# NOTATIONAL ANALYSIS OF EVASIVE AGILITY SKILLS EXECUTED BY ATTACKING BALL CARRIERS AMONG ELITE RUGBY PLAYERS OF THE 2015 RUGBY WORLD CUP

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## Abstract

The role of skill in task execution among elite rugby players has become the focus of numerous researchers. Thus, this study aimed to explore the frequency, the most highly utilized and successful as well as unsuccessful attempts of evasive agility skills executed by attacking ball carriers among elite rugby players and their relationship to selected phase outcomes. The study undertaken was a structured non-participant observational descriptive study, conducted through notational analysis of the recorded 2015 Rugby World Cup matches with the sample being attacking ball carriers among the top three and bottom three elite rugby teams which participated in the 2015 Rugby World Cup. The descriptive analyses of the current study undertaken revealed that attacking ball carriers among the top three displayed a 59% (straight), 39% (side-step) and 2% (crossover-step) while the bottom three exhibited a 45% (straight), 52% (side-step) and 3% (crossover-step) of these movement patterns. Alternatively, the inferential statistical analyses indicated that for both the teams there was no significant difference in the frequency of the execution of the side-step and crossover-step (p>0.05) while a significant difference was observed for these teams for the straight evasive agility skill (p<0.05). The straight evasive agility skill was the most frequently executed and highly utilized and though portraying a high rate of being unsuccessful yet depicted a greater occurrence of positive phase outcomes in terms of breakdown wins (top three) and offloads as well as line breaks for both teams. Conversely, the side-step evasive movement pattern was the most frequently executed and highly utilized by the bottom three and though depicting unsuccessful attempts, was found to be associated with the high occurrence of tackle breaks for both the teams. On the other hand, the very minimal frequency of execution and utilization by both the teams indicated that there was generally a very weak association with the selected phase outcomes.

Thus this study advocates the paramount importance of analyses of match play performances prior to the development of training programs for any selected skill that would have distinct implications in the context of sport specific performance.

## Introduction

With the advent of professionalism in 1995, the game of rugby union which is a type of football has now become a popular sport played both at national and international levels (Miles, 1995). Rugby, a multifaceted game has been classified as an invasive ball sport weaved upon concepts of attack and defence (Hughes and Barlett, 2002). Besides this, rugby is also described as a collision sport whereby the players during match play are compelled unavoidably to make contact with their opponents. As a field team sport, rugby union just like any other professional sport is based on the superior execution of a number of multivariate skills. The abilities and skills of individual athletes and team combination undertaken with the view to outmanoeuvre the onslaught of opponents have been said by Wheeler (2009) to be the fundamental elements leading to this success. A rugby union performance therefore by its players is marked by a combination of multifaceted physiological capacitates, advanced technical and biomechanical mechanism, complex tactical decision-making coupled with the superb execution of these skills during match play. Being a team sport, according to Savelsbergh, Kamp, Williams, and Ward (2005) the successful performance in rugby requires elite rugger players to possess perceptual skills as well as the ability to effectively perform sport-specific movement patterns. The superior skills executed and the agility portrayed demarcate elite (professional) and amateur (novice) players. In a game of rugby during match-play, most of the attention is focused on ball carriers who are the driving force to attempt scoring opportunities while effectively attempting to evade defensive opponents. These ball carriers need to possess and execute evasive agility skills in order to gain an advantage against the opponents and game coaches constantly need to adapt and adopt effective coaching of evasive agility skills to cater for the requirement of these ball carriers. Engelbrecht (2011), viewed that rugby was a game all about ball possession with the ultimate aim to score more points than the opposing team which thereby demands the superb and skilful execution of evasive agility skills by ball carriers to advance the ball beyond the advantage line and score. In order to achieve this objective, ball carriers have to possess superior evasive agility skills incorporating evasive movement patterns such as straight, side-steps and crossover-stepping strategies skills that would create opportunities at score tries and generate positive phase outcomes.

