Academy	International	Academy	International	Academy	International	Academy
15 s	268 ± 35	236 ± 21	281 ± 37	269 ± 26	317 ± 43	297 ± 41	316 ± 38	303 ± 39
30 s	197 ± 19	186 ± 17	206 ± 22	213 ± 22	238 ± 18	235 ± 33	231 ± 25	233 ± 33
1 min	154 ± 15	148 ± 16	161 ± 16	166 ± 14	189 ± 17	184 ± 17	178 ± 15	174 ± 25
2 min	127 ± 12	120 ± 17	131 ± 13	134 ± 13	158 ± 12	150 ± 22	143 ± 15	138 ± 20
2.5 min	119 ± 12	113 ± 16	122 ± 14	126 ± 13	145 ± 12	143 ± 23	134 ± 15	129 ± 18
3 min	112 ± 9	108 ± 16	113 ± 12	120 ± 14	138 ± 10	136 ± 22	127 ± 12	124 ± 70
4 min	106 ± 9	100 ± 15	108 ± 10	110 ± 14	131 ± 11	125 ± 15	119 ± 11	115 ± 15
5 min	98 ± 7	94 ± 13	100 ± 8	102 ± 14	122 ± 6	116 ± 13	113 ± 10	107 ± 15
10 min	87 ± 7	80 ± 11	89 ± 8	89 ± 11	109 ± 7	98 ± 13	101 ± 9	93 ± 12

B	Front Row		Second & Back Row		Scrum Half		Outside Backs	
	International	Academy	International	Academy	International	Academy	International	Academy
15 s	156 ± 64	96 ± 41	180 ± 61	153 ± 46	242 ± 70	203 ± 78	230 ± 60	212 ± 57
30 s	79 ± 31	49 ± 21	94 ± 32	79 ± 24	134 ± 40	111 ± 36	123 ± 29	119 ± 40
1 min	40 ± 16	26 ± 11	49 ± 16	44 ± 15	71 ± 24	62 ± 23	65 ± 15	65 ± 22
2 min	21 ± 8	14 ± 6	28 ± 10	25 ± 11	46 ± 12	34 ± 11	40 ± 10	38 ± 12
2.5 min	18 ± 7	11 ± 5	24 ± 9	21 ± 10	42 ± 13	30 ± 10	35 ± 8	34 ± 11
3 min	17 ± 6	10 ± 5	22 ± 9	19 ± 8	38 ± 11	27 ± 9	33 ± 7	30 ± 10
4 min	13 ± 5	8 ± 3	19 ± 7	17 ± 8	33 ± 10	21 ± 6	27 ± 6	25 ± 8
5 min	11 ± 4	7 ± 3	16 ± 6	14 ± 7	28 ± 9	18 ± 5	24 ± 6	21 ± 7
10 min	7 ± 3	5 ± 2	10 ± 4	9 ± 5	19 ± 6	13 ± 4	17 ± 4	15 ± 5

Data are presented as mean ± standard deviation.

Front Row



2.

