



## Quantifying Coaching Considerations, Attitudes And Strategies To Player Substitutions In School Rugby Union

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### Abstract

Rugby is a high-intensity collision sport played by fifteen players in highly specialised playing positions. Due to these physical demands and to maintain a highly competitive level, a coach may substitute no more than eight players during the match. Player substitutions can affect the match's outcome and knowing when to substitute players is largely determined by a coaches' intuition. Therefore, the coaches' involvements and decisions behind player changes must be assessed, as the effects of changing a player can directly affect the team's performance. A six-sectioned questionnaire was developed to assess various issues surrounding player substitutions. Specifically, reasons for substituting players, considerations, informing players, match progression and status. Question responses followed a five-point Likert scale. Sixty-nine age-group level rugby coaches (experience  $11.7 \pm 9.0$  years) completed the questionnaire. Common responses indicated that coaches used substitutions to increase their team's chances of winning and to reduce player load. Additionally, the results indicate that coaches are likely to substitute players based on a predetermined strategy and to manage player loads. Coaches were likely to change players following a team scoring and as the game progressed. Additionally, substitutions were more likely when game importance increased. Finally, coaches frequently considered technical abilities of the players, timing and score of the game before changing players. The results provide a likely indication that coaches rely on their own previous playing experience regarding their decision-making approaches. Importantly, substitutions are planned and not reactive. Overall, coaches should provide sufficient notice and instruction to replacement players.

**Keywords:** Interaction, Decision-Making, School Sports, Rugby Union Football

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## **A. Introduction**

The game of rugby is a high impact sport where bouts of considerable power-dependent efforts are interspersed with periods of high intensity sprints, active recovery and passive recovery (Austin et al., 2011; Lacombe et al., 2014). Within a competitive match, players can cover distances of more than 4000 m at various velocities (Jones et al., 2015; Quarrie et al., 2013). The individual demands of playing rugby are related to the players' positions (Jones et al., 2015; Quarrie et al., 2013), with backs required to participate in dynamic aerobic events compared to the forwards' moderately static, high intensity activities. Consequently, the physiological demands of rugby undoubtedly result in fatigue.

The reduction in rugby specific performance may be offset by the substitution of fatigued players. Coaching staff can make up to eight replacements for players they presume are performing less than optimally (Lacombe et al., 2016), although there is little quantitative evidence behind the substitution of players. Conversely, a coach may be forced to use replacements if a player sustains an injury through one of the many physical contests (rucks, mauls and tackles). Based on match analyses (Quarrie et al., 2017), reported that most elite players would only be on the field for 66% of a match. Currently, the

most frequently substituted players are the forwards (Quarrie et al., 2013, 2017; Sinulingga et al., 2023). Forwards are usually changed between 50-55 minutes and 60-65 minutes with the majority (85%) of substitutions based on tactical decision (Lacombe et al., 2016). Most coaches will make player substitutions based on a predetermined match strategy (Quarrie et al., 2017) or in response to changes made by the oppositions (Mouchet & Duffy, 2020). Their substituting is most likely due to the high intensity nature of their game requirements, the number of physical collisions they experience and the minimal recovery time between high intensity tasks (Austin et al., 2011). Predominately, coaches will assess the physical and technical performances of their players during the game. However, (Mouchet & Duffy, 2020) report further that some coaches rely on intuition and previous match experiences when deciding on which players to substitute. Furthermore, only specialised positions (the three front row players) can return to the game following a tactical substitution.

Communication between coaches and players is crucial to the physical (J. Weakley et al., 2020) and psychological responses of players (Morgan et al., 2020). (Woods, 2004) reported that substitute players find the process starting from the bench stressful. Moreover, the players

reported that they feel underprepared and restricted to perform when the coaches' communications and timings are poor.

Fatigue manifesting from gameplay reduces physiological, technical and tactical performances of individuals over the course of a single match. To overcome this, coaching staff have the option to substitute players, which they deem to be underperforming, potentially improve the team's chances of winning. Therefore, tactical replacements of an uninjured player at the correct or incorrect time can potentially improve or impede the team's chances of winning. However, very little is known about coaching practices, specifically their decisions, attitudes and strategies behind player replacements. For that reason, this study aims to gather information from coaching staff regarding their perceptions and decisions around player substitution in schoolboys rugby.