In view of the scenario highlighted above, published research that has investigated evasive agility skills among elite rugby players has often been confounded by poor methodological and operational definitions of performance as well as the failure to acknowledge the quality of skill execution (Wheeler, 2009). Borrie, Jonsson, and Magnusson (2002) reported that published research has typically reported the frequency of event occurrence as an index of skill execution and proposed the need to acknowledge the intricate performance

parameters associated with skill execution. Taylor, Mellalieu, and James (2007) highlighted the issue that even though notational analysis can be utilized to determine the key indicators of performance based on measures of skill execution, there is limited published research employing notational analysis to examine skill execution in rugby union. On the contrary, Sayers and Washington-King (2005) confidently suggested that notational analysis of skill execution with reference to outcome has the potential to provide a recipe for successful performance. The evolvement of rugby, a multifaceted and invasive collision sport into a professional game and the fact that past published research has been confounded by the lack of empirical data in the context of skill execution among elite rugby players has now become the focus of numerous research. Hence against this backdrop this study seeks to explore the frequency, the most highly utilized and successful as well as unsuccessful attempts of evasive agility skills executed by attacking ball carriers among elite rugby players and their relationship to selected phase outcomes.

## Methodology

The study undertaken was a structured non-participant observational descriptive study carried out in the laboratory at the UiTM's Faculty of Sports Science and Recreation. The sampling technique that was used in the conduct of this study was purposive sampling. The sample for this study were ball carriers among selected elite rugby teams who participated in the 8th Rugby World Cup 2015 tournament, the quadrennial rugby union world championships hosted by England from 18 September to 31 October 2015 and this study coded all elite ball carriers irrespective of their playing positions. The recorded matches were coded using notational analysis. Notational analysis was chosen as stated by Taylor et al., (2007) because it can be used to determine the key indicators of performance based on measures of skill execution. Two sets of data were collected whereby the ball carriers of the countries ranked top three, and bottom three were coded. The teams that were identified as being the top three elite rugby teams were based on teams that attained first, second and third placing in the 8th Rugby World Cup 2015 and these placings were secured by New Zealand (first), Australia (second) and South Africa (third). A total of 21 matches were coded for all these top three countries. Conversely, the bottom three elite rugby teams were teams that were eliminated at the group stage and these teams secured the least points in the tournament. These teams were the United States of America (USA), Uruguay, as well as Namibia and a total of 11 matches, were coded for all these bottom three countries.

*Instrumentation*

In order to collect the data for the study, all of the 32 selected matches in the 2015 Rugby World Cup which were broadcasted live by ASTRO Malaysia Holding Sdn Bhd were initially recorded using the Astro Beyond TM PVR (Personal Video Recorder) and saved onto a database. The Longomatch Pro version 1.3 was used to code all the 32 matches that were recorded. López-González and Miarka (2013) indicated that Longomatch Pro obtained strong reliability (r=.85) and also demonstrated to be reliable due to video editing capabilities. The SPSS Software Package version 20 was utilized to conduct the statistical

analysis of the data. The video match footages in the course of data analysis was displayed on a 15 inch Mac Book Pro Laptop that was set at seated eye level.

*Variables*

The independent variable in this study was the attacking ball carriers among the top three and bottom three elite rugby teams meanwhile the dependent variables were the evasive agility skills executed by these ball carriers encompassing the sub-categories of straight, side-step and crossover-step as well as phase outcomes as detailed below:

- *Evasive agility skill* examines the movement patterns exhibited by attacking ball carriers when challenging the defensive lines (Wheeler, 2009). These evasive movement patterns were sub-categorized as:
  i.   *Straight*: A ball carrier runs straight at the defence with no execution of an evasive agility manoeuvre (Wheeler, 2009).
  ii.  *Side step*: As an open step initiated by the outside leg (Rand & Ohtsuki, 2000).
  iii. *Crossover step*: As a closed step initiated by the inside leg (Hollander, Brown, Lambert, Treu & Hendricks, 2016).
- *Phase outcomes* normally describe the general result of the attacking ball carry (Bracewell, 2003). The phase outcomes variable sub-categories were:
  i.   *Breakdown loss*: Occurs when attacking teams fail to retain possession of the ball at the breakdown (Hendericks, Roode, Matthews, & Lambert, 2013).
  ii.  *Breakdown win*: Occurs when attacking team successfully retains possession of the ball at the breakdown (Hendericks et al., 2013).
  iii. *Offload*: Occurs when attacking ball carriers manage successfully to offload the ball to a supporting team member when in contact with defensive opponents (Wheeler, 2009).
  iv.  *Tackle- break*: Occurs when attacking ball carriers are successfully able to penetrate or break free from the attempted tackle from the defence (Wheeler & Sayers, 2009).
  v.   *Line-break*: Occurs when the attacking ball carrier is successfully able to evade contact with the defence and advances the ball beyond the advantage line (Wheeler, 2009).