International vs. Academy

Relative distance

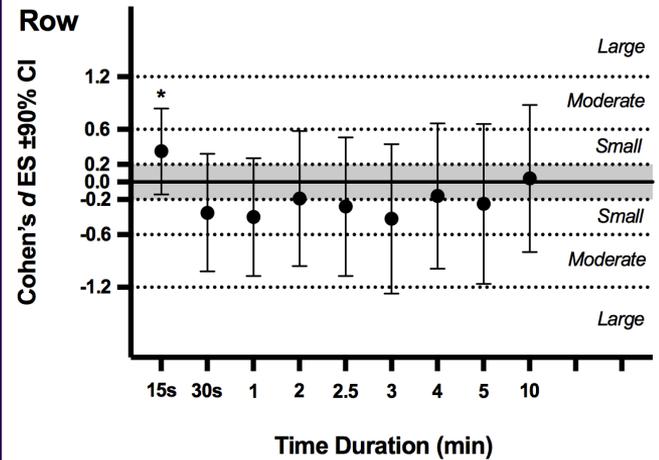
* = Possibly

** = Likely

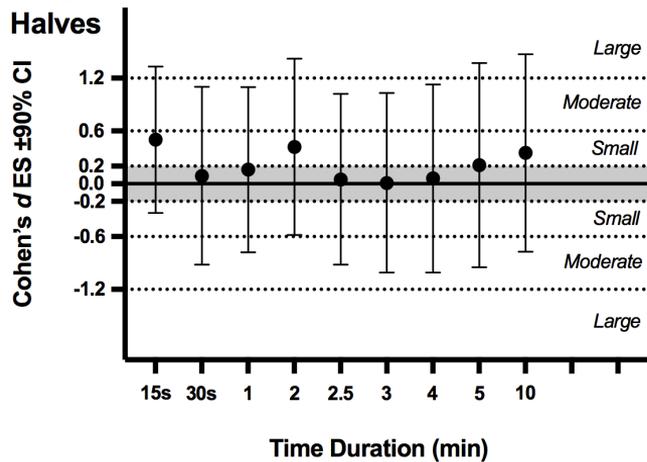
*** = Very Likely

**** = Almost Certainly

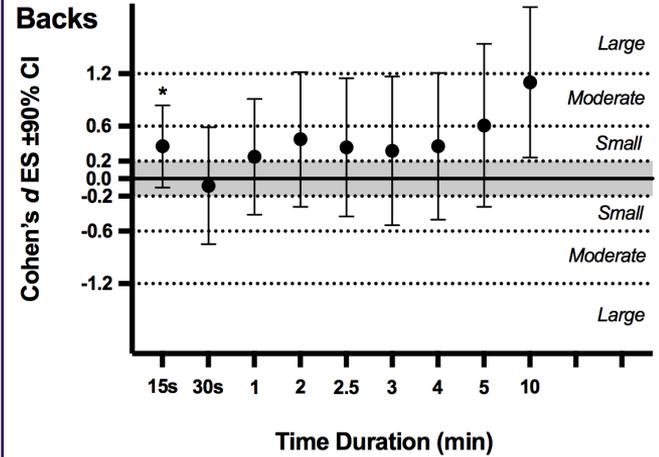
