Title of manuscript:

‘The Coaching Needs of High Performance Female Athletes within the Coach-Athlete Dyad’.
Abstract

Within the research literature there is little work that has examined how coaches (and coaching) can positively influence female athletes’ continued participation and development in performance sport. With this in mind, utilising a grounded theory approach, this study focused on what are the coaching preferences of female athletes within the elite coach-athlete dyad. Through interviews with 27 current high performance female athletes, four major coaching needs were found. These were: to be supported as person as well a performer, coaching to be a joint endeavour, the need for positive communication and finally, recognition of the salience of gender within the coach-athlete dyad. The findings provide evidence that the relational expertise of coaches is at the forefront of these women’s coaching needs. This study also demonstrates that for the participants, the coach-athlete relationship is at the heart of improving athletic training and performance, and that gender is an important influence on this relationship. Furthermore, the research highlights the strength of using an interpretive-qualitative paradigmatic approach to athlete preferences through foregrounding the women’s voices and experiences.

Keywords: Women; Athlete preferences; Coach-athlete dyad; Interpretive approach
Introduction

The coaching context is an intricate and multifaceted setting involving a complex array of interactions between the environment, athlete and coach (Jones, Armour, & Potrac, 2004). Within this, the coach holds significant accountability for athlete physical and cognitive participation and development, tactics, techniques and results (Becker, 2009). It is because of this that it has been claimed that coaching should be viewed as an educational endeavour, but this in turn dependent upon the relationship between a coach and their athlete(s) (Jones, 2006a). There is a plethora of research demonstrating a positive coach-athlete relationship can greatly improve an athlete’s reported satisfaction, motivational levels, stimulate positive moods, provide a sense of support and reduce anxiety (e.g. Bortoli, Robazza, & Giabardo, 1995; Kenow & Williams, 1999; Wrisberg, 1996). Whether this relationship is a successful one and whether coaching behaviours and athlete outcomes are positively linked has been argued to be founded upon the athlete’s perception of their coach (Horn, 2002). Understanding athlete experiences of their coach and the coaching process remains a popular topic within the research literature. For example, such findings have been utilised to define great coaching (e.g. Becker, 2009), coaching efficacy (e.g. Kavussanu, Boardley, Jutkiewicz, Vincent, & Ring, 2008; Myers, Feltz, Maier, Wolfe, & Reckase, 2006), coaching competency (e.g. Phillips & Jubenville, 2009). Less documented in the literature, is the connection between athlete preferences and the gender of the athlete and/or coach. Within this article, pertinent and recent research that makes up the existing understanding of gender related to athletes’ preferred coaching behaviours is reviewed. Following on from this, possible knowledge gaps that remain in relation to understanding what athletes need from the coaching process are explored. Thirdly, an outline of the methodology used in the present study is given and from this; the four themes that arose from the study are presented. Alongside this, is a discussion of the key messages for coaching researchers, practitioners and policy makers. The paper concludes with future possible directions for this area of study.
Utilising athlete perceptions of what they need from, rather than just how they receive coaching is not as well documented within the research. Within such existing literature, the focal point of inquiry is *athlete preferences*. Within this small body of research, there is a strong concentration of research examining athlete preferences of coaching behaviours and leadership styles. Specifically, Chelladurai’s leadership model remains a popular tool for researchers. According to the Multidimensional Model of Leadership (MML) (Chelladurai, 1984), there are three states of leadership behaviour; one of these is an athlete’s preferred coaching behaviour. Athlete preferences for coaching behaviours will depend upon individual characteristics (e.g. age, gender, traits) as well as situational characteristics (e.g. performance level, type of sport). This early work exploring the dynamics of the coach-athlete relationship greatly emphasised leadership behaviour (Lafrenière, Jowett, Vallerand, & Carbonneau, 2011). Now however, the literature has progressed to using theories to understand the relationship between coach and athlete as an outcome of reciprocal and interpersonal behaviours, cognitions and emotions such as theories of social exchange (Poczwardowski, Barott, & Henschen, 2002), motivation (Mageau & Vallerand, 2003), and interpersonal as well interdependency theories (Davis, Jowett, & Lafrenière, 2013; Jackson, Dimmock, Gucciardi, & Grove, 2011; Lorimer, 2011). This emphasis on interpersonal behaviours has suggested athletes’ needs are primarily trust, respect, communication, commitment, autonomy and empowerment (Jowett, 2006; Jowett & Poczwardowski, 2007; Kidman, Thorpe, & Hadfield, 2005; Lafrenière et al., 2011; Mageau & Vallerand, 2003). Some of these characteristics form the base of the recent and widely used conceptual model, the ‘3C + 1’ (Jowett, 2006) which adopts a relationship approach to model the coach-athlete relationship operationalised by the Coach-Athlete Relationship Questionnaire (CART-Q) (Jowett & Ntoumanis, 2003). Within this model, the interpersonal constructs of closeness, commitment, complementarity and co-orientation measure the quality of this relationship in a systematic and organised manner (Jowett, 2006).

Research has also demonstrated that the gender of the athlete is an important factor in determining athlete preferences. While much of the body of literature has produced mixed
results of what the coaching preferences are of male and female athletes, some work has reached similar conclusions. Terry (1984) revealed male elite athletes preferred a more autocratic coaching style than their female peers, a finding congruent with the earlier work of Erle (1981). His research reported that the male collegiate athletes sampled wanted to be coached more autocratically, receive more training and instruction and more social support than the female athletes surveyed. Using the revised Leadership Scale for Sport (Zhang, Jensen, & Mann, 1997), Beam, Serwatka, and Wilson (2004) concluded that female athletes placed more value on receiving training and instruction from their prospective coach than male athletes, and wanted their coach to consider situational factors in their behaviour, such as skill and maturity levels of their athletes (Beam et al., 2004). Using a similar measure and yet again revealing similar findings, Peng (1997) argued that female athletes preferred their coach to display democratic and more situational consideration behaviour than their male counterparts. As a result of the research, Peng (1997) suggested coaches may need to consider more democratic behaviour in their decision making processes with their athletes and consider situational factors more often if they want to enhance the performances of their female athletes. This colludes with the work of Chelladurai and Arnott (1985) who demonstrated that female student athletes preferred to be involved in the decision making process with their coaches. Their recommendation was that coaches of female teams should pay particular attention to situational characteristics such as interpersonal relations among the team in order to enhance their relationship with their athletes.