*Data Analysis*

The data obtained was subjected to both descriptive and inferential statistical analysis methods. For this study, the researcher utilized descriptive statistics, which involved frequency analyses (means and standard deviations). With regards to inferential statistics, the independent sample t-test was carried out to compare if there were any significant differences in the means between the top three and bottom three elite rugby teams in the context of the frequency of the executions of the evasive agility attacking skills. In order to observe if they prevailed any statistically significant relationships, the non-parametric test, the Chi-Square test was utilized. This was adopted to examine the relationship between the sub-categories of the evasive agility skills with selected phase outcomes. The significance threshold was set at $p < 0.05$. Other tests included reliability analysis. The data collected from the notational analysis were analysed using the Statistical Package for the Social Sciences (SPSS) Version 20.

Reliability Tests

In the context of this research, the inter and intra-tester reliability tests were conducted using the Cohen Kappa statistics to ensure that the data collected reflected correct representations of the variables measured. To assess the strength of agreement between the inter-tester (accredited performance analyst) and intra-tester (the researcher), video footage of a randomly selected match, New Zealand versus France was coded on two separate occasions. A one week period was observed between data collection sessions with the view to prevent measurement errors as well as to generate unbiased and minimal error-free results. The match used for the inter-tester and intra-tester reliability tests was not included as part of the actual notational analysis. The Kappa test statistics were used to assess both the inter and intra-tester reliability of nominal level of data types. The inter and intra-tester reliability tests results showed an almost perfect agreement for both the evasive agility skill and phase outcome variables which was in the range of 0.81-0.99.

## Results

The descriptive analyses of the selected evasive agility skills exhibited during rugby union match play as portrayed in Figure 1, it can be deduced that the most highly utilized evasive agility skill executed by the top three elite rugby teams in attempting to evade defensive opponents was the straight running pattern 59%  as compared to the side-step 39% and the crossover- step 2%. Conversely for the bottom 3 elite rugby teams, the most highly utilized evasive agility skill that was executed by attacking ball carriers to evade defensive opponents was the side-step 52% as in contrast to the straight 45% and the crossover-step 3%. This shows that attacking ball carriers in the top three elite rugby teams executed the straight movement pattern as their most highly utilized evasive agility skill as compared to the side-step which was most highly utilized by the attacking ball carriers in the bottom three elite rugby teams when evading defensive opponents.
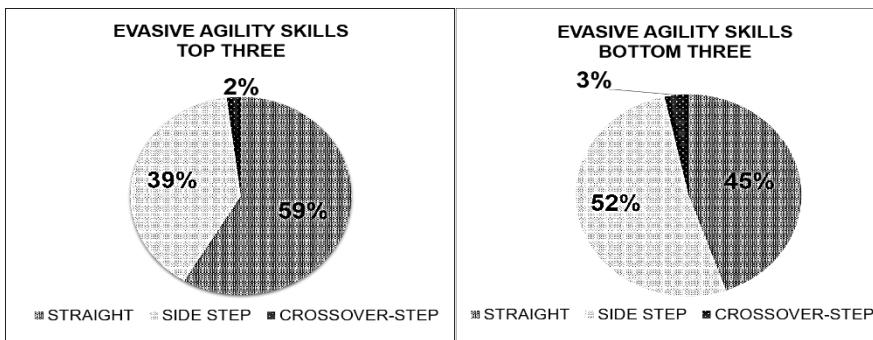


**Figure 1:** Frequency of Execution of Sub –Categories of Evasive Agility Skills Exhibited by Ball Carriers by the Top Three and Bottom Three Elite Rugby Teams

The results of the independent t-test as depicted in Table 1, it was found that there was a significant difference in the frequency of the execution of the straight evasive movement pattern as reflected by the findings for the top three elite rugby teams (M= 21.81, SD= 5.16) and the attacking ball carriers of the bottom three elite rugby teams (M=8.22, SD=

1.58) conditions; t (4) = 4.360, p= 0.012 when executing the straight evasive movement pattern. As for the execution of the side-step evasive movement pattern by attacking ball carriers the results obtained showed that there was no significant difference in the frequency of execution between the top three elite rugby teams ( M=14.67, SD= 3.94) and the bottom three elite rugby teams (M=7.64, SD=4.35) conditions; t (4) = 2.073, p=0.107. The results obtained also reflected that there was no significant difference in the execution of the crossover-step between the top three elite rugby teams (M= 0.76, SD= 1.20) and bottom three elite rugby teams (M= 0.17, SD= 0.41) conditions; t (4) = 0.854, p=0.441.

