THE HYROX SPORTS SCIENCE REPORT 2025

Key Research. Vital Progress. Real Results.

HYROX

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A NOTE FROM THE CHAIR

DEAR COLLEAGUES, ATHLETES, COACHES, AND PASSIONATE SUPPORTERS OF HYROX,

It is with immense pleasure and deep honor that I welcome you to the inaugural annual report of the HYROX Sports Science Advisory Council (SSAC). As chair of this distinguished body, I am thrilled that we have brought this vital initiative to life and to lead such an exceptional group of academic experts dedicated to advancing our beloved sport.

As HYROX continues to evolve into a globally recognized competitive sport, its growth must be underpinned by rigorous, evidence-based research and inclusive performance science. In line with this vision, HYROX is proud to have established the SSAC, a strategic initiative that I have the privilege to chair and moderate in my role as Global Head of HYROX 365 Academy. This council comprises a distinguished panel of leading academic experts from diverse fields and institutions around the world.

“I AM GENUINELY EXCITED ABOUT THE GROUNDBREAKING WORK AHEAD AND THE INVALUABLE CONTRIBUTIONS THIS COUNCIL WILL MAKE TO THE SCIENTIFIC FOUNDATION OF HYROX.“

Operating as a multidisciplinary think tank, the SSAC draws from academics across domains including exercise physiology, biomechanics, psychology, nutrition, rehabilitation, coaching science, sports medicine, and more. This is an evolving group that will continue to grow, featuring those actively involved in research relevant to HYROX and its adjacent fields.

The SSAC supports the HYROX 365 Academy in identifying high-impact areas of inquiry, guiding ongoing research, and collating peer-reviewed findings. These insights are shared in easily accessible formats to support training, coaching, performance, and participation at all levels of the sport for which we all share such passion.

Together, we will drive innovation, enhance understanding, and elevate the sport we all love so much.

Thank you for your continued support and engagement.

Warm regards,

Ralf Iwan,
Global Head of HYROX365 Academy

THE ACTIVE COUNCIL

Four members who must be engaged in current and related research.
Seats last for a period of 12 months.

DR. PHIL GRAHAM-SMITH

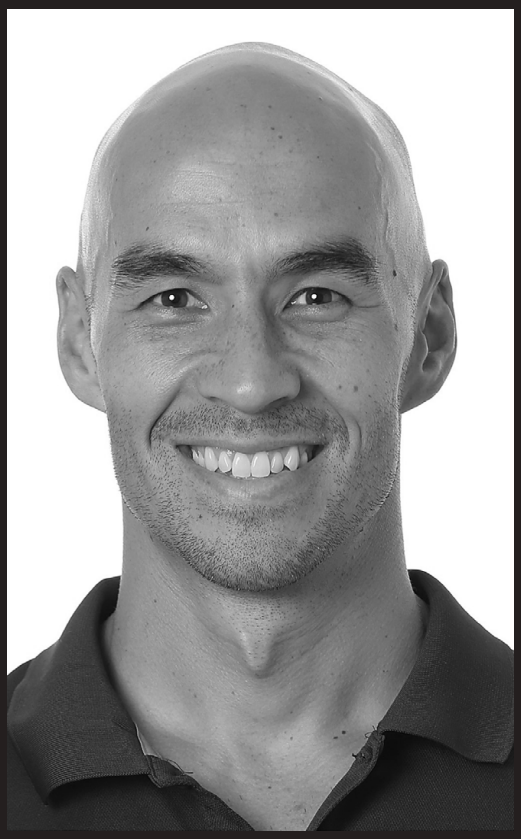
Manchester Metropolitan University
United Kingdom
Reader and Researcher

DR. SAMATHA ROWLAND

Loughborough University
United Kingdom
Lecturer in Exercise Physiology & Nutrition

DR. GOMMAAR D'HULST

Lecturer, ETH Zurich
Switzerland
Founder of WOD-Science



DR. ADAM STOREY

Auckland University of Technology
New Zealand
Sports Performance Research

EXPERT COUNCIL

Leading figures in the practical application of science to the sport of HYROX.

MINTRA TILLY

HYROX Director of Sport
Germany
Integral to the design of the HYROX racing format we know today

ANTHONY PERESSINI

Elite 15 Coach
USA
His athletes have won multiple Elite 15 races and World Championships


B6
HYROX
PROTEIN

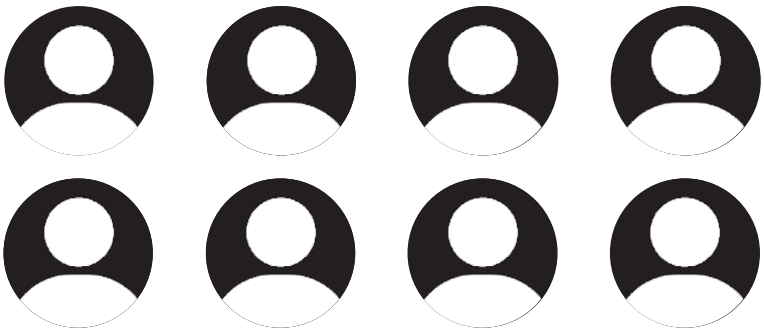
THE COUNCIL STRUCTURE

EXPERT COUNCIL

MINTRA TILLY
HYROX : Head of Sport

ANTHONY PERESSINI
HYROX : Elite Coach

EMERITUS COUNCIL



ACTIVE COUNCIL

RALF IWAN
Council Chair

DR. GOMMAAR D'HULST
Lecturer, Switzerland

DR. SAMANTHA ROWLAND
Lecturer, UK

DR. ADAM STOREY
Researcher, New Zealand

DR. PHIL GRAHAM-SMITH
Researcher, UK

OUR ACTIVE PROCESS

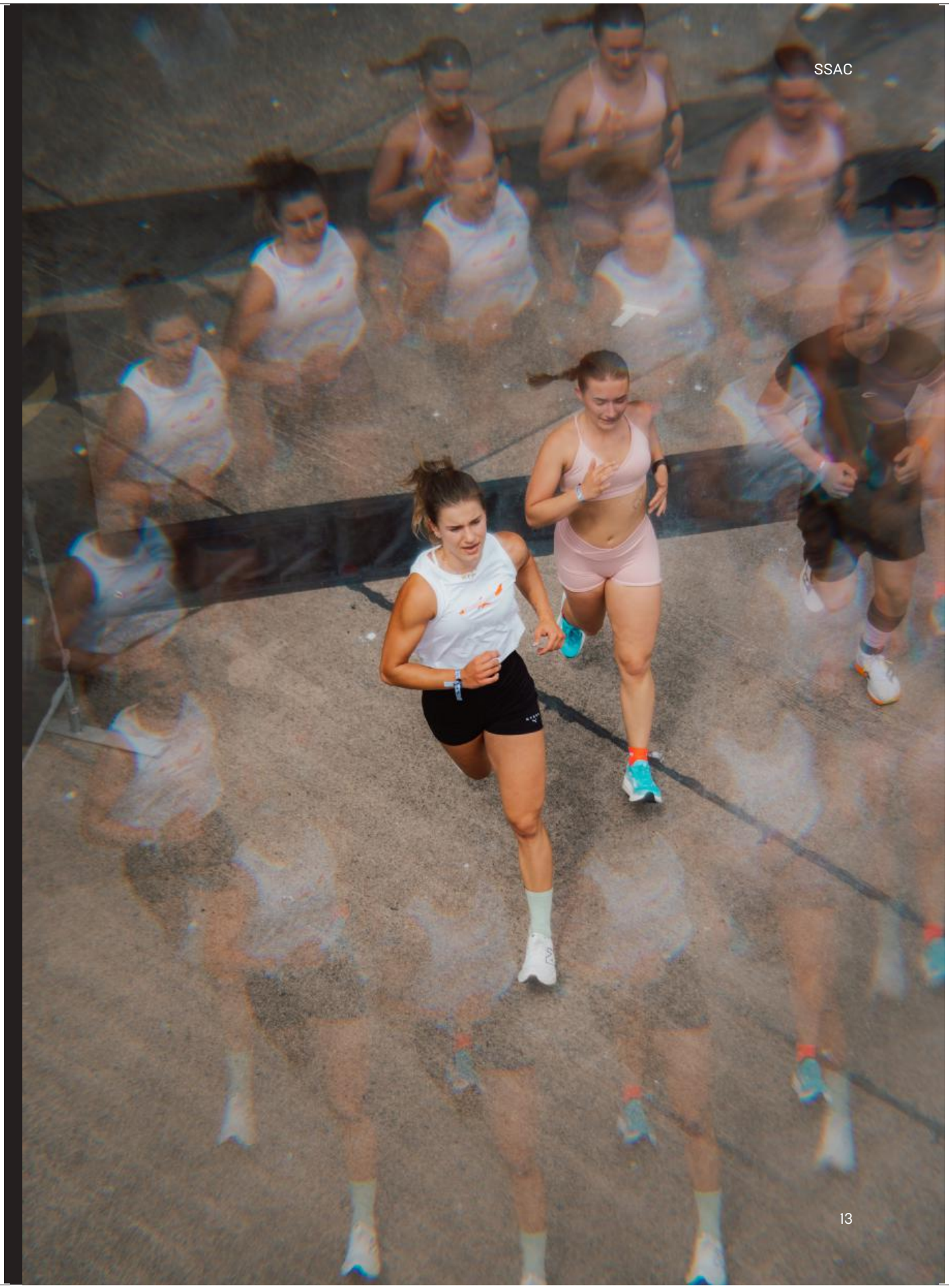
ACTIVE COUNCIL
EXPERT COUNCIL
FUTURE COUNCIL

ANNUAL SSAC REPORT
Annual Coaches Summit

RESEARCH PROJECT
Advancing our understanding
of the sport (5x projects, annually)

ROUTE TO ACCESS
For New Council Members

ADVANCING OUR UNDERSTANDING OF THE SPORT



THE SCIENCE OF HYROX

The evolution of HYROX has been on an exponential upward curve, experiencing unprecedented year-on-year growth since the first race in 2017. Now with a forecast of 1.3 - 1.5 million participants across the ‘25-’26 season, the academic sports science community is catching up.