Other notable studies which have considered the gender of the athlete include a study by Martin, Dale, and Jackson (2001) demonstrating that young female athletes preferred their coach to keep them active whereas young male athletes wanted a coach who put great emphasis on competition and fitness. Overall, both male and female athletes expressed a desire for a coach who invested time into enabling athletes to make friendships, who fostered team spirit, were competent at the skills they are trying to teach and kept the athletes active during training (Martin et al., 2001). This research built upon earlier work by Martin, Jackson, Richardson, and Weiller (1999). Using a revised version of the Leadership
for Sport Scale (Chelladurai & Saleh, 1980), one difference found in the study between gender was that female athletes, more so than male athletes, wanted to be involved in a much greater capacity in what Martin et al. (1999) termed “team happenings” (p. 199). In summary, these studies demonstrate the salience of gender of the athlete in understanding athletes’ coaching preferences within the coach-athlete dyad. Nevertheless, there remains mixed messages about what are the needs of male or female athletes; instead the focus has been on differences between these athletes or an gender as a biological concept. Therefore, knowledge gaps remain in the literature and a more specific approach to gender is required in order to understand athlete preferences. Given that sport has long been a gendered institution, that is, meanings, identities, organisational practices and processes of control and action are distinguished between / for men and women (Acker, 1990), further examination of how coaching is received according to gender is much needed.

Understanding Athlete Preferences: Privileging the Voices of Women

Within this section, two major limitations of previous studies that have sought to examine athlete preferences and gender are outlined. This will generate an understanding of where knowledge gaps are still apparent in this field and suggest an alternative direction to this work to consolidate knowledge of this area.

From a review of the most prominent research into understanding what athletes need from the coaching process, it is evident the subject area is heavily reliant on quantitative measures of interpersonal behaviours and little focus is on link to the relationships between coach and athlete (Jowett, 2006). For example, in gathering data about athletes’ preferences towards a coach, much work has utilised the Leadership Scale for Sports [LSS] (Chelladurai & Saleh, 1980) to survey athletes. While the LSS represented a crucial step forwards within the field for its focus on interpersonal interaction between coach and athlete (Wylleman, 2000), Becker (2009) argues a weakness of this measure is that it was originally constructed upon concepts from organisational and industrial psychology, and then validated according
to responses of physical education students. In this way, any data produced using the LSS “must be examined with caution” (Becker, 2009, p. 94) when applying to a sports coaching context. Vella, Oades, and Crowe (2010) agree, arguing that quantitative measures of leadership have had little impact on coaching because practitioners do not value such models as much. This may be because measures have not been generated for immediate use for coaches (Vella et al., 2010). Similarly the Coach Evaluation Questionnaire (CEQ) (Rushall & Wiznuk, 1985) was not devised using the perceptions of athletes or coaches even though the constructs included in the measure are more relevant to the coaching context. Adopting such positivistic approaches inadvertently smothers the voices of the participants; the researcher becomes the authority on the study rather than the athletes themselves. Furthermore, such quantitative methods cannot document the subjective, recurring patterns of negotiation, interpretation and meaning that occur between coach and athlete (Poczwardowski et al., 2002). The social and cultural context of coaching is absent and therefore the use of quantitative measures of coaching behaviours is limited to just describing instructional styles (Potrac, Jones, & Armour, 2002). The use of qualitative methodologies has been under-utilised in the area of athlete preferences and the coach-athlete relationship (Poczwardowski, Barott, & Jowett, 2006). The majority of this work has used a case study approach and the 3C conceptual framework to explore athlete perceptions of their coach within mixed sex coach-athlete dyads (e.g. Jowett, 2003; Jowett & Cockerill, 2003). Even less explored is a qualitative approach to athlete preferences and expectations with a specific focus on the gender of the athlete (Antonini Philippe & Seiler, 2006). There is no qualitative work proposing athletes’ coaching needs as related to socially constructed gender and gender relations.

Linked to the argument against the use of quantitative measure is the over-reliance on models to understand the coaching process and athlete preferences. Attempting to reduce and ‘fit’ what athletes need from their coach into a model ignores the idea that coaching is about improvisation and interpersonal awareness with many possible outcomes rather than just prescribed and structured actions (Côté & Gilbert, 2009; Jones & Wallace,
Poczwardowski et al. (2006) argue that using such models within the field of coaching behaviours and the coach-athlete relationship have taken a narrow approach to the subject area through the privileging of particular units of analysis over others and the over-use of psychological theories. Consequently, models fail to capture the pedagogical processes involved within the coach-athlete dyad nor adequately describe the significant contextual factors surrounding these relationships (Poczwardowski et al., 2002). Vella et al. (2010) believe that as a result of a positivistic approach to 'modelling' the coaching process, coaches (and in turn, athletes) have suffered because of the reduction of what is a complex endeavour into “simple and casual components” (p. 426). This may also explain the lack of influence of such models on coaching practice (Vella et al., 2010).

