# High-intensity intermittent running performance in relation to age and maturation in highly-trained young soccer players

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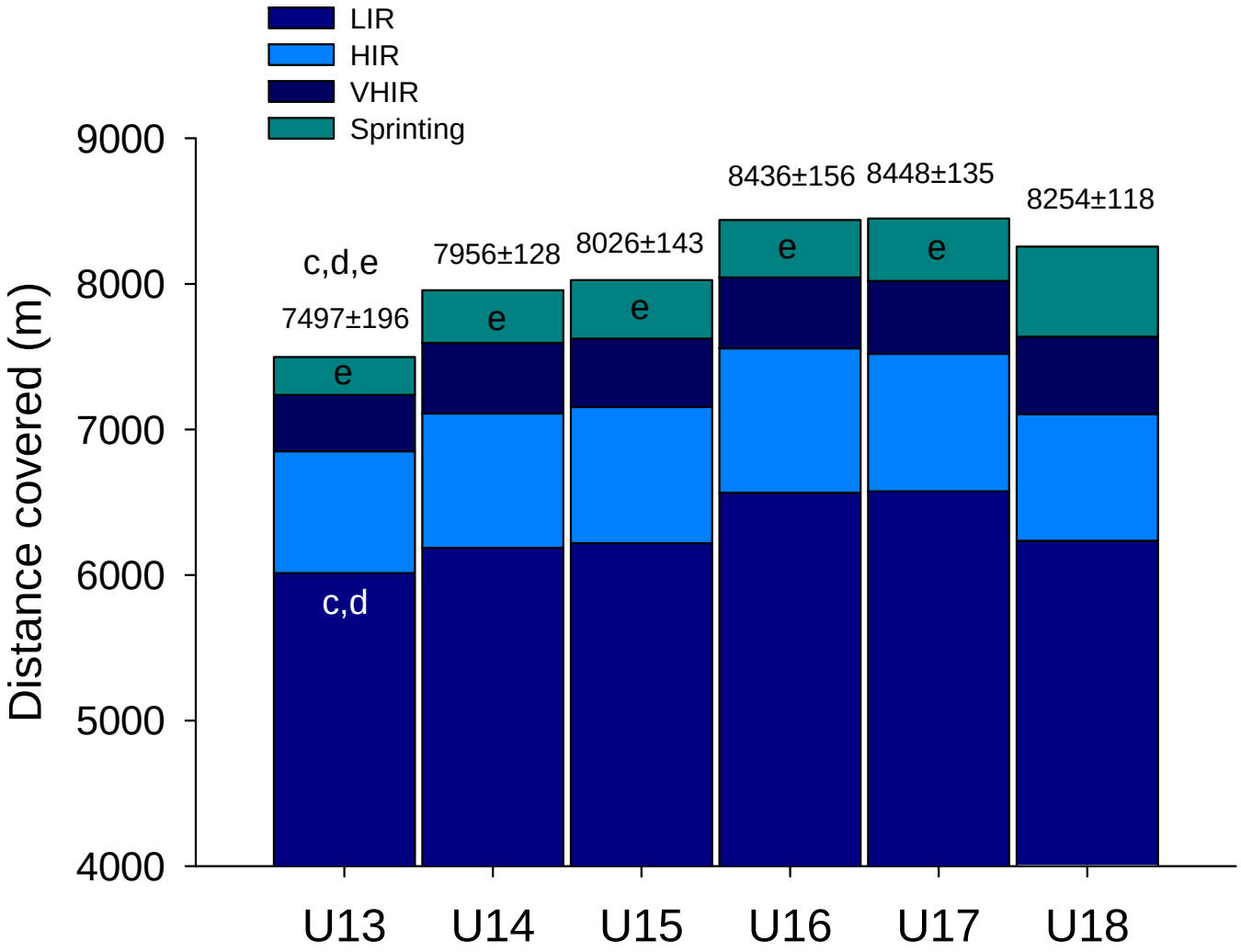
# High-intensity running during youth soccer games