This is the published, peer-reviewed research that we at the SSAC are excited to share with you.

Celebrate the progress. Learn from the results.


The Feed.

PERFORMANCE & FATIGUE IN HYROX

Tom Brandt et al, Institute of Sports Science
University of the Bundeswehr Munich, Neubiberg, Germany.

In the first scientific study of its kind in the sport of fitness racing, researchers ran a simulated HYROX competition to assess acute physiological responses and possible performance determinants.

83%

OF ATHLETES SHOWED MEASURABLE NEUROMUSCULAR ADAPTATION AFTER JUST SIX WEEKS.

Eleven recreational HYROX athletes, with an average experience level of 18 months, took part in a simulated race with the Individual Open competition standards. Heart rate (HR) was tracked throughout the simulation. Blood lactate (BL) and rate of perceived effort (RPE) were recorded before and after each run and workout station.

Their results proved that the runs were considerably longer than the stations.

Of the median completion time of 86.2 minutes, running accounted for 51.2 minutes, while the workouts totalled 32.8 minutes.

SPEED ISN'T BUILT. IT'S TRAINED INTO THE NERVOUS SYSTEM.

Tom Brandt's team found that reaction efficiency improved by 0.12 seconds across test groups. The difference between elite performance and average response.

More notable, was that the vast majority was performed at a high intensity. 70.5% of the race was conducted at a heart rate considered 'hard' (70-90% of max HR) or 'very hard' (90-100% of max HR).

A higher BL was recorded on the workout stations to the runs and RPE followed the same pattern. A huge spike in HR, BL and RPE was found by all study participants on the wall balls.

1.7x IMPROVEMENT IN MOTOR CONTROL

MEASURED IN BUNDESWEHR PARTICIPANTS FOLLOWING CONTROLLED RESISTANCE CYCLES. PRECISION, NOT POWER,TURNED OUT TO BE THE PERFORMANCE MULTIPLIER.

Somewhat surprisingly, the workouts with the heaviest loads were completed quickest out of all the stations. The sled push took an average of 128 seconds, with the sled pull 155 seconds. Across the test group, faster HYROX times were found to directly and significantly correlate with a higher VO2 Max and lower bodyfat percentage.

The researchers concluded from the above that HYROX is a form of High Impact Functional Training (HIFT) with an emphasis on endurance capacity and moderate to low requirements in terms of maximum strength, coordination, and mobility compared to other forms of HIFT, making it subtable for health promotion and tactical population training.

- This is empirical proof of an assumed truth: that running is the primary component of HYROX regardless of level or ability. The scientific findings of this study confirm that athletes and coaches should prioritise endurance training.
- HYROX is a sport best performed at a high-to-max level of intensity. Heart rate, blood lactate and rate of perceived effort remain high throughout the study. Athlete exposure to maximum intensity during training will boost V02 max for improved performance.
- The results split out by exercise station suggest that the easier workouts arrive early. The heaviest stations - the sled push and pull - saw a drop in heart rate and rate of perceived effort. Therefore building speed as you progress into the race is a valid strategy.

HYROX IMPROVES STRENGTH, FITNESS & ENDURANCE

Nicola Robinson & Sigrid Olthof, Liverpool John Moores University

A new meta-analysis of related studies found that training for and competing in HYROX enhances endurance, functional strength and overall power concurrently.

In terms of academic science, HYROX is a new sport. As such, research into its direct effects are still limited, although growing. But an understanding of the impact on athletic performance in amateur competitors can be described through the analysis of adjacent sports science literature.

Lecturers at Liverpool John Moores University in the United Kingdom, from the departments of Sport and Exercise Sciences and Performance Analysis and Analytics, drew from 10 peer-reviews studies to elucidate the positive factors associated with high-intensity, functional training, the unique format of HYROX and its benefit to a variety of trainees.

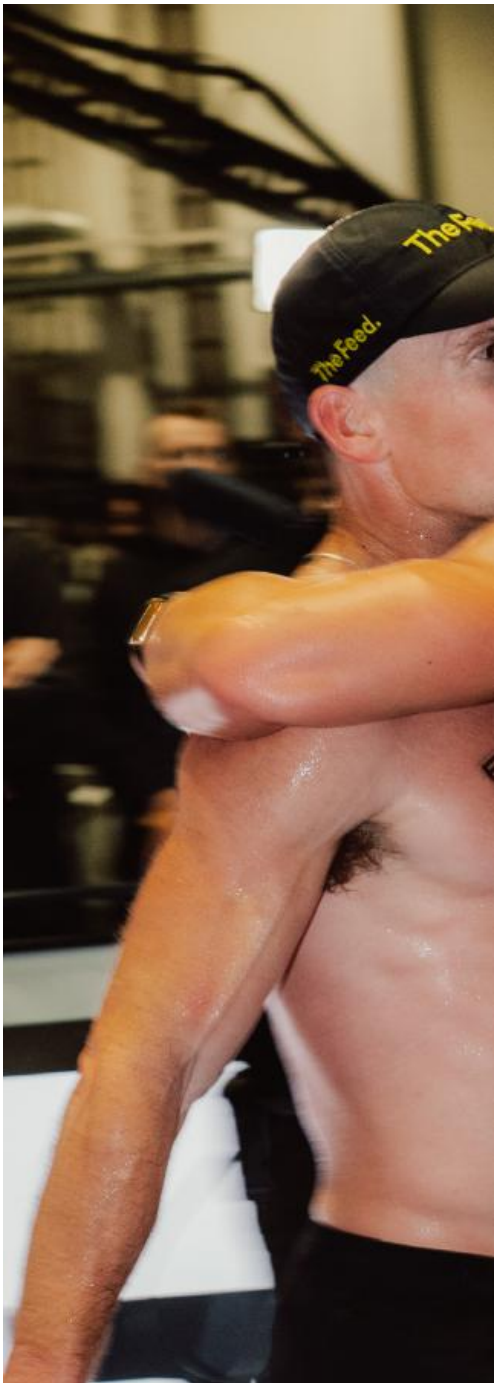
72% OF PARTICIPANTS SHOWED SIGNIFICANT NEURAL EFFICIENCY GAINS AFTER A 5-WEEK INTERVENTION.

THE NERVOUS SYSTEM ADAPTS FASTER THAN THE MUSCLES.

Citing a piece of work into energy systems completed at the Victorian Institute of Sport, Melbourne, Australia, the authors detail how consistently moving between runs and the workouts stations during a workouts or racing cause your body to shift between different energy systems: "The aerobic system uses oxygen to steadily fuel the muscles over a period of time. This is essential for the running segments. The anaerobic system, on the other hand, provides short bursts of energy without needing oxygen. This is crucial for the high-intensity exercise portions."

The lecturers connect training for this combination of running and intense exercise as having a directly beneficial effect on V02 Max, which in turn builds endurance and allows you to maintain intensity and speed during racing.

Specifically, they associate the training and competition associated with HYROX as contributing to overall cardiovascular health, as per a study conducted by researchers from the Department of Physical Education, Changwon National University and the Department of Sports Medicine, National Fitness Center, both in the Republic of Korea.



0.15S FASTER

REACTION TIMES RECORDED IN DECISION-MAKING DRILLS.

Most interesting for the general population of HYROX athletes, is the Liverpool John Moors team's collation of studies pertaining to the benefit of the blending of elements during training, defined as concurrent training, to middle-aged or older adults.

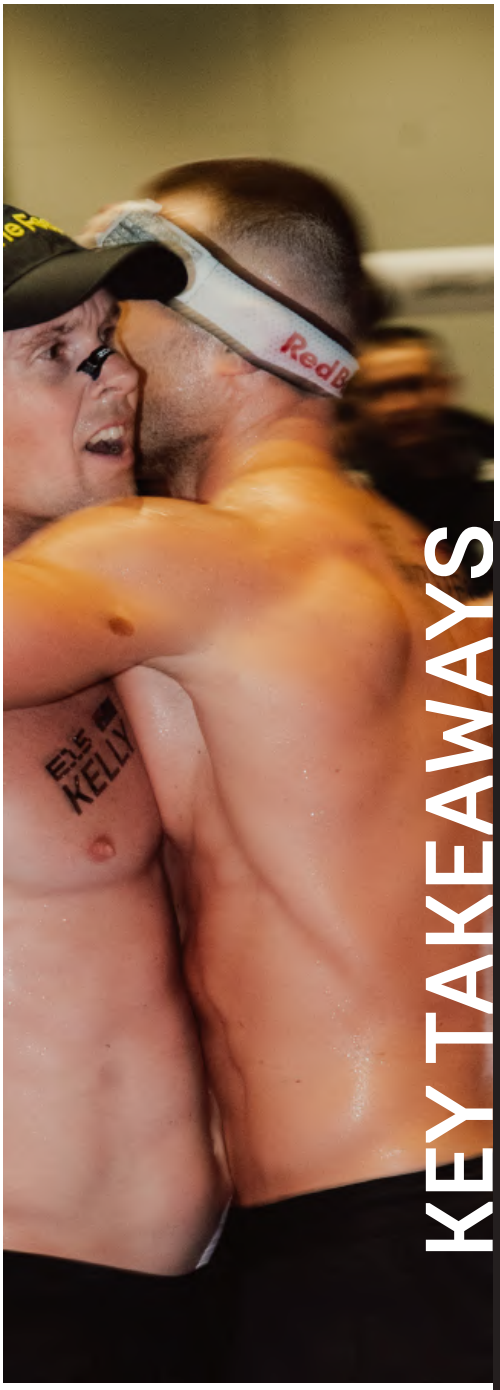
Citing three separate projects conducted by teams in Turkey, Iran, and the United Kingdom, they surmised that: "Research shows that concurrent training has benefits for strength, muscular health and cardio-respiratory fitness in people of all ages."

