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"Male athletes play well to feel good, and female athletes feel good to play well": Attitudes, beliefs, and practices pertaining to perceived sex-related differences in communication and interpersonal approach of strength and conditioning coaches in international women's rugby union

David Nolan [a], Peter Horgan [b], Aine MacNamara [a] and Brendan Egan [a]

[a]School of Health and Human Performance, Dublin City University, Dublin, Ireland; [b]Gaelic Athletic Association, Dublin, Ireland

ABSTRACT

Effective communication and rapport building with athletes are key tenets of coaching. As the majority of empirical evidence to date has adopted an androcentric view of strength and conditioning, a potential knowledge gap exists regarding sex-related differences in physical preparation and coaching approaches. Therefore, this study explored the attitudes, beliefs and practices of strength and conditioning coaches ($n = 8$; M/F, 6/2) in elite level (international) women's rugby union using semi-structured interviews (mean ±standard deviation duration 59 ± 15 min). The interviews explored differences in coaching practices for elite female rugby players compared to males, with a specific focus on the interpersonal aspects of the athlete-coach relationship. Reflexive thematic analysis was used to generate a rich qualitative dataset. The analysis resulted in the identification of higher order themes: *athlete engagement, and interpersonal approach*. The coaches in this study consistently perceived important differences between male and female players in factors related to engagement and interpersonal approach. Coaches adopted differing coaching practices for male and female athletes. This study provides important contextual evidence for the understanding of differences in the interpersonal relationships of female rugby players compared to male athletes from the perspective of elite-level strength coaches.

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Athletes; athletic development; female; field-based team sport; menstrual cycle

Introduction

Women's rugby union is one of the fastest-growing demographics within rugby union, with active registered female players increasing by 33.9% in 2023 alone (worldrugby.org., 2024) and can be described as an invasion field-based team sport consisting of intermittent bouts of high-intensity efforts (i.e., running, sprinting, tackling, rucking, mauling, and scrummaging) and periods of lower intensity activity (i.e., walking, jogging, and resting) (Coughlan et al., 2011). Appropriate physical preparation and training are integral to increasing performance capacity and long-term athletic development (Ford et al., 2011; Lloyd et al., 2015). Resistance exercise training is well-established as an effective method of increasing skeletal muscle hypertrophy, strength and power in athletic populations (Schoenfeld et al., 2021).

Females display an increased prevalence of deleterious beliefs, motivations, and hesitancies towards resistance exercise training (Hame & Bixby, 2023; Hurley et al., 2018; Peters et al., 2019) which act as barriers to engaging in this aspect of physical preparation. Athlete "buy-in" is a socially constructed belief commonly used in coaching discourse to describe an overarching concept that produces intended training effects by developing trust, relationships, and motivation as fundamental tenets, and is viewed as a desirable outcome for coaches (Gearity & Kuklick, 2018). Both socio-environmental cues and coach-athlete communication influence an athlete's belief in the perceived effectiveness of an intervention, which may influence motivation, as well as subsequent performance and adaptation (Beedie et al., 2015; Davis et al., 2020; Roelands & Hurst, 2020). There may be differences between males and females in communication style and strategy (Baird, 1976; Freed, 1996) in particular propensity to self-disclosure (Dindia & Allen, 1992) and responsiveness to non-verbal communication (Epstein, 1985; LaFrance et al., 2003; McClure, 2000). However, these differences have not been extensively demonstrated in athlete populations. Additionally, these between-sex differences are arguably minor and mediated significantly by environmental and contextual factors (e.g., physical setting, cultural norms or societal expectations) (Canary & Hause, 1993).

Socio-cultural influences significantly shape the experiences of both coaches and athletes. Intersectionality, a critical framework, helps in understanding how various social identities such as gender, race, and socio-economic status interact to affect individual experiences within societal structures (Crenshaw, 1989). This perspective is particularly relevant in the context of studies recruiting both male and female coaches. Coaches' insights are informed not only by their professional roles but also by their intersecting identities within the socio-cultural milieu of sport. Recent literature has called for the integration

CONTACT David Nolan david.nolan@dcu.ie School of Health and Human Performance, Dublin City University, Glasnevin, Dublin D09 V209, Ireland
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of intersectional frameworks in sports coaching and strength and conditioning research to better address the complexities of identity (LaVoi et al., 2019; Lord & Kavaliauskas, 2023). Strength and conditioning has historically focused on the physiological and performance aspects of athletic training with limited sociological research within this domain. The broader sports coaching literature may provide insights to understand the sex differences in coaching, with a distinct lack of research exploring attitudes towards male and female athletes from the coach's perspective. There may be important differences in how male and female athletes interact with their coaches, influenced by ingrained societal gender norms and expectations. Gendered expectations affect adolescent athletes' motivational orientations, with coaches playing a critical role in either reinforcing or mitigating these norms (Saarinen et al., 2023). Male coaches are perceived as more direct, while female coaches are viewed as communicative and supportive (Frey et al., 2006; Rima et al., 2019). Male athletes often exhibit a preference for male coaches, viewing them as more competent irrespective of when female coaches have identical qualifications, especially in traditionally male-dominated sports (Habif et al., 2001).

