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Sport psychology consultation: The attitudes of New Zealand athletes

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ABSTRACT

The purpose of this study was to examine New Zealand athletes' attitudes towards sport psychology consultation as no similar study has been conducted in New Zealand since 2004. Sixty-two New Zealand athletes (ranging from age-group to international-level), were administered the Sport Psychology Attitudes – Revised questionnaire (SPA-R). New Zealand athletes' attitudes towards sport psychology have become more positive since 2004. Independent group t-tests demonstrated that athletes in 2020 had significantly higher confidence in sport psychology, and significantly lower levels of personal openness and cultural preference compared to athletes in 2004. There was no significant difference found in stigma tolerance scores. Chi-squared tests were carried out on nine different categories: gender, sport type (contact/non-contact and team/individual), previous exposure, age, current competitive level, top competitive level, number of individual and group sport psychology sessions, and employment level. Non-contact sport athletes were found to have significantly higher confidence than contact sport athletes and individual sport athletes were found to have significantly higher confidence and cultural preference than team sport athletes. A trend was found with higher level athletes having greater confidence in sport psychology and national level athletes were found to have higher cultural preference than junior athletes. These findings are useful for organisations and practitioners as they provide an understanding of athletes' current perceptions and attitudes towards the field.

1. Introduction

For many, a relatively recent yet integral part of working towards optimal performance involves consulting with sport psychology consultants (SPC; Kornspan & Quartiroli, 2019). Sport psychology is defined as the psychological study of human behaviour in sport settings (Horn, 2008). In an applied sense, SPCs work with athletes and employ a variety of methods such as visualisation, self-talk, and mindfulness exercises to improve performance. Furthermore, SPCs look to engage with and address matters such as performance anxiety that can be detrimental to an athlete's mental health and performance (Martin et al., 2004). The demand for and recognition of sport psychology has risen considerably, and many organisations are now realising the

benefits of deliberately working on the psychological aspects of performance (Rooney et al., 2021).

As of 2021, there are 26 accredited SPCs through High Performance Sport New Zealand (HPSNZ) and Sport and Exercise Science New Zealand (SESNZ). This number includes registered psychologists and accredited mental skills trainers. Because sport psychology is relatively new as a formal discipline when compared to other aspects of training, there is a lack of general awareness concerning its purpose and function from athletes, coaches, and the general public (Green et al., 2012). Furthermore, although consultation with practitioners has been shown to be beneficial for athletes' performances and well-being (Kellmann et al., 2002), there can still be somewhat of a stigma and negative attitudes held towards sport psychology itself, as

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well as towards those receiving sport psychology support (Green et al., 2012).

The aim of this study was to capture and understand New Zealand athletes' current attitudes towards sport psychology. This is important as athletes' attitudes towards the field will likely determine their intention, adherence, and future use of sport psychology (Martin, 2005). Moreover, understanding attitudes will also allow programmes and services to be refined to better support the well-being and performances of athletes and could help establish a more positive and stigma free environment (Lavallee et al., 2006; Martin et al., 2004). For example, if it is known that a perception exists within a group that engagement with a SPC is inherently revealing of mental health challenges, a consultant can look to address this and ideally reduce such stigma before initiating consultation.

Zakrajsek et al. (2023) recently updated their Multidimensional Model of Sport Psychology Service Provision (M2SP2-R), which identifies various elements that influence athlete attitudes, intentions to access, and engagement with sport psychology services, and, as such, can improve practitioner awareness of such variables. Athlete attitudes has been consistently reported in the literature (e.g., Martin et al., 2004; Zakrajsek et al., 2023) as playing an important role in influencing willingness to engage with sport psychology services and demonstrates the importance of understanding current trends.

Within the literature, a range of variables have been found to influence athletes' attitudes towards sport psychology; specifically, (i) gender, (ii) sport type, (iii) nationality, (iv) previous exposure, and (v) age. For instance, it has been reported that males, along with contact sport (e.g., rugby, boxing) athletes, have generally held more negative attitudes towards sport psychology compared to females and non-contact sport (e.g., tennis, golf) athletes (Anderson et al., 2004; Martin, 2005; Martin et al., 2004; Wrisberg et al., 2009). It would seem this is due to ideas around masculinity and 'macho' cultures associated with being male and the kinds of sports that involve physical contact/collisions between athletes and higher risk of potential injury. Moreover, it seems that these environments often discourage the expression of emotion and sharing of problems and can develop a resistance to seeking help (Anderson et al., 2005; Martin, 2005).

It appears that there are some cultural elements and differences regarding the shaping of attitudes towards sport psychology. As of 2005, it appeared that, overall, New Zealand athletes held more favourable attitudes than athletes from Germany, United States, and Ireland (Lavallee et al., 2006). Overall, athletes that have had positive previous experiences had more favourable attitudes toward sport psychology consultation compared to those without experience or negative previous experiences (Anderson et al., 2004; Ildefonso et al., 2020; Martin et al., 2004; Martin, 2005; Wrisberg et al., 2009). Finally, the research regarding the impact of age is varied, with Martin (2005) finding difference between high school and college athletes, whilst Anderson et al. (2004) and Shaw (2018) did not find any such differences. Overall, the literature shows that there are many aspects that can affect the attitudes of athletes towards sport psychology. It is important for organisations, coaches, and support staff and SPC themselves, to be aware of these aspects and potential tendencies so that they can implement strategies within their provision of services to mitigate,

as much as possible, likely challenges and, ultimately, provide the best possible support for the individuals in their care.

2. Methods

This research was assessed by the Massey University Human Ethics Committee and deemed as low risk (notification number: 4000023030).

2.1. Participants

A convenience sample of 62 New Zealand athletes (female $n = 35$, male $n = 27$) from five different age groups, 18 – 20 years ($n = 30$), 21 – 23 years ($n = 18$), 24 – 26 years ($n = 4$), 27 – 29 years ($n = 4$), and 30+ years ($n = 6$) were involved in this study. This study was exploratory and convenient in nature, therefore although small this sample size was deemed appropriate. The participants competed in a range of sports, including, cricket ($n = 23$), rugby ($n = 13$), athletics ($n = 10$), netball ($n = 3$), cycling ($n = 2$), soccer and hockey ($n = 1$), and other ($n = 9$). Participants were a mix of top international ($n = 1$), international ($n = 14$), national ($n = 34$), junior ($n = 8$), and none ($n = 5$). Thirty-one participants (50%) had previously had an individual session with a SPC, and 47 participants (76%) had attended at least one sport psychology/mental skills workshop.

2.2. Questionnaire

To measure athletes' attitudes towards sport psychology, the Sport Psychology Attitudes – Revised (SPA-R) was used. The SPA-R is a Likert scale questionnaire that was developed by Martin et al. (2002) to improve the validity and reliability of the Attitudes Towards Seeking Sport Psychology Consultation Questionnaire (ATSSPCQ; Martin et al., 1997) that had been primarily used from 1997 to 2002. Their analysis revealed factorial validity for use with a range of athletes (male/female; adolescent/adult) and has been used in various studies since. The SPA-R includes a 10-item demographics section to capture age, gender, level of sport, and previous exposure to sport psychology and mental skills. The remainder of the SPA-R consists of a four-factor model involving a 7-point Likert scale for each of the four factors to determine an individual's overall attitude towards seeking sport psychology consultation. These four factors are (i) stigma tolerance, (ii) confidence in sport psychology consulting, (iii) (lack of) personal openness, and (iv) cultural preference. The mean for each factor is determined by summing the scores and dividing by the number of items (e.g., an average score of higher than 5 for stigma tolerance illustrates the individual has concerns with the stigma associated with seeing a SPC). A high score in confidence in sport psychology illustrates the individual has high confidence in the field and believes it is useful. A high score in (lack of) personal openness indicates a lack of personal openness and unwillingness to share personal information. A high score in cultural preference indicates an individual would prefer a consultant of their own culture, race, or ethnicity.

2.3. Procedure

Key gatekeepers (i.e., coaches/managers) of various sporting organisations/teams were approached regarding the study, four of

which (Auckland Cricket, Harbour Rugby, Massey University Academy of Sport, HPSNZ) agreed to distribute a link to an online survey (carried out through Qualtrics.com) and information sheet to athletes via email. This link invited athletes to anonymously take part in a sport psychology attitudes questionnaire that would help deepen understanding of current attitudes towards sport psychology with the aim of utilising such insights to improve services in the future.

