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Title: Performance in the 1.2 km shuttle run test reflects fitness capacities in rugby players

Running Head: The 1.2 km shuttle run test in rugby

Setting: New Zealand rugby professional teams

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BLUF

Large (r = -0.57 and 0.53) to very large (r = -0.74 and 0.71) correlations were observed between the Bronco with the MSRT and Yo-Yo IR1 in rugby players. However, the scores derived from these tests are not interchangeable.

Abstract

The relationships between performance in the 1.2 km shuttle test (Bronco) with the Multistage Shuttle Run Test (MSRT) and Yo-Yo Intermittent Recovery Test Level 1 (Yo-Yo IR1) in rugby players were investigated. Additionally, differences in Bronco, MSRT, and Yo-Yo IR1 scores between backs (B) and forwards (F), and rugby codes were assessed. Data from professional players (23 rugby sevens and 133 rugby union) were analysed. All rugby sevens players performed the Bronco and MSRT, whereas rugby union players completed the Bronco and Yo-Yo IR1. The relationship between the Bronco and MSRT or Yo-Yo IR1 was quantified using Pearson's *r*, whereas differences between playing positions and codes were quantified using Hedges' g effect sizes (ES). Large correlations were observed between Bronco and MSRT (*r* = -0.57 and 0.53). Very large correlations were observed between Bronco and Yo-Yo IR1 (*r* = -0.74 and 0.71). Similar Bronco (B: 289 ± 10 s; F: 291 ± 10 s) and MSRT (B: 2470 ± 162 m; F: 2446 ± 236 m) scores were found in rugby sevens backs and forwards, while moderately better Bronco (B: 294 ± 15 s; F: 311 ± 21 s) and Yo-Yo IR1 (B: 1985 ± 367 m; F: 1627 ± 375 m) scores characterised rugby union backs (ES = -0.90 and 0.96). Small to moderately better Bronco scores were observed in rugby sevens compared to rugby union players (ES = -0.36 to -0.99). These results support the utility of the Bronco as a fitness test in rugby. The low shared variance observed between the Bronco and the two other tests, however, indicates the scores derived from these tests (e.g., speed) are not interchangeable.

Key Words:

Bronco, Multistage Shuttle Run Test, Yo-Yo Intermittent Recovery Test, field test, training.

INTRODUCTION

Rugby is a team sport that relies on several physical qualities. Among these, possessing well-developed aerobic and anaerobic capacities have been shown to be beneficial for performance. In professional rugby union, a very large correlation ($r = 0.75$) was observed between players' aerobic capacities and total distance covered during games (43). Furthermore, moderate to very large correlations were reported between fitness capacities and on-field running activities in women's rugby sevens (7's) (11, 12, 45). Given the high-intensity intermittent nature of rugby, possessing greater aerobic capacities seems advantageous for minimising fatigue and promoting recovery between repeated high-intensity bouts, as well as between matches (38, 42, 44).

In individual and team sports, a variety of physical tests are commonly used to assess the fitness capacities of athletes. Controlled laboratory based treadmill running tests provide a more accurate measure of aerobic fitness (47), however their use in team sport is limited due to the implementation of single athlete testing protocols and the subsequent time required to test a large number of athletes. For these reasons, several field tests have been developed and validated as practical alternatives to assess fitness capacities in team sport athletes (25). These tests require minimal equipment and expertise and allow for the testing of multiple athletes simultaneously on the training field. Among these physical tests, the Multistage Shuttle Run Test (MSRT) (18-20, 40, 46) and the Yo-Yo Intermittent Recovery Test Level 1 (Yo-Yo IR1) (1, 11, 12, 14, 15, 17, 21, 22, 26, 45) have been widely used in rugby-related research to assess and describe the fitness capacities of players. Both tests are practical in applied settings and consist of 20 m shuttle runs at increasing intensities. The MSRT is a continuous shuttle test, whereas the Yo-Yo IR1 is interspersed with a brief recovery period following each shuttle. The

MSRT was originally developed by Léger and Lambert (31) with the aim to predict maximal aerobic power ($\dot{V}O_2$ max), whereas the Yo-Yo IR1 was developed to evaluate the ability to repeatedly perform high-intensity work in intermittent sports (4).

