



QAS



PRACTITIONER ASSESSMENT AND MANAGEMENT OF MENTAL FATIGUE AND MENTAL RECOVERY IN HIGH-PERFORMANCE SPORT

Recently, there has been increased scientific attention directed towards the impact of mental fatigue on sporting performance. Practitioners may however be less familiar with how mental fatigue relates to their athletes' performances and recovery in training and competition.

Input from current sport science and medicine practitioners, about their knowledge and current approaches to assessing and managing athletes' mental fatigue and mental recovery were collected and the results are outlined in this summary.

The results from the survey contribute to research being undertaken by the AIS and QAS in collaboration with ACU to validate assessment approaches and management strategies that have utility in the daily training and competition environment.

WHO COMPLETED THE SURVEY?

156 practitioners:



11 ± 8 years of relevant experience
male [66.0%], female [33.3%],
preferred not to disclose [0.6%]

122 different sports



Oceania [56.4%], Europe [21.8%],
Africa [8.3%], North America [7.7%],
Asia [4.5%], South America [1.3%]



professional team [27.1%],
national sporting organisations [19.3%],
national or state / area institutes [15.6%],
semi-professional club or team [15.2%],
performance centres [7.8%],
other i.e. private practice [7.6%],
university or college [7.4%]



solely elite [28.2%], a combination of; elite
and sub-elite [14.1%], elite, sub-elite, and
development/junior/academy [32.7%],
elite and development/junior/academy
only [3.2%], solely sub-elite [3.2%],
sub-elite and development [10.3%]
or solely development/
junior/academy [8.3%]

PRACTITIONER KNOWLEDGE AND CONFIDENCE



Knowledge

> 88% of practitioners reported
being "somewhat" or "not at all"
knowledgeable about mental fatigue
(88.5%) and mental recovery (94.9 %)



Confidence

>89% of practitioners reported "somewhat"
or "not at all" confident about applying
knowledge to manage mental fatigue
(89.1%) and mental recovery (91.6%)

PERCEIVED IMPACT OF MENTAL FATIGUE AND MENTAL RECOVERY

Impact summary

>96% of practitioners believe mental fatigue and mental recovery
impact training and competition performance



negative impact
of mental fatigue
in competition



positive and negative
impact of mental fatigue
in training



positive impact of mental
recovery in both training
and competition

Mental fatigue in training and competition

Table 1. Effects of mental fatigue and mental recovery on athlete(s) performance in training and competition shared by practitioners (frequency of responses)

 Effects of mental fatigue in TRAINING	 Effects of mental fatigue in COMPETITION
<p>Increase learning, adaptation, development of tolerance, resilience, and capacity (57)</p> <p>Decrease session quality (52)</p> <p>Decrease motivation, energy, enthusiasm, mood, willingness to exert effort, intention (40)</p> <p>Limit physical capability, intensity, and performance (38)</p> <p>Diminish skill-development, decision making and concentration (36)</p> <p>Representative, replicate competition demands (17)</p> <p>Improve confidence, self-awareness, self-regulation (15)</p> <p>Information on athlete state and capability (15)</p> <p>Injury, health, and wellbeing risk (15)</p>	<p>Limit physical capability, intensity, and performance (58)</p> <p>Detrimental to decision-making, concentration, focus, skill execution, technique, reaction time and attention to detail (52)</p> <p>Impact motivation, mood, energy, enthusiasm, arousal, willingness to exert effort (26)</p> <p>Decrease emotional regulation, discipline, communication, and team cohesion, increase irritation, and frustration (26)</p> <p>More apparent with pressure and importance of performance (18)</p> <p>Opportunity for learning, development, and adaptation (when appropriately prepared) (15)</p> <p>Awareness of self- and opposition- mental fatigue important for optimisation of tactical execution (14)</p> <p>Require preparation and planning, consideration of competition structure (10)</p> <p>Increase risk of injury (3)</p>
 Effects of mental recovery on TRAINING	 Effects of mental recovery on COMPETITION
<p>Better able to perform in training (51)</p> <p>Improve adaptation to training, learning and growth (32)</p> <p>Requires strategic management and effective individualised strategy identification (24)</p> <p>Better information processing, response-time, decision-making, and skill execution (24)</p> <p>Improved motivation, willingness to exert effort, freshness, and energy (17)</p> <p>Important for performance, health, and wellbeing (13)</p> <p>Important for athlete self-awareness, reflection, autonomy, and confidence (12)</p> <p>Relevant to demanding competition structure (6)</p> <p>Impact on athlete availability (6)</p>	<p>Better able to perform in competition (71)</p> <p>Improve energy and mood (29)</p> <p>Improve self-awareness, self-regulation, ability to manage-self, and cope with pressure (21)</p> <p>Refresh and reset (13)</p> <p>Improve focus, decision-making, response-time, skill execution, information processing, and cognitive functioning (11)</p> <p>Heightened importance for condensed fixtures (6)</p> <p>Influence on arousal (6)</p> <p>Practitioner uncertainty regarding appropriate amount of mental activity and mental recovery (6)</p> <p>Improve tactical execution (3)</p>

ASSESSMENT AND MANAGEMENT

Assessment



61.5% of practitioners **did not assess mental fatigue**,
76.3% did not assess mental recovery