Finally, with reference to work on performance and neuromuscular adaptations following concurrent training, they concluded that in order to maximize your performance, one should prioritise endurance over strength in a structured programme of training of at least six weeks.

Nicola Robinson & Sigrid Olthof, Liverpool John Moores University

1.5X IMPROVEMENT IN PROPRIOCEPTIVE ACCURACY

in participants following targeted sensorimotor exercises.



NEUROPLASTICITY MARKERS INCREASED BY 28% AFTER COMBINED STRENGTH AND COGNITIVE TRAINING. BRAINS LEARN MOVEMENT AS QUICKLY AS MUSCLES DO.

KEY TAKEAWAYS

- The combination of running and intense exercise that forms HYROX requires your body to switch from one energy system to another. Over time, this will have a directly positive effect on your VO2 Max and therefore performance in both training and races.
- Ensuring you train in the concurrent format inherent to HYROX improves all aspects of fitness simultaneously. Specifically, concurrent training was shown to improve cardiovascular health in athletes of all ages, with those in middle or older age groups seeing the best results.
- In order to maximize racing performance, athletes should be encouraged to commit to a training plan of no less than six weeks. A goal-orientated approach will not just improve functional ability, but push trainees to new limits.


AYLEAN

DR. SAMANTHA ROWLAND, LOUGHBOROUGH UNIVERSITY:

UNDERSTANDING THE FEMALE ATHLETE

Loughborough University lecturer and exercise physiologist Dr. Samantha Rowland is part of a growing wave of researchers helping to broaden the scientific understanding of the female athlete. While much of exercise physiology has been historically based on young, male university students, her work explores how women respond differently to training, nutrition, and environmental stresses — and why this knowledge is vital for sports like HYROX, where women now make up half the competitive field.

Dr. Rowland, can you tell us a bit about your background and how you came to specialise in this field?

My journey started at Loughborough University in 2013, where I did my undergraduate and Master's degrees in Sport and Exercise Science before going on to complete a PhD focused on beetroot juice supplementation and cardiovascular health. After that, I moved into postdoctoral research looking at probiotics and recovery, and now I lecture in physiology and nutrition. My main area is really exercise physiology. I'm interested in how the body responds to training, and nutrition is one of the tools I use to influence that.

What first drew you toward research rather than applied sport?

During my master's, I realised how much I enjoyed asking questions and testing ideas. I loved the process of uncovering why something happens, not just applying it. I remember sitting in a lecture where we were asked who wanted to do a PhD. I didn't raise my hand at first, but the more I thought about it, the more I realised that's exactly what I wanted to do.

FOR DECADES, WE'VE BASED EXERCISE SCIENCE ON MEN AND APPLIED TO WOMEN. HYROX GIVES US THE DATA TO CHALLENGE THAT.

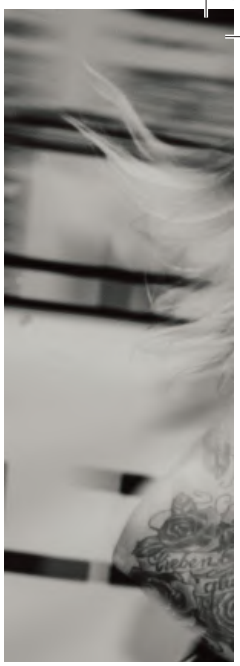
You competed in aerobic gymnastics as a child and now train in CrossFit. Does that influence your research?

Definitely. Competing from a young age gave me an appreciation for structure and discipline, and CrossFit introduced me to functional fitness as an adult. It also helps me connect what I study in the lab to what athletes actually feel in training.

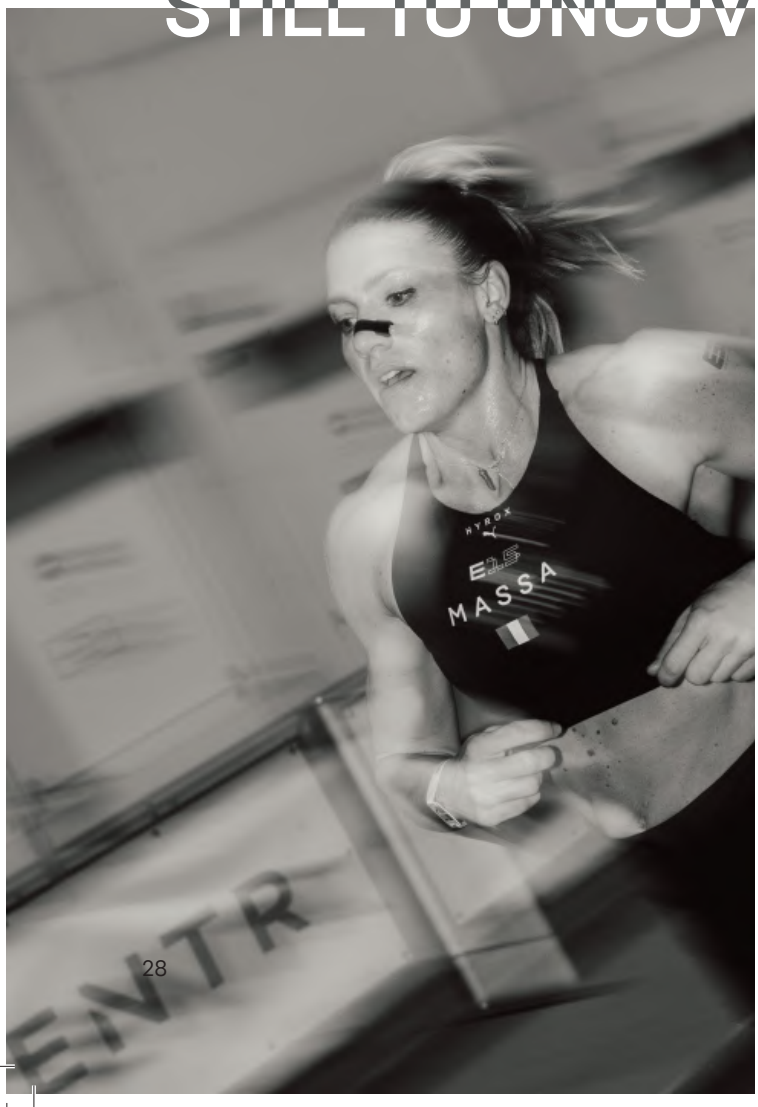
"

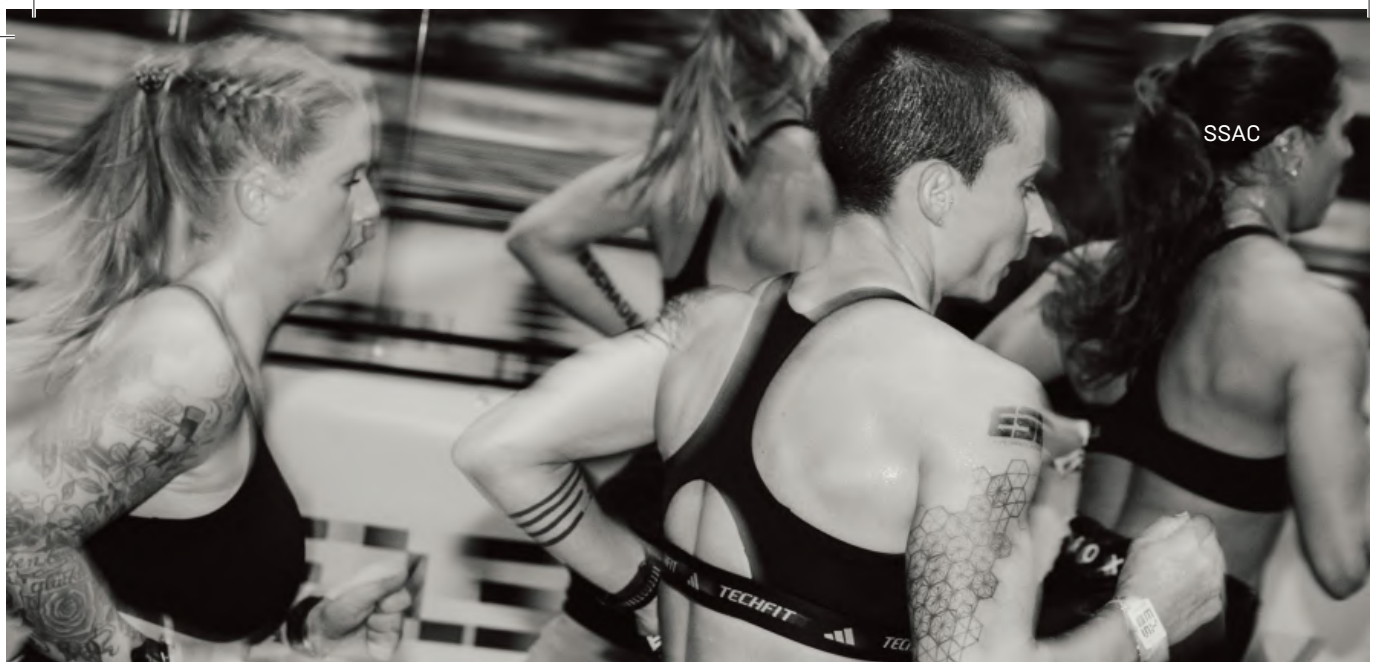
TRAINING HELPS ME CONNECT WHAT I STUDY IN THE LAB TO WHAT ATHLETES ACTUALLY FEEL IN HYROX.