2.4. Statistical approach

All statistical analyses were performed with SPSS software for windows (IBM SPSS 311 Statistics 20, NY, USA). Descriptive values were obtained and reported as means and standard deviation (SD). Given that much of the data was categorical, and that Levene's test and the Shapiro-Wilk Test provided > 50% significant data, data was analysed with a Chi-Squared Test and independent group *t*-tests. Validity for sample size was determined by checking against the result of Fisher's Exact Test. Cohen's *d* was calculated as a measure of effect size. Significance was accepted as $p < 0.050$.

3. Results

Table 1 compares the results of the current study from 2020 with those of Anderson et al. (2004) who conducted the last study of similar nature in New Zealand. These results show that in 2020, New Zealand athletes overall still hold positive attitudes towards sport psychology and still somewhat prefer working with SPCs of the same cultural background as themselves. Independent group *t*-tests demonstrate that athletes in 2020 have significantly higher confidence in sport psychology ($t(141.74) = 2.911, p = 0.004$) and lack of personal openness ($t(137.56) = 4.855, p = 0.001$); and significantly lower in cultural preference ($t(118.03) = -2.942, p = 0.004$). There was no significant difference found in stigma tolerance scores ($t(128.74) = 1.043, p = 0.299$).

As part of our analysis, gender, previous exposure, age, and highest competition level were also examined; however, no significant differences were found and therefore respective tables have not been included here.

Table 1: Stigma Tolerance (ST), Confidence in Sport Psychology Consulting (C), (Lack of) Personal Openness (PO), and Cultural Preference (CP) amongst cohorts of New Zealand athletes in the current study and Anderson et al. (2004).

Scale	2020	2004	<i>d</i>
ST	2.13 (0.78)	2.00 (0.80)	0.16
C	5.61 (0.78)	5.23 (0.90)*	0.45
PO	4.42 (0.90)	3.70 (1.00)*	0.76
CP	3.43 (1.08)	3.92 (1.00)*	0.47

Notes: Values are mean (SD). * $p < 0.010$

As seen in Table 2, the findings suggest that non-contact sport athletes held significantly higher confidence levels than contact sport athletes. Looking at Table 3, individual sport athletes have

significantly higher confidence in sport psychology and cultural preference compared to team sport athletes. Table 4 shows that there is a significant difference between athletes' confidence in sport psychology at different competitive levels; national level athletes also had significantly higher cultural preference compared to junior athletes.

Table 2: Contact vs non-contact.

Scale	Contact	Non-contact	χ^2	<i>df</i>	<i>p</i>	<i>d</i>
ST	2.16 (1.10)	2.09 (1.33)	44.0	40	0.307	0.06
C	5.49 (1.24)	5.80 (1.09)	63.6	42	0.017*	0.27
PO	4.55 (1.52)	4.38 (1.72)	37.8	38	0.479	0.10
CP	3.46 (1.74)	3.41 (1.80)	36.8	34	0.342	0.03

Notes: * $p < 0.050$.

Table 3: Team vs individual.

Scale	Team	Individual	χ^2	<i>df</i>	<i>p</i>	<i>d</i>
ST	2.56 (1.29)	1.82 (1.05)	36.5	40	0.627	0.63
C	5.64 (1.16)	5.87 (1.11)	64.9	42	0.013*	0.20
PO	4.44 (1.65)	4.49 (1.68)	39.8	38	0.389	0.03
CP	3.40 (1.74)	3.56 (1.90)	49	34	0.047*	0.09

Notes: * $p < 0.050$.

Table 4: Current level.

Scale	Top intl	Intl	Nat'l	Jr	χ^2	<i>df</i>	<i>p</i>
ST	1.00 (0.00)	2.07 (1.39)	2.02 (1.15)	2.61 (1.14)	93.0	80	0.152
C	6.62 (0.74)	5.68 (1.22)	5.51 (1.28)	5.66 (0.89)	119.2	84	0.007*
PO	4.33 (2.34)	3.35 (1.72)	4.19 (1.64)	5.04 (1.29)	65.3	76	0.803
CP	3.25 (2.63)	3.79 (1.77)	2.96 (1.63)*	4.09 (1.59)*	109.2	68	0.001*

Notes: Top intl, Top international; Intl, International; Nat'l, National; Jr, Junior. * $p < 0.050$.

4. Discussion

The results from this study show that New Zealand athletes' attitudes towards sport psychology consultation have become more favourable overall since 2004 (Table 1). Athletes have higher confidence in sport psychology and less cultural preference when working with a SPC. However, somewhat surprisingly, it is also important to note that over the last 16 years, athletes' level of openness to sport psychology consultation has declined, and there was no significant change in perceived stigma from working with a sport psychologist.

Athlete confidence in sport psychology has likely improved since 2004 due to the increasing knowledge and research that has

been conducted regarding sport psychology in recent years (Kornspan & Quartiroli, 2019). Such research has provided new information, techniques, skills, and an increased awareness of the benefits of integrating sport psychology principles, including potential contributions towards athletes, coaches, and teams. It appears that this knowledge has filtered down from researchers and academics to SPCs and, finally, to coaches and athletes, which has improved confidence and overall integration. As a case in point, in recent years, HPSNZ has integrated education modules on sport psychology into various coach education programmes. It is highly likely that such work has been improving awareness and attitudes and, as such, may be having a positive impact on normative and control beliefs which have been highlighted (e.g., Zakrajsek et al., 2023) as being important with regards to shaping overall attitudes and behaviours. Confidence in the field is considered as a key predictor of intention to utilise sport psychology services (Zakrajsek & Zizzi, 2007). Moreover, Anderson et al. (2004) found confidence to be the only of the four factors to significantly predict intention to engage with a SPC. Therefore, this improved confidence in sport psychology is an important development as it may lead to more athletes seeking proactive and/or remedial psychological support.

It would be expected this improved emphasis and integration would also improve athletes' openness to sport psychology consultation. Furthermore, we have seen a major shift recently in the nature of the discourse around psychology and mental health, both in general populations as well as sport settings (Souter et al., 2018). Additionally, many sport organisations have improved access to both support and education. However, this does not seem to have yielded a significant shift in overall attitudes in New Zealand. In fact, athlete openness towards sport psychology consultation has decreased since 2004. It is important to acknowledge however that this finding could potentially be due to the high percentage (21%) of world class athletes in the study conducted by Anderson et al. compared to 1.6% in this current study. World class athletes typically have greater access and exposure to sport psychology support, often resulting to greater openness to consultation (Marin & Boone 1996). This higher proportion of world class athletes in the study conducted by Anderson et al. (2004) may have led to higher levels of personal openness due to greater exposure to sport psychology, compared to the current study where no significant correlation was found between previous exposure and attitudes.

The competitive level of athletes significantly impacted both their confidence and cultural preference. No significant difference in confidence was found between specific competitive levels; however, an overall significant effect was found. Again, this is likely due to the small sample size for top international-level athletes in this study. Although there was no significant difference in confidence between competitive levels, a trend can be seen with greater competitive levels having higher levels of confidence. Martin and Boone (1996) attributed a similar finding in their study to higher level athletes having more exposure to sport psychology, and therefore greater appreciation and understanding of the importance of psychology. However, Anderson et al. (2004) examined competition level and attitudes towards sport psychology and found no significant differences.

The recorded decrease in cultural preference is likely found due to the increase in multiculturalism within New Zealand. As a country, New Zealand has a reputation as a modern and culturally

diverse country (Smits, 2011). Over the last two decades, multiculturalism and ethnic diversity within New Zealand has been increasing and is seen as one of the nation's strengths (Simon-Kumar, 2020). Such growth may encourage New Zealanders to have more interactions and contact with individuals from other cultures, ethnicities, and backgrounds. Intercultural contact has been found to lead to higher levels of intercultural competence, which means individuals will have an improved ability and openness to communicate, function, and work effectively with people from other cultures (Schwarzenthal et al., 2020). Moreover, the importance of practitioners considering cultural elements and tailoring their delivery and interventions accordingly has been highlighted (e.g., Hodge et al., 2011) and may be having a positive impact on how the field is perceived. Therefore, athletes in 2020 would likely have lower levels of cultural preference compared to athletes of 2004.