**Table 1:** Independent Sample T-Test Portraying the Frequency of Differences in the Execution of the Sub-Categories of Evasive Agility Skills between the Top Three and Bottom Three Elite Rugby Teams

| Evasive agility skill | Teams | N | M | SD | *F* | T | *P* |
|---|---|---|---|---|---|---|---|
| Straight | Top 3 | 3 | 21.81 | 5.16 | 4 | 4.360 | 0.012 |
| | Bottom 3 | 3 | 8.22 | 1.58 | | | |
| Side-step | Top 3 | 3 | 14.67 | 3.94 | 4 | 2.073 | 0.107 |
| | Bottom 3 | 3 | 7.64 | 4.35 | | | |
| Crossover-step | Top 3 | 3 | 0.76 | 1.20 | 4 | 0.854 | 0.441 |
| | Bottom 3 | 3 | 0.17 | 0.14 | | | |

Significant level p < 0.05

Based on the analyses as portrayed in Table 2 as regards the frequency of the execution of evasive agility skills, it was found that the attacking ball carriers in the top three elite rugby teams depicted a higher frequency of success (44%) of the crossover – step movement pattern as compared to the side-step (31%) and the straight movement pattern (29%). On the other hand, the attacking ball carriers in the bottom three elite rugby teams when attempting to evade defensive opponents frequently executed the crossover-step and recorded a success rate of 57 % for this movement pattern. This was followed by the straight movement pattern (23%) and side-step (21%).

**Table 2:** Frequency of successful and unsuccessful executions of the sub-categories of evasive agility skills by attacking ball carriers among the Top Three and Bottom Three Elite Rugby Teams.

| | Evasive agility skills | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Straight | | | | | Side-step | | | | | Crossover-step | | | | |
| Teams | *F* | Succ | | Unsucc | | *F* | Succ | | Unsucc | | *F* | Succ | | Unsucc | |
| | *n* | *n* | % | *n* | % | *n* | *n* | % | *n* | % | *n* | *n* | % | *n* | % |
| Top 3 | 458 | 132 | 29 | 326 | 71 | 308 | 96 | 31 | 212 | 69 | 16 | 7 | 44 | 9 | 56 |
| Bottom 3 | 91 | 21 | 23 | 70 | 77 | 106 | 22 | 21 | 84 | 79 | 7 | 4 | 57 | 3 | 43 |
| Note: *F*, Frequency; Succ, Successful; Unsucc, Unsuccessful; *n*, Number; %, Percentage | | | | | | | | | | | | | | | |

As shown in Tables 3 and 4 in terms of phase outcomes, the Chi-square statistical analyses revealed that when the attacking ball carriers in the top three elite rugby teams executed the straight evasive movement pattern this led to the greater occurrence of breakdown wins (49.4%) thereby implying that the attacking ball carriers successfully retained possession of the ball at the breakdown. When attacking ball carriers executed the straight evasive movement pattern, there was a greater occurrence of offloads (75.8%) while the execution

of the side-step evasive movement pattern led to the occurrence of more tackle breaks (65.8%). There was a higher occurrence of line breaks (89.1%) with the execution of the straight evasive step. The execution of the straight (50%) and the side-step (50%) indicated a greater occurrence of breakdown losses. It was inferred that when attacking ball carriers in the bottom three elite rugby teams executed the side-step (60.4%), this contributed to the greater occurrence of breakdown wins in terms of phase outcomes. When the straight evasive movement pattern was executed by attacking ball carriers, there was a greater occurrence of offloads (59.5%) while the execution of side-step led to the occurrence of tackle breaks (65.8%). There was a higher occurrence of line breaks (84.2%) with the execution of the straight step. The execution of the straight (50.0%) and side-step (50%) indicated a greater occurrence of breakdown losses.

**Table 3:** Relationship between Sub-Categories of the Execution of Evasive Agility Skills and Phase Outcomes as Exhibited by Attacking Ball Carriers among the Top Three and Bottom Three Elite Rugby Teams

