

Lifestyles and mindsets of Olympic, Paralympic and world champions: is an integrated approach the key to elite performance?

Lauren Burns,¹ Juanita Ruth Weissensteiner,² Marc Cohen¹

¹School of Health and Biomedical Sciences, RMIT University, Bundoora, Victoria, Australia

²Sport Development, New South Wales Office of Sport, Sydney, New South Wales, Australia

Correspondence to

Ms Lauren Burns, School of Health and Biomedical Sciences, RMIT University, Bundoora, VIC 3083, Australia; laurenburns8@icloud.com

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ABSTRACT

Objectives The holy grail of any nation in the global sporting race is to better understand, replicate and sustain podium winning performances on the world stage. International sporting bodies advocate a holistic approach to the athletic profile and environmental and system-level factors required for world-class sporting performance, yet key lifestyle, relational, training and performance practices are commonly overlooked. We aimed to explore the contribution, interplay, and impact of lifestyle and psychological factors among a sample of world-class, champion athletes.

Methods Open-ended, semistructured face-to-face interviews were conducted with 10 World, Olympic and Paralympic Champion athletes that covered their sporting development and athletic profile including their mindset, training and competition practices, along with lifestyle and other key factors to which they attributed their success. A thematic approach guided by grounded theory principles, was employed to source and analyse their perspectives and experiences and determine common themes.

Results Four dominant and overlapping themes emerged: psychological attributes, interpersonal relationships, performance strategies and lifestyle practices. All athletes attributed their success to psychological rather than physical factors, and the vast majority relied on mental rehearsal skills and recovery practices.

Conclusion The athletic profile and support required to reach and sustain podium-level performance is multidimensional, integrated and individualised and psychological factors are paramount. Championship performance is likely to occur at the intersection of psychological prowess, interpersonal support, effective performance strategies and lifestyle. An integrated approach inclusive of these dimensions can be used to guide athlete development and support at both an individual level and a collective level.

INTRODUCTION

Being a world-class athlete is more than the outcome of an event; it is a way of life that encompasses all aspects of the athlete's lifestyle and becomes an integral part of their identity.¹ Athletes progressing from pre-elite to elite levels need to balance multiple factors including: the demands of competition, stressors and negative chance events; interactions with family, peers, coaching and support staff; and the need to effectively 'negotiate several key life transitions'.²⁻⁷ Lifestyle practices and daily routines such as sleep, relaxation, diet,

What are the findings?

- ▶ Champion athletes attribute their psychological attributes as the major factor contributing to their success.
- ▶ Championship performance requires a particular way of life that integrates mindset, performance, lifestyle and relationship factors.
- ▶ High-performance strategies include the use of honed mental rehearsal skills and recovery practices.
- ▶ Championship performance is likely to occur at the intersection of a strong psychological profile, interpersonal support, effective performance strategies and lifestyle. The utilisation of these attributes, when needed, are dependent on the ability of the athlete to shift focus within these domains by way of a tilt which can lean in many directions. This skill is adaptive through self-regulation and becomes habitual with accumulated experience and exposure.

How might it impact on clinical practice in the future?

- ▶ Specific guidelines for athlete education to ensure these performance and lifestyle strategies are used effectively, particularly at the pre-elite and elite levels.
- ▶ Facilitating greater education for coaches and support staff in the area of interpersonal skills and rapport with athletes.
- ▶ Athlete frameworks honing strategies to strengthen and facilitate interpersonal relationships within the athlete's support network.
- ▶ Inclusion of lifestyle factors within athlete development frameworks to guide system-level implementation.

hydration, water-immersion therapy, entertainment and social networks are therefore critical to achieving and maintaining elite performance. The quest to 'unlock the secrets' of world-class performance involves understanding the attributes, skills, strategies, support, environment and lifestyles of elite performers.⁴

International governing sports agencies such as the International Olympic Committee suggest that support for an athlete must be holistic, integrated