Furthermore, this study also found non-contact sport athletes to have significantly higher confidence in sport psychology consultation compared to contact sport athletes. Similar results were found from Martin et al. (2004) and Martin (2005). It is believed that such attitudes are due to many contact sports (e.g., rugby, boxing) involving, and encouraging, aspects such as intimidation, toughness, and power, all of which are values commonly associated with masculinity and still prevalent in many communities (Martin, 2005), including sport. Ultimately, it has been shown that environments that nurture such ways of thinking can reduce the likelihood of athletes holding positive attitudes towards sport psychology consultation and also nurture a perceived stigma surrounding help-seeking in general (Steinfeldt et al., 2009).

Differences were also found between athletes that compete in team sports and individual sports. The results indicated that individual sport athletes had higher confidence in sport psychology, which has been found in previous work (e.g., Rooney et al., 2021). In their study, Rooney et al. attributed this difference to individual sport athletes having to rely exclusively on themselves and, therefore, engaging in greater psychological development in order to optimise performances and, as a result of such work, perceiving mental training as being beneficial (Rooney et al., 2021).

Interestingly, although team sport athletes reported lower levels of confidence in the field, findings suggested that these participants have lower levels of cultural preference (Table 3). Team sports are social practises where athletes are required to develop relationships and work with individuals of different ethnicities and cultures for the success of the overall team (Elling & Knoppers, 2005). As alluded to earlier, this would likely cause team sport athletes to develop higher levels of intercultural competence which may influence cultural preference (Schwarzenthal et al., 2020). National level athletes were found to have significantly lower cultural preference compared to junior athletes. According to Martin and Boone (1996), a lower cultural preference for national athletes would be expected because they found that attitudes towards sport psychology improved as competitive level gets higher. However, this also means that cultural preference should continue decreasing to international and top international level athletes, which was not found. This may have been due to this study having too few international and top international athletes to find an effect. It is important for

practitioners of sport psychology and mental skills to take these variables into account when working with athletes.

Although this study did have some significant and worthwhile findings, it is important to acknowledge some limitations. The most significant being the small sample size which can lead to false positives, as well as findings that are not representative of the targeted population. The current study also used a convenience sample and, therefore, may not accurately reflect these sports and athletes. It is also important to note that this study also had a much higher percentage of younger athletes taking part with 77% of participants being aged 23 or under. Because age has the potential to affect athletes' attitudes towards sport psychology (Martin, 2005), the findings from this study may not be generalisable to athletes over this age-group. Furthermore, the majority (81%) of athletes in this study were involved in team sports. Similarly to age, previous research (e.g., Rooney et al., 2021; Wrisberg et al., 2009) has shown that team and individual sport athletes overall have different attitudes surrounding sport psychology. Therefore, results from this study may be most appropriate to team sport environments.

In summary, this study re-examined and extended research on New Zealand athletes' attitudes towards sport psychology from 16 years earlier by Anderson et al. (2004). It was found that New Zealand athletes still hold positive attitudes towards sport psychology overall and these attitudes have improved since 2004. New Zealand athletes were found to have low levels of stigma associated with seeking sport psychology consultation, high levels of confidence in the efficacy of sport psychology, moderate levels of personal openness and low to moderate levels of cultural preference. Both confidence in sport psychology and cultural preference have improved overall since 2004. However, although we have seen improvements, it seems as though personal openness has declined, and, as such, did not fit with the overall trend. This decrease in athletes' personal openness is potentially due to some of this study's limitations, such as the lack of international-level athletes and the relatively small sample size.

There is a limited amount of research with inconsistent findings regarding aspects that could affect an athlete's attitudes towards sport psychology. Further research is needed to establish a more complete picture of such elements. For instance, this could include utilising a truly elite sample, and considering all variables within the M2SP2-R (Zakrajsek et al., 2023). This would provide a more complete understanding of current trends in attitudes, to inform programme development and ensure that our athletes are being provided with sport psychology services that they trust, as well as operating within environments where they feel safe to engage with such support.

Conflict of Interest

The authors declare no conflict of interests.

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Perception of body image, use of dietary supplements, and doping among male gym trainers in Sri Lanka

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ABSTRACT

People who train in public gymnasiums are motivated to improve aesthetic appearance, performance, and health, which may sometimes include the use of dietary supplements or banned substances. Accordingly, gym trainers are ideally placed to provide information, but the relationship between dietary supplementation and doping use and attitudes towards body image in Sri Lankan gym trainers is still being determined. 150 National Vocational Qualification certified male gym trainers across all of Sri Lanka were recruited into the study. Data were gathered to analyse supplement use, and the Male Body Attitude Scale (MBAS) and Performance Enhancing Attitude Scale (PEAS) tools were used to analyse body image and attitudes to doping, respectively. Gym trainers had positive attitudes toward body image and were satisfied with their muscularity (mean = 2.6, SD = 0.1) and body fat levels (mean = 2.5, SD = 0.1). All participants reported using at least one dietary supplement, caffeine-containing beverages (relative frequency 90%), protein powders (49%), herbal supplements (41%), individual vitamins (35%), individual minerals (34%) and energy drinks (25%). Half (54%) of gym trainers had a lenient positive attitude towards doping that was associated with body image. Supplement use and perception of muscularity ($r = 0.55$, $p < 0.001$) and body fat ($r = 0.23$, $p = 0.011$) were positively correlated. Significant regression associations existed between PEAS and muscularity, body fat, height, and supplement use. Gym trainers had a high frequency of supplement use, and a lenient attitude towards doping, which is associated with a positive perception of body composition. Confirmation of attitudinal transference to clients requires further research.

1. Introduction

Sufficient evidence supports the idea that people are motivated to exercise in gymnasiums for reasons including maintaining body image and composition, physical fitness, sports performance, metabolic and mental health (Lamarche et al., 2018). However, coaching is often sought, and gym trainers play a crucial role in assisting clients with their goals by prescribing schedules, training

programs, and nutritional guidance. Additionally, trainers provide support and training structures and recommendations for athletes.

With respect to health, fitness, and as a determinant of performance in some sports, body composition is used to describe the percentages of fat and fat-free mass, including bone and muscle in the body (Campa et al., 2021). This perception can be positive or negative and is influenced by personal and environmental factors, such as individual perception, feelings,

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and associated behaviours (Campa et al., 2021). The perception of body image has been found to significantly impact behavioral, cognitive, and affective outcomes, potentially influencing a person's quality of life (Pruzinsky et al., 2002). Body image concerns often fall between satisfaction and dissatisfaction with physical appearance (Thompson, 2004). Body dissatisfaction may lead to the implementation of harmful weight change plans, including unnecessary exercise, weight loss, and the use of supplements (McCabe & Ricciardelli, 2003).

Dietary supplements are defined as products (other than tobacco) intended to supplement the diet and contain one or more dietary ingredients. Examples of dietary supplements include vitamins, minerals, herbs, and amino acids, which can be consumed in various forms, such as tablets, capsules, powders, and drinks (Jawadi et al., 2017). The use of dietary supplements is prevalent among individuals who attend both commercial and non-commercial gyms (Morrison et al., 2004). People involved in physical or athletic activities tend to use dietary supplements more frequently than others to increase or maintain muscle mass, strength, power, exercise recovery, performance, and weight control (Attlee et al., 2017; Caudwell & Keatley, 2016; Khoury & Antoine-Jonville, 2012). However, some supplements may have side effects and can be harmful (Jenkinson & Harbert, 2008), while others may contain banned substances, leading to positive doping outcomes (Maughan et al., 2004, Morente-Sánchez & Zabala, 2013). A doping attitude means an individual's predisposition toward using performance-enhancing substances and methods (Baron et al., 2007), and if athletes use illegal substances to enhance performance, it is known as doping (Brand et al., 2014). In a study by Ruano and Teixeira (2020), the most preferred sources of information regarding supplements were registered dietitians, the internet, fitness coaches, friends, and pharmacists.

Previous research has mainly focused on investigating the prevalence of supplement use and the relationship between doping and body dissatisfaction among elite athletes, university students, and adolescents (Backhouse et al., 2013, Bloodworth et al., 2012, Hildebrandt et al., 2012). Therefore, this study aims to examine the perception of body image, dietary supplement use, and attitude towards doping among Nationally Qualified male gym trainers in Sri Lanka. We hypothesise that there will be a positive relationship between the negative perception of body image among gym trainers in Sri Lanka and supplement use, and we also aim to explore potential differences based on age.