The challenges faced by female coaches are multifaceted due to systemic resistance and gender bias, often having to navigate a landscape that questions their authority and competence, leading to psychological and professional challenges (Norman, 2014). Female leaders in sports organisations often feel constrained by traditional gender roles, forcing them to conform to masculine norms to gain legitimacy (Hovden & Tjønndal, 2019; Murray et al., 2024). By acknowledging the intersecting identities of coaches and athletes, a deeper understanding of how these dynamics influence coaching practices and athlete engagement can be achieved. For instance, female coaches may bring different perspectives and approaches to coaching female athletes compared to their male counterparts, influenced by their own experiences within a predominantly male-oriented field.

Developing effective coach-athlete relationships may be of importance in female sports, specifically in monitoring pertinent indicators of health. Self-reported data suggest that a high prevalence of female athletes experience negative side-effects of the menstrual cycle (~80%) and hormonal contraceptive use (~24 to 40%), which may negatively influence acute physical performance (Martin et al., 2018; Nolan et al., 2022; Oxfeldt et al., 2020). Female athletes not only present the unique risk of menstrual disorders (Skarakis et al., 2021) but also display higher prevalence of both disordered eating (Mancine et al., 2020) pelvic floor dysfunction (Louis-Charles et al., 2019; Sandwith & Robert, 2021) and relative energy deficiency in sport (REDs) (Mountjoy et al., 2018). Female rugby players have reported that coaches should display awareness, openness, knowledge and understanding of female-specific health concerns in their interpersonal interactions with athletes (Findlay et al., 2020).

Given the general lack of evidence-based guidelines in the domain of sex-specific requirements for physical preparation, the present study explored the attitudes, beliefs, and practices of strength and conditioning coaches in elite level (international) women's rugby union, with a specific focus on how they differ from coaching a male cohort concerning athlete engagement and interpersonal approaches to coaching. This analysis was an extension of our previous work that described the attitudes, beliefs and practices of the same coach participants relating to technical aspects of coaching in women's rugby union and the factors which influence these aspects (Nolan et al., 2023). The present exploration of differing coaching approaches to male and female athletes, if any, in their approach to these aspects of preparation in female athletes should enable the identification of unique challenges faced by elite-level practitioners, which will inform both research and practice in the future.

Research philosophy, design, and methods

Research philosophy and study design

This study was supported by a pragmatic research philosophy (Giacobbi et al., 2005). The authors, as pracademics (practitioner-academics), seek to generate practically applicable insights. Pragmatists take a utilitarian approach to research, rejecting both pure positivism (the idea that there is a single reality and that there are universal truths that can be measured objectively) and pure constructivism (the idea that reality is created by individuals and groups and that no research can determine which version of reality is more "correct" than another), without endorsing any particular ontological or epistemological viewpoint. The current study did not presuppose an objective interaction between authors and data; instead, it addressed a pertinent applied topic. As a result of their own leadership, support, and participation in elite sport, the authors' lived experiences were acknowledged, and they were seen as co-constructors of knowledge.

Participants

Following ethical approval from the Dublin City University Research Ethics Committee (permit number: DCUREC2020/283), eight strength and conditioning coaches in senior international women's rugby union were recruited using a purposive, criterion sampling approach (Palinkas et al., 2015). Invitations were extended to the 13 highest-ranked senior international women's rugby union teams as per world rugby rankings on 1 March 2021 (worldrugby.org., 2022), via email to the respective rugby unions. Inclusion criteria stated that the participants had to be the current "lead" strength and conditioning coach for a senior international women's rugby union team (i.e., the national team) or have held that position within the previous 12 months. Participants were also required to have previously coached male athletes. Participants' characteristics are summarised in

Table 1. Descriptive characteristics of participants.