## **B. Methods**

A cross-sectional study design using a questionnaire was employed to gather information about coaches' decisions and strategies to making substitutions in rugby. Potential participants were identified at a rugby coaching workshop and local schools and clubs. The self-administered questionnaire took approximately ten minutes to complete. The resulting sample

of completed questionnaires was 69 (age of  $35.9 \pm 10.8$  years and coaching experience of  $11.7 \pm 9.0$  years) spanning from primary school to elite junior (national) levels.

The questionnaire was developed following numerous interactions with five university and professional coaches. The resulting questionnaire was categorised into six sections to assess various parameters surrounding player substitutions. The specific sections were: reasons for substituting players, considerations, informing players, match progression and status (timing, score line and game type). The questionnaire made use of a five-point Likert scale and assess the frequency and likelihood of the replies. Frequencies were rated using the following point scale: 5. almost always, 4. sometimes, 3. occasionally, 2. rarely and 1. never; and likelihoods rated from 5. extremely likely, 4. likely, 3. neutral, 2. unlikely, 1. extremely unlikely. Percentage frequencies were calculated for every question and represented in Likert plots to report the distribution and tendencies of responses. The midpoint of occasionally/neutral responses serve as the zero point in each Likert plot.

All participants received an information sheet and written informed consent was obtained prior to completing the questionnaire. All procedures were

approved by the institution's faculty ethics committee (REC-01-100-2017).

### C. Result and Discussion

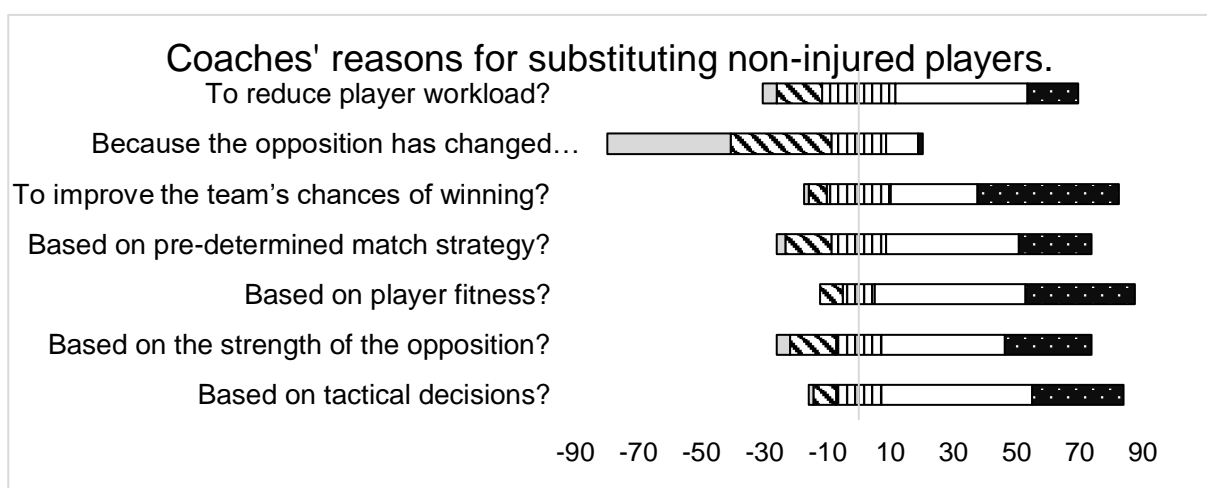
#### Result

Of the 69 responders 65 played rugby (ranging from high school to professional teams) and 64 held a rugby coaching qualification (BokSmart or World Rugby levels). The least frequent reason for substituting a player was based on the opposition making a player change (Figure 1) with 39% of responders selecting never. The strongest reasons for substituting players were based on tactical decisions (48% sometimes and 29% almost always), player fitness (48% sometimes, 35% almost always) and to reduce player workload (42% sometimes, 16% almost always). Most importantly, coaches' reasons for substituting players were to potentially