| Evasive agility skills | Teams | | Phase outcomes | | | | |
|---|---|---|---|---|---|---|---|
| | | | BD Wins | BD Loss | Offload | Tackle Break | Line Break |
| Straight | TOP 3 | *n* | 162 | 14 | 119 | 36 | 98 |
| | | % within PO | 49.4 % | 50.0 % | 75.8 % | 30.8 % | 89.1 % |
| | BOT 3 | *n* | 38 | 3 | 22 | 5 | 16 |
| | | % within PO | 37.6 % | 50.0 % | 59.5 % | 19.2 % | 84.2 % |
| Side-step | TOP 3 | *n* | 159 | 14 | 36 | 77 | 10 |
| | | % within PO | 48.5 % | 50.0 % | 22.9 % | 65.8 % | 9.1 % |
| | BOT 3 | *n* | 61 | 3 | 13 | 19 | 2 |
| | | % within PO | 60.4 % | 50.0 % | 35.1 % | 73.1 % | 10.5% |
| Crossover-step | TOP 3 | *n* | 7 | 0 | 2 | 4 | 2 |
| | | % within PO | 2.1 % | 0.0% | 1.3 % | 3.4 % | 1.8 % |
| | BOT 3 | *n* | 101 | 6 | 37 | 26 | 19 |
| | | % within PO | 2.0 % | 0.0 % | 5.4 % | 7.7 % | 5.3 % |

Note: BD Win, Breakdown Win; BD Loss, Breakdown Loss; %, Percentage; PO, Phase Outcome

**Table 4:** Chi-square Relationship between Sub-Categories of the Execution of Evasive Agility Skills and Phase Outcomes as Exhibited by Attacking Ball Carriers in the Top Three and Bottom Three Elite Rugby Teams

| Phase outcome | Teams | Evasive agility skill | | |
|---|---|---|---|---|
| | | Chi-Square ($\chi^2$) | DF | P Value |
| Breakdown Wins | Top 3 | 143.71 | 2 | 0.00 |
| | Bot 3 | 52.54 | 2 | 0.00 |
| Offloads | Top 3 | 138.43 | 2 | 0.00 |
| | Bot 3 | 16.27 | 2 | 0.00 |
| Tackle Break | Top 3 | 68.67 | 2 | 0.00 |
| | Bot 3 | 19.00 | 2 | 0.00 |
| Line Break | Top 3 | 154.76 | 2 | 0.00 |
| | Bot 3 | 22.21 | 2 | 0.00 |
| Breakdown Loss | Top 3 | 0.01 | 1 | 1.00 |
| | Bot 3 | 0.00 | 1 | 1.00 |

**Discussion**

Rugby which has a field-based environment requires attacking ball carriers to execute superb evasive agility skills. In the context of this study, two sets of data were collected whereby the ball carriers of the countries ranked top three, and bottom three at the end of the tournament were coded. This was done with the view to examine if there would be any variance in the execution of the evasive agility attacking skills between the top three and bottom three elite rugby teams. The present study through the statistical analyses of the frequencies of the evasive skills employed by the ball carriers found that there was a significant difference in the frequency of the execution of the straight evasive agility skill as reflected by the findings for the top three and bottom three elite rugby teams ($p<0.05$) when executing the straight evasive agility skill. The descriptive analyses in this study also revealed that during rugby union match play the attacking ball carriers in the top three elite rugby teams displayed a 59% of the straight evasive agility skills while the bottom three elite rugby teams only displayed 45% of this movement pattern. The findings for the attacking ball carriers for the top three elite rugby teams were similar to Wheeler's (2009) study who disclosed that 58% of the attacking ball carriers displayed a straight running evasive pattern when challenging opponents. The similarities of these findings could be attributed to the fact that the samples of both these researchers were elite rugby players who were capable of effectively executing the straight evasive sport specific movement. Wheeler and Sayers (2009) and Duthie, Pyne, Marsh, and Hooper (2006) supported the fact that when attacking ball carriers run straight at the defence with no execution of an evasive agility or manoeuvre at maximal speed capacity in attempting to evade defensive opponents was an important factor in the determination of success in rugby union. This point of view of these researchers was found to be true and valid as the most highly utilized evasive agility encompassing the selected sub-categories, the results showed that the attacking ball carriers among the top three elite rugby teams executed 59% of this straight evasive agility skill as compared to 39% of side-step and only 2% of the crossover stepping. This fact that attacking ball carriers most highly utilized the straight running evasive agility skill and attained success and top ranking in the 2015 Rugby World Cup supported the findings by Duthie et al., (2006) that straight-line running patterns with no evasive agility execution during ball carries was an important determinant of success in rugby union. Thus this could have partly contributed to their final rankings in the 2015 Rugby World Cup Tournament.