Sex	n = 8 (6 male, 2 female)
Age	35.7 ± 5.4 y (range, 31 to 46 y)
Location	6 Northern Hemisphere, 2 Southern Hemisphere
Education Level	Bachelor's Degree, *n* = 3 Master's Degree, *n* = 5
Number of Years Coaching	13.3 ± 4.7 y (range, 7 to 21 y)
Number of Years Coaching at International Rugby Level	6.5 ± 6.3 y (range, <1 to 16 y)
Current or Former Rugby Player	Yes, *n* = 7 No, *n* = 1
Number of Teams Previously Coached	11.6 ± 7.7 (range, 4 to 25)
Number of Female Teams Previously Coached	4.8 ± 4.9 (range, 1 to 14)
Coached in Sport Other than Rugby?	Yes, *n* = 7 No, *n* = 1
Coached Youth Athletes?	Yes, *n* = 7 No, *n* = 1

Data are reported as the mean ± SD, where appropriate.

Table 1, which was presented to ensure that the anonymity of the participants was maintained.

Procedures

The use of semi-structured interviews allowed for an in-depth investigation of the main study questions, while also providing the flexibility to pursue divergent lines of enquiry that came up during the interviews. This method has been used previously to gather qualitative information about strength and conditioning coaches' experiences (Bell et al., 2021). A semi-structured interview guide was created in advance of data collection, informed by pertinent literature, and improved through pilot testing. To check that the interview questions were in line with the goals and objectives of the study, pilot interviews were conducted with two different strength and conditioning coaches, one male and one female with experience, working across male and female sports, albeit at a lower level i.e., national level. Following the pilot tests, changes were made to the interview guide probes and the question structure. The interview guide (see supplementary materials) consisted of introductory, central, and closing questions, utilising a pliant approach to encourage meaningful discourse and ensure a rich exploration of participant experiences. The interview addressed two distinct research questions; i) Do coaches use differing physical preparation strategies between sexes, and what influences these differences, if any, and ii) Do coaches have differing interpersonal interactions between male and female athletes? Due to the significant quantity of data gathered from these interviews, the themes relating to physical preparation strategies were the subject of a previous paper (Nolan et al., 2023) to enable an appropriate depth of discussion for both research questions.

Detail-orientated probes were used to strengthen the insights provided by the participants (Sparkes & Smith, 2013). For example, these included *"Can you explain exactly how you implemented that?"* or *"Why did you do that?"*. Clarification probes were used to further explore points that were unclear or vague (Patton, 2014). These included using phrases such as *"Just to be clear, can I confirm that when you say X you mean . . . ?"*. The lead author conducted all interviews online using Zoom (Zoom, San Jose), taking into account the methodological and epistemological challenges that using this format for interviews poses (Howlett, 2022). Using Happy scribe transcription software (Happy Scribe, Dublin), audio recordings were transcribed verbatim, and the first author carefully reviewed the transcripts for accuracy. After transcription, all data were de-identified, and a participant identity number was assigned for reporting purposes. Interviews were conducted during the period April to October 2021 and lasted between 28:44 and 84:16 min (63:14 ± 17:59 min:sec), resulting in 145 pages (72,294 words) of data (18.1 ± 4.3 pages per interview).

Data analysis

Data were analysed using reflexive thematic analysis, utilising the framework provided by Braun and Clarke (Braun et al., 2016) to ensure the appropriate application of thematic analysis. Thematic analysis is used to identify, organise, analyse and report qualitative data sets into concise patterns, offering insights into lived experiences (Attia & Edge, 2017) and has been previously used to garner insights into experiences of strength and conditioning coaches (Radcliffe et al., 2018; Weldon et al., 2021).

The initial stage of analysis involved checking the accuracy of transcripts and immersion in the dataset by repeatedly listening to recordings and reading transcripts. This process produced "points of interest", probable codes, and themes. The transcription data were imported into NVivo Pro (QSR International, Doncaster). NVivo was used to store and organise the dataset, facilitating the research process, rather than serving as a primary component of the analysis itself. The analytic process was not guided by the NVivo software, and regular reading and rereading of the original transcripts ensured that the lead author did not grow distant from the information or participants (Fossey et al., 2002).

All the data were once again carefully reviewed, and lines and/or paragraphs that were important to the main research topics were coded. All codes were then arranged into themes and subthemes (as nodes). The data were analysed, and themes and subthemes were refined using reflexive thematic analysis. Reflecting the sixth stage of the data analysis procedure, a consensus was reached by the research team, and a summary report of the key results was created. Given the reflexive nature of the process this step was repeated throughout the data-analysis process.

Trustworthiness

Best practices must be followed to ensure that high-quality data are reported because the use of thematic analysis in sports and exercise sciences has been criticised (Braun & Clarke, 2019). Themes and subthemes were adjusted, merged, and deleted as a result of the research team's verification meetings. It is advised to use verification techniques to increase the reliability of the data (Morse et al., 2002). Authors listed at positions two

(PH) and three (AMN) of the research team acted as "critical friends" to the lead author and discussed similarities and differences in interpretation of the data, challenging the lead author until a consensus was reached, with author four (BE) acting as a moderator, leading to further refinement of themes and subthemes.