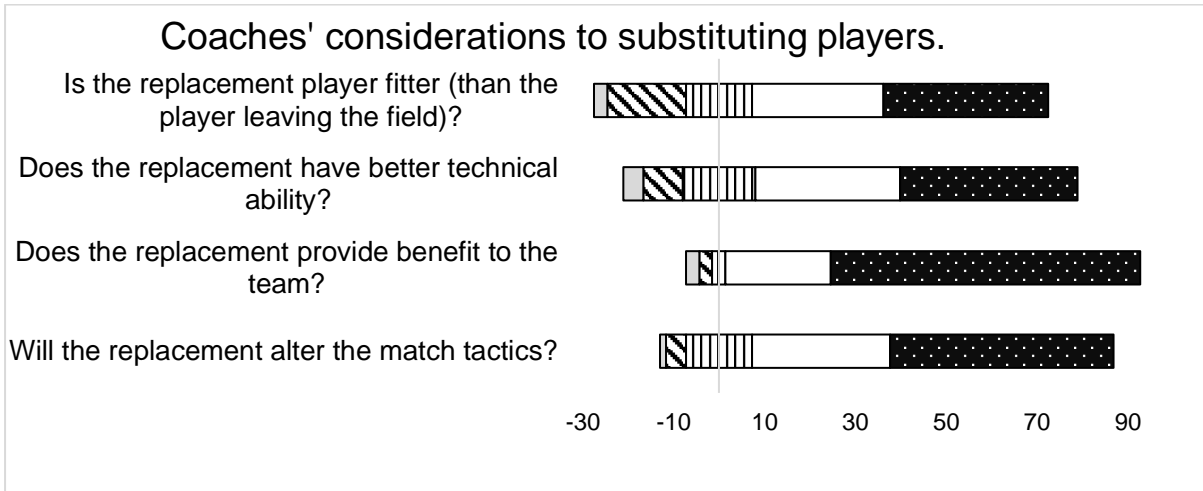
improve their chances of winning the game (45% almost always). Furthermore, figure 1 reports that most substitutions were based on a pre-determined strategy (42% sometimes and 23% almost always).

When assessing coaches' considerations (Figure 2), the strongest and most frequently assessed parameter was the potential benefit of the changing a player (68% almost always, 23 % sometimes), and how they could affect the match tactics (49% almost always, 30% sometimes). Interestingly, coaches were concerned with fitness and technical abilities of the replacement players (Figure 2). Their considerations for fitness and technical abilities of substituted players were distributed towards sometimes (29% and 32%) and almost always (36% and 39%), respectively.

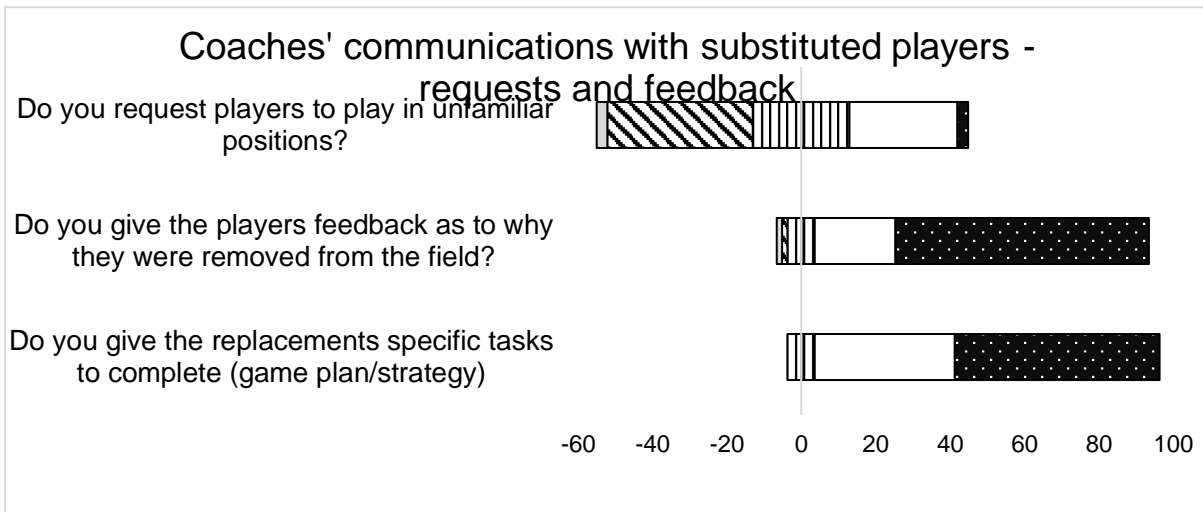
**Figure 1. Reasons Coaches Decide To Enforce Substitutions Of Uninjured Players In Age-Group Level Rugby.**



