The use of relative speed thresholds in team sports: Applications for GPS analysis

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INTRODUCTION

- Data from global positioning system (GPS) technology are typically presented as the distances covered in specific locomotor categories (e.g., walking, jogging, striding, sprinting).
- Differences have been shown between absolute thresholds and thresholds relative to maximum velocity (Gabbett, 2015).
- However, there are two distinct methods of using relative speed thresholds currently employed in the literature, 1) a maximum velocity sprint (V_{max}) and 2) the maximum velocity achieved during each match (V_{peak}).
- The purpose of this study was to compare the differences in data when analysing the same GPS files using either V_{max} or V_{peak}.

METHODS

- There were 99 GPS files analysed from rugby union match-play and split between forwards (*n*=59) and backs (*n*=40). Observations were classified into players who played the entire game, part of the game and then combined as overall.
- The participants involved were part of a regional academy and had the following characteristics (age: 17.5 ± 0.7 years; stature: 183.6 ± 6.6 cm; body mass: 90.6 ± 10.6 kg).
- V_{max} was established by players performing a maximum 40 m sprint, whilst V_{peak} was defined as the maximum velocity achieved during each match.
- The locomotor categories were defined as walking 0-20%, jogging 20-50%, striding 50-80% and sprinting 80-100% (Duthie et al., 2006) of either V_{max} or V_{peak}.
- The thresholds for small, moderate, large, and very large standardized changes (Cohen *d*) were 0.2, 0.6, 1.2, and 2.0, respectively. Magnitude based inferences were assessed as 25-75%, possibly; 75-95% likely; 95-99.5%, very likely; >99.5%, almost certainly. Where the 90% confidence interval crossed both boundaries of the smallest worthwhile change (*d* ± 0.2), the magnitude of change was described as unclear.

RESULTS

- The differences between V_{peak} and V_{max} for walking, jogging, striding and sprinting are displayed in Figure 1.
- The mean V_{max} and V_{peak} for all players were 8.7 ± 0.6 and 7.2 ± 0.9 $m.s^{-1}$, respectively.

CONCLUSIONS

- The use of V_{peak} seems to overestimate the distance covered in striding and sprinting whilst underestimating walking distance when compared to V_{max}. Jogging also tended to be underestimated but there were several unclear results.
- Practitioners should look to use V_{max} for relative speed thresholds as V_{peak} from match-play is likely to change from match-to-match and consequently misrepresent the locomotor demands that players are exposed to.

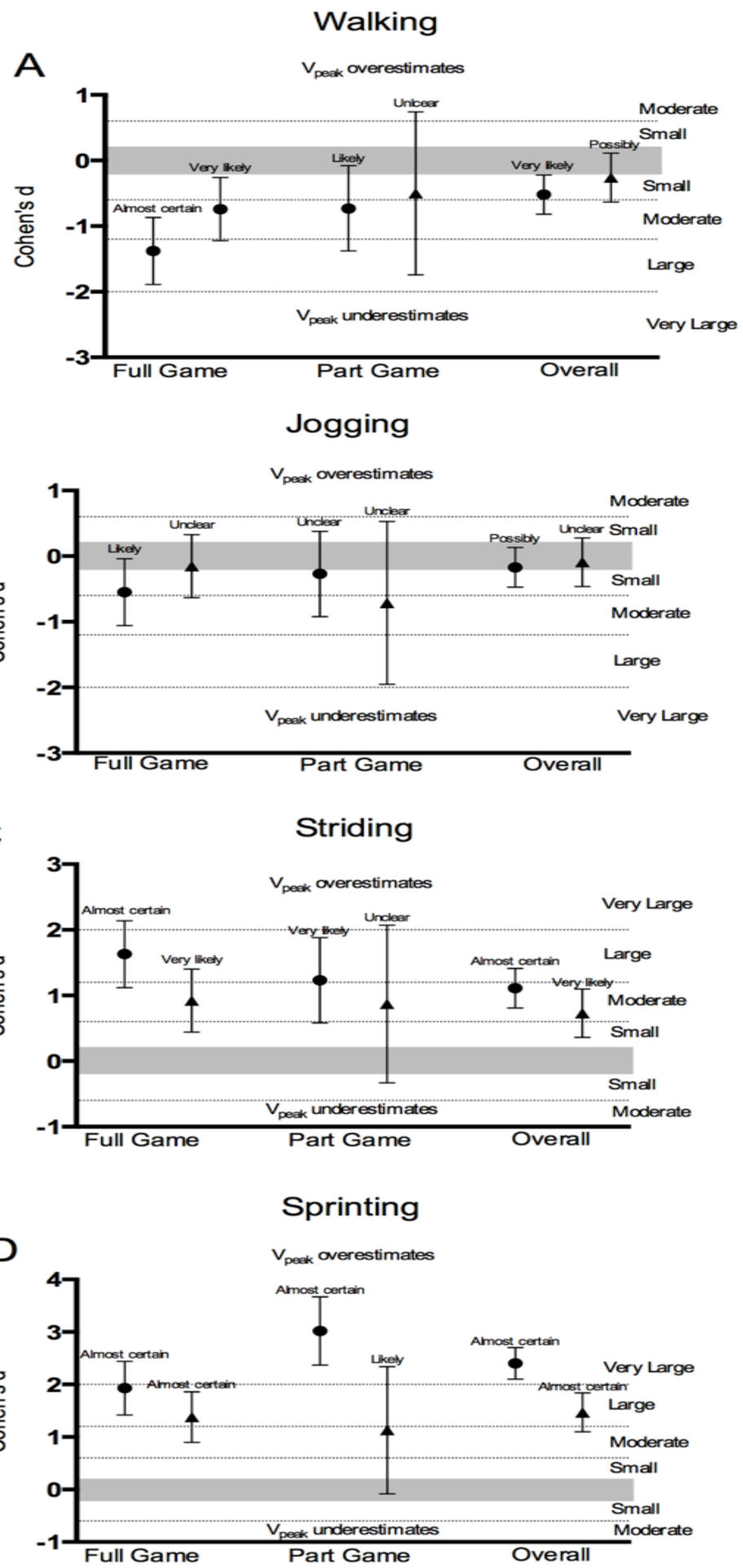

Figure 1. Differences in walking (A), jogging (B), striding (C), and sprinting (D). Forwards are displayed with a circle and backs as a triangle.

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