Outstanding knowledge gaps also exist within the research literature because of the popular use of models. As models cannot fully capture the dynamics and dyadic features of the coach-athlete relationship and tend to focus on one side of this relationship, it means that knowledge and understanding of this area is incomplete (Jowett, 2006). While modelling coaching behaviour and athlete preferences may be useful or popular for coaching researchers, they may be of little use or confusing for those who they are intended to serve, that is, coaches, athletes and coach educators (Vella et al., 2010). For the athletes themselves, the coaching practices they are surveyed on as to which they prefer, are not necessarily problematised. Research utilising models such as the MML or the mediational model (Smoll, Smith, Curtis, & Hunt, 1978) can only reach limited conclusions, for example, they tend to describe what coaches should or should not ‘do’ (e.g. punishment, reinforcement, feedback) and can only demonstrate a limited number of outcomes from these actions (e.g. burnout, attrition, changes in self-esteem) (Poczwardowski et al., 2006). The implications of using research evidence based on models is therefore restricted beyond recruitment criteria of coaches for athletes or telling coaches what to or what not to do (Poczwardowski et al., 2006). Instead, Poczwardowski et al. (2002) argue that the relationships within coaching are so individualistic that the interactions within it require a qualitative, interpretive methodology.
Understanding these two limitations of previous work in to athlete preferences, it is evident that the majority of research has been positivist in nature. As previously mentioned, within these studies an athlete’s gender has been treated the same as their biological sex, and discussed as a variable rather than as a social construction. Riemer (2007) suggests this may be an imprecise way to operationalise athletes’ gender. Studies may be more relevant and return richer data if they adopt a different paradigmatic approach to consider other factors such as the gender of coach or the culture of a sport to better understand both male and female athletes’ coaching preferences (Riemer, 2007). Athlete experiences take place in a sporting context that historically has favoured men and masculinity (Fasting & Pfister, 2000), for example, men dominate the coaching and participant ranks, enjoy greater media attention and cultural norms and values that are skewed in their favour. Previous work into what athletes prefer and need from their coaches has therefore erroneously regarded sport as a neutral sphere in which gender equality exists (Hargreaves, 1994). Yet, in the UK women are underrepresented in competitive sport relative to men and in some cases, for example, in organised sports (defined as participation in a sport at least three times a week) women’s participation is even on the decline (Sport England, 2011). As a further example, of the 1,399 athletes registered on the UK World Class Programme, only 43.5% are women (UK Sport, 2010). Evidence suggests the coaching process may be heard, seen and received differently between men and women due to the socialisation of gender (LaVoi, 2007). Interpersonal relationships may also be constructed in different ways due to the ways in which gender is socially constructed (LaVoi, 2007). However, most work on athlete preferences have either not utilised a gender perspective or have not problematised gendered experiences, instead merely arguing that gender (or interchangeably called sex) is a factor in the style and function of the coach-athlete relationship (Horn, 2002; LaVoi, 2007). There is no scrutiny of the concept of gender, no exploration of how it influences or is related to athlete expectations of their coach, and there is no ‘re-think’ of how gender may mean more than just biological sex. Therefore, the experiences of men and women have been treated in the same way and the role of power within this dyad as shaped by gender has too
been neglected. Consequently, existing research has removed athlete preferences and the coaching process from their social context thus, excluding the ‘bigger picture’ in which these individuals compete and ignoring the influences that shape their experiences. Yet, there is a small evidence base that suggests that how male coaches understand social constructions of gender is hindering their professional practices with female athletes, for example, not setting more challenging training goals, having lower expectations of their athletic ability or not investing sufficient effort into furthering their development (author, 2013). Rather than positivist stances, this subjective perspective of viewing the coach-athlete dyad offers a more in-depth understanding of this relationship. This is because athlete needs and expectations of their coach are seen as a product of negotiation between these social actors, dependent upon the context around them. While there are studies describing the differences between male and female athlete preferences, this focus has superseded examining what are the experiences of these athletes. Much of the research compares these preferences according to gender of the athlete unproblematically. This is a more simpler task and is one of classification, rather than engaging with the meaning and significance of gender (Alvesson & Due Billing, 1997). Further work is needed to explore how gendered relations, linked to how gender is socially constructed and notions of power, underpin and influence athlete needs within the coach-athlete dyad. While there is a plethora of research, as already documented in this paper, seeking to examine athlete preferences towards coaching, there remains little consideration of this with a specific focus upon women as recognition that they are a minority group in sport (Fasting, Scraton, Pfister, & Bunuel, 1999). This formed the impetus for the present study.

The aim of the present study was to understand the coaching preferences of high performance female athletes within the coach-athlete dyad. The work was based upon the view that women are an underrepresented group in sport and that their experiences and needs in relation to their coaching preferences are often overlooked (MacKinnon, 2011). While there is evidence of qualitative research of men’s expectations (e.g. Antonini Philippe & Seiler, 2006; Purdy & Jones, 2011), more knowledge is needed in order to develop
recommendations and strategies to improve the experiences of female athletes as well as educate coaches so that they can tailor their coaching and potentially increase the proportion of women progressing through the performance pathways. Meeting the expectations of athletes comprises effective coaching and managing these expectations is crucial in order to maintain a good coach-athlete relationship (Potrac et al., 2002; Purdy & Jones, 2011). Yet, the research was not an attempt to treat women as ‘special cases’ or to argue that their coaching needs may be entirely different to men. Instead, the research endeavoured to understand athlete needs on a more individual basis along the lines of gender and to privilege the voices of female athletes on the basis that sport is a gendered institution in favour of men and masculinity. Moreover, within the literature, it has been argued that that research on relationships needs to take on a more dyadic approach (Berscheid, 1999) and specifically in the sporting research context, there is a need for greater understanding of the reciprocal nature of coach-athlete relationships (Jowett, 2006; Poczwardowski et al., 2002). There is growing recognition within the field that this relationship and indeed, coaching itself, is more about social competencies, social relations, sensitive engagement, athlete empowerment and caring for the athlete’s wellbeing (d'Arripe-Longueville, Fournier, & Dubois, 1998; Denison, 2007; Jones, 2006a, 2007; Purdy & Jones, 2011). Coupled with the criticism that the research literature within this field is still greatly focused upon the thoughts and experiences of the coach and in recognition that athletes do a possess a degree of power (Purdy & Jones, 2011); the (gendered) athlete voice within the coach-athlete dyad forms the basis of the present study. To meet the study’s aims, the following research question that drove the study was: What are the coaching needs of high performance female athletes within the coach-athlete dyad? The following section outlines the methodological approach that was adopted to address the aims of the study.
Methodology

The research on which this paper is based is part of a larger study that aimed to explore high performance women athletes' coaching experiences in the UK to find out what coaching meant for them. A qualitative approach was chosen, utilising semi-structured, in-depth interviews. This approach was chosen, as Poczwardowski et al. (2006) contend, to do "justice to the nature of the athlete-coach relationship as a socially constructed phenomenon" (p. 130). It is also argued that researchers need to incorporate into their work, the aim of examining numerous units of analysis to provide the most potential for generating theoretical and practical insights (Poczwardowski et al., 2006). Rather than focusing on just coaching behaviours for example, examinations of athlete needs within their relationship with their coach should also consider cognitive or emotional expectations of their coach. Thus, the objective was to discover the personal experiences of athletes as a whole and as a phenomenon. This would provide broader explanations and diversify the methodological approaches used in this subject area. Given the research problem, it was necessary to utilise an approach that matched this problem (Poczwardowski et al., 2006). Therefore this study used a grounded theory qualitative methodology to explore data gathered from participants, beginning with an area of study (athlete preferences) and then develop theoretical understandings from the findings (Glaser & Strauss, 1967). This approach was selected as an effective way of synthesising knowledge around this topic and offered broader explanations than previous theoretical stances to this research problem (Poczwardowski et al., 2006). Grounded theory was also selected because of its dual focus on both the grounded individual experiences and for how it encourages researchers to theorise with the data (Passmore, 2010). As a qualitative methodology it was considered ideal as a tool to explore the social processes of coaching with a small participant sample (Charmaz, 2006). Moreover, to represent the holistic nature of the participants’ preferences
towards their coach, grounded theory allowed a rich, descriptive and exploratory examination of the athletes’ views.

