RELATIONSHIP BETWEEN BALANCE SWAY VELOCITY AND MODIFIED REACTIVE STRENGTH INDEX IN A COLLEGIATE WOMEN'S BASKETBALL TEAM

Nicholas M. Kuhlman,[1] Andrea Hudy,[2,3] Jui Shah,[3] Paige Leonard,[3] Jennifer B. Fields[1]

[1]Department of Nutritional Sciences, University of Connecticut, Storrs, CT
[2]Department of Kinesiology, University of Connecticut, Storrs, CT
[3]Athletics Department, University of Connecticut, Storrs, CT

UCONN — COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES

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KEY FINDINGS

BSV significantly predicted RSI_{mod} for both high- and low-minute players

RSI_{mod} was greater for high-minute players vs. low-minute players

BSV was greater for high-minute players vs low-minute players

BACKGROUND

Increased postural sway (balance sway velocity; BSV) during quiet standing tasks may serve as a useful indicator for neuromuscular fatigue, reflecting its impact on balance ability.

Modified reactive strength index (RSI_{mod}) quantifies an athlete's ability to dynamically change direction during jumping tasks, while adjusting for body mass, making it a potentially useful metric for monitoring plyometric performance and neuromuscular fatigue.

PURPOSE

To examine the extent to which RSI_{mod} can be predicted by BSV, and to compare RSI_{mod} and BSV between high- and low-minute players.
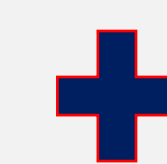
METHODS

Weekly Assessments

AUG → FEB

Single-Leg Balance Test:

Countermovement Jump:

+

Measured variable: BSV (m/s)

Measured variable: RSI_{mod} (AU)

Modified RSI (RSI_{mod})

Time To Take Off — Jump Height

$$Ratio = \frac{Jump\ Height}{Time\ To\ Take\ Off}$$

RESULTS

- A scatterplot of the regression analysis, along with the distribution of of observations for high- and low-minute players are shown in Figure 1.
- MANOVA results comparing BSV and RSI_{mod} between high- and low-minute players are displayed in Table 1.
- Regression analysis indicated that BSV is significant in predicting RSI_{mod} ($r = -0.407$ $R^2 = 0.16$, $F(1.142, 0.004) = 319.47$, $p<0.001$) (Figure 1).
- MANOVA results showed that RSI_{mod} and BSV were significantly greater for high- vs. low-minute players (Table 1).
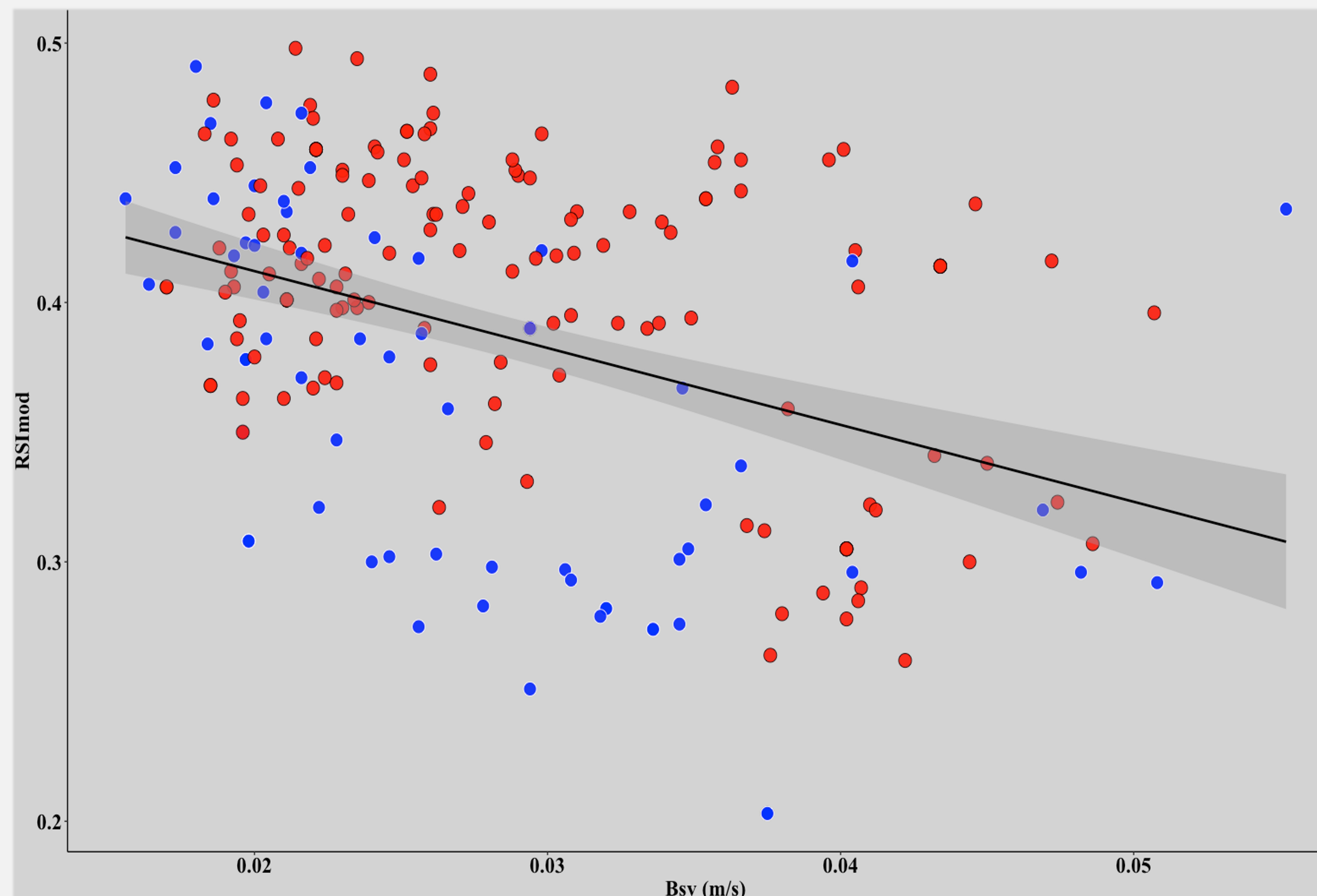
Figure 1. Scatterplot of regression analysis and distribution of individual observations; shaded region represents 95% confidence interval; red dots: high-minute players; blue dots: low-minute players; Y' = 0.479 – 3.261x

Table 1. MANOVA results comparing BSV and RSI_{mod} between high- and low-minute players

	High-Minute Players (>15 min/game)	Low-Minute Players (<15 min/game)	*p*-value	Effect Size (η^2)
BSV (m/s)	0.029 ± 0.008	0.027 ± 0.08	<0.001	0.007
RSI_{mod} (AU)	0.399 ± 0.06	0.359 ± 0.07	<0.001	0.083

CONCLUSIONS & PRACTICAL APPLICATION

- Findings suggest that increases in fatigue-induced postural sway velocity result in an attenuated RSI_{mod}.

- Despite exhibiting higher BSV, high minute players demonstrate superior RSI_{mod} compared to low-minute players.

- Force plate balance assessments may offer a non-orthopedically stressful method for evaluating neuromuscular fatigue/recovery and may hold potential for predicting how fatigue might impact more dynamic, sport-specific assessments (RSI_{mod})