Reflexivity & positionality

The lead author utilised reflexivity throughout the research process which is described as an act of self-reflection that considers how one's own opinions, values and actions shape how data is generated, analysed and interpreted (Attia & Edge, 2017; Mortari, 2015). The following information provides context which may be used to assess the credibility of this research and improve its transparency.

The principal research question was constructed as part of a wider investigation of sex-related differences in athletic development by the research team. This field of applied research is notably understudied, particularly in the context of rugby union. The lead author has practical experience and interest in female-specific strength training, and understands pertinent issues faced by practitioners in this domain. The lead author is interested in, and has expertise with female-specific strength training and is keenly aware of the problems faced by professionals in this field. During the development of the interview guide and subsequent data collection, the lead author aimed to separate his own experiences and beliefs from those held by the participants and to remain objective. However, the experience of the lead author allowed for integrity with participants, facilitating the identification of lines of enquiry during the interview process that another interviewer of an alternate background may not have capitalised upon.

The positionality of the lead author is arguably an important strength of the study. Positionality is aligned with reflexivity and acknowledges that a researcher's social and personal identity, experiences, and perspectives interact and that these influence their research. Recognition of this important as it enhances the research creativity (Jafar, 2018). The lead author's background gave him "insider" status when speaking with participants, which is invaluable to the way the study was conducted (Hammersley & Atkinson, 2019; Tracy, 2019). The recruited participants might be seen as an unidentified, difficult-to-reach group. This status provided subcultural legitimacy, enabled initial access, and promoted the growth of strong rapport between the interviewer and interviewees.

In addition to the lead author, the other individually contribute almost two decades worth of expertise and applied experience from their respective fields of coaching pedagogy (PH), talent development (AMN), and physiology and nutrition (BE). Although not strength and conditioning coaches, their backgrounds in elite-level sport contexts provide comprehensive insights into athlete performance and development. Their experience as practitioners in these areas ensures a broad and multifaceted perspective, contributing to the depth and rigour of the study. This multidisciplinary approach strengthens the research by integrating diverse viewpoints and expertise, enhancing the applicability of the findings.

Results and discussion

Through exploration of attitudes, beliefs, and practices of strength and conditioning coaches in international women's rugby union, the thematic analysis produced two higher order themes under the overarching theme of "Differing Coaching Approaches to Male and Female Athletes" (Figure 1). These higher order themes and subthemes are presented in detail with anonymised quotes included to support discussion points and explicate the coaches' experiences. Additional words are placed in parentheses to clarify the intended meaning or provide further context, where relevant. Punctuation was added to the quotations to reduce ambiguity where required.

Athlete engagement

There are potential differences between male and female athletes in psychosocial and motivational factors that practitioners should be cognisant of in a performance-orientated environment (Moreno Murcia et al., 2008). Lack of athlete engagement can be problematic in elite sports and may

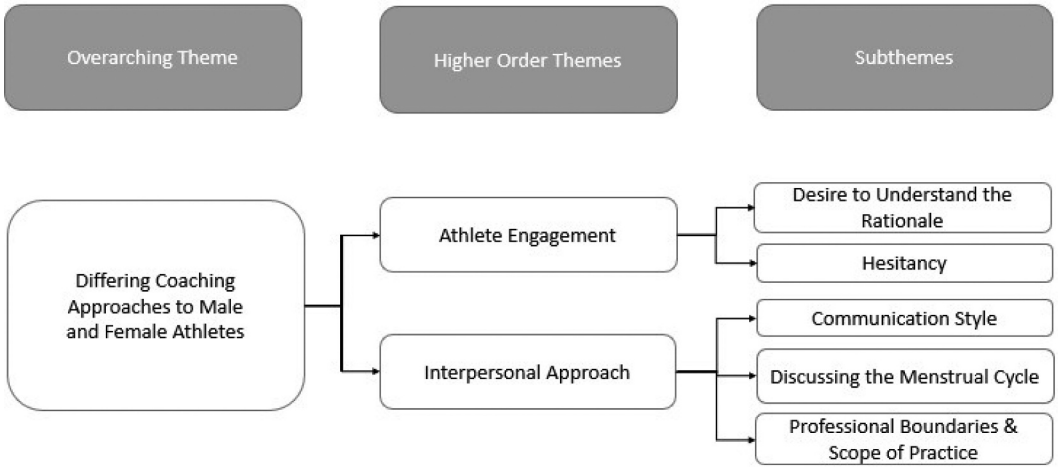

Figure 1. Schematic representation of overarching, higher-order, and sub-themes.

lead to maladaptation and/or underperformance if not appropriately addressed (Neupert et al., 2019). Two sub-themes were identified regarding engagement: desire to understand rationale, and hesitancy.