Second & Back Row

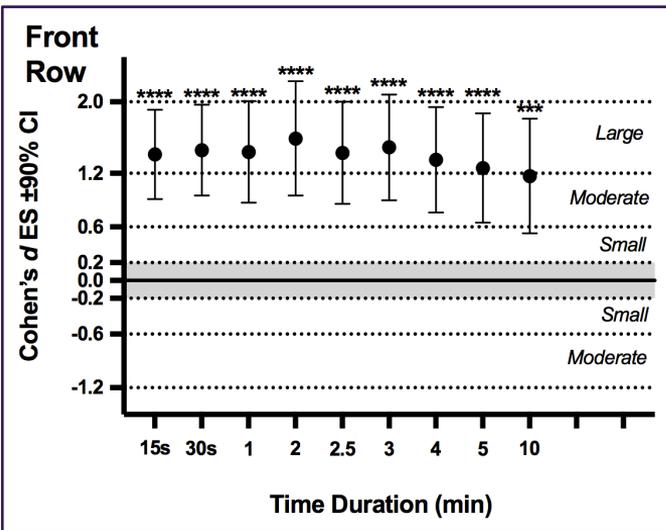


Scrum Halves



Outside Backs

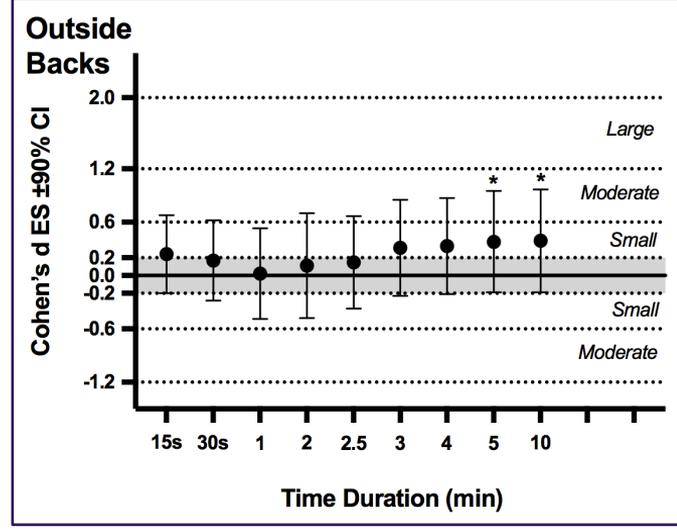
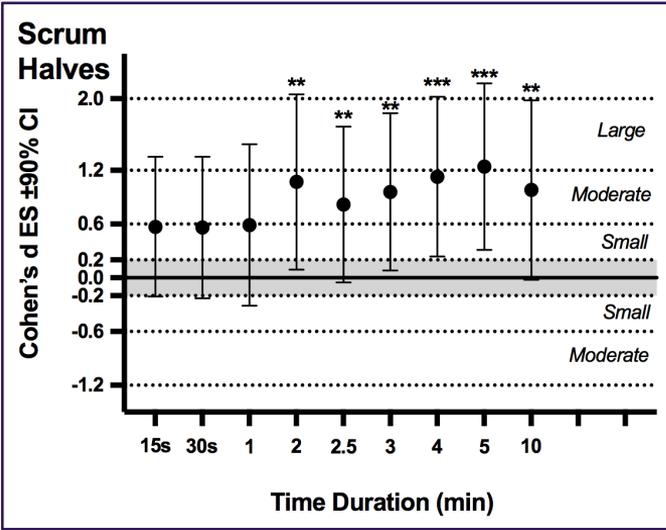
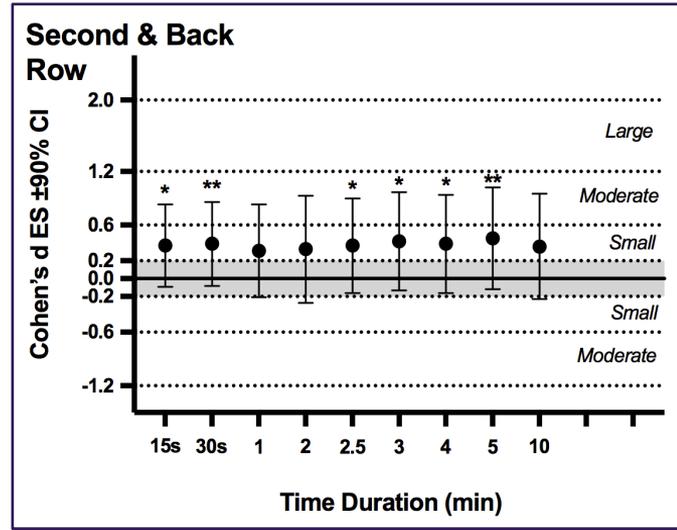