Another popular field-based fitness test in rugby is the 1.2 km shuttle run test also known as the "Bronco". This test is often used by practitioners as it is time-efficient, easy to administer, and requires minimal equipment. The protocol consists of a continuous 20, 40, and 60 m shuttle run, completed five times at a maximal intensity (i.e., 20 m and back, 40 m and back, 60 m and back) (28). Despite the widespread use of the Bronco in rugby, very limited research exists on this test. One investigation has demonstrated a high test-retest reliability based on intraclass correlation coefficient (ICC) of 0.99 and Bland-Altman 95% limits of agreements of 0.45 ± 5.2 s (7). Furthermore, previous research has reported very large to almost perfect correlations and shared variance (R^2 = 0.73-0.93) between performance in the Bronco and performance in the 30-15 Intermittent Fitness Test (30-15 IFT) in rugby league and netball players (28), and very large correlations (r = -0.89) between the Bronco with the Yo-Yo IR1 in young rugby union players (16). One additional study (27) has also described the Bronco scores of athletes competing in various team sports (e.g., rugby union, rugby league), at different playing levels, and age groups. However, no comparisons were conducted between these categories.

To our knowledge, no study has examined the relationship between the Bronco and other fitness tests in professional rugby players. Therefore, the primary aim of this study was to investigate the relationship between the Bronco test with the MSRT and the Yo-Yo IR1 in rugby 7's and rugby union players. A second aim was to provide information and examine the

differences in Bronco, MSRT, and Yo-Yo IR1 performance between playing positions (i.e., backs and forwards) and rugby codes (i.e., rugby 7's and rugby union).

METHODS

Approach to the Problem

The relationship between performance in the Bronco with performance in the MSRT and Yo-Yo IR1 was examined using a descriptive correlation design. In particular, the correlation coefficients between Bronco (time and average speed) with MSRT (distance and final speed) and Yo-Yo IR1 (distance and final speed) measures were investigated. To evaluate the differences in Bronco, MSRT, and Yo-Yo IR1 performance between playing positions and rugby codes, comparisons were conducted between backs and forwards, and between rugby 7's and rugby union players.

Subjects

Data from 23 professional male rugby 7's players and 133 professional male rugby union players were included in the analysis. All rugby 7's players were playing Internationally in the World Rugby Sevens Series representing their National team. All rugby union players were competing in Super Rugby, 47 players were also playing for their National teams at the time of testing. The data included 63 trials performed by rugby 7's players and 274 trials performed by rugby union players given that certain players were assessed on multiple occasions. Approval was granted from AUT University Research Ethics Committee.

125 ***Procedures***

126 Participants completed the fitness tests at various times between 2015 and 2019. Each
127 participant performed two different fitness tests on two separate occasions, in a randomised
128 order, within four consecutive weeks. All rugby 7's players completed the Bronco and MSRT,
129 whereas rugby union players completed the Bronco and Yo-Yo IR1. All tests were performed
130 outdoors on grass in rugby boots following a 15-minute warm up consisting of jogging,
131 dynamic stretches, and stride outs. Players were familiar with the tests and were instructed to
132 give a maximal effort. Strong verbal encouragement was given throughout the tests.

133

134 *1.2 km shuttle run test (Bronco)*

135 The Bronco was conducted in agreement with the protocol described by Kelly and Wood (28).
136 The test consists of a continuous 20, 40, and 60 m shuttle run, completed five times at a
137 maximal intensity as shown in Figure 1. Time to complete the test and average running speed,
138 calculated from total time, were used for analyses. Excellent test-retest relative reliability of
139 Bronco total times (ICC = 0.99) has been reported (7).

