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The type and variation of evasive manoeuvres during an attacking task differ across a rugby league development pathway

Leesa A Pearce[1*], Anthony S Leicht[1], Miguel-Ángel Gómez [1-2], Wade H Sinclair[1], Carl T Woods[3]

[1]Discipline of Sport and Exercise Science, James Cook University, Queensland, Australia

[2]Faculty of Physical Activity and Sport Sciences, Technical University of Madrid, Spain

[3]Institute for Health and Sport, Victoria University, Victoria, Australia

*Corresponding Author

Wade H Sinclair, Discipline of Sport and Exercise Science, James Cook University, Townsville, Queensland, Australia

Ph: +61 07 4781 6066 Mob +61 407674843 Email: wade.sinclair@jcu.edu.au

Running Title: Evasive manoeuvres differ between development level in rugby league

Abstract

This study examined the relationship between evasive skill and developmental level in a rugby league (RL) talent pathway. An observational and cross-sectional research design was used with a total sample of 90 male participants (under 18, n = 30; under 20, n = 30; and state league, n = 30) performing an attack play task, requiring three attackers to compete against two defenders to successfully generate a 'line-break'. Assessment criteria of the task included start position, type of evasive manoeuvre and task outcome (successful line-break or not), with relationships determined using the Fischer's exact test (Crosstabs Command) with adjusted residuals (AR) and the multinomial logistic regression. Outcome scores for the task did not significantly differ between development levels, but the relationship between development level and evasive manoeuvres was significant ($\chi^2 = 35.916$; *df* = 26; *P* = 0.026; ES = 0.27). State league players had a greater frequency of 'angled run', 'all square run' and combinations of evasive manoeuvres compared to the other levels. This study demonstrated that variation and type of evasive manoeuvre used by players differed across developmental level. These results could support the design of training activities intended to develop evasive skill in talented junior RL players.

Key words: Talent development; Team sport; Tactical skill; Deception; Performance analysis

Introduction

Rugby league (RL) is a team-based invasion sport, requiring players to blend a range of physical (Gabbett, Jenkins, & Abernethy, 2012), technical (Pearce, Sinclair, Leicht, & Woods, 2019) and tactical (Cupples & O'Connor, 2011) skills over the course of an 80 minute game. Given its popularity within Australia (Trueman, 2017), state-based organisations (e.g. Queensland Rugby League Intrust Super Cup Competition) have been established to nurture prospective talent, acting as 'feeder' competitions for the premier RL competition, the National Rugby League (NRL) (Woods et al., 2017). Within these feeder competitions talent development pathways have been established, intending to augment the development of talent identified RL players (Pearce et al., 2019). Such pathways typically initiate at an under 18 (U18) level, progressing into an under 20 (U20) level, and then into an open, senior level, referred to as the State League (SL). Accordingly, to support the development of talent within these feeder competitions and promote a smooth junior-to-senior transition, it would be important for practitioners to base training practices around known performance gaps between these levels (Ireton, Till, Weaving, & Jones, 2017; Till, Jones, & Geeson-Brown, 2016).

Relative to research conducted on the physical (Gabbett et al., 2012; Pearce, Sinclair, Leicht, & Woods, 2018; Till, Scantlebury, & Jones, 2017) and technical (Gabbett, 2014; Pearce et al., 2019; Waldron, Worsfold, Twist, & Lamb, 2014) aspects of RL, there has been limited research examining the decision-making skill of players across a talent pathway in Australia and internationally. Indeed, some research has suggested that elite RL players have a reduction in their attentional demands during dual-task activities when compared to their sub-elite counterparts (Gabbett, Wake, & Abernethy, 2011), while others have shown that elite players perform better than non-elite players during a video-based decision-making task (Connor, Crowther, & Sinclair, 2018). To date, though, research has yet to quantify and compare the tactical decision-making skill of RL players within a talent development pathway; a gap which would be important to fill in order to support coaches in designing training activities intended to guide the tactical skill of players.

