An exploratory study of attack variability, attack efficiency and conversion rate in elite rugby union

Andrew Barnes[1], Rachel Richardson,[1], Mohsen Shafizadeh [1]

[1] *Academy of Sport and Physical Activity, Sheffield Hallam University, Sheffield, UK.*

Background and Purpose: Tournament and match situation as environmental constraint are changed as the importance of the game increases, that in turn changes players' behaviours according to dynamic system theory (Newell, 1986; Renshaw et al., 2010). Attacking strategies as a part of behaviour can predict the probability of tactical actions in a time series (Parazen, 1962). By looking at how tactics change over the course of a tournament, it can help develop more efficient attacking strategies. The purpose of this exploratory study was to identify attack variability and efficiency as well as conversion rate and their fluctuations over the progressive stages of a tournament.

Methods: The 4 most successful teams from the Rugby World Cup 2015 were analysed by notational analysis. Six tactical actions were used to describe the attack strategies when points were scored. Using a Markov chain method, the transition probability and transition rate was calculated as indicators of tactical variability. Attack efficiency was calculated to show the percentage of possessions which led to successful attacks, the conversion rate was also calculated to represent the number of scores per successful attack.

Results: The results showed that the "hands down the line" was the most common tactical action (probability of 0.364) in the pool stage. Clean breaks and kicks also had a high average transition rate (6.87% and -10.24%) while hands down the line and opposition error remained stable through the tournament. Conversion rate remained high but fluctuated slightly ending at 47.27% while the attack efficiency remained consistent until the final when it increased to 40.13%.

Conclusion: The results show that the tactical actions of teams vary throughout the tournament and attack efficiency and conversion rate are maintained or improved throughout the tournament. These findings support the importance of variability in attack for successful performance.

References:

Hunter, P. and O'Donoghue, P. (2001), A match analysis of the 1999 rugby union world cup, *Books of abstracts Fifth World Congress of performance analysis in sports.*

Newell, K.M. (1986), Constraints on the development of coordination, Motor development in children: aspects of coordination and control, 34, 341-360.

Parazen, E. (1962), *Stochastic Processes*, Holden-Day

Renshaw, I., Chow, J.Y., Davids, K. and Hammond, J. (2010), A constraints-led perspective to understanding skill acquisition and game play: A basis for integration of motor learning theory and physical education praxis? *Physical Education and Sport Pedagog*y, 15, 117-137.