Participants

The sample consisted of female athletes who competed at a high performance level and their coaches. The participants were selected from the two UK governing bodies who expressed an interest to be included in the study out of a purposive sample of five governing bodies approached for the research. The sports included were athletics (including both track and field events) to represent an individual and mixed gender sport perspective and basketball, solely women’s teams, as the team sport. An individual and team sport were sampled to provide a representative sample of athletes and to ensure that any contextual similarities or differences in types of sports was addressed. The participants competed at a performance development and high performance level (Sports Coach UK, 2008). In the UK, high performance refers to athletes engaged in and committed to high level, performance-oriented, competitive sport (national and international) (Sports Coach UK, 2009). Letters of invitation were sent to the two governing bodies who then passed the letters onto a convenient sample of their high performance coaches. Snowball sampling was then used by the coaches to recruit their athletes. As a result, 27 females volunteered to be included in the study, including 16 athletes and 11 basketballers. The women were all aged between 18 and 28 years old. Of the 27 coach-athlete dyads, 20 were cross-sex and seven were same-sex (with a woman head coach). This was not a deliberate strategy to include more male coaches, but instead was symptomatic of the underrepresentation of women as coaches across all sports in the UK. Few women coaches exist at high performance level sport. Therefore, the gender of the coach was considered when analysing the participants’ responses to differentiate their relationship with male and female coaches. All participants were reassured that all of their responses would be kept confidential and fully anonymised so that in no way could they be identified. Ethical approval for the research was given by the
two sporting organisations who led the study. A significant limitation of this study is the inclusion of all able-bodied performers and that the research team did not explicitly include questions addressing racial, class, sexual orientation or experiences related to other differences, only gender was intentionally discussed. However, the participants did discuss such differences over the course of the interviews.

Data Collection and Analysis

Understanding the limitations of previous research and the present study’s bid to offer an alternative view of athlete preferences towards coaching, qualitative experiences formed the central concern of the study. In order to gather the athletes’ experiences, data were collected utilising one-to-one in-depth semi-structured interviews. Interviews are an ideal method to achieve a greater understanding of participant experiences through the generation of rich data (Denzin & Lincoln, 1994). Given the personal nature of the subject and topics to be discussed, in that athletes were being asked for an evaluation of their coaching experiences and what they need from their coach, it was deemed that one-to-one interviews were the most appropriate interview style for the study. An interview guide was devised based upon a review of the literature within the field of athlete preferences and needs within the coach-athlete relationship as well as on field work carried out by the sporting organisation for whom two of the research team worked (Strauss & Corbin, 1998). The beginning of the interview centred upon exploring the athletes’ sporting backgrounds (e.g. event / sport, age, level at which they competed, details about their role within the club). This background was collected through open-ended questions which led into questions based upon a review of the literature, on research carried out already by one sporting organisation and on emerging themes from the data, asking the participants about what they deemed to be characteristics of an effective coach, the meaning of ‘coaching’ to the participant, coaching needs and expectations of the participant, and the role of gender in the participant’s athletic identity and coaching experiences. Topics that arose during the course of the interview were also explored. Interviews were conducted by a member of the research
team in locations convenient to the participants (e.g. club, University) and lasted between 60 and 120 minutes. All interviews were digitally recorded and were transcribed verbatim. Participants were also asked to elaborate on any further information they felt was relevant during the course of the interview.

To enhance the trustworthiness of the data, the interview transcripts were cross-checked by other members of the research team before the commencement of data analysis. Participants were also asked at the end of their interviews whether they wished to add to or amend any of their responses. No participants requested any changes and therefore the research team had confidence that their analysis was based upon accurate representations of the participants’ views (Lincoln & Guba, 1985). The participants were also asked if they would like a copy of their interview when transcribed. All of the participants declined. The constant comparison method of inductively analyzing the data for similarities and differences was employed. The process was conducted using the software Atlas Ti to code the athletic interview data and NVIVO to analyse the basketball interview data. The use of two different software programmes reflected the different strengths and experiences of the two research team members leading the data analysis, who had utilised the software in previous research. All four members of the research team had extensive applied and academic research experience within the subject area of women in sport. Two of the members (including the author) were more experienced in data analysis and presentation and so led on the interpretation of the data. The entire research process was overseen by the author who had doctoral training in research methods and was an experienced qualitative researcher. The team’s research experience within the subject area, familiarity with the literature and personal links to the two governing bodies as well the coaches and athletes all served to increased the theoretical sensitivity of the team (Strauss & Corbin, 1990). To ensure that evaluation and interpretation of the interviews was being carried out in similar ways, regular team debriefing meetings were set up in which members audited the analysis of the transcripts to ensure trustworthiness of the data (Guba, 1981). No
disagreements occurred within the team during data interpretation and analysis and this confirmability enhanced the confidence and trustworthiness in the data (Guba, 1981).

Using the constant comparison method, the data analysis process involved several steps. First, each interview transcript was unitised into smaller units of meaning and the response to each interview question comprised a unit. Then each unit of meaning was then compared to other units of meaning and subsequently grouped with similar units to form a category (Maykut & Morehouse, 1994). Thirdly, when a unit of meaning could not be grouped with another, it formed a new category. At the point of theoretical saturation, that is, when no new categories could be formed, rules of inclusion for each category were written and connected to similar categories to show relationships and patterns across the data (Maykut & Morehouse, 1994). Throughout the analysis, recurrent themes were located across the transcripts involving continually connecting the data back to the research question, grouping these themes together to form larger, over-arching categories (see Table 1). Memos were also written to summarise the relationship between the concepts and categories that begun to draw out the key themes of what the athletes needed within their relationship with their coach. From this, a ‘framework’ of descriptive codes was refined to provide a more theoretical understanding of what the participants needed from a coach (see Table 1) (Wolcott, 1995).