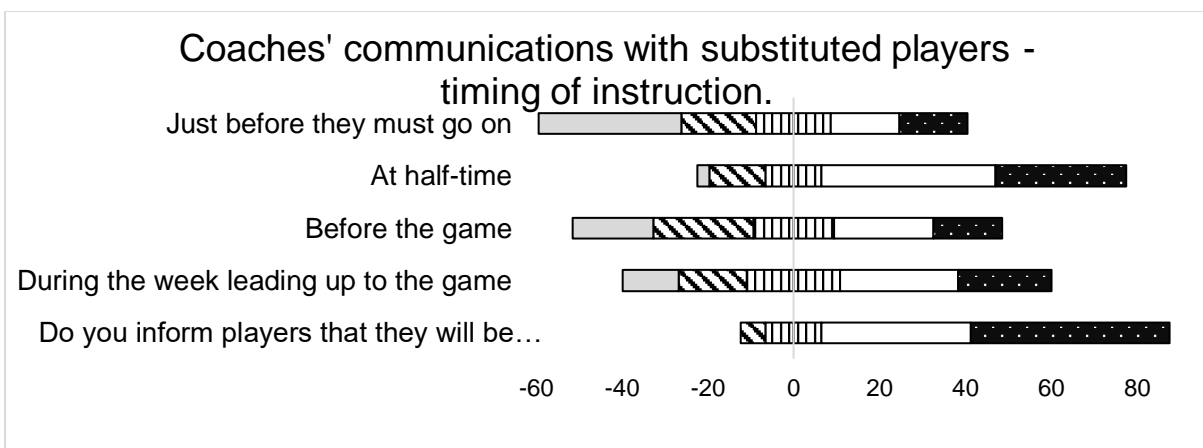
**Figure 2: Age-Group Level Coaches' Considerations Pertaining To Uninjured Player Substitution.**



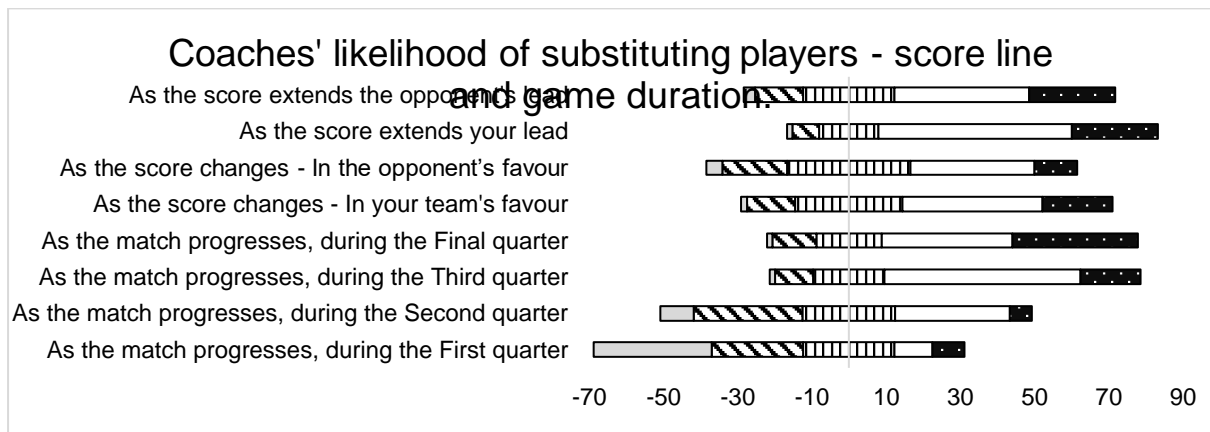
**Figure 3: Coaches' Communications To Age-Group Level Rugby Players Regarding Substitutions.**