Buchheit et al. IJSM 2010

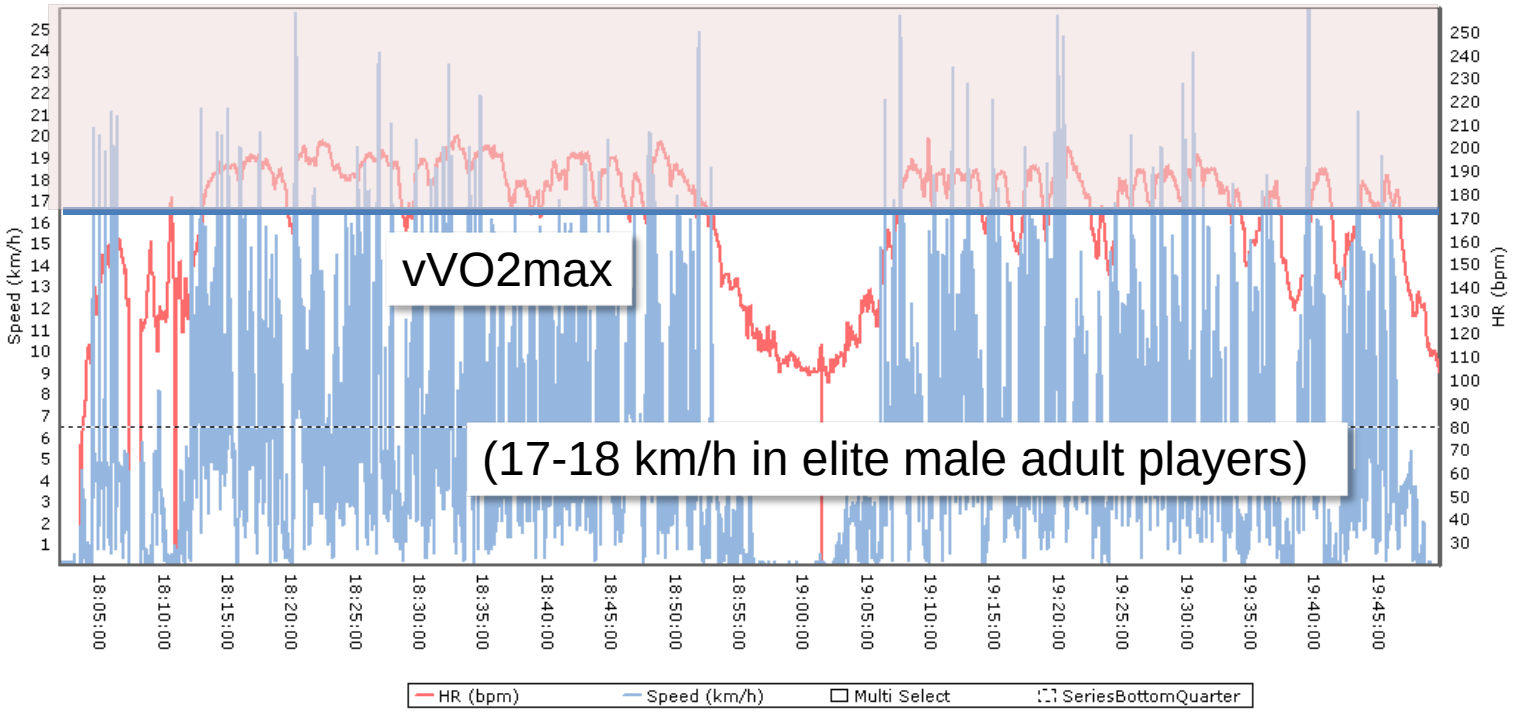
a: significant difference vs. U14 ($P<0.05$), b: vs. U15, c: vs. U16, d: vs. U17, e: vs. U18.

# Determinants of high-intensity running

Supramaximal intermittent performance (>19-21 km/h):

a greater aerobic power (i.e., vVO2max) is responsible for an upward shift of the exercise intensity domain