140

141 FIGURE 1

142

143 *Yo-Yo Intermittent Recovery Test Level 1 (Yo-Yo IR1)*

144 The Yo-Yo IR1 consists of 2 x 20 m shuttle runs at progressively increasing speeds,
145 interspersed with a 10 seconds of active rest controlled by audio signal (4, 29). The test starts
146 at a running speed of 10 $km \cdot h^{-1}$ and continues until each player attains volitional exhaustion.
147 Specifically, the test was terminated when the athletes failed to reach the finishing line in the

allotted time on two occasions, with a verbal warning given following the first failure. Total distance covered and final running speed, defined as the speed attained during the last completed stage, were considered for analyses. Acceptable test-retest absolute reliability for total distance covered during the Yo-Yo IR1 has been reported (coefficient of variation = 4.9%) (29).

Multistage Shuttle Run Test (MSRT)

The MSRT was performed as described by Léger and Gadoury (30). The test consists of continuous shuttle runs over 20 m at progressively increasing speeds determined by an audio signal. Starting speed was set at 8 $km \cdot h^{-1}$ for the first minute, increasing by 0.5 $km \cdot h^{-1}$ every minute thereafter. The test ended when a player was no longer able to perform a shuttle in the required time. Total distance covered and final running speed, defined as the speed attained during the last completed stage, were included in the analyses. Excellent test-retest reliability for the MSRT predicted V̇O2 max (Pearson's correlation coefficient, r = 0.975) has been reported (31).

Statistical Analyses

Since multiple testing results from the same athlete were analysed, generalized estimating equations (GEE) with a dependent (AR1) correlation structure were used (32). GEE allow for longitudinal or repeated measurements analysis with non-normal response variables and incomplete data sets (3). MSRT or Yo-Yo IR1 scores (distance or final speed) were entered in the GEE model as a dependent variable, while Bronco score (time or average speed) was used as the predictor. To assess the relationship between fitness tests, Pearson's correlation coefficient (r) with 95% confidence intervals [lower, upper] was calculated between the

dependent variable and the value predicted from the GEE model. The magnitude of correlations was interpreted using the following thresholds: $r < 0.1$ trivial, $r < 0.3$ small, $r < 0.5$ moderate, $r < 0.7$ large, $r < 0.9$ very large, and $r \geq 0.9$ extremely large (24). Statistical significance set at $p \leq 0.05$. To evaluate differences in Bronco performance between playing positions and rugby codes Hedges' g effect size (ES) with 95% confidence intervals [lower, upper] was calculated. ES magnitudes were interpreted as $g < 0.2$ trivial, $g < 0.6$ small, $g < 1.2$ moderate, $g < 2.0$ large, and $g < 4.0$ very large, and $g \geq 4.0$ extremely large. If the 95% CI overlapped small positive and negative values, the magnitude of the correlation or the ES was deemed unclear (24). All statistical analyses were conducted using SPSS (Version 25; IBM Corporation, New York, USA).

RESULTS

Average Bronco, MSRT, and Yo-Yo IR1 scores of rugby 7's and rugby union players are reported in Table 1. The parameter estimates of the GEE model for MSRT and Yo-Yo IR1 speed are presented in Table 2 resulting in the following equations:

$$\text{MSRT final speed} = 2.266 + (0.424 \times \text{Bronco average speed})$$

$$\text{Yo-Yo IR1 final speed} = 2.499 + (0.515 \times \text{Bronco average speed})$$

TABLE 1

TABLE 2

Large correlations were observed between Bronco time and average speed with MSRT distance and final speed, respectively (Table 3). Very large correlations were observed between Bronco

time and average speed with Yo-Yo IR1 distance and final speed, respectively (Table 3). All correlations were significant and clear.

Bronco scores specific to playing position and rugby code are presented in Table 4. Unclear differences were found between backs and forwards in professional male rugby 7's players; whereas moderately better Bronco scores were found in professional rugby union backs compared to forwards. Small to moderately better Bronco performance characterised professional rugby 7's players compared to professional rugby union players (Table 4).

TABLE 3

TABLE 4

MSRT and Yo-Yo IR1 results specific to playing position are reported in Table 5. Unclear differences were observed between professional rugby 7's backs and forwards in the MSRT; whereas moderately better Yo-Yo IR1 scores were observed in professional rugby union backs compared to forwards (Table 5).