The importance of tactical decision-making skills during RL game play has been shown by Gabbett and Abernethy (2012), who noted that approximately 50% of the 'tries' scored in the NRL were the consequence of a deceptive or evasive action (i.e., movements that coerce an opponent into a movement pattern that is then exploited by the ball carrier). Such actions are typically utilised in RL with the intent of deceiving an opponent to gain territory, or to increase the opportunity to rapidly continue game play following a tackle. Additionally, evasive manoeuvres may be used to draw and commit a defender towards the ball carrier, increasing the opportunity for any supporting players to receive an unimpeded pass (Australian Rugby League Commission, 2015). Both scenarios, however, are likely to increase the chances of inducing a line-break, which may result in the attacking team gaining territory downfield or ideally, scoring a try (Australian Rugby League Commission, 2015). Subsequently, the development of evasive, tactical skills may lead to greater success in RL, and should be a focus of training practices intended to develop talent in RL (Cupples & O'Connor, 2011).

The aim of this study was to examine the relationship between developmental level and the evasive manoeuvres of RL players within an Australian talent pathway. Based on known physical and technical differences between developmental levels (Pearce et al., 2018; Pearce et al., 2019), we hypothesized that the evasive strategies used by players would differ between developmental levels, leading to the SL players performing an evasive task with more success relative to the U18 and U20 levels.

Methodology

Experimental Approach to the Problem

This study followed an observational and cross-sectional research design with data collected during the early competition phase of the season to standardise training related adaptations. All participants undertook a field-based attack task, described in detail below, which was modified from prior research (Gabbett & Abernethy, 2012; Gabbett et al., 2011) that reported moderate to good rater reliability (Gabbett & Abernethy, 2012).

Participants

The total sample consisted of 90 male participants from five RL clubs competing in the same state-based competition. Each participant was categorised according to their developmental level; U18 (n = 30), U20 (n = 30) and SL (n = 30). Playing position was considered, with an equal number of each position (i.e., forwards and backs) spread across each developmental group. Ethical approval was granted from the James Cook University Human Research Ethics Sub-Committee (H7658) and all participants and / or guardians (for the U18 participants) provided written informed consent.

Procedures

All players performed an attack-play task, that consisted of three attackers versus two defenders (3 vs. 2). A schematic of the task's design is presented in Figure 1 but a brief description of the task requirements is provided here. Firstly, the participant starting the task in the attacker 2 position (A2; Figure 1) was the one assessed during the trial. The task was conducted within a 15 x 11m area on a standard RL field, and two standard, two-dimensional video cameras (Sony CX405 Full HD Handycam, Singapore) were positioned 8m behind and 6m perpendicular to the task, recording each trial for analysis. Pilot testing revealed that these camera perspectives afforded optimal viewing for the task,

In accord with the task descriptions of Gabbett et al. (2011), the task design represented an attacking play sequence following a tackle. As shown in Figure 1, each participant completed three trials in the A2 starting position, being free to self-select their start position on the 0m line between their two support players (A1 and A3). Participants were from the same development level and included two defenders (DL, DR) who commenced at the 8m line facing the attacking participants A1-A3 (Figure 1). Participants A1-A3 were instructed to perform attacking manoeuvres to elicit the desired outcome of a line-break and to complete the task at game speed to progress the ball 1m beyond the 10m line. The location of the starting position for player A2 was recorded as either opposite DL, opposite DR or evenly spaced between defenders (Table 1). After completing three trials, all participants moved to their right (e.g. A1 became A2, A2 became A3, A3 became D2, D2 moved to the D1 position).

******INSERT FIGURE 1 ABOUT HERE******

The task commenced with a left-to-right pass (from P) to the participant (A2). In this task, the defenders started within 2m of the 10m distance and were instructed to re-load (back up to the 10m line) and then attempt to defend against the attacking play. Upon receipt of the pass, A2 attempted to advance the ball using any legal means possible to evade defenders or draw defenders, thereby enabling the participant, A1 or A3 to successfully perform a line-break. The defenders were instructed to defend the attacking play and effect a tackle.

The criteria of the task undertaken by player A2 were retrospectively documented from the video footage and were as follows: the starting position, type of evasive manoeuvre and outcome of task (successful line-break or not). The type of evasive manoeuvre was categorised using criteria modified from previous research (Gabbett & Abernethy, 2012; Gabbett et al., 2011), with their definitions also being informed in conjunction with a NRL Level 3 and RL talent development coach. These criteria and their subsequent definitions are presented in Table 1.