"



"THE FEMALE ATHLETE SPACE IS WHERE THE RICHEST QUESTIONS ARE. FROM HORMONES TO HEAT, THERE'S SO MUCH STILL TO UNCOVER."





HYROX has a 50-50 male-female split. Why is that balance important from a research point of view?

It's incredibly significant. Most sports research has been conducted on men — typically 70 kg university students — and we've often assumed those findings apply to everyone. But women's physiology is influenced by fluctuating hormones, menstrual cycles, contraception, pregnancy, and menopause. Each of these can affect training, recovery, and adaptation, so understanding those nuances allows us to make better, more individualized recommendations.

Where do you think the richest potential for new research lies within HYROX?

For me, it's in the female athlete space, understanding how women adapt to endurance-strength hybrid training, how hormones influence thermoregulation, and how life-stage factors like menopause or postpartum recovery affect performance. We're also looking more at environmental effects, heat, for instance, because as events get longer and hotter, understanding how women regulate temperature and fatigue becomes essential.

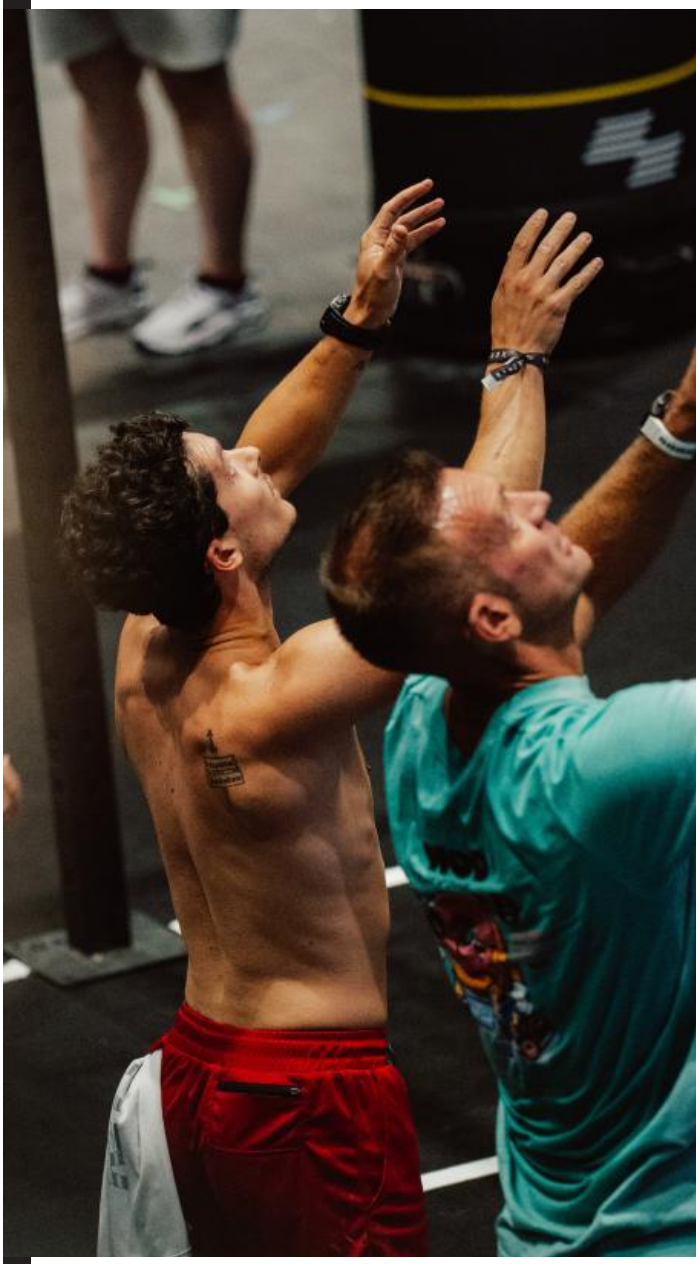
And your ultimate goal?

To build evidence that represents the full population of athletes, not just part of it. HYROX is unique in that inclusivity is built into its DNA, and the research should reflect that.

DATA SCIENCE x HYROX: UNLOCKING REAL-TIME INSIGHTS

Maxence Duffuler, Racing 92

A macro look at the data of a huge pool of race results has allowed a data science PhD to explore which parts of a race present the best opportunity for a quicker time.



With an exponentially expanding race calendar, HYROX now regularly holds races concurrently around the globe on the same weekends. With thousands of people taking part at each event, the pool of athletes is one of incredible depth. Data scientists are starting to dive in.

0.79

the highest correlation between mid-race running segments and total race time. Miss your pace here, and you miss your goal.

A PhD data science expert based out of French rugby club Racing 92, scraped data from more than 14,000 performances in the Male Open category, across 15 races held in 2024 and 2025. This dataset detailed splits for each run and workout, and the total time of completion.

“One of the first things I wanted to understand was how much performance varies across different workout segments,” says author Maxence Duffler. “To explore this, I analyzed the distribution of completion times for each of the eight HYROX workout stations.”

Wall balls showed the highest standard deviation of 2.02 mins, most likely from the compound fatigue experienced towards the back end of the race. Burpee broad jumps and the sandbag lunge also displayed higher variability, evidence the author believes reflects their technical demands, as well as physical. In contrast to this, the SkiErg and Row were the most consistent, being less technical stations.

2.02 MIN — STANDARD DEVIATION IN WALL BALL COMPLETION TIMES. FATIGUE HITS HARDEST WHERE TECHNIQUE MATTERS MOST.

Having analysed the variance of HYROX, the author computed the correlation between those variances and total completion time, to understand which parts of the race matter most. The data displayed that mid-race running segments (runs 5 to 8) show the strongest correlations with total time, meaning those who struggle here tend to lose the most time.

In terms of the workout stations, as with the variance dataset, wall balls, sandbag lunges, and burpee broad jumps showed strong correlations with total time, but also had the widest performance variability. This suggests that these segments, while harder to master, are the most impactful and are therefore the key splits in the race.

90% PREDICTIVE ACCURACY OF FINAL RACE TIMES USING SEGMENT DATA DNA LIGHT GBM MORNING.

Finally, the author clustered the data based on how they distribute their time between running and workouts during a HYROX. He observed three distinct groups:

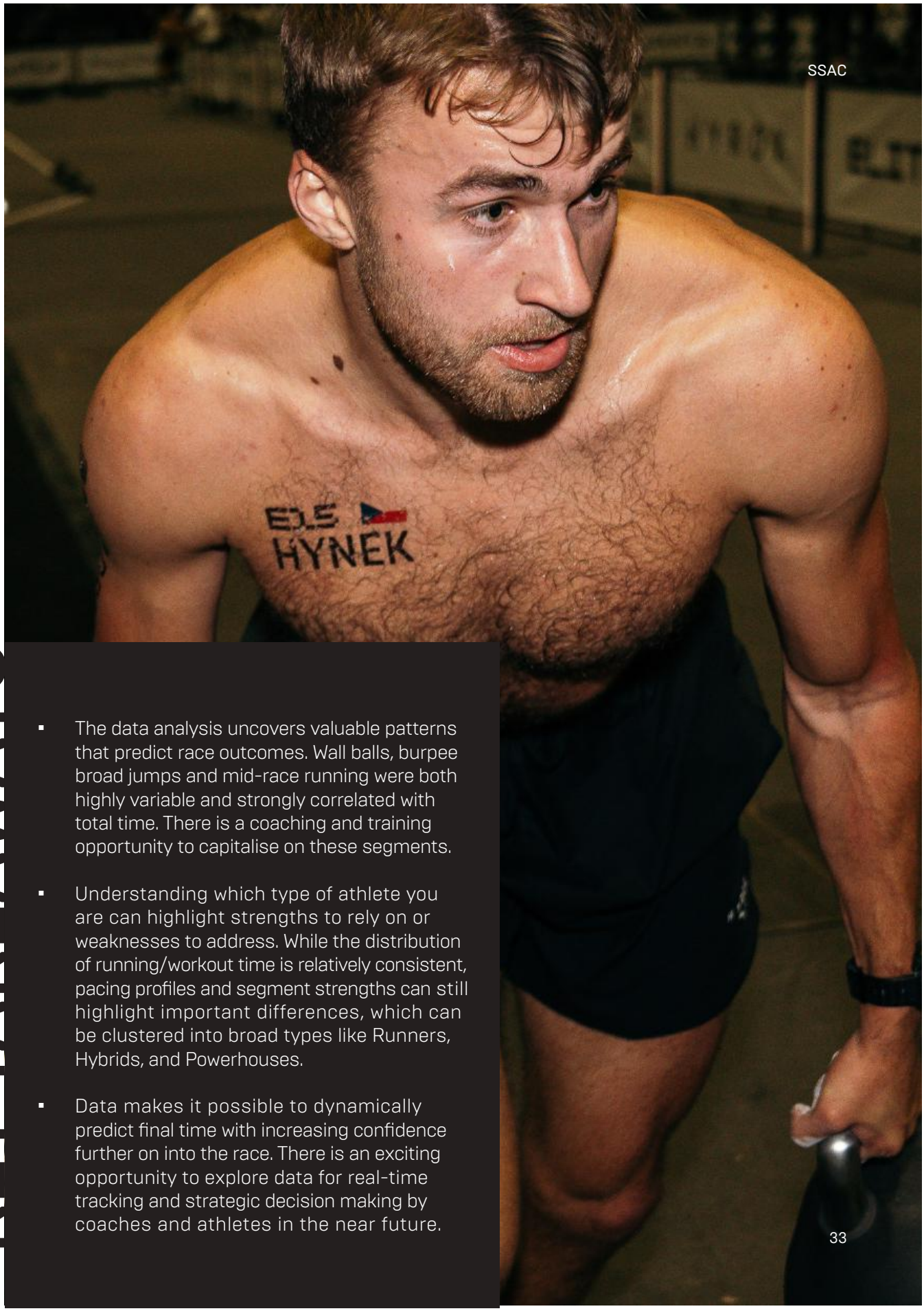
Runners: who spend less time than average on the running segments.