The study conducted also explored the execution of evasive agility skill in the context of the sub-category of the side-stepping movement pattern. Rand and Ohtsuki (2000) further enlightened by stating that the side-stepping strategy was an open step initiated by the outside leg. The research undertaken found that the attacking ball carriers in the top three elite rugby teams executed 39% of side-step agility skills while the attacking ball carriers in the bottom three elite rugby teams executed 52% of this movement pattern. Even though there was a variance of 13% between the top three and bottom three elite rugby teams, but the results of the independent sample t-test also showed that in terms of the execution of the side-step evasive movement pattern by attacking ball carriers, there was no significant difference in the frequency of execution between the top three and bottom three elite rugby teams ($p>0.05$). In this context, Wheeler, Askew and Sayers (2010) through their notational analysis of the match footage coding all ball carriers in the Super 14 Rugby

Union Competition in 2006, found that 37% of all ball carriers utilized evasive side-stepping manoeuvres. This finding by Wheeler et al. almost matched the execution by ball carriers of side-stepping movement patterns among the top three elite rugby teams (39%). Conversely, the data obtained for the bottom three elite rugby teams, it indicated that the most highly utilized evasive agility skill that was executed by attacking ball carriers was the side-step with 52% as in contrast to the straight 45% and the crossover-step 3%. Compared to the straight step that was the most highly utilized by the top three elite rugby teams, the findings for the bottom three elite rugby teams indicated that all rugby teams in the bottom three indeed utilized the side-step evasive movement pattern the most. The effectiveness of the utilization of the side-step by attacking ball carriers when attacking a structured line of defence according to Young, McDowell, and Scarlett (2001) provided them with very flexible methods of evasive attacks during numerous circumstances in play. In spite of this fact, it can be deduced that though the bottom three elite rugby teams executed a higher percentage of the side-step evasive agility skill, but this did not contribute to their overall performance and ranking. This could be attributed to the low success rate (21%), poor quality and technique of execution as compared to the top three elite rugby teams could possibly due to their high success rate of execution (31%) were able to procure more positive outcomes and obtaining higher ranking in the tournament. As regards execution of the side-step, the study by Bradshaw, Young, Russel, and Burge (2011) highlighted that the side-step had the fastest approach time performed by elite players and only accounted for 0.9% for incorrect decisions. The study by Bradshaw et al. could possibly lend support to the higher success rate attained by the top three (31%) as compared to the bottom three who only achieved a success rate of 21% in spite of their higher percentage of the execution of the side-step evasive agility skill when attempting to evade defensive opponents.

As regards the execution of the crossover-step evasive agility skill by attacking ball carriers among elite rugby teams when attempting to evade defensive opponents, the results obtained reflected that there was no significant difference in this aspect between the top three and the bottom three elite rugby teams ($p > 0.05$). This suggests that there was no marked tendency by attacking ball carriers among elite rugby teams to exhibit the execution of the crossover-step movement pattern in the context of evading defensive opponents. Furthermore, this study also revealed that there was a very minimal execution of the crossover evasive movement pattern when attempting to evade defensive opponents. The findings of this study closely matched the notational analysis conducted by Bradshaw et al. (2011) which found that only 5% of attacking ball carriers in the Super 14 Rugby Union Competition in 2006 employed crossover-stepping strategies. In this study the attacking ball carriers in the 2015 Rugby World Cup among the top three elite rugby teams only executed 2% of this evasive agility step while the ball carriers in the bottom three elite rugby teams in this tournament executed only 3% of the crossover evasive stepping movement patterns in their attempts to evade onslaughts from defensive opponents. The fact that the crossover-stepping strategies during the execution of the agility skill limit the change of direction angles, according to Cowley, Ford, Myer, Kernozek, and Hewett (2006) could be attributed as a causal factor for the minimal execution of this crossover evasive step. Furthermore, as the execution of the crossover-step usually occurs away from the congested play when counter-attacking an unstructured line of defence could possibly be linked to the least utilization of this skill as stated by Young, Hawker, and McDonald

(1996). Another attributive factor as mentioned by Hughes and Barlett (2002) for the minimal utilization of the crossover step movement patterns in evading opponents could be seen in the light of the fact that rugby being an invasive, collision sport of frequent bouts of high intensity, it would be rare to seek circumstances of uncongested play.