Desire to understand the rationale

In this sub-theme, all coaches expressed the opinion that female athletes differed in their need to understand the rationale of training in order for the desired level of engagement to occur, and were more likely to question the prescribed methods than their male counterparts. Coach 5 noted how female athletes tended to ask more questions about the purpose and outcome of training than male athletes, stating:

> I think, the guys will decide they want to lift heavy as soon as possible, but I think sometimes a female athlete is wanting to understand. That's like saying to the male athlete, sometimes run through the wall, they will say, "yes I will run through the wall". And the female athlete, you say run through the wall, they say "well, why should I run through the wall? Can I not jump over it?"

As a result, coaches described how they had to be more precise about their instructions and language when working with females as described by Coach 7 who remarked:

> The first and the main difference for me, it's about their approach of performance. When I finished with the men's team, I think I could say men ask to do things and first before [they] understand and the women have to understand before doing them.

The sentiment was elucidated in greater detail by Coach 6:

> The difference is, I think a lot of the time is around that the detail of the information that needs to be provided and communicated, which I think, you know, historically and in the male game or in any male sport, it would have just been, rock up, and you go right this is what you're doing, crack on with it and they wouldn't want information. They just go, right what are we doing? Get on with it . . . When I started, you probably had a large group of female athletes who would want to know the how, the why, the what, the who, of every element of what you were doing so that they had clarity and they could be comfortable in delivering their best effort in that particular unit of training.

Differences between male and female athletes in motivational factors and cognitive strategies used to aid athletic performance have been previously described, and may lead to differing coach-athlete dynamics and interactions (Moreno Murcia et al., 2008; Philippe & Seiler, 2005). In general, females utilise higher levels of social support in a sporting environment (Crocker & Graham, 1995) and are more likely to perceive a task-orientated climate i.e., focus on the task at hand aiming to complete it to the best of their ability, as opposed to males who display a stronger ego-orientation i.e., more likely to be competitive or concerned with proving their skills and superiority (Moreno Murcia et al., 2008). These observations are from junior- and collegiate-level athletes, and so these may not be representative of elite female populations. Regardless, these differences could arguably lead to females engaging in a symbiotic "peer-to-peer" relationship with coaches to better understand the task-specific requirements, whereas males may view coaches as an authoritarian figure who is to be impressed and therefore may be more hesitant to seek clarification, as not to appear inferior to their peers. Males also display higher levels of self-efficacy related to sporting tasks than females (Spence et al., 2010) while also displaying higher levels of narcissism (Grijalva et al., 2015; R. Roberts et al., 2015). Therefore, males may be more likely to demonstrate unjustified levels of self-confidence in the execution of sports-specific motor tasks, such as resistance exercise training, and thus, less likely to seek clarification from practitioners.

Four coaches (Coaches 1, 2, 3 and 6) specifically noted that highlighting the role of dynamic correspondence (i.e., the ability of an exercise/programme to directly affect sports performance) is a key element in justifying their rationale to the players. Coach 1 described a frequently experienced situation in which female athletes questioned the necessity of resistance exercise training, to which he/she retorts with,

> let's then talk about [to the player] how that strength can translate into their sport and help them as an athlete and help them stay in their sport versus sitting on the side lines due to an injury. So, I think focusing on what lifting, and what S&C [strength and conditioning] can do for them and how it can help them become a better athlete, maximize their potential versus that fear driven place.

This was echoed by Coach 3 who depicted regular conversations of a similar nature, in which he/she explained to his/her athletes, "*this is why we are doing this [resistance exercise training], this is how we do it, and it's going to help you in the lineout, and then the light will switch on. And then we get the buy in. Then we get that sort of OK, I have to lift this because, and this is the reason why, and this is how I need to do it, and this is how we transfer it. And when the light switches on, it goes [intent]*". Coach 6 simply stated he/she *"spent a lot of time working with players around education and really, really painting the pictures and allowing them to join the dots between physical training and rugby performance"*.

Given the stronger desire to understand task-specific components in females to achieve engagement, the ability to effectively communicate the role of dynamic correspondence to athletes is arguably a key skill that practitioners should possess. Practitioners should be able to elucidate key concepts to a wide range of athletes, who are likely to have varying degrees of comprehensive ability (Boone et al., 2020). Acknowledging the influence of intersectionality in this context is crucial for coaches, given that sports teams typically consist of athletes with diverse backgrounds in terms of ethnicity and socioeconomic status, which may meaningfully impact their interactions with authority figures.