******INSERT TABLE 1 ABOUT HERE******

Statistical Analysis

All analyses were conducted using the statistical software IBM SPSS version 25 for Windows (IBM. Corp., Armonk, NY). Relationships between the developmental level and evasive manoeuvres, based on frequencies, were determined using the Fischer's exact test (Crosstabs Command), with adjusted residuals (AR) >1.96 classified as significant, and Cramer's V test used to represent the magnitude of difference or effect size (ES). Multinomial logistic regression was conducted to identify associations between the response variable (developmental level) and the explanatory variables of start position, evasive manoeuvre and task outcome score. This regression model included a nominal dependent variable with three categories (U18, U20 and SL), then each model considers a reference category that is compared to each other when relating the predicted differences based on the independent variables. The regression model allows to obtain the odds ratios (OR) and 95% confidence intervals (CI) for each variable. The statistical significance was set at $P < 0.05$.

Results

The outcome score for the task did not significantly differ between development levels (U18, 4.0 ± 1.8; U20, 4.0 ± 1.7; SL, 4.3 ± 1.5). However, the relationship between development level and evasive manoeuvres was significant (χ^2 = 35.916; *df* = 26; *P* = 0.026; ES = 0.27). For the U18 level, more participants completed a 'square up' move (AR=2.2) and less completed a combination of evasive manoeuvres (AR=-2.4) compared to the U20 and SL levels (Table 2). For the U20 level, more participants completed an 'all square run' (AR=2.0) compared to the other development levels (Table 2). The SL participants recorded a greater frequency of 'angled run' (AR=2.2), 'all square run' (AR=2.0) and a combination of evasive manoeuvres (AR=2.5) compared to the other levels (Table 2). The SL level started the task from the right more (AR=3.8) and less from the middle positions (AR=-2.1) compared to the U18 and U20 development levels.

******INSERT TABLE 2 ABOUT HERE******

The logistical regression model for development level was significant (Likelihood Ratio Tests = 363.131, χ^2 = 102.740; *df* = 58; *P*<0.001), with a classification accuracy of 58.9% (Nagelkerke R^2 = 0.356). The significant predictors of developmental level were starting position and outcome score. Specifically, there was a greater probability that U18 (OR =6.5 x 10^{-7}, *P*<0.05) and SL (OR = 2.1 x 10^{7}, *P* <0.05) participants would commence the task from the left position compared to U20 participants. In addition, SL participants had a greater probability of performing 'step' (OR = 9.667; *P* <0.05), 'square up' (OR = 7.672; *P* <0.05) and 'all square' runs (OR = 3.317; *P* <0.05) compared to the U18 level.

Discussion

The aim of this study was to examine the relationship between evasive skill, measured via an attack play task, and developmental level in an Australian RL talent pathway. Results showed consistent task outcome scores across developmental levels, but significant differences in the type and variety of evasive manoeuvres used, in addition to starting position, between developmental levels. Notably, the U18 and U20 levels adopted similar evasive manoeuvres with significant differences being found

between these levels and the SL level. Accordingly, while differences in task outcome were not observed, this study showed that the type and variation of evasive manoeuvre used by players differed across developmental level. Importantly, our results have the potential to enrich training designs in Australian and international RL development pathways, indicating that younger levels (i.e., U18 and U20) may benefit from greater exposure to training activities intended to augment evasive skill (e.g. the use of small-sided games).

Relative to their U18 and U20 counterparts, the SL players generally performed a greater range of intentional evasive manoeuvres and appeared to deliberately position themselves opposite one particular defender at the initiation of the task compared to U18 and U20. This indicated that the SL players may have engaged in a pre-emptive strategy (starting position manipulation) that they perceived would increase their likelihood of achieving the task goal (e.g. to score via evading opponents). This response could be indicative of greater knowledge of their performance environment relative to the younger developmental levels (Davids, Araújo, Seifert, & Orth, 2015), potentially developed over prolonged exposure to rich and diverse practice designs. Further, the SL participants were more likely to use a variety of evasive manoeuvres to achieve the task goal relative to the U18 and U20 levels. This suggested that the SL participants were able to interpret defensive movements and then readjust their attacking movements to maintain their chances of achieving the task goal. For example, the ball carrier could accelerate and adjust their speed in accordance with the drawn defender to deceive them into altering their momentum and unbalance the defender (i.e., to wrong-foot them). The ball carrier could then exploit this by evading their defender through changing direction and stepping back toward the origin of the pass, further drawing the defender from the defensive line to allow a supporting attacking player to run into the hole created in the defensive line. Accordingly, it would seem important, from our results, for practitioners at the U18 and U20 levels to promote an environment that encourages this type of evasive maneuverability. Such a training environment may consist of activities that afford players opportunities to explore different ways of evading opponents with coach instruction reflecting the desired outcome, not the possible movement

solutions. For example, a training activity could simply have the task goal of *to progress the ball to the try line* with players then being awarded additional points if they evade their opponent in a highly creative way. Such a design may function to minimize an apparent gap within the tactical skill of players across a developmental pathway in Australia.