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and evidence-based.⁸ While current and predominant athlete development frameworks, notably the Foundation, Talent, Elite and Mastery athlete development framework and the complementing Three Dimensional Athlete Development Model (3D-AD),^{4, 7} Long Term Athlete Development framework,⁹ Developmental Model of Sport Participation,¹⁰ Differentiated Model of Giftedness and Talent,¹¹ and Psychological Characteristics of Developing Excellence^{12, 13} models seek to describe the development and maintenance of elite performance in terms of the required athlete profile, and environmental and system-level factors,^{2, 7, 14, 15} none to date consider the contribution and impact of lifestyle factors.^{2, 7, 14, 15} Even the more recent 'Great British Medalists project',¹⁶ 'My Sporting Journey' project,¹⁷ and studies performed by Fletcher and Sarker (2012) which tap into and use the athlete's voice, provide great insights regarding key factors contributing to success, but do not consider the impact of nutrition, hydration, sleep, recovery, and the recreational practices of elite athletes. This is at odds with current high-performance strategy where the provision and impact of educational and practical support specific to disciplines such as nutrition, recovery and well-being, are well recognised. In this investigation, we engaged the athlete's voice by exploring the perspectives of elite athletes through a qualitative approach in order to understand the lifestyle and other factors to which they attribute their success with the intent of informing a grounded and truly holistic athlete framework that will, in turn, guide future research, strategy and practice.

METHOD

A qualitative thematic approach guided by grounded theory principles and incorporating one-on-one semistructured interviews with world, Olympic and Paralympic gold medal winning athletes was used to gain further insight regarding what athlete and environmental factors contribute to success and explore the relative contribution and interplay of lifestyle factors to athlete well-being and sustained high performance. Due to the exploratory nature of this study, this methodological approach was deemed to be the most appropriate given its generation of rich data grounded in the lived experience of the participant.¹⁸ Such an approach also affords inherent flexibility to permit continual redirection of the focus of the inquiry to fully elucidate key factors and their interaction leading to the development of a grounded conceptual model of the phenomenon.¹⁹⁻²¹ This qualitative approach has been used more frequently in the field of athlete development and expertise^{2, 22, 23} as it meets these requirements.

The research team consisted of an Olympic gold medallist and naturopath/nutritionist; a registered medical practitioner and professor of health sciences; and a principal advisor with PhD qualifications within the Sport Development section at the New South Wales Office of Sport with extensive experience in qualitative research methods.

Participants

The participant sample included 10 athletes (6 female and 4 male) from various able-bodied, Paralympic, team and individual sports all of whom had won a gold medal at an Olympic, Paralympic Games or World Championship event and had varying lengths of sporting career. A snowball recruitment campaign was initiated through the Victorian Institute of Sport and the lead author's network. Athletes were given a Participant Information Statement and they gave written consent to be interviewed and identified.

Table 1 Summary of participant sample and number of key international events competed at, along with gold medals won

Athlete sample				
Athlete	Olympic/Paralympic Games attended	Gold medals	World championship/cup Gold medal performances	Gold medals
AIF2	Barcelona 1992 Atlanta 1996 Sydney 2000	Gold	World Championships	2× gold
AT/IM1	Sydney 2000 Athens 2004	3× gold 2× gold	World Championships	11× gold
AT/IM2	Seoul 1988 Barcelona 1992 Atlanta 1996 Sydney 2000 Beijing 2008 London 2012	Gold	World Cup World Championship	5× gold 4× gold
PI/TM1	Atlanta 1996 Sydney 2000 Athens 2004	–	World Championships	Gold
ATF4	Atlanta 1996 Sydney 2000 Athens 2004	Gold	–	–
PI/TM2	Atlanta 1996 Sydney 2000 Athens 2004	Gold 2× gold	World Championships 1998	Gold
AIF1	Not an Olympic sport	–	World Titles	7× gold
AIF3	Beijing 2008 London 2012 Rio 2016	–	World Championships	Gold
AIF4	Lillehammer 1994 Nagano 1998 Salt Lake City 2002 Torino 2006 Vancouver 2010	–	World Titles	9× gold
ATF5	Rio 2016	Gold	–	–

Key: A, able-bodied; P, Paralympic; T, team sport; I, individual sport; T/I, team and individual; F, female; M, male.

Participant involvement

Participants in this study were not involved in the design of the research question or outcome.

All interviews were conducted by the first author. Eight interviews were conducted face to face and two via video, with an average duration of 1 hour. Breadth of experience of the participant sample and their gold medal results are presented in [table 1](#).

Procedures

A semistructured interview guide was developed that featured a broad line of questioning on developmental background, athlete profile, lifestyle practices, support networks and key support services (see [table 2](#) for interview guide structure). At the beginning of each interview general questions on the athlete's background were posed to assist in developing rapport. All questions were asked in a conversational tone. Probe questions were used where required, to expand on a theme or gain a deeper understanding. Interviews were recorded and transcribed verbatim.