Results and Discussion

This section of paper concentrates on the findings of the study that relate to four key dyadic needs of the participants. The results were clustered under four themes (Table 1). These themes are based on the emergent concepts, categories and relationships between the categories from the data analysis. Verbatim text is included to illustrate the findings (Groom, Cushion, & Nelson, 2011). The four shared key fundamentals across the two sports are discussed, that the participants argued were their coaching needs in order to facilitate a positive coaching relationship and enhance their overall training and performance.
experience. A discussion of the findings is also included in relation to the review of literature. For the purpose of this section, all of the female participants will be referred to as ‘athletes’ including the basketballers.

**Female athletes prefer to be supported as both a performer and a person**

This theme was the most reiterated across the interviews with the participants. Indeed, the participants felt very strongly that a coach’s appreciation and understanding of their athletes as individuals was the most pertinent characteristic of an ‘effective’ coach. In order to fully support the athlete as a performer, one of the key requests by the participants was for their coach to get to know them completely as a person. As the following excerpt from one interview demonstrates:

[Ideally, a coach would] get to know you, yeah, get to know you and as a person…

It’s good if they do get to know you as a person cause then that can really affect the way they coach you.

According to the participants, this understanding of the athlete should be in-depth and goes beyond just an interest in their athletic development or performance. Instead, this appreciation should be aimed at getting to know the athletes as people to better support them as performers involves understanding their personality, what motivates them in life and in their sport, what their goals are and what will bring out the best in them. The participants believed that seeing female athletes as individuals and not just sports performers may help coaches understand that they desire a balance between their sporting commitments and an outside life.

Many of the participants, particularly from an athletics context, felt suffocated as a result of their coach’s pressure on them to concentrate solely on their sport. This was the experience of one of the women with her athletics coach:
Table 1: Main themes of what are the coaching preferences of female athletes within the coach-athlete dyad

<table>
<thead>
<tr>
<th>Main theme</th>
<th>Sub-theme</th>
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<tbody>
<tr>
<td>Female athletes prefer to be supported as both a performer and a person</td>
<td>• Athlete wants to be understood as a person as well as a performer by the coach</td>
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<td></td>
<td>• Athlete wants a coach to understand that there needs to be a balance between sport and outside life</td>
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<td></td>
<td>• Does not always want the coach involved in the athlete’s life outside sport</td>
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<td></td>
<td>• Role of coach should change with age of athlete</td>
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<td></td>
<td>• Wants to the coach to be approachable and to discuss personal aspects of their life that may impact performance</td>
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<tr>
<td>Coaching should be a joint endeavour</td>
<td>• Equal commitment</td>
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<tr>
<td></td>
<td>• Coach is a guide and mentor rather than authority</td>
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<tr>
<td></td>
<td>• Guidance from coach but some input / control by athlete themselves</td>
</tr>
<tr>
<td>Female athletes prefer positive communication</td>
<td>• Consistent and frequent communication</td>
</tr>
<tr>
<td></td>
<td>• Positive communication and encouragement / be a source of motivation</td>
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<tr>
<td>The significance of gender in the coach-athlete dyad</td>
<td>• The coach should understand their own gender is significant</td>
</tr>
<tr>
<td></td>
<td>• The coach should understand the gender of their athlete is significant</td>
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</table>
He’s not very keen on like people going out and having late nights and stuff because he just thinks that that, it will affect your training which it does but, I think that there needs to be a bit more of a balance personally.

Yet, the participants needed their coaches to understand they have a life outside their sport (for example education and employment), and to appreciate they have to juggle all the different areas of their lives with their sport (e.g. socialising with friends, studying or working with training). Many of the participants were studying at a University at the time of interviewing and felt excluded from their peer activities because of the disproportionate time they spent training and performing. Instead, as this participant observes, they require a coach to support a balance in recognition that sporting careers do not always last due to injury or age, or that performers wish to balance their athletic career with other aspirations:

[An effective coach is] Someone who can set good sessions, knows what they are talking about but at the end of the day has a grip on reality that your sport is not the be-all and end-all, you know, you have to enjoy it really and have other things in your life because in sport it can just end like that.

This participant agrees that the coach must recognise that athletes required a balance of interests but is sceptical as to whether, at this level of competition, coaches can do so. She remarks “it could be hard for the coach to let go. [But] they’ve got to be able to have the ability to let go”.

Understanding the athletes as both people as well as performers is not to say that participants preferred their coach to be a ‘friend’, as this athlete points out: “I like to keep, you know, my coaches are my coaches they are to do with my [sport] and not to do with anything else.” The athletes acknowledge they will sometimes bring their problems into training and can find it hard to ‘switch off’. A coach needs to consider how they manage this and the impact on training but the participants felt there was a definite ‘line’ between
understanding them and the factors that impact their performance yet not trying to be to
‘over-familiar’, as this participant illustrates:

I don’t like them when they get involved in my personal life… I was saying [to my
coach] about wanting me to stay here and wanting to organise my life around [my
sport]. I think I like there to be a line drawn around that and when they [the coach]
start to try and intrude, that’s when I don’t like it.

This point that the participants made concerning the relationship they want with their coach,
understanding them as a person but not attempting to be their friend, appears to be very
much linked to their desire to have a balance between their sport and an outside life. Not
having that ‘overly’ close relationship with a coach is something the athletes do not always
need if they have friends and a social life away from their sporting endeavours. The following
quote from one of the participant supports this:

The coach doesn’t need to understand everything else that goes on in your life
to make you better at [my sport]. I think it’s almost a good thing to have stuff
outside of sport to get away from it in a way. So [I don’t want] a coach that’s too
intrusive and wants to know every aspect of your life.

Understanding the athlete as a person will enable the coach to understand what
relationship their athletes do prefer. This understanding of an athlete should be meaningful
and flexible, as the athletes also believed the coach should adapt their relationship and role
with them as they grow older.

Continuing the theme of female athletes needing to be supported as a performer
based upon a coach’s knowledge of them as a person, the final point the athletes made was
that they would like their coach to be approachable. Athletes are individuals with personal
backgrounds and issues that do not always get left ‘at the door’ when they walk onto the
court, the track or the pitch. Building on from the earlier point that the athletes did not
necessarily want their coach to be a friend, this is balanced however with the need for
coaches to have the readiness to discuss personal aspects of their athletes’ lives that may impact their training and performance. For the athletes interviewed, this was of paramount importance. In order to achieve this, coaches need to be aware of their background, as one participant points out:

[The coach should not always be] talking to you about the sport, [but] wanting to know like what else is going on, any other interests. Because I think if they know more about you, they’ll find out like how you like to train.