TABLE 5

DISCUSSION

The large to very large correlations observed between Bronco with the MSRT and Yo-Yo IR1 in professional male rugby players were clear and significant. Similar Bronco and MSRT

scores were observed between backs and forwards in professional rugby 7's players, while better Bronco and Yo-Yo IR1 scores were observed in professional rugby union backs compared to forwards. Further, better Bronco scores were found in professional rugby 7's players compared to professional rugby union.

Current findings are in agreement with the study of Deuchrass et al. (16) that showed a very large correlation (r = -0.87) between Bronco time and distance covered in the Yo-Yo IR1 in young rugby union players. The slight difference in the correlation coefficients observed between the studies (r = -0.87 and -0.74) is likely attributed to the different populations considered (i.e., professional vs young players) and differing sample sizes. In the current study, a very large correlation was observed between Bronco average running speed (3.97 $m \cdot s^{-1}$) with final running speed attained in the Yo-Yo IR1 (4.54 $m \cdot s^{-1}$) in professional rugby union players; whereas a large correlation was observed between Bronco average speed (4.15 $m \cdot s^{-1}$) with final running speed attained in the MSRT (4.03 $m \cdot s^{-1}$) in professional rugby 7's players. The relatively low shared variance (28 to 50%) observed in the running speed between the Bronco with the MSRT and Yo-Yo IR1, indicates that there are other contributing factors to performance in these tests, and the speeds obtained in the different tests are not interchangeable. The different testing protocols and variables analysed likely explain these results. In fact, while the MSRT and Yo-Yo IR1 speeds represent the final speed reached during an incremental test, the Bronco speed is the average speed derived from a distance-based test. Furthermore, while Bronco speeds were obtained over ~ 5 min test in professional rugby 7's and rugby union players, on average the MSRT and Yo-Yo IR1 took ~ 13 and 14 min to completion, respectively.

Of note, a greater degree of correlation ($R^2 = 0.73$) was found between Bronco average running speed with the final speed recorded in the 30-15 IFT in semi-professional rugby league players (28), compared with the final speeds obtained in the MSRT and Yo-Yo IR1. Despite being continuous, greater correlations were observed between the Bronco and intermittent shuttle tests (i.e., 30-15 IFT (28) and Yo-Yo IR1), compared with the continuous MSRT. However, knowledge of the specific physiological responses (e.g., heart rate, $\dot{V}O_2$ max, and blood lactate) to the different tests in rugby players would be required for more detailed comparisons to be made.

In addition to assessing physical performance, fitness tests are used to inform exercise prescription and determine appropriate training intensities. Maximal aerobic speed (MAS), defined as the lowest speed that elicits $\dot{V}O_2$ max (6), has been widely employed as a reference speed to prescribe training intensity in different sports. Gas analysers are the only method able to provide a true measure of MAS or v$\dot{V}$O2 max (9). Nevertheless, given the difficulties of conducting laboratory $\dot{V}O_2$ max testing in team sports, a number of field-based tests have been developed and proposed as a practical alternative to indirectly predict MAS (5, 35). In addition to MAS, the final speed reached during the 30-15 IFT has been suggested as a reference speed to establish exercise intensity. In particular, when exercise consists of intermittent shuttle runs, 30-15 IFT final speed appears to be a more accurate reference to prescribe training intensities compared to MAS (8). With regards to the Bronco, a practical correction equation has been proposed to prescribe exercise intensities based on the time taken to complete the test (2). Given the very large correlations observed between Bronco and 30-15 IFT speeds ($R^2 = 0.73$ to 0.93), Kelly and Wood (28) suggested that a correction factor could be applied starting from the 30-15 IFT speed. However, due to the lack of scientific evidence, future research is warranted to investigate the relationship between Bronco measures with the gold-standard laboratory tests

(i.e., gas analysis and physiological responses), and the ability of the Bronco to inform exercise prescription and set training intensities for rugby players and other team sports.