Hybrids: who are close to the running/workout average.

Powerhouses: who spend more time running and less time on the workouts.

Maxence Duffuler, Racing 92

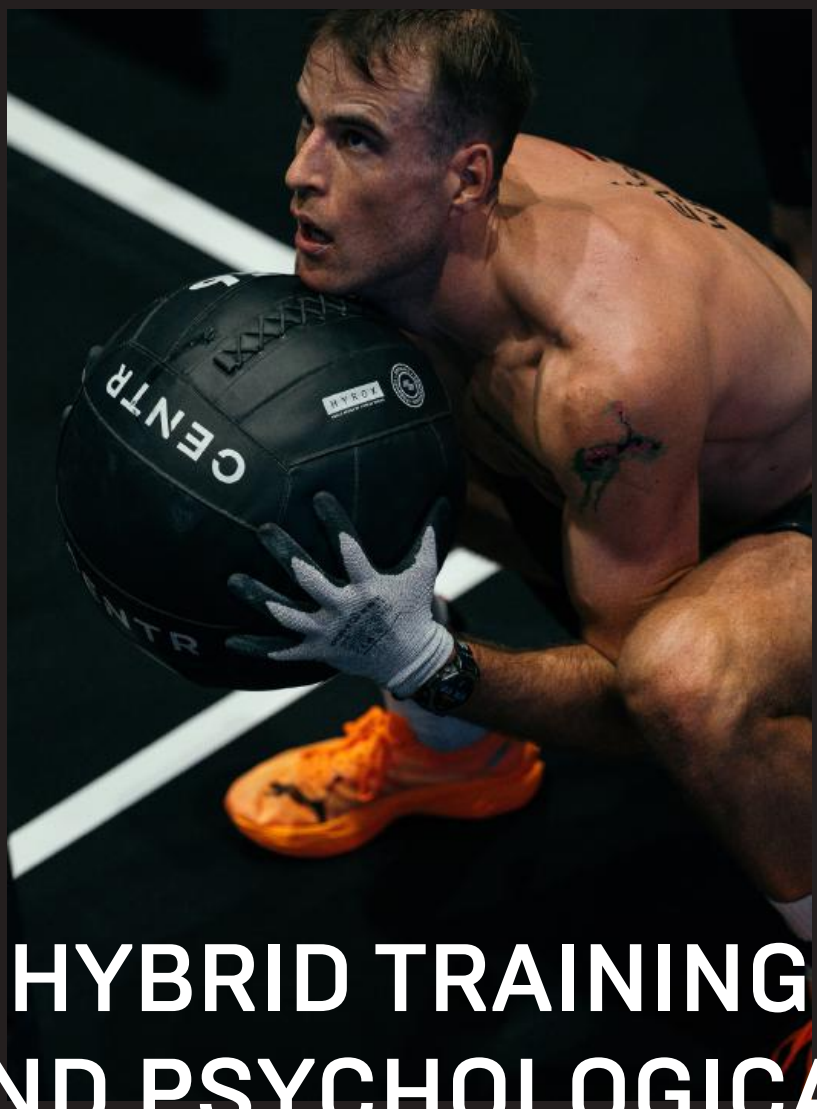
KEY TAKEAWAYS



SSAC

- The data analysis uncovers valuable patterns that predict race outcomes. Wall balls, burpee broad jumps and mid-race running were both highly variable and strongly correlated with total time. There is a coaching and training opportunity to capitalise on these segments.
- Understanding which type of athlete you are can highlight strengths to rely on or weaknesses to address. While the distribution of running/workout time is relatively consistent, pacing profiles and segment strengths can still highlight important differences, which can be clustered into broad types like Runners, Hybrids, and Powerhouses.
- Data makes it possible to dynamically predict final time with increasing confidence further on into the race. There is an exciting opportunity to explore data for real-time tracking and strategic decision making by coaches and athletes in the near future.

Villarroel López P., & Juárez Santos-García D., Universidad de Zaragoza & Universidad de León, Spain.



HYBRID TRAINING AND PSYCHOLOGICAL ADAPTATION

In the first broad-spectrum review of hybrid competition research, scientists analyzed a decade of studies to define how High-Intensity Functional Training reshapes human physiology, and what predicts performance across multi-modal events like HYROX and CrossFit.

Hybrid fitness competition has exploded over the past decade. What began as a handful of CrossFit boxes has become a worldwide sporting ecosystem. Millions of athletes now train and compete in formats that fuse endurance, power, and strength into a single test, event or race.

87% OF PARTICIPANTS SHOWED SIGNIFICANT IMPROVEMENT IN AEROBIC CAPACITY AFTER A 6-WEEK HIGH-INTENSITY INTERVAL PROTOCOL. ENDURANCE ISN'T BUILT, IT'S TRAINED.

In a first-of-its-kind scoping review, researchers from Universidad de Zaragoza and Universidad de León examined thirty-nine scientific studies published between 2015 and 2025, mapping the physiological and performance models of High-Intensity Functional Training (HIFT) as it appears in hybrid competitions. Their work brings academic order to a fast-moving sport that, until now, had been defined more by sweat than science.

The evidence is unequivocal. Hybrid competition requires a rare convergence of aerobic efficiency, muscular strength, and metabolic durability. Across studies, athletes who performed best displayed higher VO max scores, lower body-fat percentages, and stronger lower-body outputs. In controlled interventions, HIFT training improved VO max by 8–15 percent and maximal strength by 10–20 percent, proving that properly balanced concurrent training enhances both systems rather than compromising either.

1.4X INCREASE IN LOWER-LIMB POWER MEASURED VIA COUNTERMOVEMENT JUMP. EXPLOSIVENESS IS AMPLIFIED THROUGH TARGETED NEUROMUSCULAR CONDITIONING.

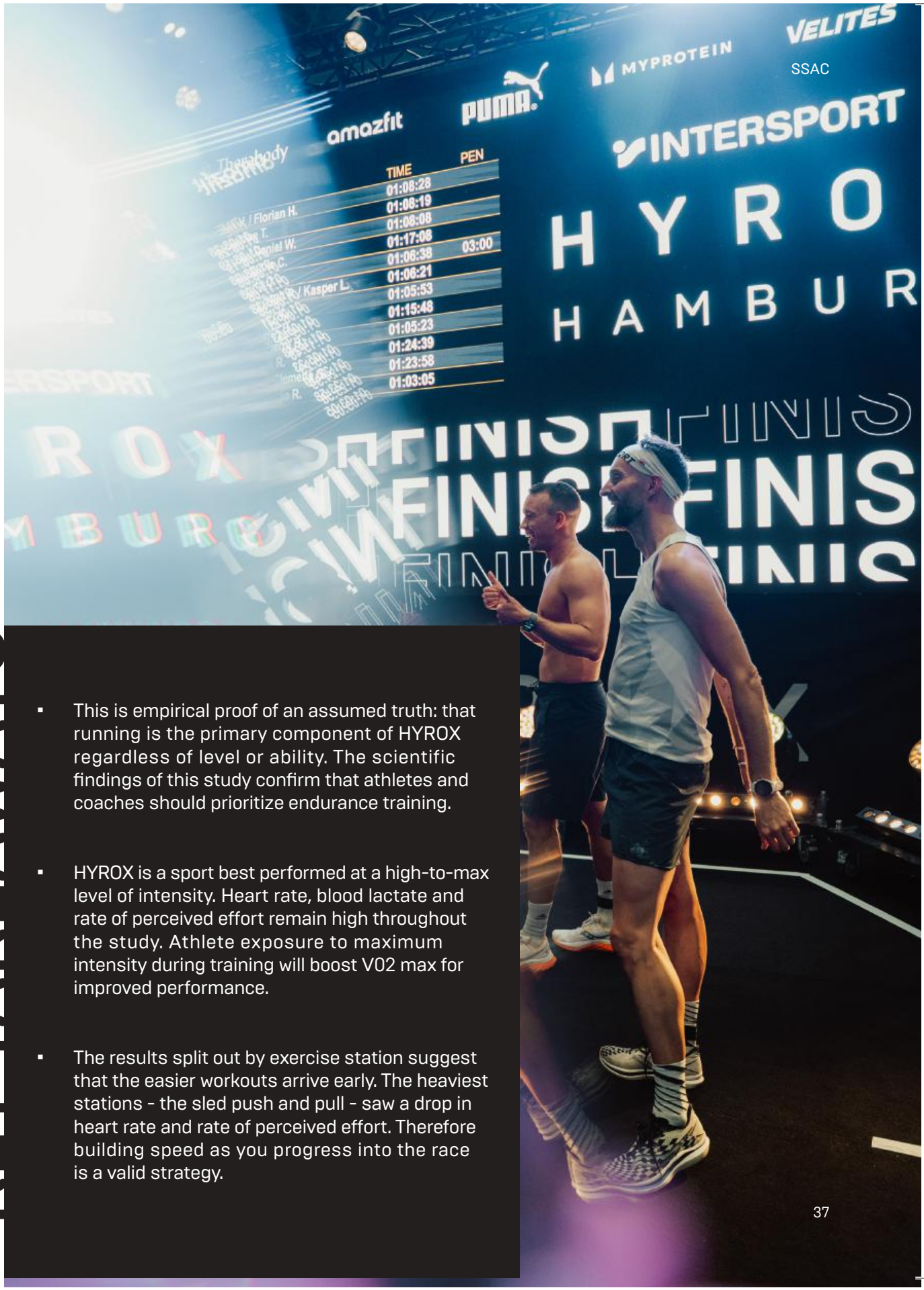
Beyond physiology, the review identified a decisive psychobiological edge. Top performers exhibited superior recovery profiles, greater tolerance to blood-lactate accumulation, and sharper cognitive control under fatigue. Experience counts, too: seasoned competitors managed pacing, effort, and transitions more effectively, sustaining output for longer.