In order to be ready to discuss personal aspects of performers’ lives, coaches should be available to their athletes. This was mentioned in many of the interviews and is illustrated by the following participant:

Someone… that you can like talk to if you’ve got like problems with [the sport] or even if it’s something that’s bothering you out [of the sport] but then it’s affecting you while doing [the sport]… I kind of need someone who’ll be able to just sort of see that there’s something wrong and then either take me aside and say “What’s up?” or just be able to sort of react in a way to make me cheer up.

To summarise, according to the participants, a deep and genuine understanding of an athlete as an individual with a personal background and circumstances is one vital skill of coaches in order to foster a positive relationship with their athletes. Knowing who they are and what they need will enable coaches to support their athletes in a way that is tailored to the individual. For the participants, a key aspect for coaching practice is that coaches understand who they are coaching, to seriously consider the personal background of athletes and tailor coaching practices to the needs and preferences of that individual. This finding adds to the growing body of literature that calls for coaching to be understood as a pedagogical endeavour in which the coach makes decisions based upon an understanding of what their athletes need and on contextual awareness (Jones, 2007, 2006b; Jones & Bailey, 2011). The research also corroborates with the work of Becker (2009). Her study,
also based on interviews with athletes, concluded that being a coach that is willing to take
the time to get to know their athletes, being approachable and having a strong personal as
well as professional relationship with their athletes is a hallmark of ‘great’ coaching. The
athletes in Becker’s study reported that their motivation and coachability was enhanced
through this effective coach-athlete relationship when the coach showed a genuine interest
in the athlete as a person as well as a performer and when the relationship was athlete
centred. Building a personal relationship with athletes goes beyond merely relating to them,
it is vital that coaches get to know the individual in order to understand how they prefer to
learn and train, what motivates and de-motivates them and holds their interest (Becker,
2009). Indeed the work of Poczwardowski et al. (2002), again utilising an interpretive
framework, spoke of the need for athletes to felt known and cared for by their coach. The
present study adds to this and is congruent with LaVoi’s findings (2006) that the onus is on
the coach to take responsibility for relationship development. This relationship must be one
in which the coach genuinely invests and represents themselves (LaVoi, 2006) and gained
through making the effort to get to know the athletes, resulting in the athletes feeling valued
(Becker, 2009). This will assist in increasing their athlete’s sense of belonging and in turn
improve that performer’s self-determined forms of motivation. Leading on from this first
theme, I will now discuss the second theme; this is the need for coaches to participate in
continued professional development (CPD).

Coaching should be a joint endeavour

Across the interviews, many of the women interviewed had great respect and
appreciation towards their coaches and how they were trained. However, also within this,
many of the participants described their coach’s style as autocratic, a ‘my way or no way’
style of coaching which led to the women feeling considerable frustration within their
everyday coaching experiences. When asked about suitable coaching behaviours, the
female athletes interviewed preferred a coach who is in control of and who leads the team,
but balances this with flexibility and negotiation with the athletes themselves, as this participant illustrates:

I hope they would guide me and tell me how to do it, but then let me have some input in if I think that’s the correct way to do it or not… They should have your best interests at heart but also to listen to what you’ve said and actually help you achieve what you want to achieve.

The participants wanted guidance from the coach but liked to have a significant input into and even control themselves of important decisions regarding training and performance. This was particularly the case in the athletics context for individual events, according to this participant:

I am running all sorts. Eventually you have got to narrow down your distance a bit more and concentrate on this. [I want] Guidance in that way, but also, you know, I would hope that they [the coach] would begin to realise that I have to sort of make the decisions for myself as well.

The role of the coach should be one that ‘scaffolds’ the athlete, providing them the tools and knowledge so that eventually, as many of the women described, the athletes can “learn to think for themselves”. The participants believed that they are at a level in their sport where they have developed considerable knowledge, and are aware of their bodies’ limitations and strengths. As such, they want to feel that the coach will listen to their ideas and suggestions and yet can contribute their own ideas. Then instead of the coach being the authority, their position is to act as a mentor or guide. For one participant, the ‘effective’ coach is almost a peripheral figure at a high performance level:

They’re more there then as a mentor, not really to tell you what to do, but just to reassure you, maybe, say, ‘I think I should do this’, because you know what you should be doing then. And for them to just say, ‘Oh yeah, you’re right, you should
be doing that.’ So they’re maybe not as big a part of the picture, but you still want them there for the reassurance and for the positive input, and the evaluation.

The term ‘guide’ was a popular term across the interviews when asked as to what the athletes need from their coach. Most of the women did not believe that their coaches possessed a ‘win-at-all-costs’ ethos, but did think they dictated too much of the training programme and the direction of their career, particularly in the athletics setting. Instead, the athletes wanted the evolution of their development to be reversed, in that they set the goals and the coach worked towards guiding the women to achieve these. This is instead of the coaches having the first say and the women fitting in:

[My ideal coach] would give me a set programme and they guide me, if I tell them a goal, they’ll do the most in their power to help me get there. And I communicate with them on a regular basis.

For the coach to act more as a ‘chaperone’ of athletic development rather than as an authority can mean the coach-athlete relationship becomes a joint endeavour rather than as a ‘leader and the led’ scenario. For this to occur, the women believed that equal commitment was required on both sides. The athletes across the sports recognised that the role of the coach often is one that involves investing a lot of time in athletes and requires much preparation and hard work. But based upon their previous experiences of feeling though that some of their coaches often lacked enthusiasm; the women needed a coach who put in as much commitment as they felt they did. This excerpt from one interview supports this:

[I want] kind of a bit more enthusiasm in the actual coaching because it does feel sometimes that [my coach is] there for, like just because he’s been asked to be there, not because he wants to be there and he really wants to see us improve.