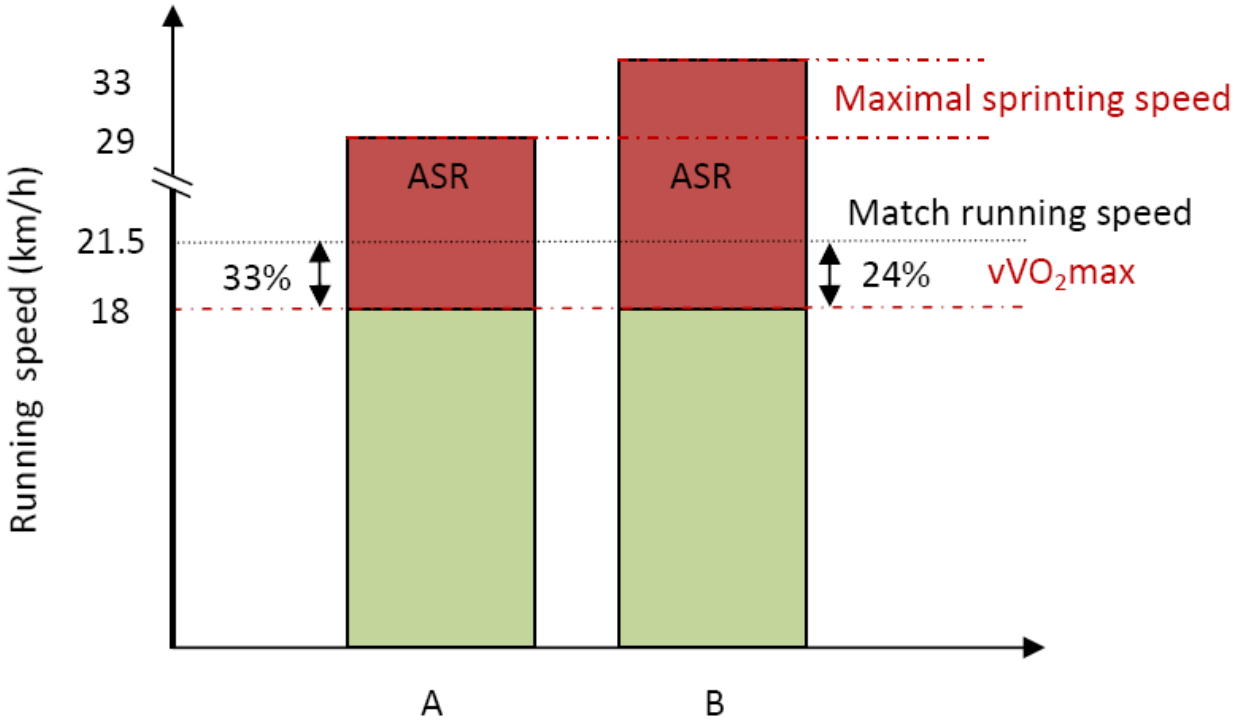
→ decreased relative intensity → less fatigue (?)



# Determinants of high-intensity running

Supramaximal intermittent performance :

- ↑ Anaerobic capacity/ Anaerobic speed reserve (ASR) and the proportion of ASR used
- Inter-efforts recovery capacity



# What is already known in youth ?

- The younger, the more limited the anaerobic capacity and presumably, the smaller the ASR
- The younger, the better the inter-efforts recovery capacity *(Ratel 2006)*
- **Q:** How does this translate into supramaximal intermittent performance in highly trained young soccer players ?

1. Smaller ASR in the younger → worse performance than older?
2. Greater ability to recover in the younger → better performance than older?

# Purpose

- Examine supramaximal intermittent performance capacity in relation to age /maturation in highly-trained young soccer players
- Examine supramaximal intermittent performance capacity in relation to physical capacities, i.e., ASR, $vVO_2max$

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# Methods

# Participants

- 27 U14 : 13.0±0.7 y; -3.1 to 0.3 y to/from APHV, 154.7±9.7 cm; 41.5±7.2 kg
- 19 U16 : 14.9±0.5 y; -0.1 to 2.0 y from APHV, 169.2±7.4 cm; 56.8±9.1 kg
- 16 U18 : 16.7±0.8 y; 1.0 to 2.9 y from APHV, 171.2±5.9 cm; 61.1±6.8 kg