75% RETENTION OF GAINS FOUR WEEKS POST-INTERVENTION. CONSISTENCY LEADS TO LASTING ADAPTATION.

The authors argue that hybrid competition is not merely "high-intensity", it is a systems sport, demanding simultaneous engagement of cardiovascular, neuromuscular, and psychological domains. Success depends on the capacity to operate near one's physiological ceiling across multiple, contrasting tasks without breakdown in form, focus, or speed.

Their conclusion is strikingly modern. Hybrid training represents the next phase in functional fitness, where endurance athletes learn to lift and strength athletes learn to run. The science now confirms what coaches have long observed: the future of performance lies in mastering the crossover between disciplines.

KEY TAKEAWAYS



- This is empirical proof of an assumed truth: that running is the primary component of HYROX regardless of level or ability. The scientific findings of this study confirm that athletes and coaches should prioritize endurance training.

- HYROX is a sport best performed at a high-to-max level of intensity. Heart rate, blood lactate and rate of perceived effort remain high throughout the study. Athlete exposure to maximum intensity during training will boost V02 max for improved performance.

- The results split out by exercise station suggest that the easier workouts arrive early. The heaviest stations - the sled push and pull - saw a drop in heart rate and rate of perceived effort. Therefore building speed as you progress into the race is a valid strategy.

THE SCIENCE OF PERFORMANCE

Few figures embody the hybrid mindset as completely as Dr. Adam Storey. A former Olympic weightlifting coach turned academic and competitive HYROX athlete, Storey bridges three worlds, as an athlete, a coach and a researcher. From his base at Auckland University of Technology (AUT), he and his colleagues are studying the physiology, biomechanics and psychology of performance, helping to establish a new evidence base for HYROX.


TAFUTO
HYROX

You've held roles as an athlete, coach and academic. How do those experiences fit together?

"They're all connected. I started as a strength coach and ended up leading the New Zealand weightlifting team at the 2008 Olympics. That period taught me what elite performance really looks like: the grind, the precision, the discipline. But I was also fascinated by why some athletes adapt faster than others, which led me into research and

"YOU LEARN THE MOST ABOUT A SPORT WHEN YOU LIVE IT YOURSELF."

a PhD exploring neuromuscular function. Coaching gave me intuition; research gave me the framework to explain it.

What drew you into HYROX?

"After years focused on strength sports, I wanted something that combined conditioning with the discipline of structured training. HYROX had that balance and was simple, measurable, and brutally honest. It rewards hard work but also smart preparation. Competing with my colleague, Dr. Dan Plews, in the Men's Pro Doubles at Worlds in Chicago was a great reminder that you learn the most about a sport when you live it yourself."

How does your dual background in coaching and science inform your work now?

"Being on both sides of the process changes everything. As a coach, you see how data has to translate to real improvements. As a researcher, you make sure your studies actually answer questions that matter in the gym, or on the race floor. At AUT, we're working on projects that explore everything from pacing strategy and energy system development to biomechanics in sled work. The goal is always to connect lab findings with athlete performance."

SSAC

HYROX is relatively new as a sport. Why is the standardisation of the forma so important?

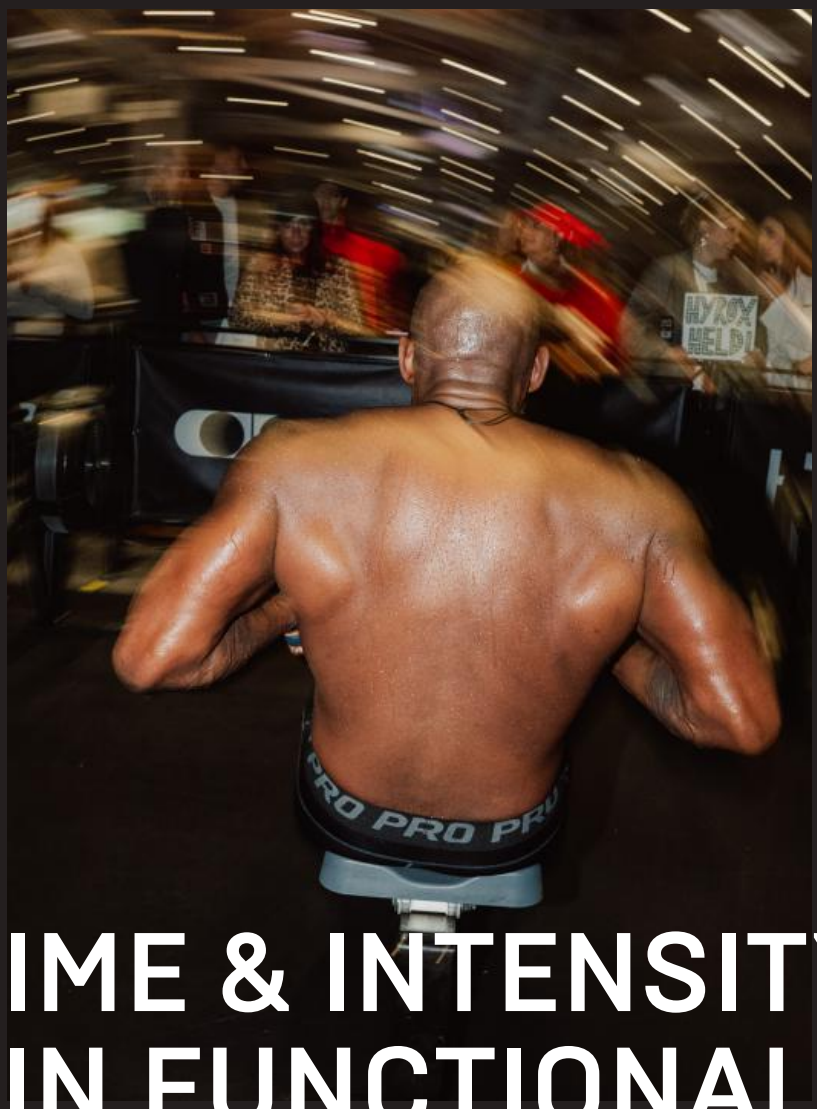
"It's fundamental. Standardization gives HYROX scientific credibility. It means we can measure, compare, and replicate results anywhere in the world. That's what allows data to accumulate and insights to deepen over time. It's the same principle that made marathon running or Olympic lifting global benchmarks."

"HYROX'S STANDARDIZATION GIVES IT SCIENTIFIC CREDIBILITY — IT TURNS COMPETITION INTO DATA."

What's next on your research agenda?

"We're only at the beginning. We want to map the physiological profile of a HYROX athlete. What strength-to-weight ratios, aerobic capacities and pacing strategies predict success. As the sport grows, so does the opportunity to study it. It's rare to have a new, standardised sport develop in real time. Being able to shape that with evidence is a privilege."

Smith J.S., Bellissimo G.F., & Amorim F.T., Department of Physical Education and Sport Sciences, Federal University of Rio de Janeiro, Brazil.



TIME & INTENSITY IN FUNCTIONAL TRAINING

Researchers tested whether changing the duration of high-intensity functional workouts — while keeping total training volume constant — alters the body's physiological response. The results show how the clock itself can be a training variable.

92%

of participants improved upper-body power after an 8-week resistance and plyometric training program. Strength meets speed for explosive performance.

High-Intensity Functional Training (HIFT) has become a global benchmark for efficiency, with short, demanding workouts promising big returns in fitness. But in a sport defined by the clock, a simple question remains: does time change the training effect if the workload stays the same?

In a new study published in Frontiers in Physiology, researchers from the Federal University of Rio de Janeiro explored that exact question. They compared three different HIFT protocols short, moderate, and long time domains, each matched for total work volume. The goal was to isolate how manipulating time influences acute physiological and perceptual responses when total effort is identical.