Hesitancy

For five coaches (Coaches 1, 2, 6, 7 and 8), hesitancy to engage in resistance exercise training was viewed as disproportionally prevalent in female athletes, resulting in a different coaching approach towards female athletes, exemplified by Coach 2 who stated, "*it takes a little while longer, I think, to get over that hump, to break down that barrier [fear of using high load in resistance exercise training] with females than it is with males . . . But I think to get to being able to tolerate heavy [resistance exercise training] takes just a little bit longer*".

Females demonstrate higher levels of perceived barriers to engaging in resistance exercise training, such as fear of resultant hyper-muscularity and peer deprecation (Peters et al., 2019). As previously noted, the ability of the practitioner to

effectively communicate and educate the athletes is essential in overcoming these perceived barriers, as described by Coach 7 who reported his/her belief that female rugby athletes *"don't want to be too strong. They don't want to get too much muscles. So we need to understand this is really why we do this kind of job, why strength, for example, is so important for them, at least to prevent [injury] but also because performance is our objective . . . [they] just need to know why they have to do it"*. Body image and distorted understanding of the time course of adaptations to resistance exercise training were voiced as the main reasons for hesitancy to engage in resistance exercise training as summarised by Coach 1 stating he/she knows *"there is kind of a lot of stigma around working with some females who did have the fear, for whatever reason of getting bigger or how the training might affect that muscle mass and have that fear . . . but I did experience that stigma, that fear of maybe gaining weight or gaining muscle mass, more so with the women in the female population than I did with the men"*. This experience was also disclosed by Coach 2 who expressed that female players *"just think, you know, lifting weights, I'm going to be huge"*, and by Coach 6 who acknowledged, *"it certainly was in female rugby when I worked there [fear of hyper-muscularity], there is a body consciousness around putting on muscle mass"*.

Although it appears that males and females respond to hypertrophy-focused training in a similar manner (B. M. Roberts et al., 2020) females display lower levels (by ~ 45%) of skeletal muscle mass after puberty than males (Mortari, 2015). This results in differences in the magnitude of increases in muscle mass and strength in absolute terms following resistance exercise training in males and females, despite similar relative increases in these outcomes (B. M. Roberts et al., 2020). Additionally, increasing muscle mass through targeted interventions is a relatively slow process compared to other neuromuscular adaptations such as strength. For example, strength increases by 25%, on average, in females following 15 weeks of resistance exercise training, while muscle mass increases by ~ 3.3% (1.4 kg) in the same period (Hagstrom et al., 2020). These concepts should be communicated to athletes who have fears of gaining what they perceive to be excessive quantities of muscle mass.

Interpersonal approach

Seminal research on differences between males and females in communication suggested that males and females exist in linguistically distinct groups, with males being more active, aggressive, and task-orientated in their communication, as opposed to females, who tend to have an increased frequency of self-disclosure and expressiveness (Baird, 1976; Freed, 1996) although athlete-focused research in this area is equivocal (Sullivan, 2004). Three subthemes of interpersonal approach are presented: communication style, discussing female-specific issues, and professional boundaries/scope of practice.

Communication style

Overall, it was expressed by all coaches that they perceive their interpersonal engagement experienced with female athletes to differ in important ways from males, as exemplified by Coach 3 who remarked, *"they [females] will speak to you about how they are feeling, you know, so you have the interaction between you and a female athlete is a little bit better"*. This sentiment is shared and expanded upon by Coach 4 describing he/she *"do[es] find girls are a lot more loose in the sense of they have more fun in the weight room, like it's dancing, fun, partying, whereas guys is not to that same degree"*, which he/she stated leads to a differing interpersonal approach highlighted in their comment, "*it's just your coaching style just differs a bit between training the girls and the guys"*. Coach 5 expressed his/her belief that differences between males and females are present in motivational factors stating, *"Male athletes play well to feel good. And female athletes feel good to play well . . . you take that into your training session or coaching session as well. It's a different method of motivation, how you start interacting with the athletes"*.

Whether there are distinct differences between male and female athletes in communication styles has not been fully elucidated (Sullivan, 2004). However, all the coaches in this study described perceiving a need for divergence in communication and interpersonal approaches between male and female athletes. Given the general differences in psychosocial processes between the sexes, these arguably manifest in divergent interpersonal characteristics, and practitioners should be cognisant of this. Conversely, inter-individual variability, independent of sex, is likely sizable and must be acknowledged alongside between-sex differences, with further investigation warranted.