14 hr/week in an elite academy

# Testing

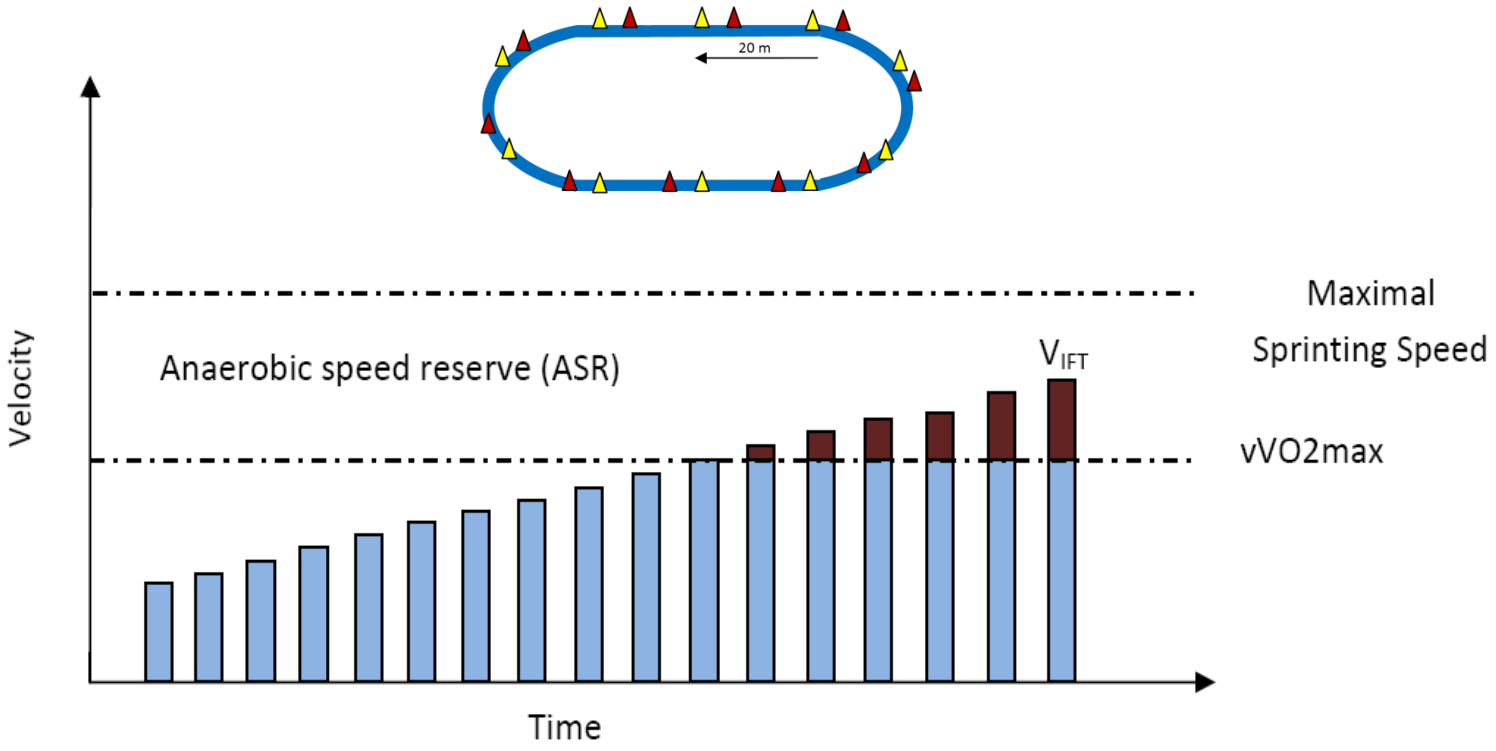
- Anthropometry / Peak Height Velocity
- 40-m sprint with 10-m split times

→ Maximal sprinting speed (best split)

# Testing

2 Incremental track tests:

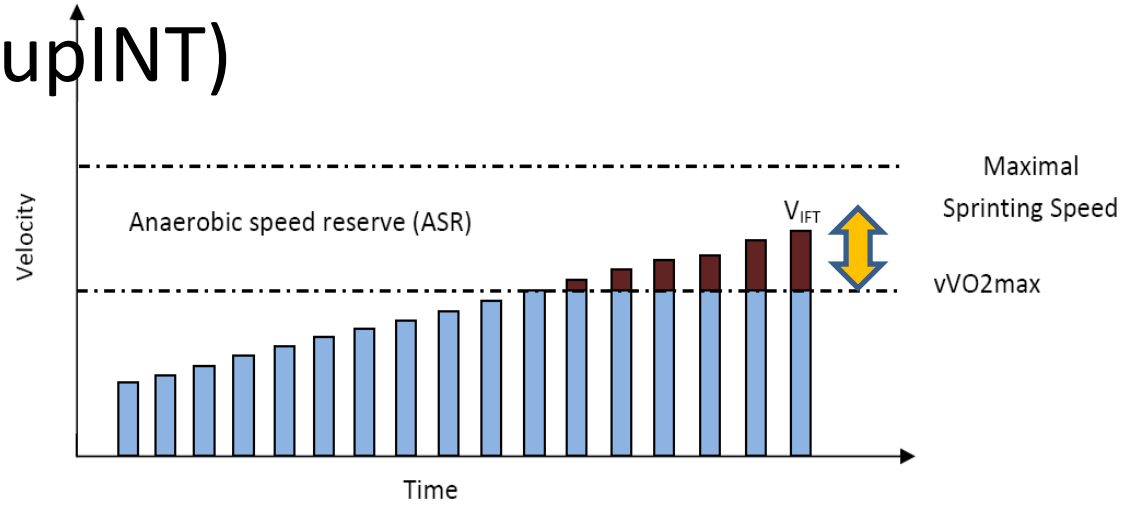
- Vam-Eval (continuous) → Vvam-Eval ⇔ $vVO_2max$
- 30-15 Intermittent Fitness test (no COD) → $V_{IFT}$ ⇔ supramax. Int. perf