The ability of a test to reflect the specific demands of a given sport needs to be considered when choosing a fitness test (12). Specific to rugby, a very large correlation (r = 0.75) was observed between a 1.2 km time trial performance performed on a grass-field track and total distance covered during games in professional male rugby players (43). Furthermore, moderate to large correlations were observed between performance in the Yo-Yo IR1 and on-field running activities in women's rugby 7's (11, 12, 45). To date, no current information exists on the association between Bronco performance with on-field running activities. Like rugby, the Bronco consists of multiple accelerations, decelerations, and changes of direction. Additionally, the heart rate and blood lactate values recorded post-test suggest that the Bronco stresses both the aerobic and anaerobic systems (7). However, further research is required to assess the relationship between Bronco performance (e.g., time and average speed) with match demands metrics (e.g., total distance and high-intensity distance) in rugby and other team sports.

This study is the first to report and examine Bronco scores of professional rugby 7's and rugby union players specific to playing position. Similar Bronco performance were observed between backs and forwards in rugby 7's players; whereas substantially better performance was observed in rugby union backs compared with forwards. Analogous results were observed when comparing MSRT and Yo-Yo IR1 performance between playing positions in rugby 7's and rugby union, respectively. Thus, suggesting that the tests possess a similar sensitivity in detecting fitness performance differences between playing positions. During international-

level men's rugby 7's matches, trivial to small differences were reported between playing positions in the running activities (23, 39), with maximal velocity showing a moderate difference (39) between backs and forwards; therefore, it is apparent that well-developed fitness capacities are important to both backs and forwards (41). It is possible that the lack of positional differences observed in the Bronco and MSRT reflect the similar running activities of backs and forwards during international-level games. In contrast to rugby 7's, the greater running demands of professional rugby union backs (10, 36, 37, 43) compared with forwards are likely to explain their superior performance in the Bronco and Yo-Yo IR1.

Between rugby codes, slightly better Bronco performance was observed in rugby 7's backs compared with rugby union backs and moderately better scores characterised rugby 7's forwards compared to their rugby union counterparts. Given the reduced number of players competing on a full-size rugby pitch and the relatively short duration of the games, higher running demands and intensities have been observed in international-level rugby 7's matches compared to professional rugby union matches (22, 38). These different match demands suggest the need to possess high levels of aerobic and anaerobic capacities. In addition, since professional rugby 7's players are often required to compete in up to six matches over two days, possessing well-developed aerobic capacities seems to be beneficial for recovery between matches (38). Of note, the larger difference observed between rugby 7's and union forwards compared with backs is likely correlated to the higher specialisation of rugby union forwards compared to rugby 7's. Professional rugby 7's players are required to complete in more similar tasks, as suggested by the more similar running and match activities between playing positions (22, 39). In contrast, professional rugby union forwards show a greater involvement in contact situations (e.g., scrums, rucks, and tackles) when compared to backs who engage in a greater number of high-intensity running activities (36).

The professional rugby union players included in this study displayed Bronco times and average speeds of 304 ± 20 s and 3.97 ± 0.25 $m \cdot s^{-1}$, respectively. Kelly et al. (27), reported slightly slower Bronco times (311 ± 28 s, $Diff_{\%}$ = 2.3%) and average speeds (3.86 ± 0.34 $m \cdot s^{-1}$, $Diff_{\%}$ = 2.8%) in professional rugby union players. Two other studies investigating Bronco performance in professional rugby union players reported Bronco times between 297 – 302 s (33), and 297 – 316 s (34), respectively. When Bronco times were categorised by playing position, as expected backs (294 ± 15 s) were substantially faster than forwards (311 ± 21 s). The study of Deuchrass et al. (16) investigating fitness qualities in young rugby union players (Age: 19 ± 1 years) recorded Bronco times of 284 ± 11 s, 297 ± 8 s, 317 ± 15 s, and 301 ± 13 s for inside backs, outside backs, tight forwards and loose forwards, respectively. These results suggest that Bronco performance is similar ($Diff_{\%}$ = 0.6-1.0%) between professional and young players. A previous investigation conducted in rugby union players has shown that fitness capacities measured via the 30-15 IFT are similar between academy and professional players when expressed in absolute terms (13). However, the substantial increase in body mass observed from academy to senior players and its potential detrimental effect on testing performance could mask any improvements, if fitness scores are expressed without considering body mass (13).