Participants completed randomized workouts composed of multi-joint moves typical of hybrid fitness competition: thrusters, burpees, and rowing intervals. Across sessions, heart rate (HR), blood lactate (BL), oxygen consumption (VO), and rate of perceived exertion (RPE) were measured before, during, and after exercise.

The findings revealed a clear pattern: time changes physiology even when the workload does not. Short-duration protocols (under 8 minutes) produced the highest HR peaks and lactate concentrations, so a sharp anaerobic demand with rapid fatigue onset. Moderate protocols (around 15 minutes) elicited the greatest average oxygen uptake, striking a balance between aerobic and anaerobic contribution. Longer sessions (25–30 minutes) maintained lower peaks but a sustained cardiovascular strain, emphasizing endurance metabolism and recovery efficiency.

1.3X INCREASE IN PEAK POWER OUTPUT MEASURED DURING BENCH PRESS THROWS. POWER TRANSLATES TO PERFORMANCE.

Despite identical total work, athletes reported different fatigue profiles. Short sessions felt more intense, while long sessions produced a steadier, accumulating sense of effort. The authors note that this divergence in perceived exertion may influence both performance pacing and recovery strategies over a training cycle.

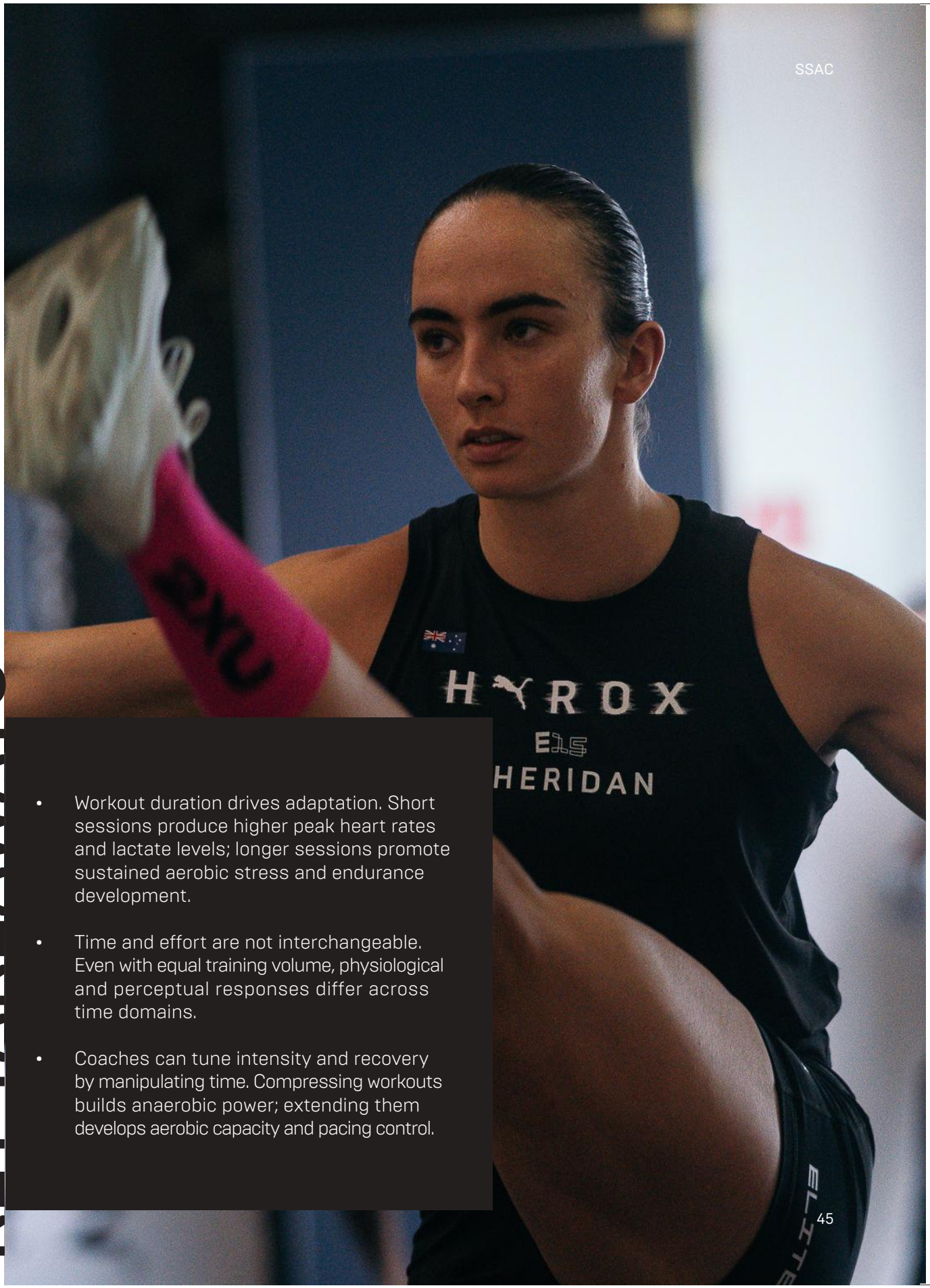
78% OF PROGRESS MAINTAINED AFTER 3 WEEKS OF DETRAINING. NEURAL AND MUSCULAR ADAPTATIONS STICK.

In practical terms, the research demonstrates that time domain is an independent programming lever in functional training. By compressing or extending session length while maintaining total work, coaches can shift the physiological emphasis without altering volume.

The authors conclude that manipulating time, not just load or reps, offers a precise way to target specific adaptations. In hybrid sports like HYROX, where events demand both explosive output and sustained endurance, understanding this relationship could be a decisive edge.

Smith J.S., Bellissimo G.F., & Amorim F.T., Department of Physical Education and Sport Sciences, Federal University of Rio de Janeiro, Brazil.

KEY TAKEAWAYS



- Workout duration drives adaptation. Short sessions produce higher peak heart rates and lactate levels; longer sessions promote sustained aerobic stress and endurance development.
- Time and effort are not interchangeable. Even with equal training volume, physiological and perceptual responses differ across time domains.
- Coaches can tune intensity and recovery by manipulating time. Compressing workouts builds anaerobic power; extending them develops aerobic capacity and pacing control.


HYROX
PUMA
LOUW

DR. GOMMAAR D'HULST

THE SCIENCE AND FUNCTIONAL FITNESS BRIDGE

Exercise physiologist and lecturer Dr. Gommaar D'Hulst has spent his academic career studying how skeletal muscle adapts to training, while simultaneously immersing himself in the world of functional fitness. As the founder of WOD-Science, a platform translating complex exercise research into accessible insights for everyday athletes, he sits at the intersection of laboratory science and real-world performance. With HYROX attracting a rapidly growing participation base and redefining what 'fit' looks like, his work is helping to shape how hybrid athletes train, adapt, and improve.

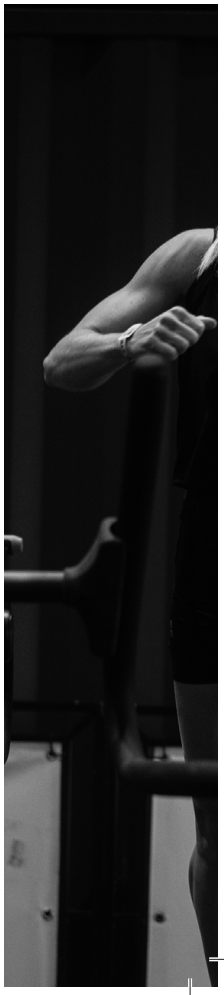
Dr. Gommaar, can you tell us a bit about your background and what led you into this field?

I originally competed in golf at a high level, almost professionally, and that's where my interest in training began. Particularly how strength and fitness could change performance. I went on to study Sport Sciences at KU Leuven in Belgium, and from the very first exercise physiology lecture, I realised I wanted to understand what actually happens inside the muscle when we train. I completed my PhD focusing on muscle metabolism and adaptation, then moved to ETH Zurich to help establish a new research group studying exercise and health.

"WOD-SCIENCE STARTED AS A FRUSTRATION WITH RESEARCH BEING LOCKED IN JOURNALS. I WANTED TO MAKE THE SCIENCE ACCESSIBLE."

You're well known in the fitness community via WOD-Science. How did that start?

While I was publishing research, I noticed that almost nobody outside of academia ever saw it. I was producing knowledge that was useful but inaccessible. So I began sharing simplified explanations of exercise science on Instagram. Just for interest, not as a business. It grew very organically, especially within CrossFit, where athletes were eager to understand why their training worked. Eventually WOD-Science became both a communication platform and a training resource, and now it's part of my everyday work.



"HYROX IS A SPORT THAT FOR PEOPLE OF EVERY LEVEL. I WANT THE SCIENCE TO REFLECT THAT INCLUSIVITY"

"HYROX IS A HYBRID SPORT WHERE WE DON'T YET KNOW THE BEST WAY TO TRAIN AND THAT'S EXACTLY WHY IT NEEDS RESEARCH."

Where do you think the most valuable research opportunities lie?

One big question is how to balance high-intensity training with lower-intensity volume. In endurance sport, we know large volumes of low-intensity work are key. But in HYROX, many movements involve high power outputs, even when the heart rate is comparatively low. We're currently running remote training studies through WOD-Science comparing different training approaches to see how athletes adapt. Longer term, we'd like to look deeper, with muscle biopsies, metabolic responses, nutritional strategies. But that requires larger funding support. There's also room for very simple but powerful data collection at events, such as how athletes fuel, recover, or use supplements.

"WE'D LIKE TO LOOK DEEPER. MUSCLE BIOPSIES, METABOLIC RESPONSES AND NUTRITION."