Data analysis

Initial themes were extracted by sentence-by-sentence open-coding using NVivo qualitative software (V.11.3).¹⁸ In accordance with constant comparative analyses, interviews were spread to allow for transcription, analyses and reflection to occur so that

Table 2 Sample questions from the interview guide

Interview guide structure		
Interview section	Aim	Exemplar questions
1. Introduction, sport background and rapport building	To explain the research and identify sporting achievements and developmental background and develop trust and rapport between the researcher and athlete	Tell me about how you got involved in your sport. What is the highest level of competition you have achieved? How long have you been competing at the senior international level? Please explain your training regimen during the peak of your career.
2. Identification of the athlete profile	Identify and explore physical and psychological attributes, motivation and strategies and sport-specific skill competency	To what (factors/attributes) do you attribute your success? What planning and preparation did you do leading up to a major event? Tell me about your ability to cope and adapt with changing circumstances? What recovery tools did you use during your training? Do you use any mental imagery techniques? Can you tell me about your practice?
3. Lifestyle practices	Explore lifestyle practices and routines	Did you have any 'extra-curricular' training activities you implemented that were separate to the set team training programme? As part of your preparation did you see any complementary health practitioners? Can you describe your daily diet during a precompetition and competition day?
4. Support networks and key support services	Identify the role and influence of support networks both in and out of their sport	Do you have someone in your life who makes you laugh? Who provided you with support during the hard times of your sporting career? How would you describe your relationship with your coach?
5. Balance, rest and relaxation	Identify practices employed outside of their main sport for time out, rest and relaxation	What did you do to relax when you weren't training or competing? Did you have any specific treats, rituals or rewards?

evolving themes and subthemes could be further explored and elucidated in the next interview.^{18 20 21} Participants were purposively sampled to fully explore and confirm the evolving theory and model.^{18 20} Emergent higher-order themes (eg, psychological factors) and lower-order themes representing relevant subcomponents (eg, self-regulation) were identified. Lastly, a conceptual model incorporating all relevant themes, including the interrelationships between them was created.

Methodological rigour and trustworthiness were ensured throughout via a complement of strategies. First, the main researcher used a journal to record notes, observations, reflections, potential themes and questions for the next interviewee. Second, regular meetings between researchers were held throughout the data analysis phase to discuss and confirm emergent themes and subthemes. Lastly, to ensure representativeness, quotations from participants were applied to illustrate and support each emergent theme and subtheme.

RESULTS

Four dominant themes emerged from the interviews: psychological factors, performance strategies, interpersonal relationships and lifestyle practices. The psychological dimension was the strongest and most impactful theme to emerge from the data analysis along with its underpinning subthemes (see [box 1](#)). The athletes' psychological attributes, cognitive competence, strong self-regulation and utilisation of mental rehearsal or imagery were closely related, and directly impacted the other emergent themes. These included getting the right match of support in and out of sport; adoption of key complementary lifestyle and performance practices (ie, utilisation of complementary therapies; yoga, meditation, recovery, sleep and nutrition); embracing competition exposure and accrued experience within the daily performance environment; and refining their sport-specific skill, in particular their tactical and technical preparation and performance.

When athletes were asked 'To what do you attribute your success?' all athletes referred to psychological competencies, with none crediting their physical attributes. The psychological profiles of these athletes were multidimensional and refined, featuring strong and enduring self-regulation, strong intrinsic motivation, effective coping skills, self-confidence, dominance

and resilience, strong work ethics and preparation, hunger for self-challenge, a positive mindset, and effective coping with injury and other seemingly negative chance events. When asked 'What advice would you give other athletes?' their responses were psychological in nature, and included themes around self-belief, not getting distracted, using detailed mental imagery and visualisation, meticulous preparation prior to an event, embracing challenging competitive experiences, mental preparation, having a good support team and feeling comfortable being alone.

The following section addresses the commonalities elicited from the data. Representative quotes are provided in [boxes 2, 3, 4 and 5](#) to illustrate and expand on each theme and subtheme.