PRACTICAL APPLICATIONS

Clear and significant correlations were observed between performance in the Bronco with performance in the MSRT and Yo-Yo IR1 in rugby players. However, test scores (e.g., average and final shuttle speed) derived from these tests should not be used interchangeably given the low shared variance between tests. The Bronco displayed a similar sensitivity compared with

the MSRT and Yo-Yo IR1 in detecting fitness performance differences between playing positions in rugby players. Similar Bronco and MSRT results were observed between professional rugby 7's backs and forwards, possibly due to the homogeneity of running activities during games. In contrast, the greater running demands observed in professional rugby union backs compared to forwards most likely explain the differences Bronco and Yo-Yo IR1 performance between positions. The clear differences observed in Bronco performance between rugby codes highlight the different on-field demands of these rugby codes.

When deciding the most appropriate fitness test to use, a number of variables should be considered, including time to administer, the number of players being tested, test characteristics (i.e., specificity, validity, reliability, and sensitivity), and its purpose (e.g., monitoring fitness levels and/or prescribing individualised fitness training intensities). The Bronco test is easy to administer, requires minimal time and equipment, and is reliable (7); however, it requires at least 60 m of space to be completed. In contrast, the MSRT and Yo-Yo IR1 require more time an audio signal to be performed; however, they only need 20-25 m of space. Overall, these results provide support for the use of the Bronco as a viable fitness test for rugby players.

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Figure 1. Bronco test protocol.

Table 1. Bronco, MSRT, and Yo-Yo IR1 scores. Values are mean ± SD and range.

Table 2. Parameter estimates from GEE analysis for MSRT and Yo-Yo IR1 speed from Bronco speed.

Table 3. Correlations between Bronco and MSRT, or Yo-Yo IR1. Values are Pearson's *r* and 95% confidence intervals [lower, upper].

Table 4. Bronco times (s) of rugby sevens and rugby union players specific to playing position. Values are mean ± SD, ES and 95% confidence intervals [lower, upper].

Table 5. MSRT and Yo-Yo IR1 distances (m) of rugby sevens and rugby union players specific to playing position. Values are mean ± SD, ES and 95% confidence intervals [lower, upper].

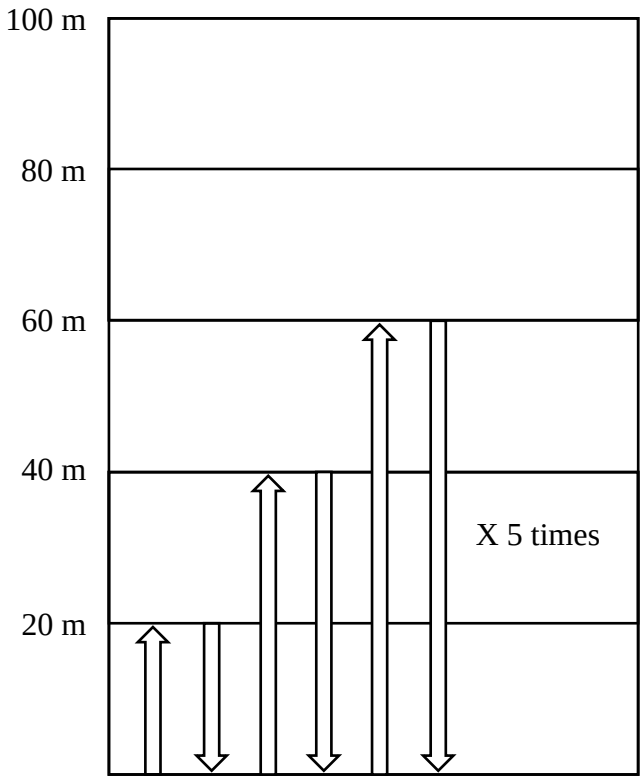

Figure 1. Bronco test protocol

Table 1. Bronco, MSRT, and Yo-Yo IR1 scores. Values are mean ± SD and range.