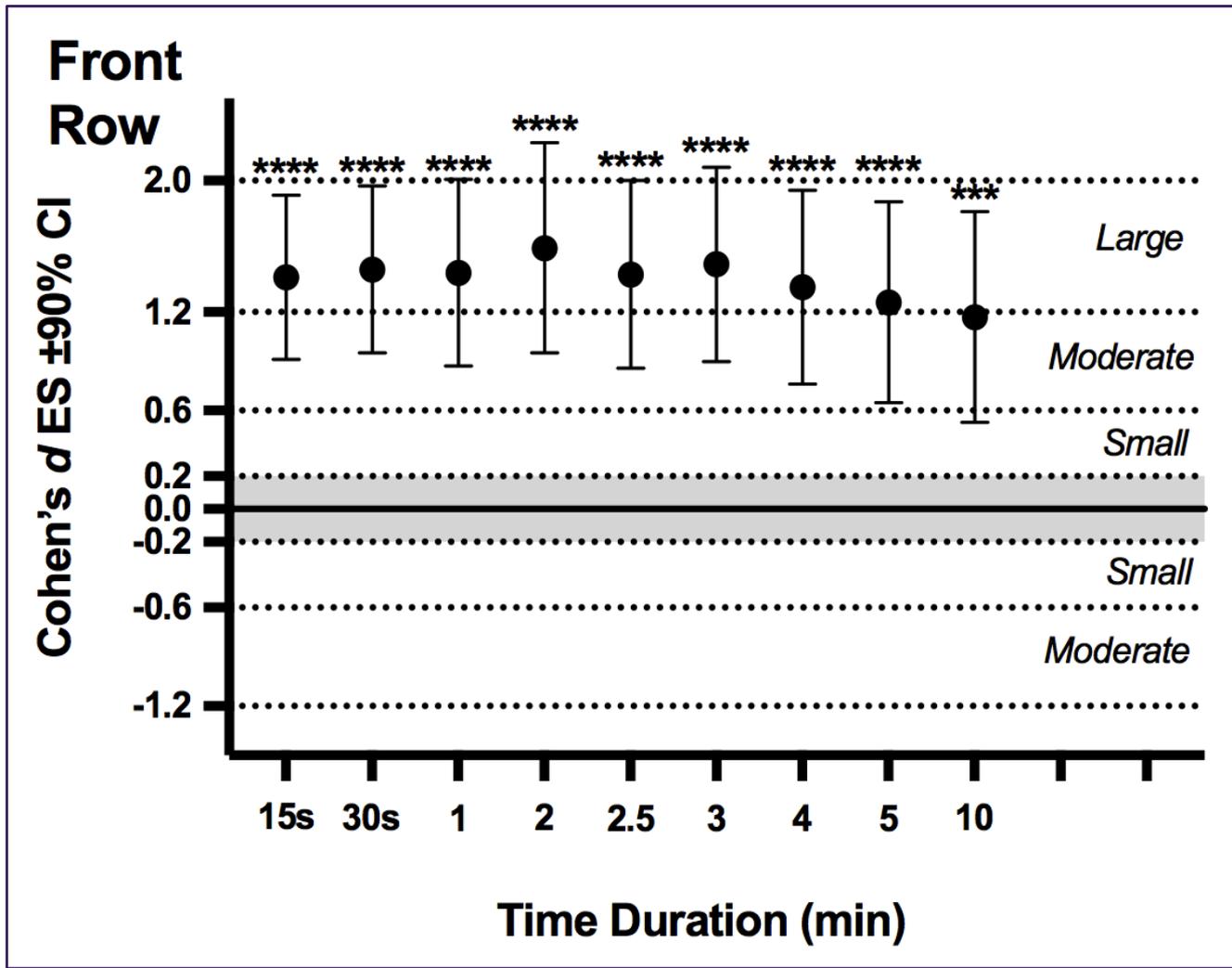
2. International vs. Academy

High-Speed Relative distance (>5.5 m·s⁻¹)