2. Methods

During the sampling period (20/06/2020 to 10/07/2020), 300 registered National Vocational Qualification certified male gym trainers were at the National Apprentice and Industrial Training Authority, Sri Lanka. A systematic sampling technique was used to select and invite 150 gym trainers from this population. The protocol was approved by the Sabaragamuwa University of Sri Lanka ethics committee, and written informed consent was given by the participants.

A single-sample age-stratified study design was used to examine the perception of body image, use of dietary supplements, and attitude towards banned substances. Invitations to participate were sent via email, and a questionnaire and consent form were

also sent and collected via email. The survey questionnaires obtained personal information (age, height, weight), supplement usage, and questions related to the Male Body Attitude Scale (MBAS) (Tylka et al., 2005) and the Performance Enhancing Attitude Scale (PEAS) (Moran, et al., 2008). Higher MBAS scores reflect a more negative body attitude, and lower scores indicate a more positive body attitude. The MBAS provides measures of attitude toward muscularity, low body fat, and height and comprises of 29 questions, with the MBAS total score ranging from 29 to 174. Body dissatisfaction (MBAS) was measured using a questionnaire via a 6-point Likert scale: 1-never, 2-rarely, 3-sometimes, 4-often, 5-usually, and 6-always.

Attitude towards doping was measured using the PEAS, which is an instrument of unidimensional self-reports that measures general attitude towards doping. It is an extensively used questionnaire to assess doping attitudes among adult and adolescent athletes. It is widely used in doping literature (Nicholls et al., 2017) to explore the relationship between attitudes to doping and supplement use perfectionism, achievement goals and the motivational climate, willingness to dope, and social desirability. Some of these samples have included adults, teenagers, or a mix of older and younger adults (Nicholls et al., 2017). PEAS comprises 17 items measured on a 6-point Likert scale: 1-strongly agree, 2-agree, 3-slightly agree, 4-slightly disagree, 5-disagree, and 6-strongly disagree. The PEAS total score ranges from 17 to 102, and the PEAS theoretical middle and the neutral point is 59.5; a higher than neutral suggests a positive attitude towards doping (Hildebrandt et al., 2012) indicating more support for doping in sports.

All data gathered from the survey was entered into a spreadsheet prior to analysis (SPSS version 21.0, Chicago, IL, USA). One-way ANOVA tests were performed to test for significant differences in body image regarding age, with $p < 0.050$ taken as significant. A linear regression analysis (see Supplemental materials) was performed to estimate the impact of variables on doping attitude. Pearson correlations were performed on the relationship between dietary supplement use and body image parameters. The strength of the relationship of the correlation was interpreted using the following threshold: 0 to 0.1 as trivial; 0.1 to 0.3 as small; 0.3 to 0.5 as moderate; 0.5 to 0.7 as large; 0.7 to 0.9 very large; and greater than 0.9 as nearly perfect (Hopkins et al., 2009).

3. Results

All 150 invitees agreed to participate in the study. Participants' mean weight, height, and BMI were 73.6 kg ($SD = 9.6$), 171.7 cm ($SD = 5.6$), and 24.9 kg/m² ($SD = 2.5$), respectively. The number of participants (n) and frequency (%) within each age categorisation in years was: < 20 years ($n = 1$, 0.7%), 20 – 29 years ($n = 105$, 70%), 30 – 39 years ($n = 39$, 26%), and ≥ 40 years ($n = 5$, 3.3%).

3.1. Sources of information

Most of the gym trainers gained information from the Internet (75%; all significantly different from other sources, $p < 0.050$), followed by information from friends (22%), newspapers (2%), and doctors (1%).

3.2. Perception of body image

Figure 1 illustrates the mean sample response in the MBAS subscales (muscularity, body fat, height, overall body). The highest scores were recorded with height, reflecting more negative body-composition attitudes, and the lower scores in muscularity and body fat reflected more positive attitudes towards the body composition parameters. The overall mean score for MBAS across the group was 2.5.

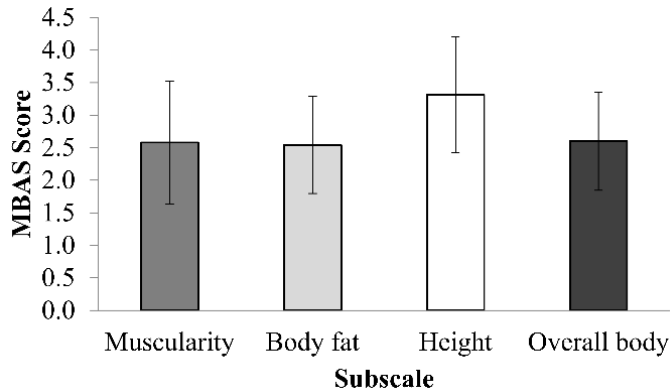


Figure 1: Male Body Attitude Scale (MBAS) scores. Data shows means and error bars represent standard deviations.

3.3. Supplement use

All participants reported using at least one dietary supplement, with the type and frequency of use shown in Table 1. Most trainers used caffeinated beverages (tea, coffee, herbal tea), at a ratio of use nearly two-fold greater than other supplements. The least used supplement was caffeinated candy/gum/medications.

Table 1: Type and frequency of supplement use in Sri Lankan male gym trainers.

Supplement	Frequency (n)	Sample (%)
Caffeinated-containing beverages (e.g., instant coffee, hot brewed tea)	136	90
Protein powder (e.g., whey, soy)	73	49
Plant extracts/herbal supplements (e.g., echinacea, ginseng)	62	41
Individual vitamins (e.g., vitamins A, C, D, E)	52	35
Individual minerals (e.g., calcium, iron)	51	34
Vitamin and mineral supplements	47	31
Protein or sports bars (e.g., Cliff Bar, Power Bar)	37	25
Energy beverage (e.g., energy drink)	38	25
Branched-chain amino acids	33	22
Caffeinated candy/gum/medications (e.g., Jolt Energy Gum)	22	15

3.4. Attitude toward doping

The mean sample total PEAS score was 64.4 (SD = 28.1), suggesting that gym trainers have a slight, somewhat positive attitude towards doping (neutral point 59.5; standardised difference relative to the neutral point 0.17). The percentage of gym trainers scoring higher than mid-value was 54%.

3.5. Relationship between body image and dietary supplement use

The correlation relationships between supplement use and MBAS categories and PEAS are shown in Table 2. Small correlations were observed between individual vitamins (correlation: negative), vitamins and minerals (negative), caffeine-containing beverages (positive), and branched-chain amino acids (negative) and PEAS. No significant correlations were observed with muscularity. Small correlations were observed between plant extracts/herbal supplements (negative) and muscularity; individual vitamins, plant extracts/herbal supplements and height (negative); and caffeinated beverages and body fat (positive). The correlations between supplement use and perception of muscularity and body fat were 0.55 and 0.23, respectively.

Table 2: Correlations between supplement use and MBAS and PEAS

Supplement	MBAS				PEAS
	Muscularity	Body fat	Height	Overall body	
Caffeinated-containing beverages	0.086	0.216**	0.049	0.057	0.219**
Protein powder	0.156	0.045	0.096	0.134	-0.101
Plant extracts/herbal supplements	-0.179*	-0.098	-0.188*	-0.148	-0.094
Individual vitamins	0.046	-0.075	-0.161*	-0.054	-0.279**
Individual minerals	0.022	-0.022	0.010	-0.028	0.096
Vitamin and mineral supplements	0.092	-0.116	0.007	0.004	-0.195*
Protein or sports bars	-0.012	-0.010	0.028	-0.017	0.010
Energy beverage	0.026	0.096	-0.011	0.062	-0.122
Branched-chain amino acids	0.092	-0.110	-0.053	-0.062	-0.211**
Caffeinated candy/gum/medications	0.036	-0.139	0.020	-0.057	-0.067

Note: *p < 0.050, **p < 0.001.