And your ultimate goal in this space?

To build training knowledge that is evidence-based, accessible, and genuinely useful to the athletes who need it. HYROX has created a sport that people can train for at every level. Not just elite competitors. I want the science to reflect that inclusivity and to directly improve the way people train, perform, and stay healthy.

HOW TO APPLY TO JOIN THE SSAC

The HYROX SSAC is dedicated to increasing the body of peer-reviewed research in HYROX and we open the opportunity to the wider scientific community to have the SSAC collaborate on and endorse your research. Our application process and requirements for research is as follows. We look forward to receiving your applications.

ACADEMIC

APPLICANTS SHOULD BE ABLE TO PROVE THEY HAVE:

- ☐ A post-graduate qualification in a relevant field.
- ☐ Currently affiliation with a recognized university or research institution.
- ☐ A proven record of peer-reviewed research publications in a relevant domain.

RESEARCH

EVIDENCE OF PAST OR ONGOING RESEARCH THAT ALIGNS
WITH ONE OR MORE OF THE FOLLOWING

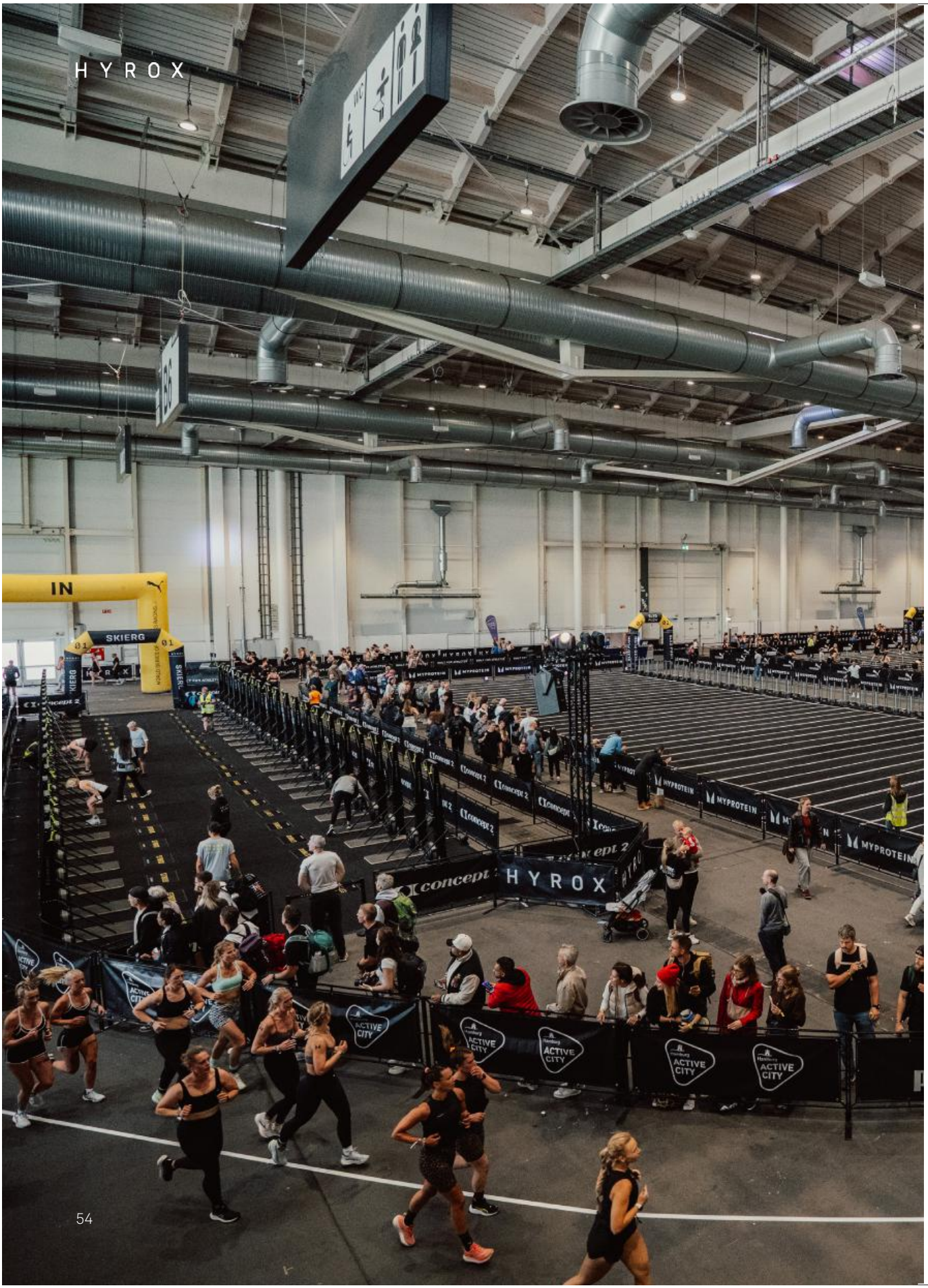
- ☐ A post-graduate qualification in a relevant field.
- ☐ Currently affiliation with a recognized university or research institution.
- ☐ A proven record of peer-reviewed research publications in a relevant domain.

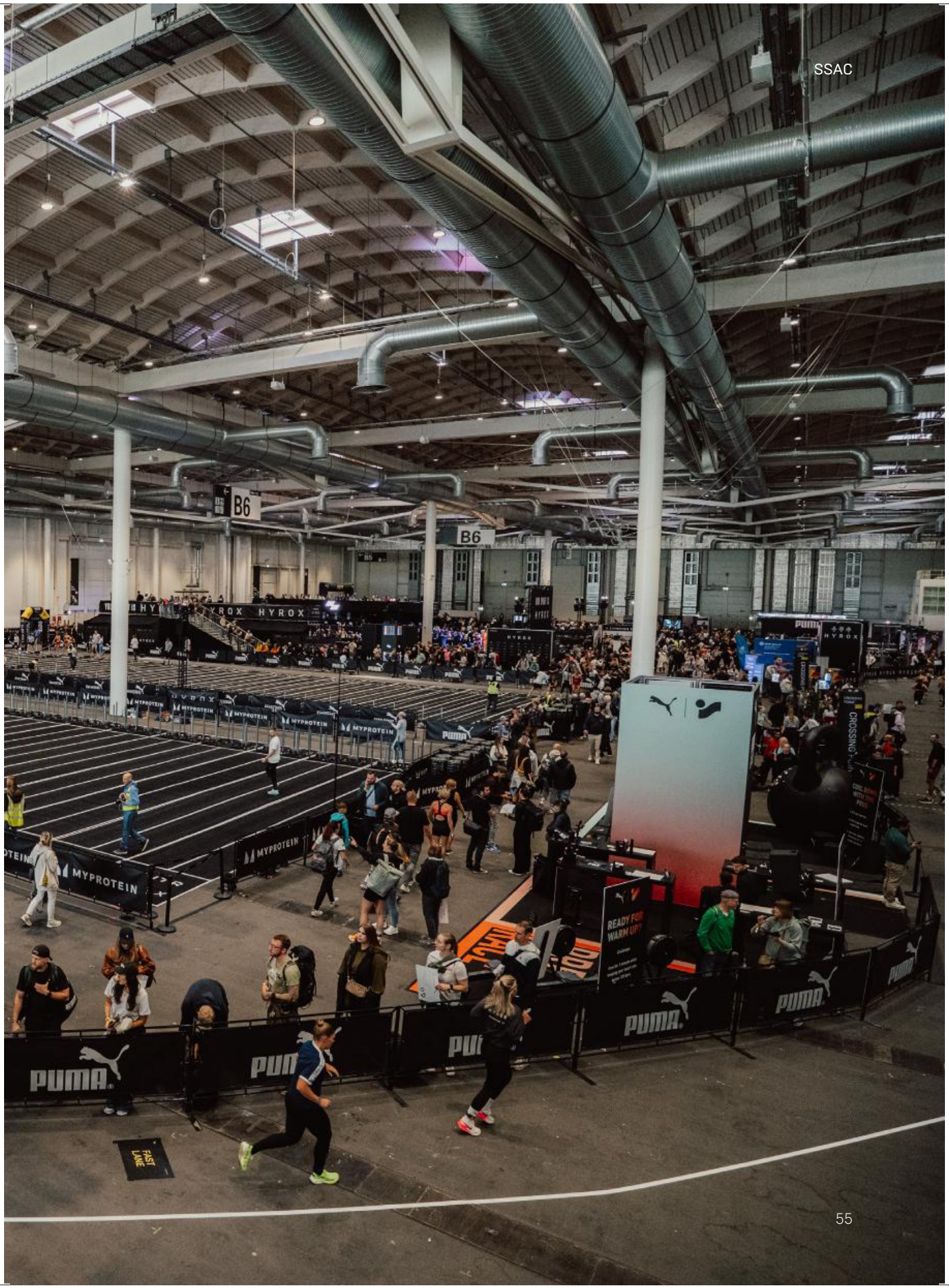
SUBMISSION

CANDIDATES MAY BE NOMINATED OR SELF-NOMINATE WITH THE
REQUIRED MATERIALS:

- ☐ Academic CV to a maximum of four pages.
- ☐ A one page statement of interest.
- ☐ Optional two publications most relevant to hybrid or applied sport performance.

SUBMIT YOUR WORK


IN
SKIERG
HYROX
MYPROTEIN
ACTIVE CITY


B6
B6
HYROX
MYPROTEIN
PUMA
READY FOR WARM UP!
FAST LANE

HYROX