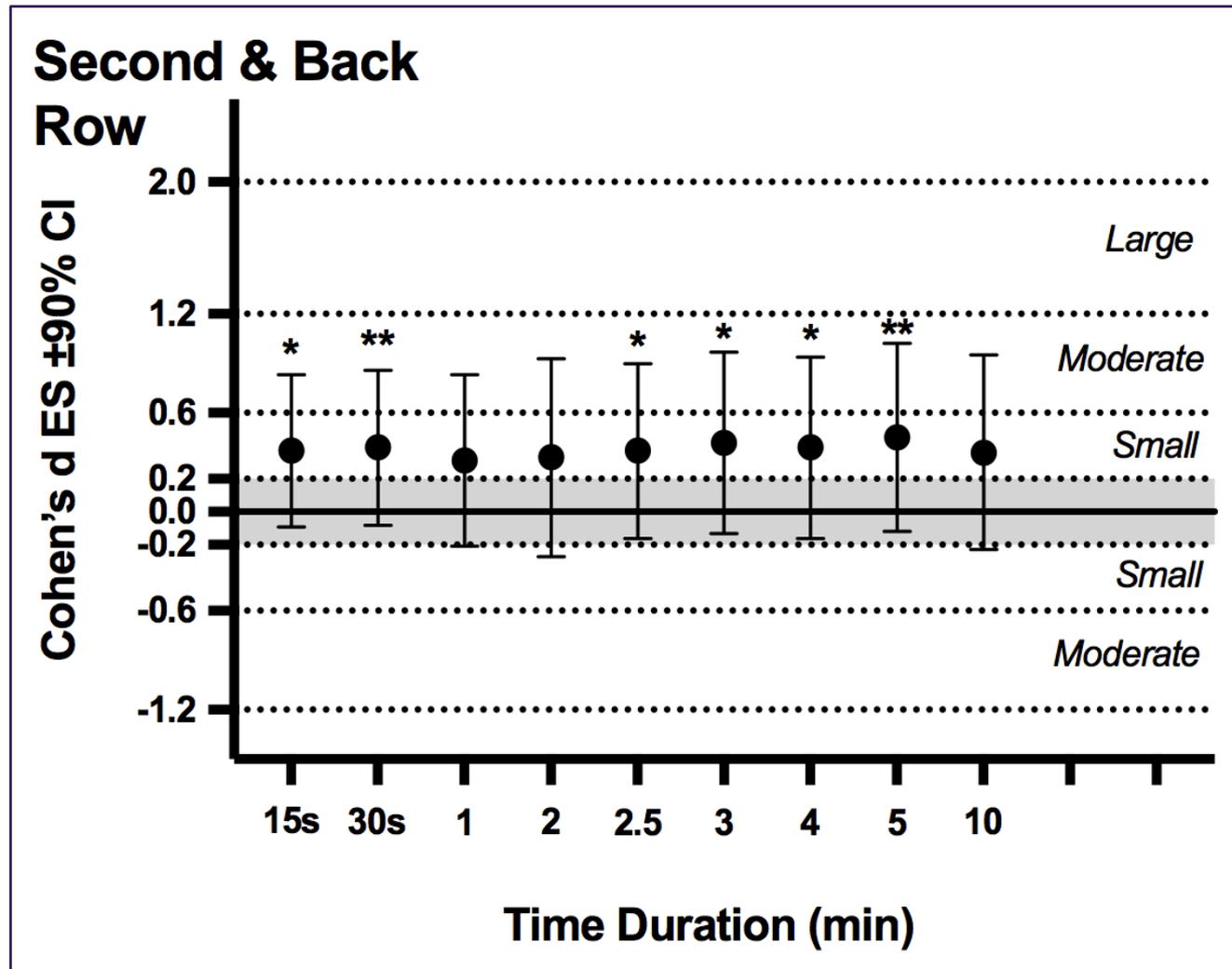
* = Possibly
 ** = Likely
 *** = Very Likely
 **** = Almost Certainly



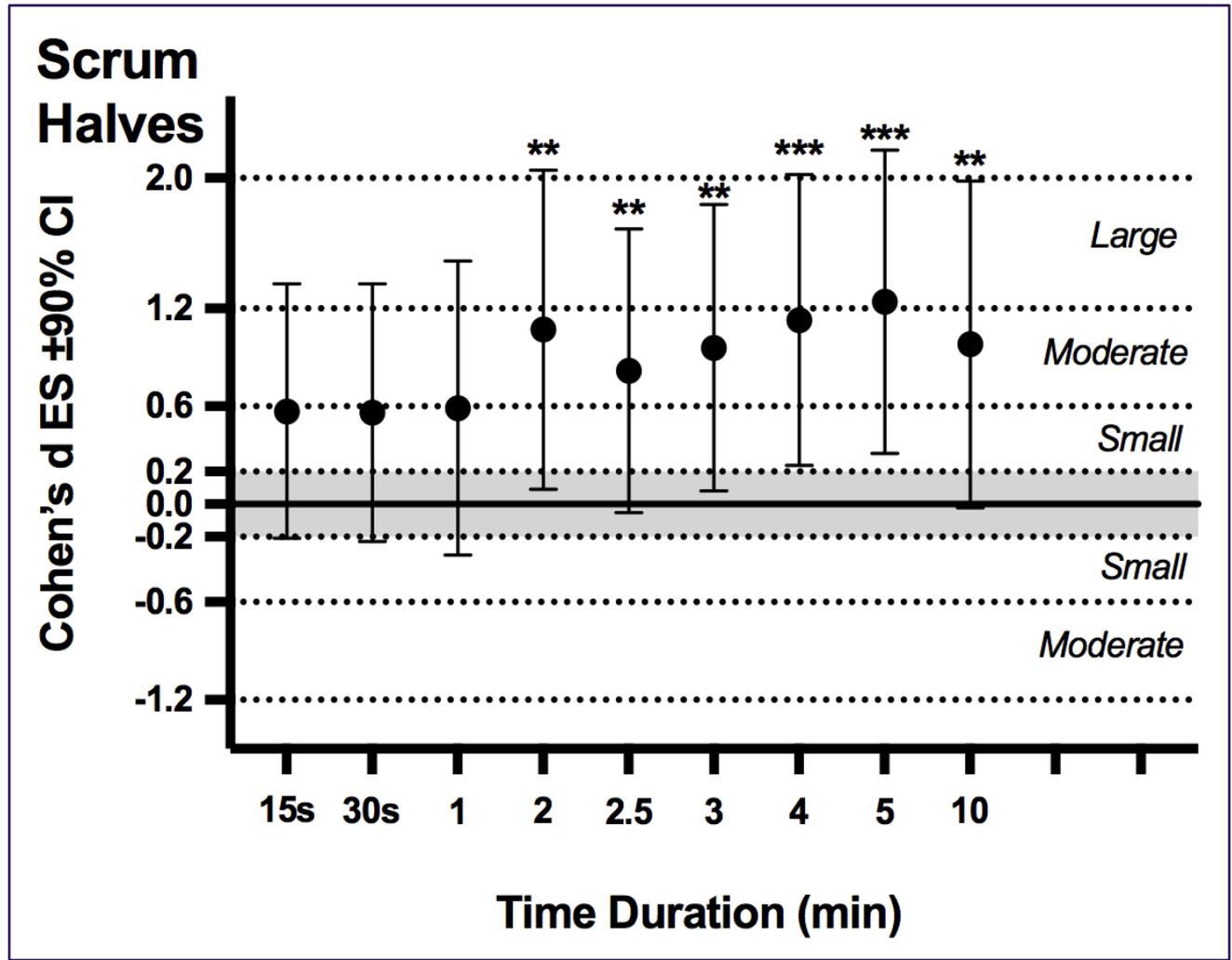
2.