# 30-15 Intermittent Fitness Test

# Variables

- MSS – Vvam-Eval = ASR
- $V_{IFT}$ - Vvam-Eval = Surpramaximal intermittent performance *per se* (SupINT)

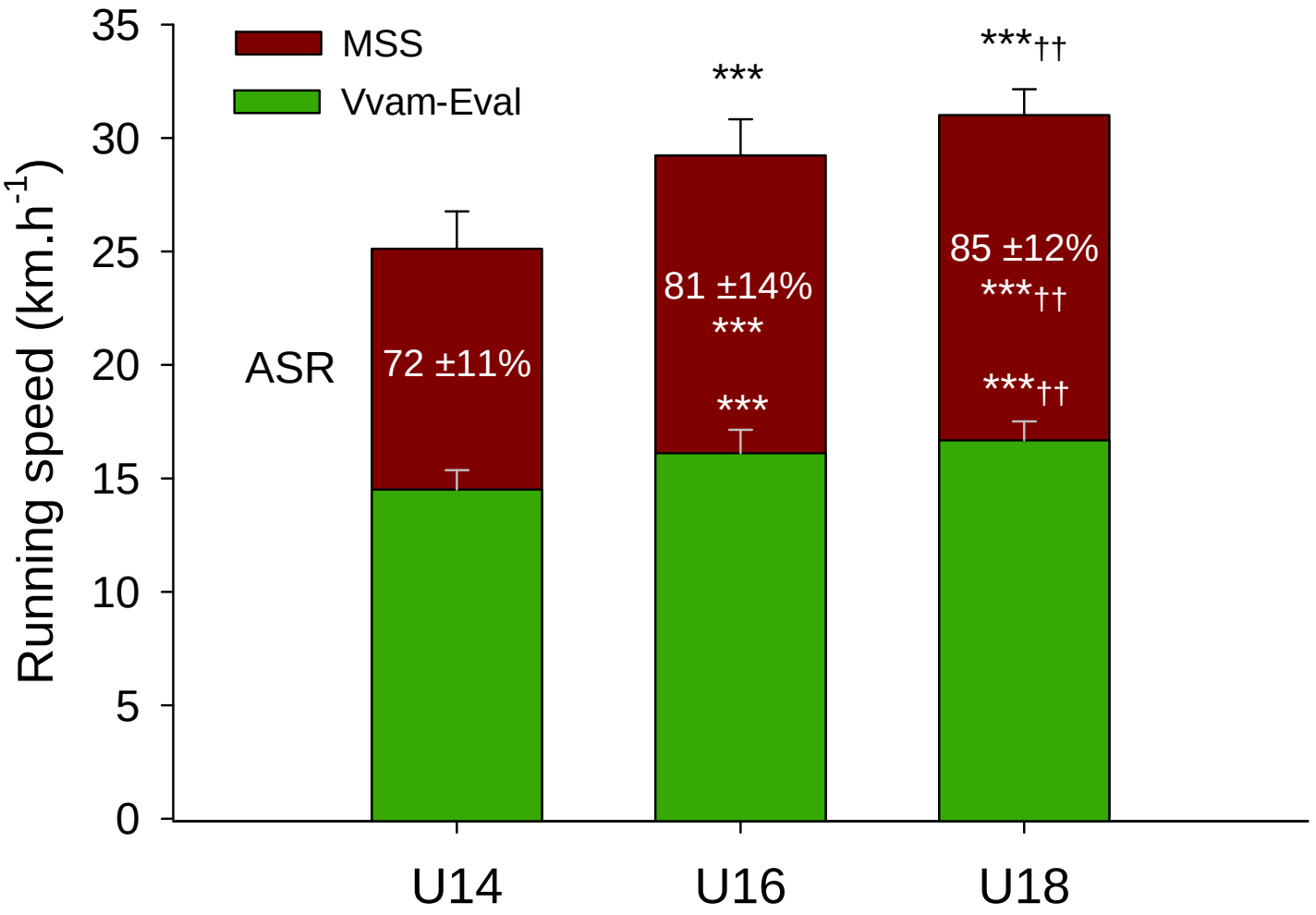



→The higher SupINT, the better anaerobic capacity and/or recovery

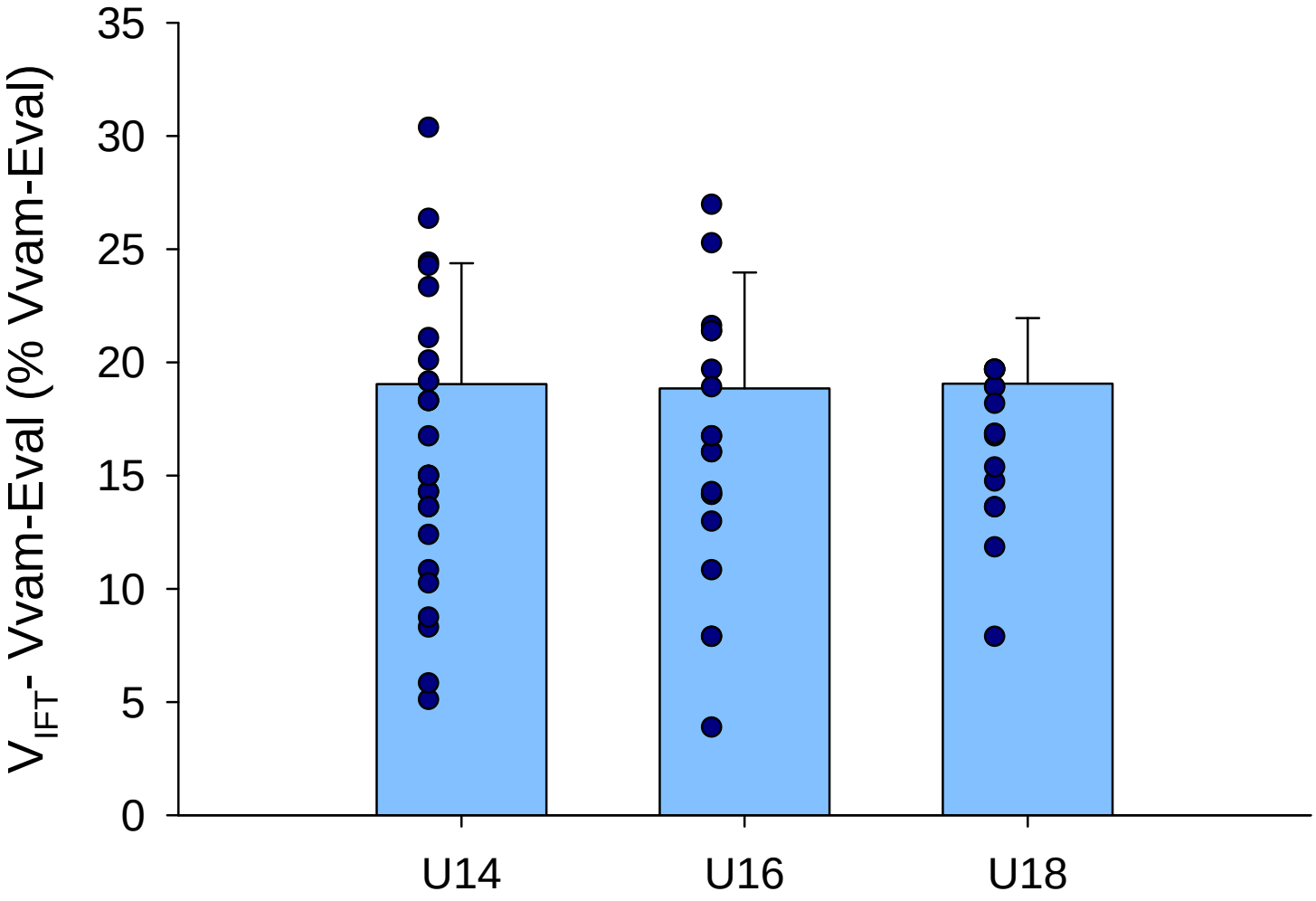
- SupINT /ASR = recovery index ?

