

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

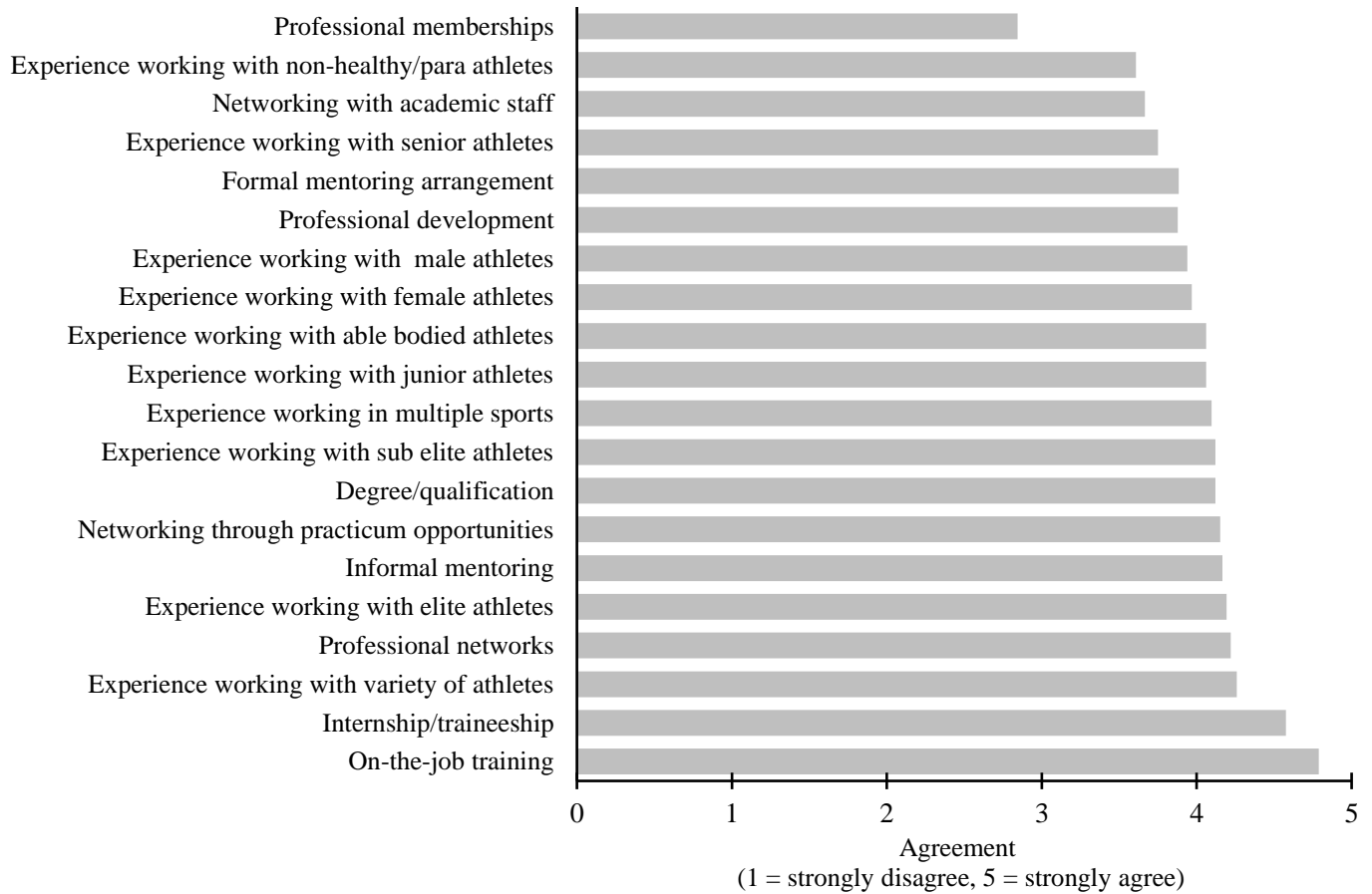


Figure 1: Importance of factors for early work in the sport science industry.

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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