The four domains identified, that is, psychology, performance, relationships, lifestyle, are multidimensional, dynamic and individualised. They are also strongly interrelated and have significant overlap. It is suggested that podium performance is best supported when all domains are integrated and contribute

Box 1 Higher-order emergent themes and subthemes

Psychological attributes

- ▶ Superior self-regulation
- ▶ Intrinsic motivation
- ▶ Effective visualisation and imagery strategies
- ▶ Reliance on faith, routines or rituals
- ▶ Strong work ethics
- ▶ Self-confidence and dominance
- ▶ Effective coping strategies and positive mindset

Performance strategies

- ▶ Maximising training and performance opportunities
- ▶ Effective utilisation of sports science
- ▶ Physical therapies and recovery

Interpersonal relationships

- ▶ Having the right support team
- ▶ The athlete-coach partnership

Lifestyle practices

- ▶ Nutrition and hydration
- ▶ Utilisation of complementary therapies
- ▶ Importance of time out

Box 2 Representative quotes from athletes - psychological attributes

Psychological Attributes

All athletes possessed high cognitive competence enabling them to maximise learning and performance opportunities continually honed through self-reflection and self-awareness of their strengths and limitations. They were meticulous with planning and preparation and adept at problem-solving and proactively seeking and experimenting with potential solutions, which enhanced their self-efficacy, confidence, resilience, and dominance.

AIF1 comments: There are three things that I attribute to my success. Vision, a real clear sense of what I want. Courage, to keep getting up and fighting, courage to surround myself with the right people and put my hand up and ask for help; and resilience to keep getting up, because I failed a lot more than I succeeded.

Intrinsic motivation

Strong intrinsic motivation rather than extrinsic reward and recognition was evident. A hunger for self-challenge and being the best was prevalent, along with a connection to something meaningful.

AIF2 shared: My earliest memory of what drove me to run was just feeling happy when I ran. I felt so free...so untouchable. I was never the type of person who needed to be watched. I didn't need to have an audience. I just took off and it was like I'd left everything or everybody behind me. It made me happy to take notice of nature.

Effective visualisation & imagery strategies

All athletes incorporated and heavily relied on mental rehearsal and visualisation as a preparatory strategy or way to refine their sporting skills, sharing their preferred approaches, experimentation with different perspectives, and engaging their senses.

AIF4 revealed: I visualised myself from a judge's perspective, from a helicopter angle and, in my own eyes what I see. It takes a lot of skill to be able to do that and get it to play the right images and not negative ones or crashing. When I sat in the wheelchair (due to injury), that's all I did, visualise, even my body healing. I used to visualise myself at the gym and doing everything that I couldn't do...it's just training smarter.

Reliance on faith, routines or rituals

All athletes utilised routines, however some maintained they purposely refrained from superstitions or religious faith whereas others followed these fastidiously.

AIF3 responded: It gives me strength. It helped me a lot to let go of superstitions. It's sort of like everything's predestined. Everything's going to turn out the way it's supposed to. Believing in God and doing my prayers, it settles me and it's important for me.

ATF4 said: I think it's more important to believe in yourself than to believe in something else. Maybe by believing in something else that helps somebody believe in themselves more, fantastic if that's the way they want to be, but I just learned to believe in myself.

Strong work ethic

Independent rigor and meticulousness in preparation and actively seeking out and engaging with knowledge or experts to assist in their training, performance or recovery was applied by all athletes. Considerable time and effort in seeking, experimenting with, and honing potential strategies and solutions and placing themselves in uncomfortable situations (eg, tough competition or training) to challenge themselves further was evident.

Preparation was important to **AT/IM2:** I religiously got ready the night before so when I woke up the next morning everything was in place. I'd come home from the last practice session and the next morning was the comp, the first thing I would do is get everything ready. All the physical things I had the control over. I was very regimented like that.

AT/IM1 describes his process before a competition: Shaving down. You know what it's like to get into sheets. It just feels great. The same with the water. It's more to do with the sensory side of how that feels, it heightens your awareness of the water and where it's moving, and you feel like you're going through silk. That was end of the training phase, and then I'm straight into competition mode. Nine times out of 10, I knew the outcome.

Self-confidence & dominance

Self-assurance resounded strongly across all athletes and much of this confidence developed as a result of accrued experience in both training and competition.

When asked 'how mentally strong did you feel on the day of competition?' **AIF 1 responded:** Unbeatable, most of the time. **AIF 4** was asked if she studied her opponents: I didn't study anybody. I figured they were studying me. I never ever wasted the time in thinking about anybody else, ever.