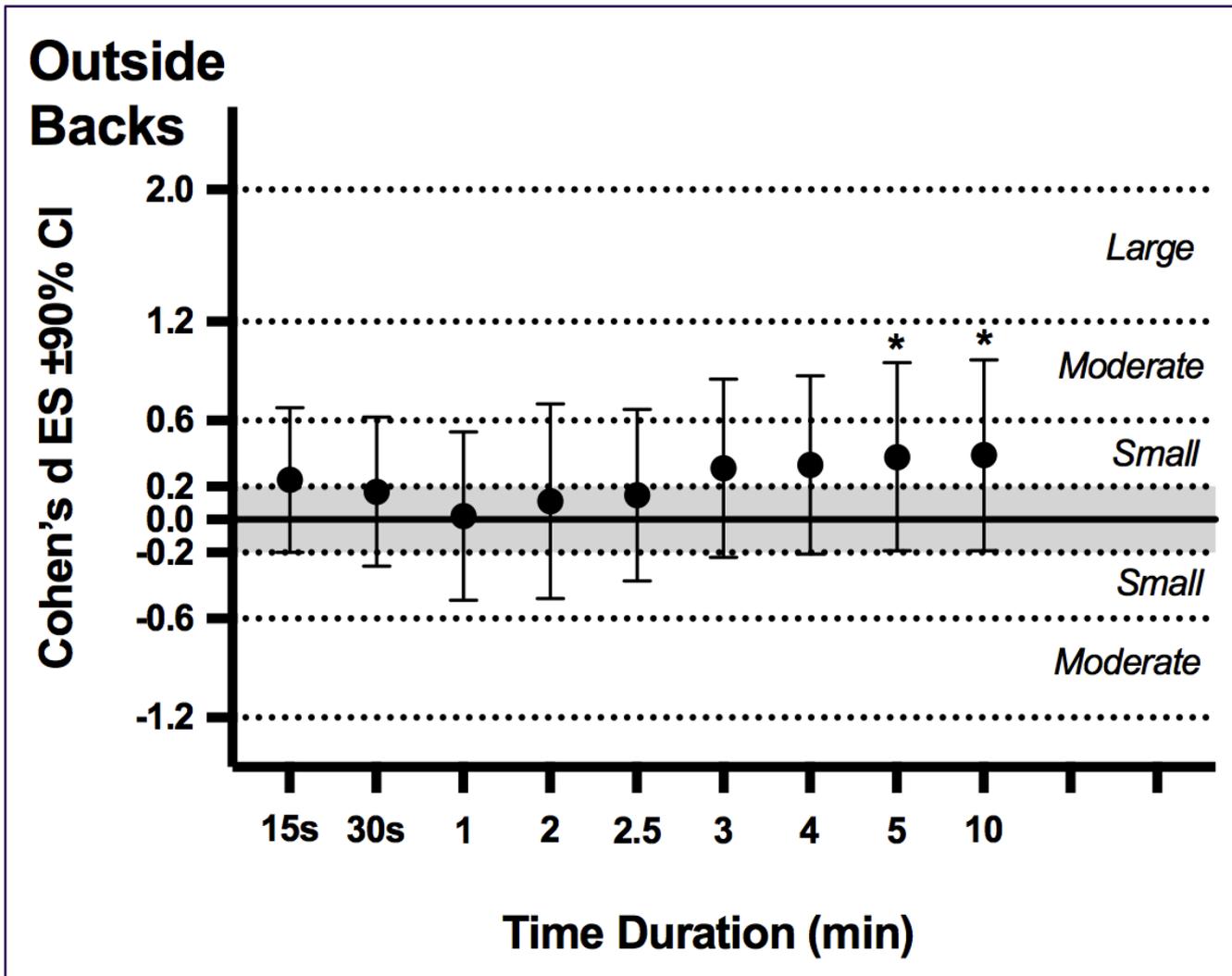
2.