Variable	Rugby sevens (n = 63 trials)	Rugby union (n = 274 trials)
Bronco time (s)	290 ± 10 (267–313)	304 ± 20 (267–370)
Bronco average speed ($m \cdot s^{-1}$)	4.15 ± 0.14 (3.83–4.49)	3.97 ± 0.25 (3.24–4.49)
MSRT distance (m)	2462 ± 189 (2020–2940)	--
MSRT final speed ($m \cdot s^{-1}$)	4.03 ± 0.11 (3.75–4.31)	--
Yo-Yo IR1 distance (m)	--	1772 ± 411 (680–2720)
Yo-Yo IR1 final speed ($m \cdot s^{-1}$)	--	4.54 ± 0.19 (4.03–5.00)

MSRT: Multistage Shuttle Run Test, *Yo-Yo IR1*: Yo-Yo Intermittent Recovery Test Level 1.

Table 2. Parameter estimates from GEE analysis for MSRT and Yo-Yo IR1 speed from Bronco speed

MSRT final speed	B	SE	95% Wald CI		Wald Chi-Square	df	*P*-value
			Lower	Upper			
Intercept	2.266	0.340	1.599	2.933	44.35	1	$P < 0.001$
Bronco average speed	0.424	0.827	0.262	0.586	26.32	1	$P < 0.001$
Yo-Yo IR1 final speed							
Intercept	2.499	0.140	2.224	2.774	317.56	1	$P < 0.001$
Bronco average speed	0.515	0.355	0.445	0.585	210.24	1	$P < 0.001$

GEE: Generalized estimating equations, *SE*: Standard error.

Table 3. Correlations between Bronco and MSRT, or Yo-Yo IR1. Values are Pearson's *r* and 95% confidence intervals [lower, upper]

	MSRT		Yo-Yo IR1	
Bronco	Distance (m)	Final speed ($m \cdot s^{-1}$)	Distance (m)	Final speed ($m \cdot s^{-1}$)
Time (s)	-0.57^{*L} [-0.71, -0.37]		-0.74^{*V} [-0.79, -0.68]	
Average speed ($m \cdot s^{-1}$)		0.53^{*L} [0.32, 0.68]		0.71^{*V} [0.65, 0.76]

MSRT: Multistage Shuttle Run Test, *Yo-Yo IR1*: Yo-Yo Intermittent Recovery Test Level 1.
* $p < 0.01$.
^{L} large, ^{V} very large.

Table 4. Bronco times (s) of rugby sevens and rugby union players specific to playing position. Values are mean ± SD, ES and 95% confidence intervals [lower, upper]

	Backs	Forwards	ES
Rugby sevens	289 ± 10 (*n* = 41 trials)	291 ± 10 (*n* = 22 trials)	-0.20 [-0.72, 0.32]
Rugby union	294 ± 15 (*n* = 112 trials)	311 ± 21 (*n* = 162 trials)	-0.90^{M} [-1.15, -0.65]
ES	-0.36^{S} [-0.72, 0.00]	-0.99^{M} [-1.45, -0.54]	

ES: Effect size.
^{S} small, ^{M} moderate.

Table 5. MSRT and Yo-Yo IR1 distances (m) of rugby sevens and rugby union players specific to playing position. Values are mean ± SD, ES and 95% confidence intervals [lower, upper]

	Backs	Forwards	ES
MSRT, Rugby sevens	2470 ± 162 (*n* = 41 trials)	2446 ± 236 (*n* = 22 trials)	0.12 [-0.39, 0.64]
Yo-Yo IR1, Rugby union	1985 ± 367 (*n* = 112 trials)	1627 ± 375 (*n* = 162 trials)	0.96^{M} [0.71, 1.21]

ES: Effect size.
^{M} moderate.