3.6. Age and the relationship between body image and attitudes to doping

Figure 2 displays the mean response in overall MBAS and PEAS scores relative to age, and Table 3 the age-contrast statistics. For MBAS, 20 – 29 years was significantly lower than 30 – 40 years, but no other significant contrasts existed. A regression analysis was performed to predict PEAS from age, overall body image, and supplement use. The outcome was: $PEAS = -0.05644 + 0.0236 \times (Age) + 0.492 \times (Overall\ Body\ image) - 0.270 \times (Supplement\ use)$. The R-squared value for the fitted model indicates that 63.2% of the variation in the PEAS can be explained by age, overall body, and supplement use, but overall body image was the greatest predictor.

Table 3: The effect of age on the PEAS and the MBAS

Age band (years)	Mean difference	95% CI [LL, UL]	p
PEAS			
20 – 29 vs 30 – 40	0.43	[-0.36, 1.22]	0.49
20 – 29 vs ≥ 40	-1.30	[-3.07, 0.48]	0.24
30 – 40 vs ≥ 40	-1.73	[-3.58, 0.12]	0.08
MBAS			
20 – 29 vs 30 – 40	-0.43	[-0.77, -0.09]	0.01
20 – 29 vs ≥ 40	-0.11	[-0.88, 0.66]	0.98
30 – 40 vs ≥ 40	0.31	[-0.49, 1.12]	0.74

Note: PEAS, Performance Enhancing Attitude Scale; MBAS, Male Body Activity Scale; LL, lower limit; UL, upper limit. Age band > 20 years was excluded due to low sample bias (n = 1).

4. Discussion

The current study examined the perception of body image, use of dietary supplements, and attitudes toward doping among nationally qualified male gym trainers in Sri Lanka. Our findings indicate that all gym trainers used supplements; however, this included tea, coffee, and herbal tea, which some may argue are not traditionally considered supplements. Additionally, the available evidence suggests that most gym trainers had above-normal BMI values.

Based on evidence regarding the average MBAS score, it seems fair to suggest that the gym trainers were overall satisfied with their bodies. However, gym trainers were dissatisfied with their height (most think they need to be taller) and were satisfied with muscularity and body fat. On logical grounds, there is no compelling reason to argue that these findings suggest the fact it may be that gym trainers are satisfied with the subscales which they have control via training (muscularity, body fat) and dissatisfied with the subscale with they cannot change (height). Similarly, in adolescent boys Yager and O’Dea (Yager & O’Dea, 2014) found in response to direct questions about body image and body dissatisfaction, 78% indicated that they were satisfied with their body muscularity, fat, and height, while 10% thought themselves too thin and 13% too fat. In contrast, for the question about body dissatisfaction, 35%, 30%, and 28% of the boys indicated that they would like to be their present weight, a little lighter, or a little heavier, respectively.

In the present study, all participants used at least one dietary supplement, with caffeine-containing drinks, then protein powders, the top-ranked items. Ruano and Teixeira (Ruano & Teixeira, 2020) reported that 44% of gym trainers used dietary supplements (Morente-Sánchez & Zabala, 2013). According to that study, the most consumed supplements were protein powders (80%), followed by multivitamins and/or minerals (38%), sports bars (37%), branched-chain amino acids (37%), and n-3 fatty acids (36%) (Ruano & Teixeira, 2020). Gym trainers in our study were found to be frequent consumers of supplements that may be associated with performance-enhancing motives, such as vitamins, minerals, branched-chain amino acids, and caffeine-containing drinks (Table 2).

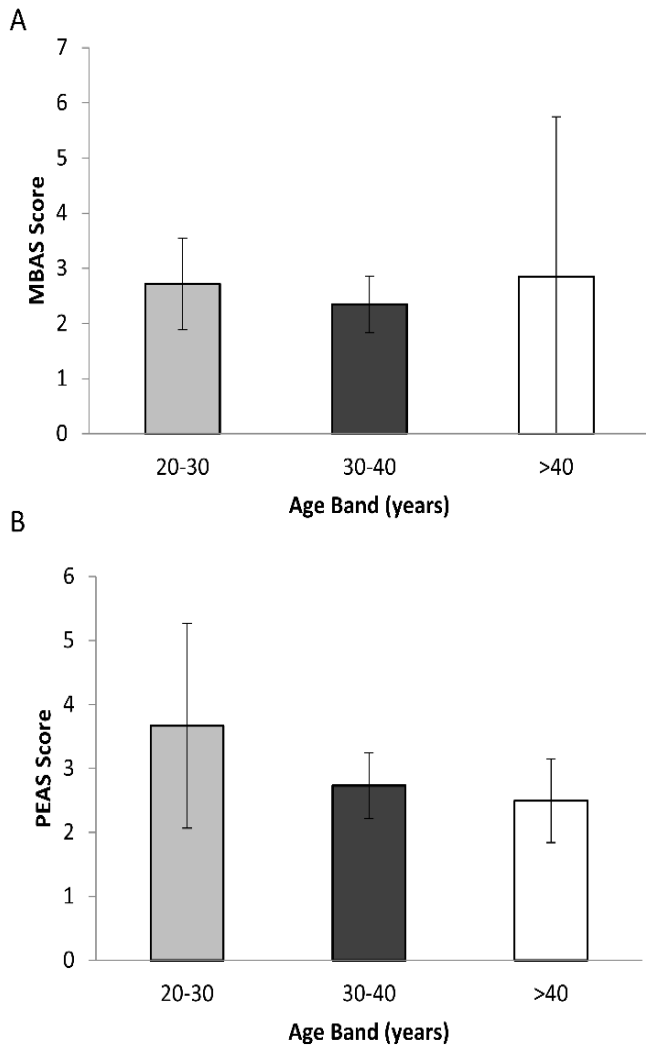


Figure 2: Group response to (A) Male Body Attitude Scale (MBAS) and (B) Performance Enhancing Attitude Scale (PEAS). Sample size in each age band: 20 – 29 years, n = 87; 30 – 40 years, n = 33; ≥ 40 years, n = 5. Age band > 20 years was excluded due to low sample bias (n = 1). Data shows means and error bars represent standard deviations.

Our study revealed that over half (54%) of Sri Lankan gym trainers had PEAS scores higher than the theoretical value, indicating a lenient attitude toward doping. This finding is consistent with the study by Yager and O'Dea (2014), which found a positive attitude toward doping among Australian adolescent boys. However, Sas-Nowosielski and Budzisz (2018) observed a negative attitude toward doping among Polish athletes. These contrasting results suggest that attitudes toward doping may vary across different populations.

Yager and O'Dea (2014) found a relationship between supplement use and subscales of MBAS, which implies a positive relationship between supplement use and muscularity, body fat, and height. In this study, only plant and herbal supplement use in gym trainers had a small association with the perception of muscularity, with only caffeine associated with body fat. Height is largely determined during childhood and adolescent growth phases, and while plant and herbal supplement and vitamin use had a small negative correlation with height in adult gym trainers, there is unlikely to be any biological relationship.

Yager and O'Dea (2014) also stated that body image and dissatisfaction levels vary according to age. They stated that total MBAS scores and dissatisfaction with muscularity increased with age. Males older than 16 years of age were significantly more likely to have higher scores on the muscularity subscale and the total MBAS indicating greater levels of body dissatisfaction. The current study shows that body image varied according to age only between 20 – 29 years and 30 – 40 years (Table 3). Similarly, we found no significant difference in mean PEAS scores by age, suggesting performance-enhancing attitudes to doping attitudes were generalisable.

In the current study, most gym trainers received information from the Internet (75%); only 1% received advice from doctors. It is well known that information from the internet is of variable quality. The study gathered no data on the quality of information, but future studies could explore the effect of information quality on attitudes. In contrast, Waddington et al. (2005) stated that 28% of English professional footballers took advice from the club's physiotherapist, 21% from a fitness trainer, 21% from another sports scientist (e.g., nutritionist), and the club's doctor was their last option (15%). The differences may reflect variations in participant cohorts or the availability of sports and sports medical professionals in Sri Lanka to provide advice.

This study shed light on the relationship between body image, use of dietary supplements, and attitudes toward doping in sports. Strengths of the study include a sizable sample and the use of standardised measures to assess body image and attitudes toward doping in sports. However, a limitation is that some of the words and concepts in the questionnaire may have needed to have been correctly understood by gym trainers, which could have led to erroneous reporting.