Effective coping strategies & positive mindset

Mental strength and competition experience were used to enhance the athletes' ability to cope with and adapt to changing circumstances. Whilst all athletes faced differing levels of adversity through seemingly negative chance events, their ability to cope, by adopting a pragmatic yet calm, confident and methodical approach was evident. Some athletes had minimal or virtually no injuries, whereas others had life-changing injuries that culminated in major operations, extensive rehabilitation and modification of their training program. The Paralympians who had rehabilitation and management as a result of their impairment and the athletes who suffered major injuries all showed incredible mental fortitude and positivity, with a big picture attitude and clear goals that helped their rehabilitation and resilience.

ATF4 describes her response after a career-changing knee injury: Instead of just going, 'Well, just wait and see what happens' I put a plan together. I put dates on it, then when I couldn't do one thing, I'd miss it and go to the next one. Because it was written on a ball, it was in front of me every single day, it was a reminder; 'This is what I'm going for.' It wasn't something that was deep in the back of my mind, it kept me accountable to do the work, to do the rehab, to keep trying, pushing to the next step. Then other people saw it and we talked about it. They'd come into the house and see the ball and we'd chat about it. So that was good, by having the goal out there, it helped people support me.

positively to the whole. This is represented in the generated conceptual model presented in [figure 1](#). The complementary and dynamic nature of these dimensions is depicted by the juncture in the centre where the domains overlap. The nature of this overlap is dynamic, and this model does not attempt to represent relative contributions but rather implies that if any one of these domains is not present then performance will be compromised. It is the utilisation of these attributes when needed by way of a tilt which can lean in many directions and is dependent on the

ability of the athlete to shift focus within these domains. This skill, becoming sub-conscious with practice and experience and thus creating an equilibrium of balancing between a group of important principles and practices.

While the domains identified as important for elite performance are distinct and serve specific needs, the psychological domain provides the context for linking all other domains. Psychological attributes, skills and strategies are instrumental in coordinating all aspects of life including lifestyle practices, interpersonal

Box 3 Representative quotes from athletes - performance strategies

Performance strategies

All athletes described getting the most out of their training, initiated either by the coach or the athletes. Many attributed embracing rigorous competition exposure as a contributing factor to their success.

AT/IM2 recommends seeking competition exposure: There are a lot of good practice people out there, a very small percentage of good competitors. You can learn it, but you've got to be put under pressure. Just find me competitions with pressure. Lots of competition. That's what I've always told people. Get as much competition as you physically can get and then find some more, because the more times you are exposed to pressure the better you get. A lot of people don't like competition, they like to train a lot but when they get to a big competition it then becomes foreign.

Effective utilisation of sports science

A variety of sports science methods were used, including monitoring breathing patterns with heart rate monitors, individualised sports specific exercises and urine testing to monitor hydration. Video analysis was common across all athletes, either self-initiated or via their coaching and sports-science team. Various applications were employed, including analysis of their own and their competitors' techniques and strategies. Utilisation of the latter was sport dependent for example, sports featuring strategic interaction with opponents relied on this feedback. Contrastingly, sports without this interaction mostly used video analysis to study their own performance rather than their opponents.

AT/IM2 describes working with a sports scientist from the VIS: We worked on a technique through breathing that in the 10 seconds before you actually shot. Your heart rate had to be on a decline. You had to be able to drop at 10 beats per minute in that 10 seconds and we worked out through breathing, exactly how to do it. I think it was world-breaking. I shot so many targets with a heart rate monitor on. 10 seconds, the 10 seconds before you shoot, is the only time you need to be concentrating or getting your breathing right. You really concentrate on hearing yourself exhale and just by doing that it distracts your mind from the pressure of the competition. When you're under extreme pressure you tend to think negative thoughts, when you're concentrating on your breathing it just puts this little man in your head to sleep because he's got nothing to do. If he's concentrating and listening to your breathing, he's not telling you you're about to miss the next target and you're not going to win the Olympic final.

Physical therapies & recovery

Physical therapies and recovery strategies were heavily utilised, in particular: massage, sleep and water-immersion therapy, which was mostly in the form of ice-baths and hot/cold showers and was practiced by all athletes except one who competed in an ocean-water sport. All athletes attributed improved recovery, decreased muscle-stiffness and less injuries to the practice, some also reported ice-baths induced a meditative state that put them 'in the moment'.