The data collected portrayed that in the course of the execution of the evasive agility skills, the frequency of utilization of the straight movement pattern revealed a higher percentage of being unsuccessful for the top three elite rugby teams (71%) and bottom three elite rugby teams (77%), thereby implying that the success rate was only 29% and 23% respectively. As for the side-step, again the unsuccessful rate was shown to be higher whereby the ball carriers in the bottom three elite rugby teams portrayed that 79% out their 106 executions failed in their attempts to evade their defensive opponents. Similarly, the ball carriers in the top three elite rugby teams through the utilization of the side-step too failed to ward off the defensive opponents because 69% out of the 308 executions were deemed as being unsuccessful. Conversely, even though the crossover evasive agility skill was the least utilized but out of the 7 executions of the skill by the attacking ball carriers in the bottom three elite rugby teams, 57% (4 executions) were successful while 3 executions were rated as being unsuccessful. The ball carriers in the top three elite rugby teams, on the other hand, executed 16 attempts utilizing the crossover-step and of this 56% were unsuccessful while 44% were successful. From the above findings it can be deduced that in terms of the execution of evasive agility skills to evade defensive opponents, there was a higher frequency of attacking ball carriers in both the top three and bottom three being unsuccessful. Nevertheless, this should not be interpreted that these evasive agility skills are not important in rugby union matches because further analysis in this study showed there were, in fact, positive phase outcomes due to the frequency of executions of these movement patterns. This fact was also supported by Borrie et al., (2002) who reported that published research has typically reported the frequency of event occurrence as an index of skill execution and thereby proposed the need to acknowledge the intricate performance parameters associated with skill execution. The above interpretation was also supported by Wheeler (2009) who stipulated that evasive agility skills were an important attacking strategy that promotes positive tackle outcomes in rugby union (p.129).

Phase outcomes according to Bracewell (2003) could be viewed as results of the attacking ball carry. Coaches have analysed phase outcomes as a very vital contributor to scoring tries according to Jones, Mellalieu, and James (2004) and the importance of phase outcomes was further enlightened by Laird and Lorimer (2004) that success in rugby union was undeniably related to scoring tries. The findings of this study revealed that the straight evasive agility skill (59%) was the most frequently utilized by attacking ball carriers among the top three elite rugby teams, but 71% of its executions were rated as being unsuccessful and only a 29% of success rate was recorded for this evasive skill. In spite of this, in terms of phase outcomes a higher percentage of breakdown wins were observed in this study when attacking ball carriers in the top three elite rugby teams executed the straight evasive agility skills (49.4%). This implied that attacking ball carriers in the top three elite rugby teams successfully retained possession of the ball at the breakdown. This finding was similar to Wheeler's (2009) research that straight movement patterns were contributive to breakdown wins (47.1%) and thereby this step is suggested to be utilized by attacking ball carriers in their attempts to advance the ball to the advantage line and

achieve score tries. On the contrary, this study found that attacking ball carriers in the bottom three elite rugby teams, most highly utilized the side-step evasive agility skill (52%) but 79% of the execution of this step was deemed unsuccessful while recording a success rate of 29% only. When attacking ball carriers in the bottom three elite rugby teams utilized the side-step, that is (60.4%) this led to a higher association with breakdown wins in the context of phase outcomes, but it did not attribute positively to their successful performance and overall ranking in the 2015 Rugby World Cup. This study revealed that there was a high occurrence of breakdown losses through the execution of the straight evasive step (50%) and side step (50%) for the both the top three and bottom three elite rugby teams. These findings were similar to that of Wheeler et al. (2010) portraying that the straight evasive agility skill was associated with 57.3% of breakdown losses. This view that the possibility of negative phase outcomes could be associated with the execution of the straight evasive manoeuvre was also supported by Sayers and Washington-King (2005) indicating that attacking ball carriers may not be successful in retaining possession of the ball during breakdown. The above findings as regards the execution of the straight and side-step evasive agility skill as revealed by this study and other related studies mentioned above should not be misconstrued that it only portrayed negative outcomes in terms breakdown wins and breakdown losses. If the breakdown wins and breakdown losses occurred within the range of 50%, it should also be interpreted that in fact attacking ball carriers in elite rugby union had an equal chance of retaining and losing the ball and thereby portrayed positive as well as negative tackle outcomes. During the conduct of this observational study, it was found that positive outcomes during breakdown down were very dependent on the support by fellow teams mates in the continuous possession of the ball.

The attacking ball carriers in both the top three (75.8%) and bottom three (59.5%) elite rugby teams portrayed a higher occurrence of offloads through the execution of the straight evasive agility skill even though there was a difference of 16.3% between both the teams. Wheeler (2009) was of the opinion that 90.1% of offloads in rugby matches were associated when attacking ball carriers were challenged by a single defensive opponent thereby leading to the elite attacking ball carriers being pressurized to offload the ball to their team members. Ball carriers are deemed as facing obstacles to offload the ball successfully to team members when poised for tackling more than one defensive opponent (Wheeler et al., 2010). The high occurrence of offloads in this study through the execution of the straight evasive step could be attributed to the fact that during match play, the ball carriers generally ran straight at the defence. This thus compelled them to offload and thereby ensuring the retention of the ball and the continuity of play advancing the ball to the advantage line with the view to score tries.