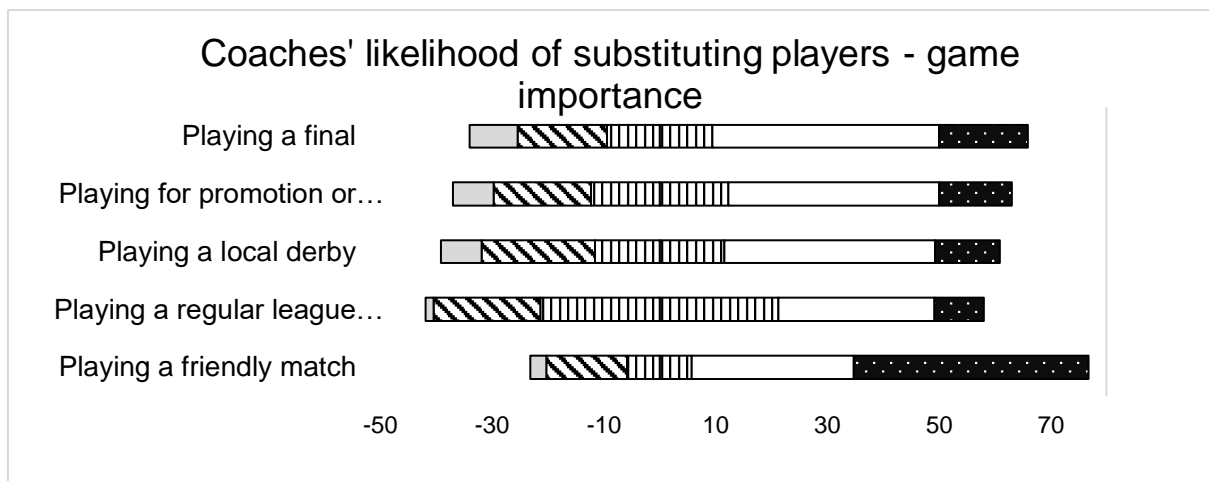
**Figure 4: Instructional Communication Timings Between Coaches And Age-Group Level Rugby Players.**



**Figure 5: The Likelihood Of Coaches Substituting Uninjured Players Based On Changes In Score Line And Game Duration.**



**Figure 6: The Likelihood Of Coaches (N=69) Substituting Uninjured Players Based On Game Importance.**



When implementing a substitution, coaches rarely (36%) asked players to play in unfamiliar positions (Figure 3). However, this parameter was evenly distributed across neutral responses (36% rarely, 26% occasionally and 29% sometimes). Conversely, coaches tended to frequently give feedback (68% almost always and 22% sometimes) to players removed from the field and specific instruction (55% almost always and 38% sometimes) to substitutes entering the game (Figure 3).

Coaches tend to always inform players that they will be substituted or play from the bench during a game (46% almost always and 35% sometimes) (Figure 4). This communication tends to take place at half-time (30% almost always and 41% sometimes). Communication during the week before the game seems to be less clear with an equal distribution of responses across the frequency range (Figure 4). A similar pattern is seen with communications taking place before the game, with many responses falling between rarely (23%)

occasionally (19%) and sometimes (23%). and less frequently before the player change is enforced (33% never and 17% rarely). This data reinforces the tactical nature of substitutions, specifically the predetermined nature of player substitutions. Substitutions were more likely (Figure 5) when the team scored (38% likely and 19% extremely likely) or extended a lead (52% likely and 23% extremely likely). If their opponents scored resulted in a neutral to likely chance of a substitution being made (33% neutral, 33% likely). Conversely, coaches were more likely (36% likely and 23% extremely likely) to substitute players when the oppositions score line increased (Figure 5).

The least likely time during which substitutions would be made were the first quarter (32% extremely unlikely, 25% unlikely). The possibility of a change being made in the second quarter tended to become neutral or more likely (29% unlikely, 25% neutral and 31% likely). The likelihood then increased in the third (53% likely and 16% extremely likely) and final (35% likely and 34% extremely likely) quarters.

The possibility of substituting players diminished with game importance (Figure 6). Coaches were more likely to substitute players in friendly games (42% extremely likely, 29% likely) compared to league fixtures (28% likely, 43% neutral) and local

derby (38% likely, 23 neutral and 20% unlikely) games. Promotion/relegation games (Figure 6) resulted in a neutral (25%) to likely (38%) chance of coaches using substitutes. However, a trend towards likely was noted for finals (41% likely 16% extremely likely).