Conclusion

The findings suggest that gym trainers had a positive attitude toward body image and were satisfied with their muscularity and body fat levels but not with their height. The study revealed that all participants reported using at least one dietary supplement, with the most used supplements being caffeine-containing beverages, energy drinks, protein powders, herbal supplements,

individual vitamins, protein bars and individual minerals. A slight majority of gym trainers exhibited a lenient attitude toward doping, which was significantly associated with body image. Most gym trainers obtain information from the Internet.

Based on these findings, it is important to emphasize the need for reliable information for self-learning, considering the risks of side effects from various supplements and the potential influence of trainer attitudes on clients, leading to doping abuse in sports. Further research in this area may involve conducting similar studies with gym users to examine their perception of body image, supplement use, and attitude toward doping, as well as the sources and influences of information, including coaches and gym staff.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgment

We thank the participants for their contributions. The authors declare no conflicts of interest. Author contributions: MVCM, TSHP, and DSLP conceived and conducted the study, analysed data, and drafted the manuscript. AA and DSR contributed to data analysis, interpretation, manuscript writing, and supervision. All authors read and approved the final version of the manuscript.

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Supplemental materials

Supplementary Table 1: Regression statistics.

Regression statistic	Value
Multiple R	0.96
R Square	0.97
Adjusted R Square	0.97
Standard Error	0.13
Observations (n)	126

Supplementary Table 2: ANOVA statistics.

	df	Sum of squares	Mean squares	F	p
Regression	4	63.30	15.83	991.97	< 0.001
Residual	121	1.930	0.016		
Total	125	65.23			

Supplementary Table 3: Regression coefficients and equation.

	Coefficients	SE	<i>t</i>	<i>p</i>	95% CI [LL, UL]
Intercept	-0.03	0.05	-0.47	0.638	[-0.13, 0.08]
Muscularity	-0.04	0.02	-1.95	0.053	[-0.07, 0.00]
Body fat	0.18	0.02	7.26	< 0.001	[0.13, 0.22]
Height	0.07	0.01	5.47	< 0.001	[0.05, 0.10]
Supplement Use	0.79	0.03	26.81	< 0.001	[0.73, 0.85]

Note: PEAS = -0.0252 – 0.0350 × (Muscularity) + 0.1762 × (Body Fat) + 0.0722 × (Height) + 0.7890 × (Supplement use).

Career entry and early experiences of sport scientists in Australia

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ABSTRACT

Little is understood about the early career experiences of sport scientists in Australia. The aim of this manuscript was to investigate the reasons why people pursue a career in sport science, alongside their early career experiences, including those experiences that early career sport scientists found to be valuable for their current role. 116 Australian Sport Scientists completed an online survey aimed at understanding why they entered the profession, and their early career experiences including the number of paid and unpaid intern (or similar) roles (excluding work integrated learning) they had before their current (paid) position. Descriptive statistics revealed that participants pursued a sport science career to follow their passion for sport and because it aligned with their perceived abilities. Sport scientists who were employed reported a median of 3 paid and unpaid roles before obtaining their first paid role, while those who were not currently employed reported a median of 5 paid and unpaid roles to this point of their career. Internship positions and on the job training were considered the most helpful activities that assisted early in their career. The requirement of internships beyond work integrated learning gained through formal university study suggests there is a gap between knowledge and /or skills and what is required for employment, or the time required to refine their practices.

1. Introduction

The term ‘sport science’ is broad and can be used to describe a wide range of potential roles for people working in sport (e.g., sports physiologist, biomechanist, skill acquisition specialist, performance analyst, and strength and conditioning coach; French & Torres-Ronda, 2022). Some roles within the sport science industry are specialist, whereby the employee has a sole focus in one discipline area or generalist, whereby an employee may undertake roles across more than one discipline. Many roles within the industry are in high performance sport, and the opportunity to work in this field appeals to many young sports fans. At least 34 Australian universities offer studies within exercise and sport science, with many offering more than one course option (Exercise and Sports Science Australia, 2022a). Currently, little is known about why people decide to pursue a career in sport science.

Previous research has begun to explore the reasons why students enter an exercise and sport science degree and career. Spittle et al. (2021) investigated a sample of Australian undergraduate exercise and sport science students at one Australian university and asked them why they chose to study exercise and sport science. The strongest reason for pursuing a career in exercise and sport science was related to ‘sport association and continuation’, followed by ‘interpersonal reasons’, ‘means to an end’, and ‘subjective warrant and prestige’. York et al. (2014) interviewed six sport scientists and three indicated they initially had little understanding of the role. Given the breadth of career options available from exercise and sport science courses, these limited findings may not accurately reflect those of students and graduates who have specifically undertaken an exercise and sport science course to pursue a career in sport science (rather than using the course as a pathway to another vocational outcome). Understanding motivations for entering the sport science workforce could provide valuable information for universities and career educators to use in promotion and career guidance.

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Entry into any workforce can be challenging, especially when the number of graduates is greater than the demand. Anecdotally, entry into the sport science workforce, especially in the high-performance setting, is very challenging. Stevens et al. (2018) found that 41% of exercise and sport science graduates had to volunteer, in addition to their formal work integrated learning (WIL) placements before becoming paid in the exercise and sport science workforce. This ranged from short term (7 to 31 days, 5% of the workforce) to long term (> 12 months, 18% of the workforce). Currently there is no evidence of how sport science graduates enter the workforce, and what volume of volunteer or paid internship roles they undertake before potentially gaining full-time employment (either in a full-time capacity or multiple part-time equivalents). Understanding how graduates enter the workforce and the experiences gained in the process will assist University sport science course designers. It will also assist in providing career advice to future sport scientists and policy developers around acceptable WIL and internship practices.

The number of accredited sport scientists in Australia has risen from 5 in 2008 (0.25% of the membership base of Exercise and Sports Science Australia [ESSA], the accrediting body within Australia) to 398 plus 84 high performance managers in 2021 (5.8%; Exercise and Sports Science Australia, 2021). This is in part due to the increased professionalism in women's sport (Bowes & Culvin, 2021; McLachlan, 2019). Two separate, survey-based, studies have reported on the sport science workforce in Australia—one was conducted in 2013, producing a report (Dawson et al., 2013) and a publication (Dwyer et al., 2019), and another was conducted in 2019, producing a publication (Bruce et al., 2022). These enable comparisons of the demographic profiles of participants across the two occasions. Notable profile differences include: a greater proportion of females working in the industry in 2019 compared to 2013 (2013 = 24%; 2019 = 33%); a greater proportion of participants reported working in two or more positions in 2019 compared to 2013 (2013 = 23%; 2019 = 44%); and a greater proportion of participants had been in the sport science industry for more than five years in 2019 compared to 2013 (2013 = 37%; 2019 = 62%; Bruce et al., 2022; Dawson et al., 2013). Furthermore, a higher proportion of participants had completed a higher level of education (Masters/PhD) in 2019 (68%) than in 2013 (57%). These figures help understand the evolving Australian sport science industry and how it may be changing.

As the sport science workforce continues to grow and evolve, it is important to understand what factors sport scientists believe assisted them in gaining employment. Stevens et al. (2021) asked sport science practitioners what their main tasks were, with participants required to select three tasks from a list of 14, with the option to nominate other specific tasks. Four tasks received greater than a third of preferences: assessment of fitness/performance (56%), training monitoring (53%), designing, implementing, and modifying training programs (42%), and research (42%). This provides some understanding of the tasks a sport scientist may be required to complete but does not provide any information about whether sport scientists feel well-prepared to perform this work.

The aim of the present study was to investigate why people enter the sport science workforce. In addition, we aimed to understand the factors that recent graduates found valuable as they transitioned into the workforce. The final aim was to understand the amount of paid and unpaid work an individual typically completes before entering the sport science workforce.

2. Methods

2.1. Participants

Full details of the methods used in the study including the target population, sample and recruitment strategies, instrument development, and analytic methods have been reported previously (Bruce et al., 2022); consequently, this information is briefly summarised in the following subsections.

A total of 116 participants completed the survey. Participants were recruited from the population of sport scientists in Australia. A purposeful recruitment strategy was used to recruit participants whereby information about the survey was distributed to members of relevant state and national sporting bodies via membership and mailing lists, as well as circulated through social media and personal networks. Inclusion criteria for study eligibility included being engaged in the field of sport science (i.e., working or volunteering in sport science practice) in Australia during the survey period and aged over 18 years.