PI/TM1 shares: One thing that I took from ice-baths is the importance of being present. If you're going to get an ice-bath, don't put your toe in it to feel if it's cold. It's an ice-bath, it's going to be cold. When you immerse yourself in the present and you feel that blood run through your veins, it's a special thing to be so in tune just being you and going, 'Wow, feel those pins and needles splash over me, feel what this is like to be here, yup,' By doing that mentally it connects you physically what you're doing and, again, you mentally get recharged.

Box 4 Representative quotes from athletes - interpersonal relationships

Interpersonal relationships

All athletes mentioned a significant person in their life who was influential and supportive in their sporting career. This person varied from a parent, team-mate, partner or someone within the athletes' support team (coach, masseur or physiotherapist), yet they were all highly valued for their ability to share a laugh and helped the athletes unwind, relax and feel removed from the pressures of training and competition.

AIF4 described the influence of a talent scout: I felt like if I just rubbed him I'd feel better. Just standing next to him I felt so much confidence. So, sports psych, partner, scout and my coach, they were the four people I would say that I needed.

ATF5 commented: Our physio is the only female in the program. We think there should be another female but there's not at the moment, so it's quite refreshing having her.

The athlete-coach partnership

Athletes reported the most valued support from their coach was not technical but inter-personal and relational (eg, emotional support and encouragement, open and honest communication and strong rapport). Some also acknowledged the paramount importance of their coach's technical ability.

AT/IM2 talks about the role of a coach being more than just technical: The coach that I had in my best years was an Italian guy, he was an Olympic medallist in his own right and fully understood coaching doesn't stop until you go to bed at night. Because he'd become a part of your life, he's nearly a part of your family. Then they become good coaches and they become a dual role of a coach and a manager. I think at the top level, you don't need a technical coach. We've worked out what we need to do. It's what's going on in your brain will determine how you shoot. And that's often all you need, distract you, just keep you calm, keep you calculated, give you confidence.

PI/TM2 shares: He'd never coached anyone with a disability, so he probably didn't know where to start except I know a friend had the discussion with him about if he would take me on, and he was like, 'Oh, I never had anyone with a disability.' And she was like, '... just treat him like another athlete. He'll be fine.' And once he did that, once he made that conscious decision that if I was down on the ground, about to spew and I had another rep to go, and if it was another athlete in the squad he'd kind of kick him on the leg a bit and say, 'Hey, get up, you've got another one to go,' once he kind of did that with me I was like, 'Yes, great,' because the last thing I wanted was a coach that would say, 'Oh yeah, but it's okay, you've got one arm.'

relationships and performance strategies. For example, the current sample of champions viewed the psychological domain as vital to provide the vision of the desired performance outcome within both a training and competition context as indicated by their use of visualisation and mental imagery by all participating champions. The psychological domain is also required to ensure the intrinsic motivation, self-confidence, dominance, resilience, work-ethic, self-regulation, positive mindset, determination and

mental resilience necessary to endure the training regimens and implement effective coping strategies for dealing with setbacks.

The performance domain ensures athletes are adequately prepared for elite performance by maximising training and performance opportunities, ensuring adequate competition exposure and effective utilisation of sports-science and sports-medicine strategies, along with maximising physical therapy and recovery. Recovery strategies such as massage, water-immersion therapy

Box 5 Representative quotes from athletes - lifestyle practices

Nutrition & hydration

Only one athlete was in a weight division sport, yet most were conscious of maintaining a 'competition weight'. All athletes saw a Nutritionist or Sports Dietician at some point during their career. Despite this, the area of diet, performance-nutrition and hydration practices varied. Athletes who competed at the 2016 Rio Olympics, shared a deeper understanding of nutritional demands, which was reflected in the complexity of their diet regimen. Other athletes who had competed earlier, were under the guidance of nutritionists who recommended strategies that have now been expanded and/or superseded. Other athletes either forged their own path, seeking to go against the norm of nutritional advice of the day, or had little nutritional understanding. Athletes with long careers (e.g., over 20-years), noted stark changes in their nutritional knowledge over their career. All athletes revealed that they drank water for hydration and most didn't drink coffee. Consumption of sports drinks varied; some never consumed them, some had them regularly and others only drank them on competition days.