## **Discussion**

The study aimed to gather information from age-group level coaches pertaining to their decision behind player substitutions. Common themes from the responses included to increase their team's chances of winning and to reduce player load. Additionally, it seems that coaches may approach a match with a predetermined substitution strategy. From the results, most coaches consider the technical abilities of the players, timing and score of the game before changing players.

Most coaches in the current sample had previously played the sport that they now coach. This is comparable to (Basson et al., 2017) who reported that 68% of age-group rugby coaches played rugby at any competitive level. It must be stressed that successfully coaching a sport does not require the individual to have previously played the sport (Kaya, 2014). However, playing experience may allow coaches to have react and rely on their own experience regarding their decision-making approaches (Kaya, 2014; Morgan et al., 2020).



(Morgan et al., 2020) reported that coaches usually have a predetermined strategy prior to a game and that they will try and adapt this strategy during the game. One such adaptation could be substituting players. Furthermore, most player changes in rugby occurred due to tactical strategies and to manage player loads (Lacome et al., 2016; Morgan et al., 2020; Mouchet & Duffy, 2020). It would appear that age-group level coaches in the current study follow this trend. (Kaya, 2014) stressed that tactical decisions are largely dependent on their timing. Overall, coaches considered substitutions based on the potential benefit of changing a player, how a new player may change the tactics, the players' technical abilities and fitness. The consideration of physical fitness and exertion must, however, be interpreted with caution as, coaches tend to underestimate the level of exertion experienced by athletes (Lupo et al., 2020). Further investigations into coaches perceptions of physical, technical and perceived efforts are required.

Coaches in this sample do not appear to be reactive to changes made by their opposition. Mouchet and Duffy (2018) reported in their evaluation of elite level coaches, that a few coaches are prone to reactive decision when it comes to substituting plays. Specifically, they reported that coaches might wait for their

opponents to make the first tactical player substitution before considering changing their own players (Mouchet & Duffy, 2020). Differences in competition levels between the two samples may reflect the differences in results. That is, more emphasis may be placed on winning in older age groups. Additionally, different tactical approaches across playing and coaching levels may be present.

Importantly coaches almost always gave feedback to players that were substituted. (Middlemas et al., 2017) showed the importance of team and player-debriefing following matches. Debriefing allows for goal adjustments and feedback pertaining to their performance. This process permitted coaches and players to reflect on match performance and the tasks performed in game preparation (Middlemas et al., 2017).

Coaches frequently gave specific instruction to players entering the game as substitutes. However, it must be stressed that no further information was obtained from the coaches regarding their communications with players prior to entering the game. (Mouchet & Duffy, 2020) reported that coaches' main themes of communication to players were to pass on strategic instruction and to encourage the players, specifically to build confidence in the players. Most communications between coaching staff and players seems

to occur following important match-related events – scoring of tries and penalties (Mouchet et al., 2014). Interestingly, coaches' communication styles and content tend to be different depending on the score line of the game (Mouchet et al., 2014). A clear modification in approach to the players and to the game may be a common tool used by coaches to encourage their teams when score lines change. However, verbal encouragement during a game may not increase physical or tactical performance (J. Weakley et al., 2020). The match complexities may have the dominant influence on performance. Moreover, coaches may need to increase the frequency of communication with players (J. J. S. Weakley et al., 2020).

Player changes were more likely when their team had a favourable score line change or extended their lead. Contrary to this were the results presented by (Mouchet & Duffy, 2020) who reported that coaches thought changing players following an improvement to their score was less crucial. Indeed, coaches reported to increase their likelihood of changing players when their opponents extended their leads. A similar result was reported in World Cup final matches, where losing teams tended to make more substitutions than winning teams (Vaz et al., 2019). This tactic may be an attempt to 'shake-up' the game with new players in an attempt to make something

happen - in an all or nothing effort. Cognisant of this, (Mouchet & Duffy, 2020) cautioned that substituted players cannot be disruptive to the team and must contribute to the match.