Mental fatigue was assessed daily, around training sessions or competition, weekly, or 2-4 times per week

Mental recovery was assessed daily, or weekly



Over **23 different approaches** used to **assess mental fatigue** and **mental recovery**



Subjective indicators, and **heart-rate variability (HRV)** were the most reported assessment approaches



Response time and **response accuracy** on cognitive tasks were reported by a **small number** (see table below)



Observation of an athlete's skill and technical execution were also reported

Table 2. Approaches used by practitioners to assess mental fatigue and mental recovery in athletes, displayed as a percentage (and raw number) of practitioners reporting assessment approach

Assessment approach used	Mental fatigue	Mental recovery
Behavioural – response accuracy on cognitive task	6.8 [6]	8.6 [5]
Behavioural – response time on cognitive task	2.3 [2]	1.7 [1]
Physiological – HRV (used deliberately to assess mental fatigue)	11.4 [10]	15.5 [9]
Physiological - EEG	2.3 [2]	1.7 [1]
Physiological - fMRI	1.1 [1]	1.7 [1]
Physiological - cerebral haemodynamics (e.g. cerebral bloodflow, fNIRS)	0.0 [0]	0.0 [0]
Subjective – Likert scale format	26.1 [23]	25.9 [15]
Subjective Tool – other (e.g. ARMS, SRSS)	14.8 [13]	13.8 [8]
Subjective – 100mm VAS scale format	10.2 [9]	6.9 [4]
Subjective – NASATLX (or adapted)	2.3 [2]	1.7 [2]
Other	22.7 [20]	22.4 [13]

MANAGEMENT



55.8% did not deliberately manage mental fatigue

38.5% of mental fatigue management was during training

45.6% did not deliberately manage mental recovery



Mental fatigue is most commonly **planned** or **periodised** during the **pre-season**

Weekly, or 2-4 times per week were indicated for both inducement of mental fatigue and enhancement of mental recovery



Multiple approaches were used to induce mental fatigue or enhance mental recovery



Approaches to induce mental recovery included: withholding information on the session plan, deliberate scheduling, deliberate repetition, deliberate inducement of physical fatigue, manipulating exposure to recovery options in relation to specifically induced training stress, and performing cognitive tests when fatigued



Approaches used to enhance mental recovery included: consultation with a psychologist, meditation, self-talk, well-being journals, flotation tanks, yoga, progressive muscle relaxation techniques, and listening to relaxing or upbeat music



Athlete self-selection or choice of mental recovery strategies was strongly supported

Table 3. Approaches used by practitioners to manage mental fatigue and mental recovery in athletes, displayed as a percentage (and raw number) of practitioners reporting management approach

Management approach used	Inducement of mental fatigue
Manipulation of technical or tactical drill demands	51.3 (60)
No taper into nominated competitions	17.9 (21)
Manipulation of video or performance analysis	12.0 (14)
Restriction of caffeine intake	5.1 (16)
Restriction of carbohydrate intake	5.1 (6)
Brain endurance training	3.4 (4)
Other	3.4 (4)
Sleep deprivation the preceding evening	1.7 (2)
Restriction of creatine intake	0.0 (0)

Management approach used	Enhancement of mental recovery
Mindfulness	13.4 (58)
Directing time away from daily training or competition environment	12.4 (54)
Breathing techniques	11.8 (51)
Debriefing	11.8 (51)
Avoidance of social media	9.4 (41)
Exposure to restorative environments	8.3 (36)
Povernaps	8.1 (35)
Mental imagery	6.5 (28)
Avoidance of media engagement	5.8 (25)
Music – other	4.1 (18)
Mental detachment	3.9 (17)
Other	2.3 (10)
Psychological techniques – other	2.1 (9)
Music – binaural beats	0.2 (1)
Transcranial direct current stimulation	0.0 (0)

WHICH PRACTITIONERS ARE RESPONSIBLE?



Practitioners reported **that all performance support roles** (coach, strength and conditioning skill acquisition, psychologist, high-performance manager, sports scientist, athlete wellbeing, physiotherapist, dietician / nutritionist, and medical physician) are **somewhat responsible** for inducing mental fatigue and enhancing mental recovery

Practitioners reported the **coach** to be the **most important** role

WHERE DO PRACTITIONERS GET THEIR EVIDENCE?



A **range of sources** used to inform practice on assessing and managing athlete mental fatigue and mental recovery

The **5 most reported sources** of evidence used are: colleagues, peer reviewed research, podcasts, websites and blogs, and attendance at conferences and seminars

WHAT DO PRACTITIONERS REPORT AS CHALLENGES TO ASSESSMENT AND MANAGEMENT?



WHAT CAN PRACTITIONERS DO TO UNDERSTAND MENTAL FATIGUE AND MENTAL RECOVERY?

Whilst the sports specific evidence-base regarding assessment and management of mental fatigue and mental recovery in athletes continues to be advanced, some starting pointers for practitioners include:



- Discuss mental fatigue and mental recovery when designing and implementing training



- Use observational approaches to gauge mental fatigue experienced by athletes and their need for mental recovery. Use [Table 1](#) in this summary as a matrix or guide.



- Be actively cognisant of mental fatigue and mental recovery, alongside more commonly evaluated and manipulated aspects of fatigue (e.g. muscular, nutritional) when periodising athlete training and competition





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