This commitment is demonstrated for example in the athletics setting, by the visible support of coaches at events and monitoring individual efforts in training. The reward, according to this participant, is greater effort invested into training and performance by the athlete: “if I put
more effort in because my coach is there, because I am sort of being timed and things, I will get more out of it”. Commitment to the role of being a guide and mentor of athletic development means a balance of power between the athlete and coach over the direction and progress of training and performance. This is a pertinent message to arise from the interviews with the participants. The women athletes interviewed felt very strongly that the coaches possessed too much power over the content and direction of their training as well as performance. By wanting a coach to be a guide, the participants aspire for a greater involvement in decision making processes and for the management of their career to be a joint endeavour. This finding adds to more general coaching literature that has concluded athletes’ participation in decision-making is important in order for performers to engage with their coaches (Kidman, 2001; Kidman et al., 2005). Yet, other research has revealed that some coaches may struggle to balance the power within the coach-athlete relationship since they understand themselves to be the sole leader of team and the authority (Fox, 2006; Purdy & Jones, 2011). This may be associated with high performance level coaches, that as coaches became more experienced and gained more expertise that any presentation of new challenges from their athletes may be construed as a threat to their authority rather than as an opportunity learn new practices (Johns and Johns 2000). Denison and Avner (2011) believe that this is symptomatic of coaches ignoring the power that athletes have and disregarding the notion of shared leadership. Yet, mutuality has been cited as a characteristic of what athletes believe to be great coaching (Becker, 2009). While not linking findings to the gender of the athlete, democratic decision making and less autocratic coaching styles has also been found to positively impact athletes’ motivation-related responses in sport (e.g. Barnett, Smoll, & Smith, 1992; Duda, 2001). By welcoming athletes into making decisions and allowing them to offer suggestions, it has been demonstrated that this may also lead to other positive psychological outcomes for athletes such as an improved sense of enjoyment and perceived competency as well as less negative psychological outcomes such as burnout and sport competition anxiety (Price & Weiss, 2000). The present
study adds to this by revealing that the desire to be involved in decision making processes is a strong need of these high performance women athletes.

This leads onto a discussion of the third key skill that the female athletes needed from their coach, that is, positive communication.

**Female athletes prefer positive communication**

The participants reported that coaches need to consider two important dimensions of the communication they adopt. Firstly, the frequency with which they communicate with their athletes is an essential consideration when coaching female athletes. The consensus between the high performance athletes interviewed was that they require consistent and frequent communication with their coaches, as this participant states:

> I like to think that they’d keep in touch. They’d like to know what I was doing, whether I was [completing] the schedule that I’m on, or they’d have an input on what I do. I’d like to know they’d want to keep in touch with you and want to know what’s going on and just because you’re not on the scene, you’re not turning up to training sessions, they [often] forget. I think that’s important.

For many of the participants, they liked and benefitted from having access to online training programmes that was regularly updated by their coach. This was one form of communication they wanted as well others:

> [I would like it if] they’re going email you sessions, they’re going to text you the sessions before and you’ll know when they’re not going to be there and you know what they want you to do.

Continual communication with their coaches was important for the participants. This was in part to make the athletes feel integrated and an important part of the team, even for individual sports athletes who still desired to feel part of their club. Often the participants
described the coach-athlete relationship as akin to a ‘popularity contest’ that was performance contingent. Therefore, at times some of the participants described feeling isolated even within a team sport setting. Continual communication with athletes by coaches can overcome this.

Secondly, as well as frequency, coaches must pay consideration to the type of communication they employ when coaching female athletes. For the participants, the type of communication they preferred was personalised and positive as a source of encouragement and motivation. This is not to say that the women interviewed wanted feedback on training sessions and performances to be ‘sugar coated’ or praise given when it was not warranted. Nevertheless, the female athletes did prefer to receive positive encouragement and praise, when it was due, to motivate them and improve their sense of confidence. Under their current coaches, many of the participants felt that the type of communication they receive was inconsistent, from sometimes distant and autocratic to jokey and ‘laid back’. Therefore, not only did they require consistent communication but positive too, similar to one example given by the following athlete, a long distance runner:

They could just say, ‘Oh, you know, she’s [a rival athlete] run that but you know, you’ve beaten her before so it means you can run that time,’... not ‘Wow, she’s run really, really fast.’ Say, ‘Oh, you’ve beaten her last year so it means you could run just as fast as her,’ or, you know, ‘You can beat her again’ Like, you can say it but turn it in a way that makes it positive.

Positive encouragement and praise to act as a source of motivation was a persistent need from the women interviewed. Coaches should be a source of encouragement by pushing their athletes to develop using positive communication, as this participant describes:

[I need] More support. Advice. Someone to hold my hand. Someone to get me there because I'll get shy, nervous, go away from it. Tell me that “Yeah, you can do it. You just have to go [for it]”. 
The need for coaches to pay attention to the style of and frequency with which they communicate with their athletes is not a novel finding. However, the findings from the present study demonstrate that positive and consistent communication is crucial in order to enhance the coach-athlete relationship with and performance prospects of these high performance female athletes. The final finding of what the participants needed from their coach was for their coaches to not only realise the significance of whom they are coaching but the significance of who they are themselves.

**The significance of gender in the coach-athlete dyad**

As discussed earlier in this article, the gender of athletes and indeed coaches is often treated as a variable and is therefore not problematised. However, according to the participants interviewed in the present study, they are eager for coaches to be aware that gender is an important consideration when working with athletes. Precisely, coaches should understand that women may approach training and performance in ways that are different to men athletes and secondly, that the gender of the coach themselves affects athlete perceptions of and interactions with them.

Firstly, the participants stated that they want to be pushed as hard as their male counterparts, something that is often lacking in many of the participants’ current coaching experiences. The women interviewed believed they shared similar expectations to their male peers however, based upon how they have observed other athletes interact with their coach, acknowledged that many women are different to men in other ways, such as describing a deep emotional connection to training and performance outcomes, believing they will want to discuss their progress more with their coaches, and also will to know ‘why’ from their coach more frequently. As such and as discussed earlier, coaches should consider this and tailor the way they communicate with the athlete/team to meet these needs, while at the same time conduct training with similar technical rigour for all of their athletes. Coaches should not ignore the significance of an athlete’s gender as this participant illustrates:
Ultimately I’m a basketball player and I think that’s what I want to be seen as…but I think gender always comes into account. There’s no way of getting around it, no matter how much you try.