As mentioned previously, the starting position for the U18 and U20 players was similar, with players positioning themselves between both defenders. Importantly, defenders were free to position themselves in a way they felt could stop the attackers. When compared to the SL, it seemed these younger levels were less inclined to undertake a pre-task strategy intended to improve their chances of achieving the task goal. While speculative, this could indicate a tactical knowledge gap with players in these levels being unable to recognise opportunities present in their environment that could be of assistance to evade a defender (such as their starting position). It may be also be that more experienced SL A2 knew the pass could be well executed by his teammate and may have prior knowledge of the opposing defender's ability to be drawn. This knowledge would be important for game play, particularly during set plays (i.e., following a scrum), as positioning oneself in such a way that could 'wrong-foot' a defender may increase the chances of a line-break following a stoppage in play. Accordingly, using our novel results, coaches at these younger developmental levels could implement training activities (similar to the study task) that encourage players to explore differing start positions and evasive manoeuvres. Further, to increase the knowledge of these younger players, coaches could use questioning to educate a player's attention toward critical features of their environment that may assist their capability to detect and exploit the positioning of defenders (Chow et al., 2007). Nonetheless, these findings have clear practical utility for coaches within the RL talent pathway in Australia and internationally.

Despite the unique findings of this study, it was not without limitations that should be acknowledged to guide future research. Firstly, this study explicitly focused on the structured talent development pathway within one state-based organisation in Australia. As such, we do not have reference data for

comparison to the NRL, which would offer practical insight into the performance gaps between developmental levels and the elite level. Secondly, although the task was performed in a representative context, it would be interesting for future work to compare the evasive manoeuvres of players across these developmental levels during actual game play. This type of notational analysis may uncover further differences between levels that could support practice designs intended to develop talent. Lastly, while specifically focusing on the attacking evasive manoeuvres, future work could look to examine how the defender's actions shape the evasive opportunities for the attackers by adopting a more dyadic system perspective, rather than just focusing on one player's (evasive) movement.

Conclusion

This study demonstrated that the type and variety of evasive manoeuvre significantly associated with developmental level in a RL talent pathway in Australia. Of note, the SL players performed a greater variety and combination of evasive manoeuvres when compared to the U18 and U20 levels. These results emphasise the importance of affording practice designs at these younger developmental levels that encourage players to explore a variety of ways of evading an opponent. In doing so, it is perceived that players will deepen their knowledge of their environment, increasing their capacity to detect relevant opportunities to evade a defender, which could assist with the junior-to-senior transition within an Australian and international RL talent pathway.

References

Australian Rugby League Commission. (2015). *Rugby League Laws of the Game International Level with Notes on the Laws and NRL Telstra Premiership Interpretations*.

Chow, J. Y., Davids, K., Button, C., Shuttleworth, R., Renshaw, I., & Araújo, D. (2007). The role of nonlinear pedagogy in physical education. *Review of Educational Research, 77*(3), 251-278.

Connor, J. D., Crowther, R. G., & Sinclair, W. H. (2018). Effect of different evasion maneuvers on anticipation and visual behavior in elite rugby league players. *Motor Control, 22*(1), 18-27.

Cupples, B., & O'Connor, D. (2011). The development of position-specific performance indicators in elite youth rugby league: A coach's perspective. *International Journal of Sports Science & Coaching, 6*(1), 125-141.

Davids, K., Araújo, D., Seifert, L., & Orth, D. (2015). An Ecological Dynamics Perspective. In J. Baker & D. Farrow (Eds.), *Routledge Handbook of Sport Expertise* (1st ed., pp. 130-135). New York NY: Taylor & Francis Group.

Gabbett, T. J. (2014). Effects of physical, technical and tactical factors on final ladder position in semi-professional rugby league. *International Journal of Sports Physiology and Performance, 9*(4), 680-688.

Gabbett, T. J., & Abernethy, B. (2012). Dual-task assessment of a sporting skill: Influence of task complexity and relationship with competitive performances. *Journals of Sports Sciences, 30*(16), 1735-1745.