Jones, Mellalieu, and James (2005), as well as Van Rooyen and Noakes (2006), reiterated that tackle breaks should be perceived as a major contributor of teams achieving success in rugby union as tackle breaks are reflective of try-scoring capabilities. The current study through the Chi-square statistical analysis revealed that the attacking ball carriers in both the top three and bottom three elite rugby teams showed a higher occurrence of tackle breaks through the execution of the side-step as compared to the straight and crossover-step evasive agility skill. It was observed that 65.8% and 73.1% of tackle breaks displayed patterns of side-stepping evasive attacking strategies by both the ball carriers in the top

three and bottom three elite rugby teams respectively. The high association of tackle breaks and side-stepping movement patterns as portrayed by top three and bottom three elite rugby teams in 2015 rugby World Cup could be attributed as stated by Wheeler (2009) and Wheeler et al., (2010) that side-stepping strategies play a major role in enabling attacking ball carriers to penetrate the defensive lines structured by the opposing teams. The attainment of positive tackle break by these teams could have been further enhanced through the execution of the side-stepping evasive agility skill as revealed by the biomechanics research by Wheeler (2009) that the dynamic stability attributes that are linked with side-stepping movement patterns contribute to improving running ability during the course of contact with defensive opponents.

In the present study, the highest occurrence of line breaks were displayed when ball carriers in both the top three and bottom three elite rugby teams utilized the straight evasive movement pattern. It was observed that 89.1% (top three) and 84.2% (bottom three) of line breaks occurred through the straight evasive movement pattern. The importance of the link between straight evasive movement patterns and line breaks promoting scoring tries was also portrayed in this study because the top three elite rugby teams achieved a 29% rate of success as compared to the bottom three elite rugby teams who procured a 23% success rate thereby lending support to the fact as highlighted by Ortega, Villarejo, and Palao (2009) that successful teams were able to evade contact with the defence and secure more scoring tries leading eventually to their success. The statistical analysis as regards the crossover evasive step in this study found that there was no significant relationship between this evasive skill and within the selected phase outcomes for the top three ($p > 0.05$) and bottom three ($p > 0.05$). The attacking ball carriers in both the top three and bottom three elite rugby teams also showed a very minimal execution of the crossover evasive movement pattern when attempting to evade defensive opponents whereby respectively there was only a 2 % and 3% execution of this evasive skill. Thus the very minimal execution and non-significant relationship with within selected phase outcomes of the crossover evasive step could be an attributive factor for the lack of published research as regards its importance.

Generally, it can be inferred that while initial statistics showed that side step evasive agility skill portrayed a higher and better success rate for the top three elite rugby teams, and inversely for the bottom three elite rugby teams, but overall positive phase outcomes suggested that the attacking ball carriers benefitted more from the straight evasive (top three) and side step (bottom three) due to the occurrence of only 50% of breakdown losses and 50% of breakdown wins. This could possibly be linked to the decision making process by the attacking ball carriers during match-play which was not part of the notational analysis conducted.

**Conclusion**

The current study found that among the three sub-categories of evasive agility skills, the straight evasive movement pattern was the most frequently executed and highly utilized by attacking ball carriers in the top three elite rugby teams. Nevertheless, in spite of portraying a higher rate of unsuccessful execution, the straight evasive agility skill

depicted a higher occurrence of positive phase outcomes in terms of breakdown wins, offloads and line breaks, thereby contributing to New Zealand, Australia and South Africa being ranked as the top three elite rugby teams in the 2015 Rugby World Cup. Generally, it can be inferred that the side step evasive agility skill portrayed a higher and better success rate for the top three elite rugby teams, and inversely for the bottom three elite rugby teams, but overall positive phase outcomes suggested that the attacking ball carriers benefitted more from the straight evasive (top three) and side step (bottom three) due to the occurrence of breakdown losses and breakdown wins. Besides that, the very minimal frequency of execution of the crossover-step by both the elite rugby teams indicated that there was generally a very weak association with the selected phase outcomes. These findings suggest that the multiple positive combination and execution of both the straight and side-step evasive agility skill compared to the crossover-step during play and coaching sessions creates an abundance of positive phase outcomes and attainment of success in rugby union.

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