Similarly, substitutions were more likely to occur as the match progressed. From the sample it was very unlikely that a change would be made in the first quarter of the match. However, as the match progressed so too did the chances of substitutions being made. This is likely due to the perceived efforts of players and development of fatigue. Both factors increase as matches progress. A strategy commonly used by coaches is to substitute players at half-time or save them for the final 20 minutes (last quarter) of the game (Lacome et al., 2016; Mouchet & Duffy, 2020; Quarrie et al., 2017). An important aspect in sport is an athlete's ability to pace their effort (Lacome et al., 2017). Consequently, starters should be informed when they may be replaced and similarly substitutes when they can be expected to join the game. (Till et al., 2016) go further to recommend that coaches provide full instructions to potential substitute players in good time to reduce any pregame anxiety. One source of anxiety was players felt that if they were substituted too late in the game, without limited warning from the coaches, they wouldn't manage to keep-up with the game pace and thus underperform (Phibbs et al., 2017).

According to coaches' responses in the current study, players were frequently informed that they would be substituted. The timing of this communication seems to occur during the half-time break, coinciding with most tactical player substitutions (Lacome et al., 2016; Mouchet & Duffy, 2020).

Another consideration for coaches based on the state or status of the match was the importance of the game. Friendly games had the highest positive likelihood of substitutes being used. Coaches may be more conservative when using their substitutes with the trend being more neutral for normal league and local derbies. Conversely, coaches were more likely to use substitutes in finals and games that could result in promotion or relegation between divisions. This reflects the all-or-nothing approach to these games.

It must be noted that most responders in the current study coached at an age group or school-level. Thus, affording all players time on the field, to gain experience, is likely to be an important component to school sports (Mouchet & Duffy, 2020). Furthermore, an elite-level age-group coach stressed the importance of keeping experience players on the field during crucial periods of the game

#### **D. Conclusion**

Rugby coaches enforce player

substitutions based on a predetermined plan or approach to a match. Managing player load and improving their team's chances of winning were all major coaches' considerations. It is important for coaches to be aware of and respond to visual cue and performance of players. Additionally, open communication between coaches and players seems to be paramount in a team environment. Therefore, coaches are encouraged to communicate their decisions regarding player substitutions with their teams.

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#### **F. Conflict of Interest**

The authors declare no conflict of interests.

#### **References**

- Austin, D., Gabbett, T., & Jenkins, D. (2011). Repeated high-intensity exercise in professional rugby union. *Journal of Sports Sciences*, 29(10), 1105–1112. <https://doi.org/10.1080/02640414.2011.582508>
- Basson, J., van Deventer, K., & Kraak, W. (2017). A profile of mini rugby coaches in the Western Cape Province, South Africa. *International Journal of*

- Sports Science & Coaching*, 13(1), 104–112.  
<https://doi.org/10.1177/1747954117741256>
- Jones, M. R., West, D. J., Crewther, B. T., Cook, C. J., & Kilduff, L. P. (2015). Quantifying positional and temporal movement patterns in professional rugby union using global positioning system. *European Journal of Sport Science*, 15(6), 488–496.  
<https://doi.org/10.1080/17461391.2015.1010106>
- Kaya, A. (2014). Decision Making by Coaches and Athletes in Sport. *Procedia - Social and Behavioral Sciences*, 152, 333–338.  
<https://doi.org/https://doi.org/10.1016/j.sbspro.2014.09.205>
- Lacome, M., Piscione, J., Hager, J.-P., & Bourdin, M. (2014). A new approach to quantifying physical demand in rugby union. *Journal of Sports Sciences*, 32(3), 290–300.  
<https://doi.org/10.1080/02640414.2013.823225>
- Lacome, M., Piscione, J., Hager, J.-P., & Carling, C. (2016). Analysis of Running and Technical Performance in Substitute Players in International Male Rugby Union Competition. *International Journal of Sports Physiology and Performance*, 11(6), 783–792.  
<https://doi.org/10.1123/ijspp.2015-0191>
- Lacome, M., Piscione, J., Hager, J.-P., & Carling, C. (2017). Fluctuations in running and skill-related performance in elite rugby union match-play. *European Journal of Sport Science*, 17(2), 132–143.  
<https://doi.org/10.1080/17461391.2016.1220986>
- Lupo, C., Ungureanu, A. N., Frati, R., Panichi, M., Grillo, S., & Brustio, P. R. (2020). Player Session Rating of Perceived Exertion: A More Valid Tool Than Coaches' Ratings to Monitor Internal Training Load in Elite Youth Female Basketball. *International Journal of Sports Physiology and Performance*, 15(4), 548–553.  
<https://doi.org/10.1123/ijspp.2019-0248>
- Middlemas, S. G., Croft, H. G., & Watson, F. (2017). Behind closed doors: The role of debriefing and feedback in a professional rugby team. *International Journal of Sports Science & Coaching*, 13(2), 201–212.  
<https://doi.org/10.1177/1747954117739548>
- Morgan, K., Mouchet, A., & Thomas, G. (2020). Coaches' perceptions of decision making in rugby union. *Physical Education and Sport*