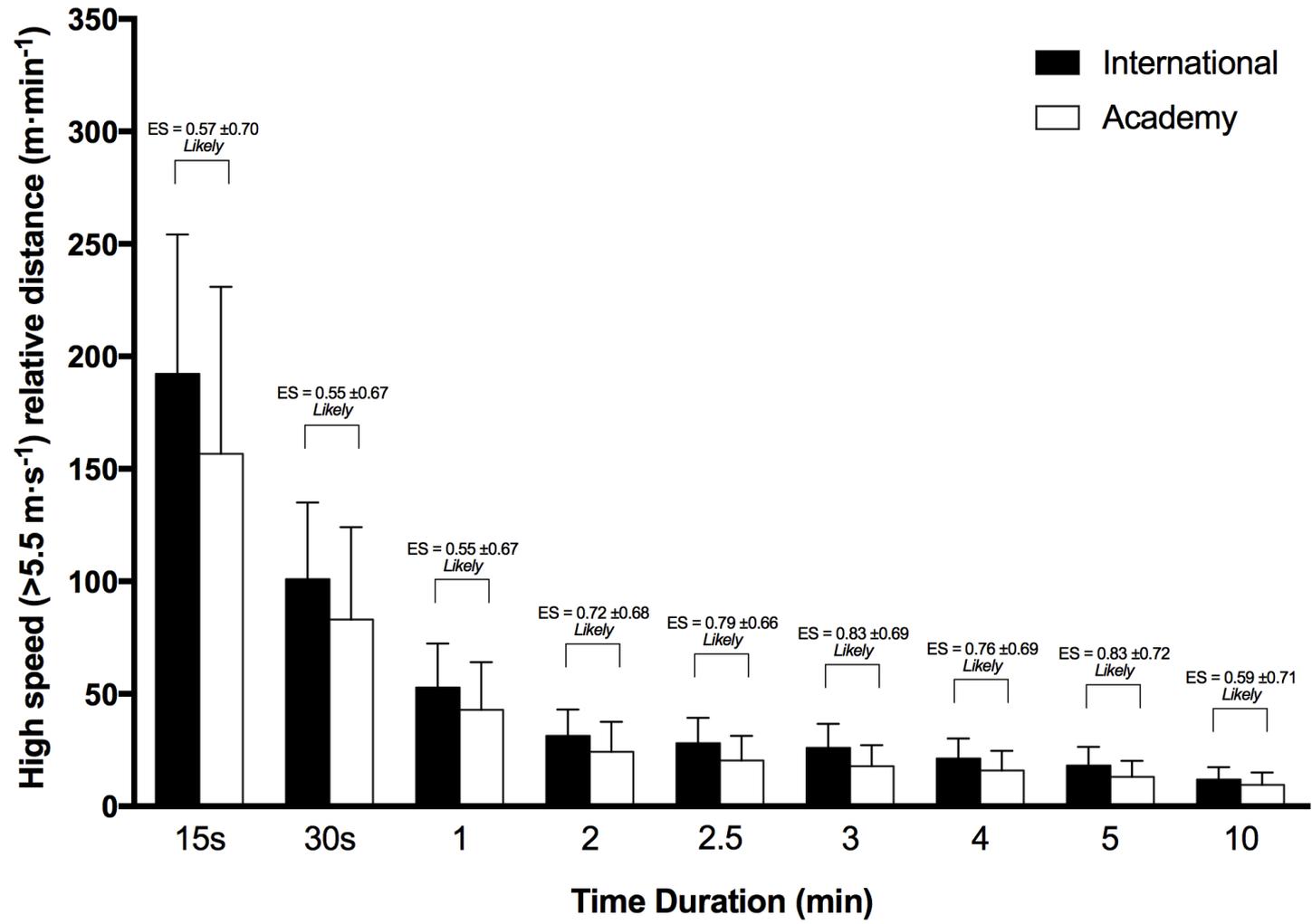
2.