Other participants described how they think coaches should differentiate their methods according to whether it is men or women they are coaching:

I’ve raced badly, whereas guys just tend to like keep it to themselves or get angry or just like, “oh I’m not bothered”. I think girls tend to … I know I myself have got upset through it because I feel like I’ve let myself down and let other people down, and that’s the point where I think you almost need the comfort [from a coach] … I mean, like just a tap on the shoulder or a hug just to say “everything’s okay, it’s just one race, you’re going to have other times”, just reassurance, I haven’t witnessed many guys get upset or need that reassurance. Whereas girls I think they are almost more emotional.

Many of the women interviewed felt that they possessed a strong emotional investment in how they were performing; they reacted to failings and triumphs with much more emotion than their male counterparts. This was the most significant difference, according to the participants, between men and women as athletes. A coach needs to be aware of this and manage this as one participant wished for when she said “Yes, [I need] probably a little bit more understanding [from my coach towards gender issues], like [women] are more sensitive”. As well as understanding that women may have a strong emotional investment in how they are performing, coaches should be aware that women may question their self-confidence on occasions and need an environment in which they feel secure rather than exposed:

I think girls lack more of confidence than men. A lot of girls lack self confidence whereas guys see it as ego boosting when they are running together, like competing and things like that. For girls it is a bit different, maybe that’s why there
are not many girls competing. So I think as a coach you need to help boost the confidence of girls.

This participant agrees:

The majority of girls from what I’ve seen are generally not as confident. And boys are definitely more aggressive and confident. Girls tend to be a bit more like ‘I don’t know if I can do this’. So yeah, I think they do need [a] more encouraging coaching style.

During the interviews, the younger participants often described incidents in which they felt aware of their appearance in front of others whilst they trained and this decreased their sense of confidence. Other participants described losses of confidence through occasions in which they were weighed by their coach in front of their peers but the male athletes were not asked to do so. These coaches should have been sensitive and understood that the confidence levels of these female athletes may be affected by what the coach may consider are insignificant coaching practices. This may be the case particularly with younger competitors and so coaches should be willing to adapt the training environment if this is affecting their athletes.

Furthermore, not only is the gender of the athlete significant but the participants believed that the gender of the coach was significant. When asked as to what they needed from their coach, most of the athletes from a cross-sex coach-athlete dyad responded that they only wanted to be coached by a man because they erroneously believed them to be stricter, more assertive and more knowledgeable. Thus, they associated with what they considered good coaching skills with masculinity. When positively challenged on this by the interviewers, the participants reflected upon their responses and understood their preference to be based on their previous experiences. Many of the participants had only ever been coached by a man and this negatively affected their opinion as to the coaching abilities of women. Some acknowledged that they also built their opinion as to the coaching
competencies of women on preconceived ideas, stereotypes and unfavourable ideologies that exist within the wider culture of sport. One participant remarked that she strictly preferred male running coaches on the basis that “men run faster than females”. Crucially however, during discussions with the participants as to their coaching needs, most of the women expressed a desire for a strong communicator for a coach, someone who could demonstrate high emotional intelligence and who was approachable to discuss often sensitive and personal issues. Contradicting themselves, some of these participants felt that these were skills most associated with female coaches, as one athlete stated: “Maybe if it was a woman I’d feel maybe that I could speak to them about things sometimes”. Another participant agrees: “I think [having a male coach] means you can’t talk to them about personal problems whereas if you had a female coach, you might”. Nonetheless, what this means for coaches is that they need to acknowledge and manage athlete perceptions of their coaching ability and qualities. These findings also reveal the salience of gender in the coach-athlete dyad that is more than just biological sex. The participants from a cross-sex coach-athlete dyad experienced gender as significant in that coaches either unfairly adjusted their training programmes to make them ‘easier’ compared their male counterparts because they were perceived as less competent. Some male coaches ignored that women and men do have differing coaching needs and expectations, and instead approached them as ‘athletes’ rather than individuals each with their own personal backgrounds. This is not a call however, for coaches to treat female athletes as ‘special cases’, but rather to, as discussed earlier, understand that the gender of their athlete and indeed, themselves as the coach will influence their relations with athletes. Future research is needed, conducted from an interpretive framework, to examine the coaching needs and preferences of men athletes to add to this finding. While psychology may be full of debates as to the influence of gender over social interactions and the gender similarity hypothesis, LaVoi argues that there is little work into the intersection of gender and closeness in the coach-athlete relationship (2007). What the present study also revealed is that women may have a preference for a cross-sex coach-athlete dyad because they associate the needs they have with skills that they
considered are masculine traits. This is a worrying response from athletes and impresses the need on governing bodies and coaching agencies to push to recruit a more diverse coaching workforce to balance athlete views of what makes sporting leaders. After all, some of these athletes may aspire to be future coaches. However, more female athletes may be put off because they have always experienced a one-sided view of the profession and thus, do not see a place for themselves. A suggestion for coaches may be to consider bringing in male and female coaches into training sessions to offer athletes a more rounded picture of other coaches.

**Conclusion**

This study examined the coaching needs and expectations of high performance female athletes from both cross-sex and same sex coach-athlete dyads. The research builds upon previous research that found that coaching preferences are influenced by the gender of the athletes and of the growing importance of interpersonal relations in sport, by highlighting some specific coaching needs of the women interviewed. This was through a more holistic approach to examining athlete preferences. The findings suggest that the relational expertise of coaches is at the forefront of what these women need from their coach. The study also demonstrated that for the female athletes interviewed, the coach-athlete dyad was at the heart of improving athletic training and performance. The study highlighted the importance for these female athletes, of coaches genuinely understanding and knowing their athletes in order to personalise their coaching, for coaches and athletes to regard the dyad as a partnership, the significance of how coaches communicate with their female athletes, and that gender relations between coach and athlete are a salient influence on this relationship. These implications require coaches to be flexible and responsive to whom they coach because athlete expectations will never be satisfied if coaches employ uniform, ‘one-size-fits-all’ practices (Denison & Avner, 2011). This may require more work on the part of the coach, but as Denison and Avner (2011) also assert, this can allow coaches
the flexibility and freedom to practice rather than having to stick to what are considered ‘correct’ methods and problem solving procedures. The strength of this research is also that it is based upon the first hand voices and experiences of the women themselves. Further research is warranted, using interpretive approaches and qualitative methodologies, to understand the value and meaning of coaching for different individuals and groups across the various performance domains.

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References


Fasting, K., Scraton, S., Pfister, G., & Bunuel, A. (1999). Summary of "the experiences and meaning of sport and exercise in the lives of women in some European countries": Report to IOC. Oslo: NIH.