Discussing the menstrual cycle

All coaches recognised the requirement to discuss issues around the menstrual cycle as a key difference in their practice compared to with male athletes. All coaches conveyed their willingness and comfort with discussing these issues with athletes, as demonstrated by Coach 3 who stated conversations of this nature are, "*part of my portfolio [discussing the menstrual cycle]"*. Coach 3 emphasised that "*for them [the players] to be comfortable with me, I have to be comfortable with them, and they have to be open with me, they have to be honest and I don't make them feel insecure about it . . . [speaking directly to players] You all are mostly female here, I am the odd one out. So, by all means, if this is how you feel [experiencing symptomology of menstrual cycle]. Take a break, take some time"*. This sentiment was reiterated by Coach 8 who stated *"[I] felt it was really important that I did that [speak about the menstrual cycle] and didn't make a thing about it. So, I was real comfortable talking about it and stuff like that"*, while Coach 2 remarked that he/she "*could have a week where I'm chatting about it [the menstrual cycle] every day, but then I could have two weeks where it's not mentioned"*.

Coaches 5 and 7 suggested that the discussion of the menstrual cycle has become more prominent in their practice recently with Coach 5 noting "*it's become more a common conversation than it ever has in the past. So, in the past it was, whether it was, if the right word is taboo or not, it was not talked about in a public forum*", and Coach 7 similarly remarking, "*[In the past] it was very something very personal and no, no discussion about that . . . Now it's very easy to speak about that*".

The insights provided by the coaches relating to female-specific issues are arguably progressive, and should be welcomed by those advocating for increased awareness of female issues

within sport (Mountjoy et al., 2018). These calls for increased awareness may imply that there is a perception that discussing female-specific considerations such as the menstrual cycle with athletes is taboo, yet the viewpoint of the coaches in this study are in contrast to this perception, nor has it been the experience of the authors of the present study when working in their respective elite-level sports. Although, it must be recognised that differing socio-cultural environments, such as those involving young adolescents or amateur athletes, might exhibit divergent attitudes and levels of comfort when engaging in discussions about menstrual-related issues. Whether this perception of taboo relating to the menstrual cycle, which is regularly stated in academic (O'Loughlin et al., 2023; Prince & Annison, 2022) and mainstream domains (Ingle, 2022) is a phenomenon strongly supported by empirical evidence, or is an artefact of a repeatedly-reinforced false narrative, remains to be determined.

Professional boundaries and scope of practice

Six coaches (Coaches 2, 4, 5, 6, 7, and 8) expressed being aware of professional boundaries and scope of practice as aspects that they were more cognisant of with female athletes, particularly relating to aspects of female health:

> At some points, I just don't think that's my lane to be having those kind of conversations [specific advice regarding menstrual dysfunction] with our female athletes when it's not something I've personally been through or couldn't fully understand other than what I've been told and read. (Coach 4)

> [Regarding contraceptive use] I think that would have been probably advised by a senior doctor or someone like that, but it would have been way outside of my remit. (Coach 6)

Coach 8 noted that he/she had increased awareness and hesitancy to make physical contact with the female athletes:

> That's probably one thing I didn't do with the girls, I'd probably be a little bit less hands on or ask for consent beforehand . . . that's one of the biggest ones in terms of style of delivery. That was the only thing that felt particularly different was like, you probably just grab a boy and move him. But I'd always have, literally the point I knew girls didn't mind, and they almost rolled her eyes every time I asked them, but I always wanted to have that option for it not to happen.

Coach 3 stated he/she does not currently systematically monitor menstrual cycle status as *"it's a personal thing . . . we can't just decide as a management to you know, we're going to monitor that"*, then proceeded to describe a previous decision to implement systematic pregnancy testing of players at a previous club-level team:

> I don't know about [other team], what we decided was we said, look, because they're all female and it's a real thing [chance of pregnancy], you know, let's take pregnancy tests at the beginning of the season and then we'll take one every three weeks, and we had to get consent . . . But it's something that we decided as a management and we administered to the girls . . . So for me, as long as you have the ethics and the paperwork and the things behind it, I don't think you can't do it. [pregnancy testing]

The coach described two primary motivations for implementing systematic pregnancy testing. First, to ensure athlete safety in the event of an unknown pregnancy:

> If we, if they don't know that they are pregnant. And they play. There is a massive risk. Because the person can be six weeks pregnant and she doesn't know and she's takes a hit to the stomach, she gets severe pain. And she doesn't know why. And then what? Then does that fall on us? Does that fall on her? That's negligence from a medical point of view . . .