2.



3.



Summary

2.

The maximum locomotor intensities (**relative distance**) largely showed *unclear* results **between international and academy** players.

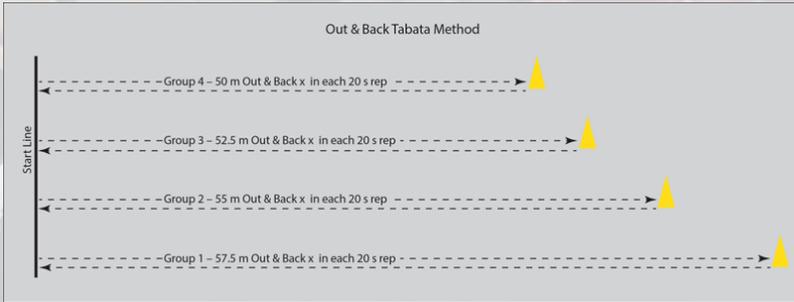
2.

The maximum locomotor intensities (**high-speed relative distance** ($>5.5 \text{ m}\cdot\text{s}^{-1}$)) were **greater for international front row** players (*moderate* and *large* effects), **greater in selected time durations for back and second row** (*small* effects), **scrum halves** (*moderate* and *large* effects) and **outside backs** (*small* effects).

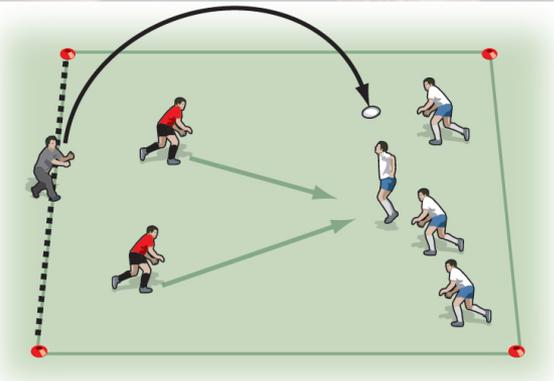
3.

The maximum locomotor intensities (**high-speed relative distance** ($>5.5 \text{ m}\cdot\text{s}^{-1}$)) were **greater for international players that represented both playing levels.**

Practical Applications



Longest ball in play period = 2.5 min



	FR	SR & BR	SH	OB
Total Distance (m)	298	305	363	335
Relative Distance (m·min ⁻¹)	119	122	145	134
High-Speed Total Distance (m)	45	60	105	88
High-Speed Relative Distance (m·min ⁻¹)	18	24	42	35



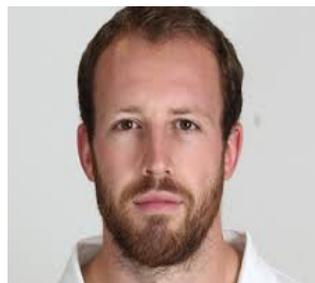
Professor Kevin Till



Nicholas Dalton-Barron



Professor Ben Jones



Grant Beasley

This research, travel and conference fees were funded by the Carnegie School of Sport,
Leeds Beckett University, UK



LEEDS
BECKETT
UNIVERSITY



Questions (or any comments) welcome

Dale Read
d.read@leedsbeckett.ac.uk

 @DaleRead4