AT/IM2 says: The best was sending a dietician/nutritionist on tours. They used to do all the urine tests for hydration, which was important because you're out in the hot weather. Every morning and every night we did a urine test. I was always conscious of my competing weight. I always tried to be the same weight. The guns are made for you're a certain weight and when you lose or put on weight the first thing you do is put it on your face, and that makes a big difference. If you lose it quickly, your face changes and it changes where your gun shoots. These are \$40 000 guns made so it shoots perfectly every time.

AT/IM1 was very organised in his meal preparation: As a general rule, I would make sure my plate was colourful. A combination of good carbs with protein and fat. I ate more fat than what a lot of the other athletes were eating. Like seeds and nuts. I kind of disagreed with the high-carb thing, refined carbohydrates from pastas and rice. I want to sustain energy, so that's what I tried to do with diet. Listening to my body.

Utilisation of complementary therapies

Having regular massage was deemed critical to an athletes' preparation due to the physical benefits and as a means of mentally debriefing with the trusted masseur. Other complementary practices relied upon included: plyometrics, yoga, meditation, acupuncture, osteopathy, kinesiology, chiropractic, naturopathy and nutrition.

AIF 1: I realised that my behaviors were as inconsistent as my mindset. I'd be bitching about my weight and then I'd reward myself for a workout with apple pie or cheesecake. I didn't have enough discipline. I had a naturopath. I met him after I won my sixth world title, he's played an instrumental role in keeping me alive. A lot of herbal remedies. Musashi, Magnesium. Vitamin C. Vitamin B.

Importance of time out

All athletes had their own way of switching off, 'escaping' and creating balance between rest and relaxation and the rigors of training and competition. These strategies included taking a bath, shopping, catching up with friends, interacting with nature, watching movies, reading and listening to music.

AIF4 described how she would relax: Movies and get into bed ... You're watching a movie – it's escapism, you're lying down, you're warm, you actually feel safe, not dying right now. You're not going to kill yourself going off a jump at 70K an hour.

(ice baths) and optimising sleep may be of particular importance and were widely used by champion athletes. While there was strong commonality in adopted practices and strategies, some practices such as the use of video analysis and studying opponents, were dependent on the individual and/or the type of sport. Such athlete-specific findings suggest a need for athlete development frameworks to recognise and cater for individualised approaches.

The relationship domain, which includes having an effective athlete/coach partnership and the right support team, is necessary to provide support and encouragement as well as to help athletes unwind, relax and feel removed from the pressures of training and competition, thereby maintaining adequate balance in and out of sport. All athletes mentioned their reliance on social support and someone with whom they could laugh with and de-stress, and who helped make them feel like a regular person. For some, it was the massage therapist, for others it was a coach who simply asked about their day and shifted their focus to regular human issues other than sport.

The lifestyle domain is required to ensure athletes' physical well-being, sustenance and robustness through appropriate nutrition and hydration, utilisation of complementary therapies and practices and taking time out to relax and obtain perspective. The lifestyle domain is important during both training and non-training periods and helps to ensure career longevity and sustain the appropriate psychological attributes, interpersonal relationships and performance factors.

DISCUSSION

Overview

Lifestyle is 'what we do with our lives' and for an athlete, this is all-encompassing and includes training, work, entertainment and is inclusive of identity, self-image and values. While current literature on elite athletic performance stresses the importance of sociodevelopmental, physical, sport-specific skills

and psychological factors, the interviews with elite athletes in this investigation suggest that championship performance also requires a particular way of life that integrates mindset, performance, relationships and lifestyle factors and supports the athlete in navigating their way through life's challenges and the challenges of their sport.

Using a qualitative approach and a world-class sample of athletes, the findings of the present study expand on the existing literature and understanding of the athlete profile required to reach a world-class level and achieve and sustain international sporting success, although with individualistic nuances. The findings confirm the critical importance of an athlete's psychological profile, in particular their strong self-regulatory skills in coordinating and maximising their learning and achievement in and out of the sporting arena and also highlights the perceived

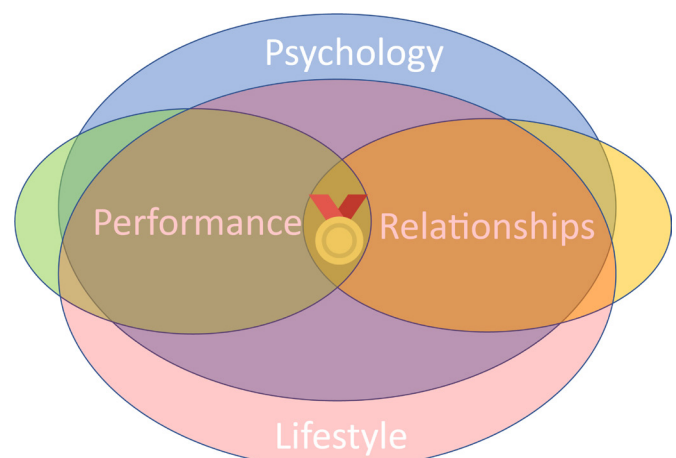


Figure 1 Contributors to world-class performance.

psychological and physical benefit of recovery strategies such as ice baths.