Second, to encourage safe-sex practices to improve player retention:

> You know, they're going to be sexually active, same as the males, 18, 19, 20, 21 [age of players] . . . because they're girls, it doesn't mean they're not going to do it [engage in sexual activity] . . . I think it's very unfair [if players have an unplanned pregnancy] personally because, you lose good players if they are [pregnant], and you lose them for the amount of time as an ACL. It's nine months plus four, so you're looking at 13 months. That's if they come back in the shape that they were currently when they left. So, think about having some of your best players out with ACL injury because they weren't safe. And they are still young, you know, you might lose them through the system for years. That's happened to us many times.

A clear understanding of professional boundaries is imperative for safeguarding athletes. In multi-disciplinary teams, roles and scope of practice should be clearly defined and understood by all practitioners. The authors express a concern regarding the appropriateness of certain practices described above by participants, underscoring the need for a critical examination of these approaches within the broader socio-cultural context. Practitioners must be aware of, and adhere to the limits of their scope of practice, yet it is acknowledged this scope of practice may not be well defined by governing bodies. Unions must actively engage with practitioners to ensure that they are fully educated in athlete welfare and safeguarding responsibilities, and stringently adhere to the principles of best practice in this area. It is imperative to emphasise that the systematic implementation of repeated pregnancy testing deviates from standard practice and raises significant ethical concerns. The prevailing attitude towards pregnancy in this context, often likened to an injury, adopts a notably negative tone. Such practices not only potentially infringe on the bodily autonomy of players but also implicitly discourage pregnancy. Although consent is reportedly obtained, the inherent power imbalances and social pressures within this dynamic critically challenge the authenticity and validity of such consent. This situation necessitates a thorough ethical evaluation, especially in light of the potential impacts on the individuals involved.

Study strengths and limitations

These coaches provided valuable insights into their experience and perceptions of differences between males and females in athlete engagement with physical preparation programmes and interpersonal interactions. The positions and experience of the coaches are strengths of this study, although employment status alone does not necessarily indicate expertise or knowledge. Nonetheless, to our knowledge, this is one of the first studies to investigate attitudes, beliefs, and practices in elite-level strength and conditioning coaches regarding sex-related differences. This illustrates the current understanding and opinions of strength and conditioning practitioners in international level women's

rugby union. The qualitative methods employed in this study allowed for systematic analysis of rich information.

Although the elite status of coaches is considered a strength of this study, it could also be viewed as a limitation. The homogeneity in the status of the coaches should lead to caution in interpreting and applying the results to practitioners in rugby as a whole. The viewpoints expressed may not be similar to those held by sub-elite coaches, those working with amateur athletic populations, or those within other sports. The merit of occupying a senior position in an elite team should not be assumed *de facto* to reflect a high level of competency and knowledge. In addition, three-quarters of the coaches interviewed were male, and while this is representative of the current landscape at the international level, the majority of coaches arguably present an androcentric view of beliefs and attitudes towards conditioning practices in women's rugby union i.e., adopting practices from, and consistent comparisons to the male game.

Conclusion

This study provides important insights and contextual evidence for the understanding of male and female differences in the interpersonal relationships of female rugby players from the perspective of elite-level strength coaches, which, to date, has not been explored. Differences in psychosocial factors, such as communication and social dynamics characteristics, may lead to different barriers to engagement when comparing male and female athletes. Understanding these nuances and how to effectively engage with athletes to overcome these perceived barriers are central functions of the coach. Practitioners should not assume that players possess tacit knowledge pertaining to physical preparation, and must effectively communicate task-specific requirements and the relevant dynamic correspondence of the physical preparation strategy.

Although the evidence relating to differences between male and female athletes in interpersonal approach is conflicting, and high degrees of individual variability are present, the coaches in this study consistently perceived distinct differences between male and female rugby players. Practitioners should be aware of these potential differences, with further research required to determine what constitutes effective communication strategies to ensure that successful relationships are developed with athletes. Practitioners should be highly cognisant of professional boundaries and place athlete welfare as paramount at all times.

Authorship

The study was conceived and designed by DN, PH, AMN, and BE. Data were collected by DN. Data were analysed by DN, PH, AMN, and BE. Data interpretation and manuscript preparation were undertaken by DN, PH, AMN, and BE. All authors approved the final written version.

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ORCID

David Nolan http://orcid.org/0000-0002-0743-8801
Peter Horgan http://orcid.org/0000-0002-1622-1778
Aine MacNamara http://orcid.org/0000-0002-8110-6784
Brendan Egan http://orcid.org/0000-0001-8327-9016

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