2.2. Survey instrument

The survey instrument was developed by the research team and was based on an initial set of questions from a previous survey of the sport science workforce (Dawson et al., 2013; Dwyer et al., 2019). It included questions separated into nine sections, with this paper reporting on demographic information and results from the section focusing on 'Careers in sport science'. The demographic section included items for capturing participant information (e.g., age, gender, location, education) including current employment (e.g., number of jobs, status, sector, length). The 'Careers in sports science' section included 9 questions. Participants reported on the importance of 10 factors (e.g., 'sports science allowed me to work with athletes', 'sports science was a career that suited my abilities') for their decision to pursue a career in sport science using a 6-point rating scale (1 = not important, 5 = very important, 6 = unsure). They also reported on whether they were currently in a paid sport science role (not an intern or honorarium; yes, no) and the position title that best described their first paid role (not intern or honorarium) in the sport science industry from a list of titles (e.g., 'academic sport science', 'high performance manager', 'performance analyst'). Those who were currently employed, reported on the number of unpaid and number of paid volunteer or intern roles they had before obtaining their first paid role (0, 1, 2, 3, 4, 5 or more), and those who were not currently employed, reported on the number of unpaid and number of paid volunteer or intern roles they had up to this point in their career (0, 1, 2, 3, 4, 5 or more). In addition, participants also reported on whether they had been working in the sport science industry for five years or less (yes, no); and for those reporting involvement for five years or less, their level of agreement for 20 factors (e.g., 'on the job training', 'internship/traineeship', 'professional networks') that were helpful for their early work in the industry (1 = strongly disagree, 5 = strongly agree).

2.3. Procedure

Ethical approval for this study was obtained from the Deakin University Human Research Ethics Committee and all participants provided informed consent prior to completing the questionnaire. Survey data were collected using the REDCap (Research Electronic

Data Capture) software (Harris et al., 2019). Data was captured over a 7-week period between October and December 2019 and survey completion took approximately 20 minutes.

2.4. Statistical analysis

Categorical demographic and career variables were summarised as proportions. Continuous variables were assessed for normality using published thresholds (Field, 2013; Lumley et al., 2002) and summarised as the mean (and standard deviation). For this, ‘unsure’ responses for the decision to pursue sport science career items were set as ‘missing’ and excluded from analysis. Ordered categorical variables were summarised as the median (and interquartile range [IQR]). All analyses were performed using Stata 16SE (StataCorp).

3. Results

Sample characteristics have been reported previously (Bruce et al., 2022). In brief, 116 participants were analysed (38 female, 78 male; < 25 years, *n* = 20; 26–35 years, *n* = 47; 36–45 years, *n* = 29; > 45 years, *n* = 21). Most participants were based in Victoria, New South Wales, and Queensland (total 81.2%); male (67.2%); aged 35 years or younger (57.8%); and hold a Master’s or PhD as their highest completed education (67.5%), mostly within the field of sport science (94%). Experience in the sport science workforce varied with the highest proportion of participants having less than 5 years’ experience (37.6%). This was followed by experienced practitioners with greater than 15 years’ experience (29.9%), practitioners with 6–9 years’ experience (20.5%), and practitioners with 10–15 years’ experience (12%).

The importance of various factors for choosing to pursue a career in sport science are summarised in Table 1. Five factors (‘I was passionate about sport science’; ‘Sport science was a career that suited my abilities’; ‘I believed I would be a good sport scientist’; ‘Sport science allowed me to work with athletes’; ‘Sport science allowed me to work with coaches’) were rated moderately to very important (≥ 3.0) while the other factors were rated slightly to not important.

Table 1: Importance of factors for pursuing a career in sport science.

Factor	Mean (SD)
I was passionate about sports science	4.7 (0.6)
Sports science was a career that suited my abilities	4.2 (1.0)
I believed I would be a good sports scientist	3.9 (1.1)
Sports science allowed me to work with athletes	3.9 (1.2)
Sports science allowed me to work with coaches	3.4 (1.4)
Sports science provided me with opportunities to work overseas	2.6 (1.4)
As an athlete it was important for me to be good at sports science	2.4 (1.4)
I wanted to work in a sub-elite sport environment	2.2 (1.3)
Sports science provided opportunity for a high income	2.0 (1.2)
Sports science provided me with job security	1.9 (1.3)

Note: Number of responses varies across different factors; Rating scale: 1 = not important, 5 = very important.

A total of 82 participants reported being in a paid sport science role; 14 were not currently in a paid sport science role and data was missing for 21 participants. Those currently employed reported a median of 2.0 (IQR = 2.0) unpaid volunteer/intern and 1.0 (IQR = 2.0) paid volunteer/intern roles before obtaining their first paid sport science role. Whilst those not currently employed reported a median of 4.0 (IQR = 2.0) unpaid volunteer/intern and 1.0 (IQR = 2.0) paid volunteer/intern roles at this point of their career (i.e., time of completing the survey). Those currently employed in a sport science role, nominated a range of position titles as best representing their first paid position (see Table 2). The most frequently nominated titles were ‘strength and conditioning coach’, ‘academic sport scientist’, and (generalist) ‘sports scientist’. Other common titles included ‘sports physiologist’, ‘performance analyst’, and ‘high performance manager’, while titles reflecting more specialised roles (e.g., ‘sports biochemist’, ‘sports biomechanist’, ‘sports dietitian’) were less frequently nominated. Almost two thirds (63%) of participants reported being in the same role currently as their first position.

Table 2: Position titles for first paid role in sport science.

Position title	<i>n</i> (%)
Strength and conditioning coach	18 (22.0)
Academic sports science	15 (18.3)
Sports scientist	14 (17.1)
Sports physiologist	9 (11.0)
Performance analyst	7 (8.5)
High performance manager	5 (6.1)
Physiotherapist	4 (4.9)
Skill acquisition specialist	3 (3.7)
Sports biomechanist	2 (2.4)
Other	2 (2.4)
Sport psychologist	1 (1.2)
Sports biochemist	1 (1.2)
Sports dietitian	1 (1.2)

Participants who had been involved in the sport science industry as a sport science professional for five years or less (*n* = 44, 37.6%) reported on factors that were most helpful to them in their early work in the industry. There was agreement (≥ 4.0) about helpfulness for a total of 12 separate factors with strongest agreement for two of these factors being ‘on the job training’ and ‘internship/traineeship’ (see Figure 1).

4. Discussion

This work sought to understand why people enter the sport science workforce, the factors that recent graduates find valuable as they transition into the workforce and the level of unpaid and paid (i.e., honorarium) work an individual needs to invest in prior to gaining paid employment. Participants pursued a career in sport science as they were passionate about the area, and it aligned with their perception of their abilities. People who were currently in a paid position reported having two unpaid and one paid position prior