- Pedagogy*, 25(4), 394–409.  
<https://doi.org/10.1080/17408989.2020.1725458>
- Mouchet, A., & Duffy, P. (2020). Rugby coaches' perceptions of their in-competition role. *Sports Coaching Review*, 9(1), 24–47.  
<https://doi.org/10.1080/21640629.2018.1532650>
- Mouchet, A., Harvey, S., & Light, R. (2014). A study on in-match rugby coaches' communications with players: a holistic approach. *Physical Education and Sport Pedagogy*, 19(3), 320–336.  
<https://doi.org/10.1080/17408989.2012.761683>
- Phibbs, P. J., Roe, G., Jones, B., Read, D. B., Weakley, J., Darrall-Jones, J., & Till, K. (2017). Validity of Daily and Weekly Self-Reported Training Load Measures in Adolescent Athletes. *Journal of Strength and Conditioning Research*, 31(4), 1121–1126.  
<https://doi.org/10.1519/JSC.000000000000001708>
- Quarrie, K. L., Hopkins, W. G., Anthony, M. J., & Gill, N. D. (2013). Positional demands of international rugby union: evaluation of player actions and movements. *Journal of Science and Medicine in Sport*, 16(4), 353–359.  
<https://doi.org/10.1016/j.jsams.2012.08.005>
- Quarrie, K. L., Raftery, M., Blackie, J., Cook, C. J., Fuller, C. W., Gabbett, T. J., Gray, A. J., Gill, N., Hennessy, L., Kemp, S., Lambert, M., Nichol, R., Mellalieu, S. D., Piscione, J., Stadelmann, J., & Tucker, R. (2017). Managing player load in professional rugby union: a review of current knowledge and practices. *British Journal of Sports Medicine*, 51(5), 421–427.  
<https://doi.org/10.1136/bjsports-2016-096191>
- Sinulingga, A., Pasaribu, A. M. N., Bangun, S. Y., Ningrum, D. T. M., & Mahyudi, Y. V. (2023). Plyometric Exercise and Speed on the Power of Sabit Kick in Pencak Silat. *International Journal of Human Movement and Sports Sciences*, 11(3), 591–597.  
<https://doi.org/10.13189/saj.2023.110311>
- Till, K., Jones, B. L., Cogley, S., Morley, D., O'Hara, J., Chapman, C., Cooke, C., & Beggs, C. B. (2016). Identifying Talent in Youth Sport: A Novel Methodology Using Higher-Dimensional Analysis. *PloS One*, 11(5), e0155047.  
<https://doi.org/10.1371/journal.pone.0155047>
- Vaz, L., Hendricks, S., & Kraak, W. (2019).

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of Rugby World Cups Finals. *Journal of Human Kinetics*, 66, 247–256.

<https://doi.org/10.2478/hukin-2018-0061>

Weakley, J. J. S., Read, D. B., Fullagar, H. H. K., Ramirez-Lopez, C., Jones, B., Cummins, C., & Sampson, J. A. (2020). “How Am I Going, Coach?”- The Effect of Augmented Feedback During Small-Sided Games on Locomotor, Physiological, and Perceptual Responses. *International Journal of Sports Physiology and Performance*, 15(5), 677–684. <https://doi.org/10.1123/ijsp.2019-0078>

Weakley, J., Wilson, K., Till, K., Banyard, H., Dyson, J., Phibbs, P., Read, D., & Jones, B. (2020). Show Me, Tell Me, Encourage Me: The Effect of Different Forms of Feedback on Resistance Training Performance. *Journal of Strength and Conditioning Research*, 34(11), 3157–3163. <https://doi.org/10.1519/JSC.00000000000002887>

Woods, C. (2004). The Football Association Medical Research Programme: An audit of injuries in professional football - Analysis of hamstring injuries. *British Journal of Sports Medicine*, 38(1), 36–41. <https://doi.org/10.1136/bjism.2002.00>