It is well accepted that autonomy-supportive behaviours have a beneficial impact on athletes' intrinsic and self-determined extrinsic motivation²⁴ and are important determinants of performance and persistence.²⁴ The ability of coaches to facilitate and empower the needs of the athlete's own autonomy and competence increases their potential for improved performance and enhanced motivation,²⁴ and honest and open communication between this particular dyad fosters more effective collaboration.²⁵ Furthermore, social relationships promote health and well-being.²⁶ In particular, the adolescent brain (note that many athletes' competitive phase is during adolescence) relies on complex social connections outside the family unit to form an independent sense of identity.^{27,28} The quality and quantity of an individual's social connections during adolescence are linked to their behaviour and mental health.²⁶ Fletcher and Sakar (2012) incorporate this into their model which encompasses a multidimensional psychological profile coupled with perceived social support which allows elite athletes to negotiate and manage the realistic stressors they will face in high-performance sport.² Social support is seen as stress-buffering and integral to building resilience.^{2,29} Based on interpersonal relationships emerging as a major theme for these high performers, it is critical that we place importance on facilitating and valuing the relationships they form among peers, team-mates, coaches, family and support staff throughout the elite athlete journey.

Extending on existent athlete development frameworks, key lifestyle practices were identified that were integral and intertwined, complementing conventional performance strategies. At a practical level, these findings have promising implications specific to how and when tailored education should commence specific to these recognised performance and lifestyle strategies to ensure they are used effectively. And how, at a high-performance level, the athlete's voice and empowered decision making can directly inform an individualistic and effective approach for refining athletic preparation and performance.

A personal wellness plan as suggested by Anderson (2012),³⁰ which is inclusive of athlete lifestyle factors as a whole, and involves nutrition, recovery, sports psychology, injury prevention and promotes interpersonal connections, may be the best way to provide a comprehensive and overarching framework to support and develop the athlete as a whole person and prove the best outcomes for resilience, self-regulation, podium performances and longevity on the world stage and beyond.

Limitations and strengths

A limitation of this study is the small sample of subjects from different sports and it is therefore not possible to make conclusions about any specific sport or make meaningful conclusions about differences between athletes. It is the firm intent of the researchers to further explore and confirm the relative impact of the emergent themes from this study, using a customised survey tool administered to a large participant sample that includes varying types of athletes including Paralympic athletes from a pre-elite level to an elite level.

The fact that the sporting achievements of many of these athletes spanned over two decades further raises the likelihood of generational differences in education and awareness, technology, culture, sports science and sports medicine support, nutrition and training methods, along with differences in self-disclosure, self-awareness, subjectivity and recall of key events and their reflections, that may be impacted upon with the passing of time.

The strengths of this study are the world-class quality of the sample. The main researcher herself is an Olympic gold medalist, this greatly facilitated trust leading to generosity and honesty of insight by interviewees and was a methodological advantage in effectively 'tapping into the athlete voice'.³¹ However, care was taken to ensure separateness between researcher and participant in order to maintain objectivity and trustworthiness.³¹ Another notable strength is the inclusion of the experiences and perspectives of world-class Paralympic athletes.

CONCLUSIONS

Our findings from the perspectives offered by the current champion sample confirmed that the athletic profile and support required to reach and sustain podium-level performance is multi-dimensional, integrated and individualised and that psychological factors are paramount. Championship performance is most likely to occur at the intersection of psychological prowess, interpersonal support, performance strategies and lifestyle. Understanding more about the role and impact of these key factors is critical to informing current athlete-level and system-level support. An integrated approach encompassing these four dimensions can potentially be used to inform the development of a valid and reliable screening tool that assesses a developing athlete's competency in each of these domains and is a precursor to tailored education and intervention that can maximise an athlete's longevity and performance success.

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