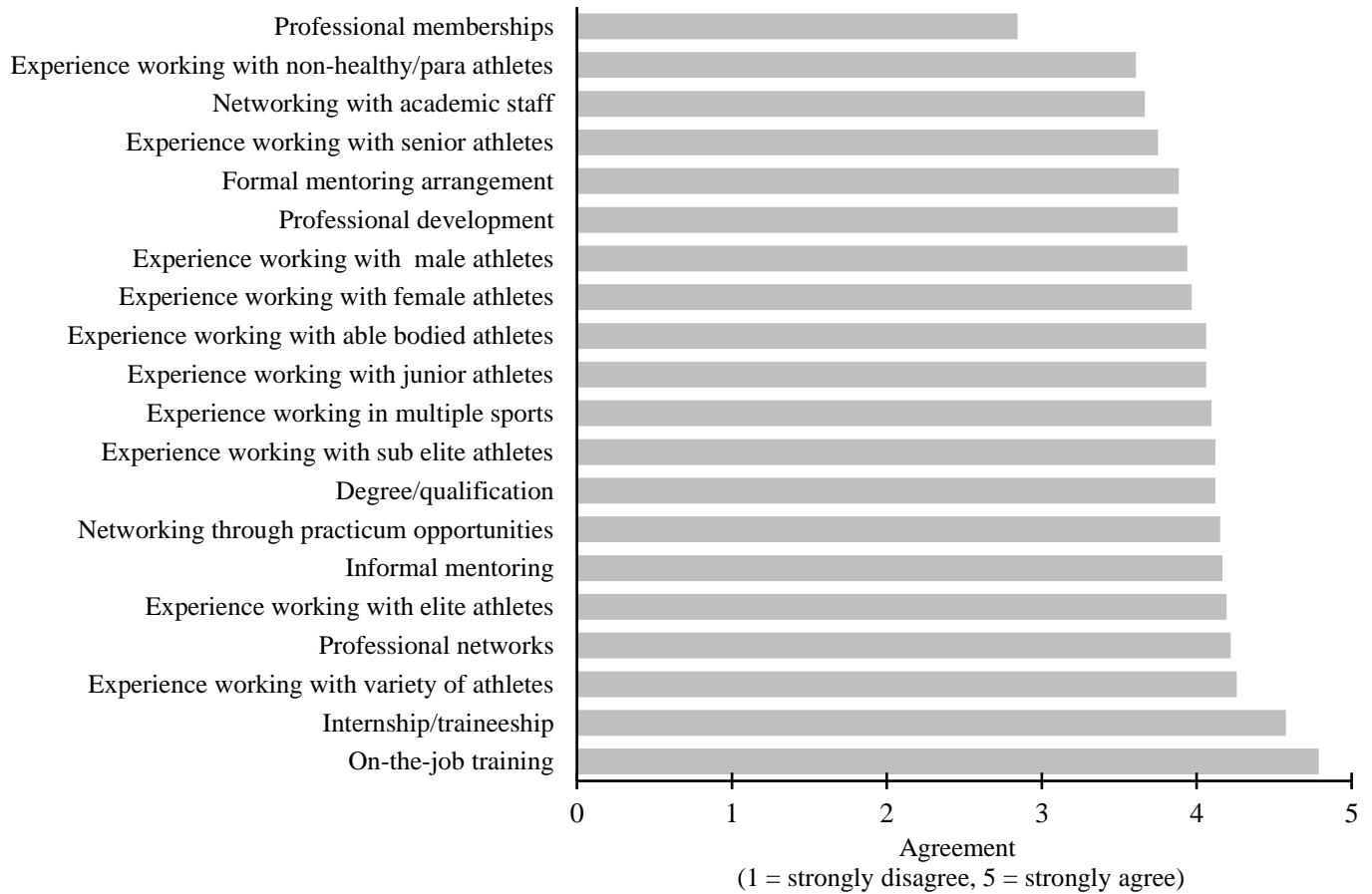


Figure 1: Importance of factors for early work in the sport science industry.

to their full-time employment, whilst those who were not in full-time work reported having four unpaid positions and one paid position to date. Several factors were highly rated for assisting sport scientists in their current role with on-the-job training and internship/traineeship the most highly rated of these.

Participants pursued a career in sport science as they were passionate about the area, thought it suited their abilities and would allow them to work with athletes. These findings are consistent with previous work showing that people enter sport careers due to a love of sport and wanting to be involved in sport as a career (Mensch & Mitchell, 2008; Spittle et al., 2021; Vaartstra et al., 2017). Previously and concerning (for sport scientists), in a study by Stevens et al. (2021) coaches ranked sport scientists (defined as specialists in the application of scientific principles and techniques to assist coaches and athletes improve their performance at an individual level or within the context of a team environment) as the lowest of eight practitioners (the other seven practitioners specified in the Steven’s et al. study were coach, physiotherapist, sports psychologist, high performance manager, strength and conditioning, sports doctor, dietician) around providing value for the athlete. This is despite agreement that sport scientists play a necessary role in sport and that they are effective in improving an athlete’s performance. This suggests that there may be a misalignment between expectations of sport scientists entering the workforce and the reality of the job

alongside the expectation of colleagues (e.g., coaches, physiotherapists; York, 2014). These findings indicate a need for industry to provide greater awareness of the roles and expectation required as a sport scientist.

Sport science, particularly at the high-performance level, has been considered a tough field to break into, with anecdotal stories of students quitting or changing career aspirations before gaining paid employment. Our findings revealed that those who were not currently working in a paid industry role had a higher number of paid and/or unpaid volunteer or intern roles compared to their peers who were working in industry. Participants who were not currently working in industry were mostly 1–3 years into their career (71%) with one 6–7 years into their career and another greater than 15 years. This indicates that due to unknown factors a considerable proportion may have struggled to break into the paid sport science role or are taking extra time to find their preferred role. Further research is required to understand these reasons.

Within exercise and sport science, 41% of graduates had to volunteer before being hired and paid in the workforce (Stevens et al., 2021). Our findings show even higher levels of volunteer work prior to obtaining a first paid role in sport science with 89% of participants reporting having at least one unpaid position and 65% at least one paid volunteer or intern role. It appears that for sport scientists, there remains an expectation by employers to

obtain additional experience before gaining a paid role. This highlights the potentially challenging nature of sport science and suggests it may be harder to specialise in than other exercise science career options (e.g., accredited exercise physiologist, exercise scientist, physiotherapy) given the larger percentage of graduates who have undertaken unpaid work before gaining employment compared to the Stevens et al. (2021) findings.

The necessity to complete intern or volunteer roles was however identified as one of the most important factors for early work in the industry alongside ‘on the job training’. Students graduating from ESSA accredited courses are required to undertake WIL which is designed to provide students with an opportunity “to develop and demonstrate competence in integrating and applying their professional knowledge and skills in a real-world setting” (Exercise and Sports Science Australia, 2022b, p.3). It seems that recent graduates entering the sport science workforce need more experience than is provided during their WIL as evidenced by the internships completed post-graduation. Students completing an exercise and sport science undergraduate degree are not required to complete WIL within sport science (rather Exercise Science), so this may indicate that they are then seeking additional sport science experiences to gain the required skills and knowledge for the sport science industry. Further research is required to understand what is contributing to the current situation; for example, but not limited to, is WIL providing the necessary opportunities for students to experience sport science? What is the responsibility of professional colleagues in industry alongside ESSA to work towards a solution? And, what are the ethical considerations of graduates completing multiple unpaid internships? among other questions to be considered.

Internships are often longer than WIL experiences (advertised as 10–12-month opportunities) and as a result interns may feel more ‘a part’ of the organisation than when completing WIL, thus providing a more authentic experience. Whilst this may be of benefit to a graduate student, it is likely only those with underlying financial security can take on these internships or multiple unpaid roles and absorb the loss of salary, creating inequity within the field. Further research should examine what it is about on the job training and internships that recent graduates find valuable, with the intent to embed this, where possible, into university degrees. Understanding the needs of both the university sector and industry will be challenging, alongside considering the ethical implications of additional WIL or internships, especially those which are unpaid.

Job security and a high income were not considered to be the most important factors for pursuing a sport science career. These commonly cited characteristics of sport science may act as barriers to attracting people into the industry. Low job security has been observed as a potential issue by Stevens et al. (2021) who found that sport scientists in sporting clubs are likely to be in their position for less than five years. Alongside job security, ‘(lack of) demand’ has been identified as a low scoring reason for pursuing a career in sport science (Spittle et al., 2021), thus are areas for concern of potential sport scientists. Previously, sport scientists within sports teams ‘somewhat disagreed’ with the statement that ‘sport scientists generally receive fair working conditions’ (Stevens et al., 2021). There is an opportunity for an increase in education and awareness of the issues faced by sport scientists and how to be valued in the workforce.

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This body of work focused on understanding sport scientist’s perceptions of their early career trajectory and the factors contributing to success in their initial working career. The sample did not reach all sport scientists employed in Australia and may represent the views of only a sample of sport scientists. Sampling may have been biased towards those working in sport science and may not have captured those who are still seeking roles within the industry or who have already existed the field due to reasons that may include lack of opportunities, limited career pathways or low levels of satisfaction. Future research may look to understand the career paths of those who pursue a different career due to the lack of opportunities within high performance (elite) sport.

Overall, findings of this study supported previous research showing that people pursue a career in sport science in line with their passion and to align with their perceived abilities. They also revealed that sport scientists are required to gain more experience (e.g., internship) than may be presented to them by WIL opportunities. This may be due to undergraduate degrees requiring WIL within the realm of Exercise Science, and WIL for sport science only being required if they complete a postgraduate degree. Further research is required to understand the benefits and practicalities of longer internships alongside the potential issue of inequity. This is particularly important as these experiences are perceived as valuable once employed in industry as ‘on the job training’ and ‘internship/traineeships’ were the highest rated experiences for assisting them in their current role.

Conflict of Interest

The authors declare no conflict of interests.

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