Gabbett, T. J., Jenkins, D. G., & Abernethy, B. (2012). Physical demands of professional rugby league training and competition using microtechnology. *Journal of Science and Medicine in Sport, 15*(1), 80-86.

Gabbett, T. J., Wake, M., & Abernethy, B. (2011). Use of dual-task methodology for skill assessment and development: Examples from rugby league. *Journal of Sports Sciences, 29*(1), 7-18.

Ireton, M. R., Till, K., Weaving, D., & Jones, B. (2017). Differences in the movement skills and physical qualities of elite senior & academy rugby league players. *Journal of Strength & Conditioning Research, 33*(5), 1328-1338.

Pearce, L. A., Sinclair, W. H., Leicht, A. S., & Woods, C. T. (2018). Physical, anthropometric and athletic movement qualities discriminate development level in rugby league talent pathway. *Journal of Strength & Conditioning Research, 32*(11), 3169-3176.

Pearce, L. A., Sinclair, W. H., Leicht, A. S., & Woods, C. T. (2019). Passing and tackling qualities discriminate developmental level in a rugby league talent pathway. *International Journal of Performance Analysis in Sport, 19*(6), 985-998.

Till, K., Jones, B., & Geeson-Brown, T. (2016). Do physical qualities influence the attainment of professional status within elite 16–19 year old rugby league players? *Journal of Science and Medicine in Sport, 19*(7), 585-589.

Till, K., Scantlebury, S., & Jones, B. (2017). Anthropometric and physical qualities of elite male youth rugby league players. *Sports Medicine, 47*(11), 2171-2186.

Trueman, N. (2017). Rugby Football History. Retrieved from www.rugbyfootballhistory.com/

Waldron, M., Worsfold, P., Twist, C., & Lamb, K. (2014). The reliability of tests for sport-specific skill amongst elite youth rugby league players. *European Journal of Sport Science, 14*(S1), S471-S477.

Woods, C. T., Robertson, S., Sinclair, W., Till, K., Pearce, L. A., & Leicht, A. S. (2017). A comparison of game-play characteristics between elite youth and senior Australian National Rugby League competitions. *Journal of Science & Medicine in Sport, 21*(6), 626-630.