# Results

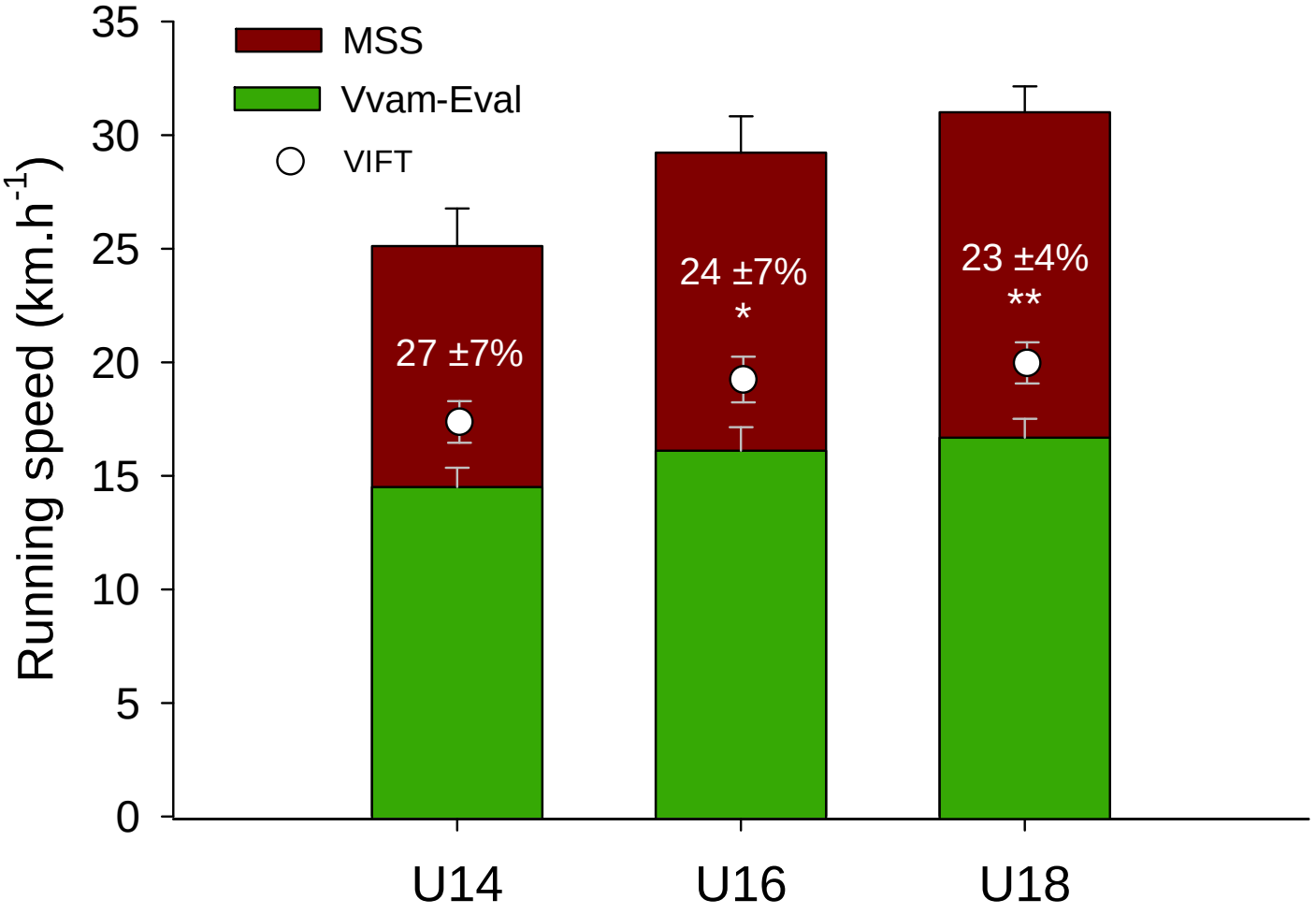
# Vvam-Eval, MSS and ASR



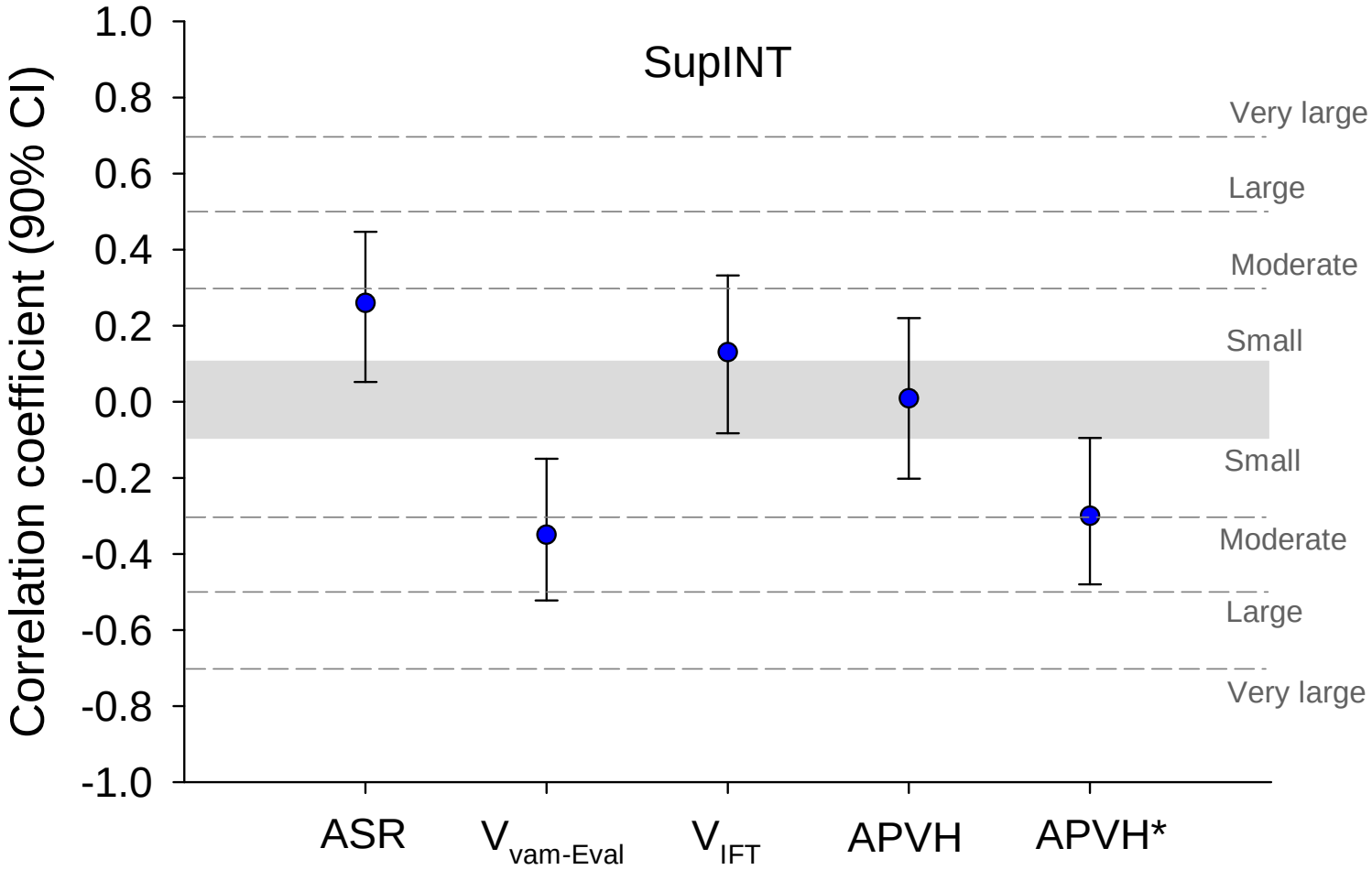
# Surpramaximal intermittent performance



# % of ASR used


MSS
Vvam-Eval
VIFT
Running speed (km.h-1)
35
30
25
20
15
10
5
0
27 ±7%
24 ±7%
*
23 ±4%
**
U14
U16
U18

# Relations with physical capacities and maturity




*: adjusted for ASR

# Conclusions

- The younger players use a greater proportion of their ASR to reach similar supramaximal intermittent performance levels than the older players
- Supramaximal intermittent capacity is therefore poorly affected by age; however, once adjusted for ASR, the less mature tend to perform better than their more mature counterparts
- This is consistent with the greater propensity of young individuals toward high-intensity activities (i.e., better inter-efforts recovery capacities, faster $VO_2$ kinetics) *(Ratel 2006)*
- For all players pooled together, Supramaximal intermittent performance is positively related to ASR, and negatively to Vvam-Eval → training load management? → training strategies?

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