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Figure and Table Captions

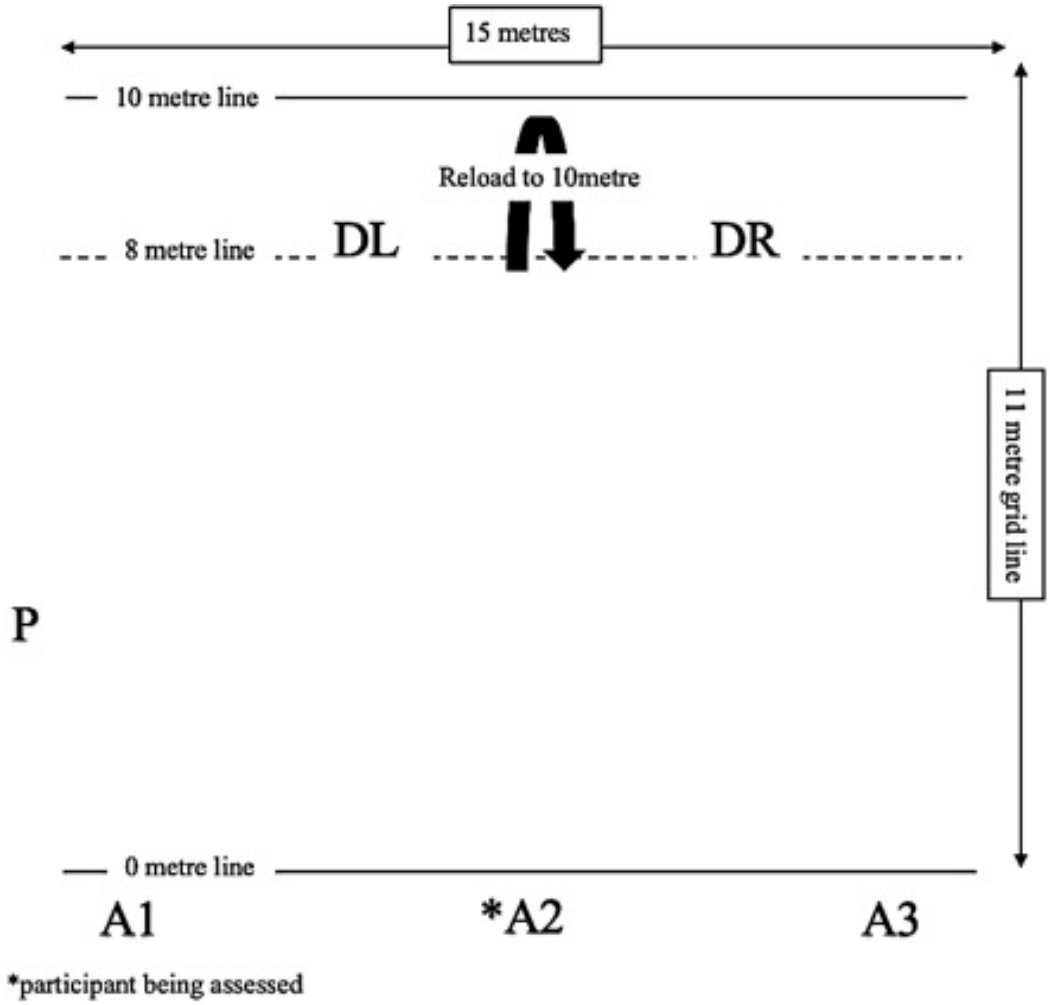

Figure 1. A schematic of the attack-play task as used to measure evasive manoeuvres. DL=defender left; DR=defender right; P=participant executing initial pass; A1=attack player 1; *A2=attack player 2 and the participant being observed; A3=attack player 3.

300 **Table 1**. The evasive manoeuvres and subsequent definitions as used in the attack play task.
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Evasive Manoeuvre	**Definition**	
Skip	Change of tempo (slow to fast). Permits maintenance of balance to affect rapid change of direction	
Step	A shortened stride to a wide step off the outside leg. Weight is shifted to other leg to accelerate from standing foot	
Change of direction	Change direction of current line	
Start Square	Shoulder and hips face forward to initiate task run	
Square up	Straightening shoulder and hips to face forward after initial angle run	
Angle run	Run diagonally from pass receipt	
Run angle left, pass left	Angle run to left and pass ball to left	
Run angle left, pass right	Angle run to left and pass ball to right	
Dummy pass	Deceiving opposition with fake pass or direction of pass	
All square run	Shoulder and hips facing forward, running forward straight line	
Run angle right, pass left	Angle run to right and pass ball to left	
Run angle right, pass right	Angle run to right and pass ball to right	
Behind flick pass	The ball is passed with a flick of the wrist behind ball carrier's torso	
Combination	Two or more of the above manoeuvres executed in trial	
Start Position		
Opposite defender left	Participant positions opposite the left defender	
Opposite defender right	Participant positions opposite the right defender	
Middle position	Participant positions evenly spaced between defenders	
Outcome Score		**Score**
Evaded tackle	Linebreak completed. Increased opportunity for territory or try scoring.	5
Tackled by one defender	One defender completed two handed touch (tackle). Attack not slowed, and ball is maintained	3
Tackled by two defenders	Both defenders completed two handed touch (tackle). Attack is slowed and ball is maintained	1
Lost possession	Illegal (forward) pass, or play would result in loss of ball possession	0

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304 **Table 2**. Frequency (%) of starting position and evasive manoeuvres undertaken by under 18, under

305 20 and State League players during the 3-v-2 attack task.

Start Position	**U18 (%)**	**U20 (%)**	**SL (%)**
Opposite defender left	11.1	6.7	10.0
Between defenders	88.9	93.3	82.2[ab]
Opposite defender right	0.0	0.0	7.8[ab]
Evasive Manoeuvre			
Skip	0.0	0.0	3.3
Step	13.3	20.0	14.4
Change of direction	21.2	22.2	20.0
Start square	1.1	5.6	8.9
Square up	8.9	5.6[a]	6.7[a]
Angle run	3.3	5.6	10.0[ab]
Run angle left, pass left	5.6	2.2	5.6
Run angle left, pass right	1.1	0.0	4.4
Dummy pass	20.0	21.1	22.2
All square run	35.6	38.9	27.8[ab]
Run angle right, pass left	0.0	1.1	4.4
Run angle right, pass right	2.2	0.0	1.1
Behind flick pass	0.0	1.1	3.3
Combination of manoeuvres	12.2	20.0	28.9[ab]

306 [a]$P<0.05$ vs U18; [b]$P<0.05$ vs U20.

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