

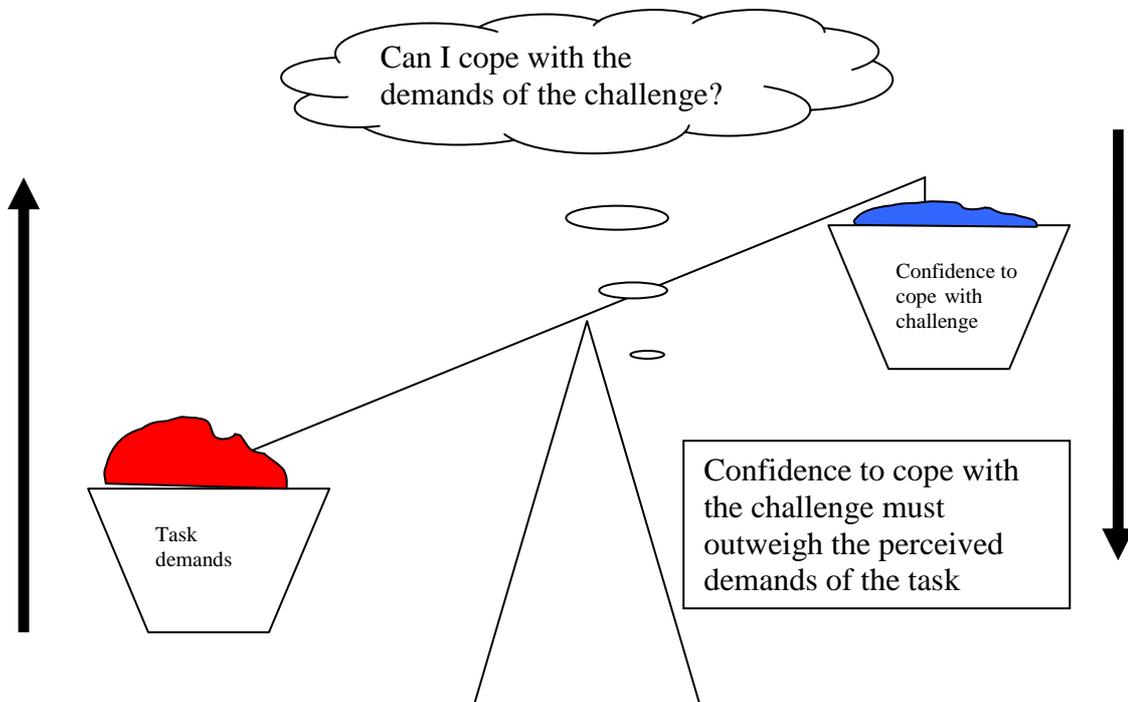
## Long-distance open-water Swimming: Physical and mental toughness

### At a glance

Distance swimming requires physical and mental toughness. Swimmers must develop strategies to cope with exposure to the cold and the open water leaning to manage their self-talk, goals and emotions. A systematic approach to training can develop mental and physical toughness.

Imagine the scene; it is 5 o'clock in the morning and you're about to walk into the sea at Dover with the intention of swimming the English Channel. You will be swimming in a dark, cold and lonely environment. Not surprisingly, performing in such conditions is likely to lead to asking yourself a question such as: What am I doing this for? Can I keep going? Sport psychologist Professor Andy Lane and sport physiologist Professor Greg Whyte focus on the psychology and physiology of preparation for long-distance swimming with an emphasis on Channel swimming. Professor Whyte supported David Walliams (Little Britain) successful Channel swim.

Figure 1: The balance between the demands of the task and confidence to cope: The starting point must be to believe that these scales can be balanced



### Establishing the goal and developing a plan

The first step is to identify the goal. Distance swimming events are not something to be entered into casually or at the last minute. They tend to be events that athletes commit to a long-time in advance. It is important not to enter such events without giving due consideration to the difficulties of the task. For example, a number of swimmers have died trying to swim the English Channel, and with a success rate below 40%, thousands have failed. Following David Walliams successful Channel swim, several celebrities have postulated about swimming the Channel themselves. Whilst such claims are praiseworthy if they lead to individuals engaging fully with exercise programmes, in many instances, they represented a gross underestimation of the difficulty of the task. Walliams' seemed to have engendered a message to such people that "if he can do it so can I". Many people identify Walliams as a comedian on the show Little Britain rather than an elite endurance athlete, and therefore, swimming the channel must be achievable. Distance swimming requires physical and mental toughness and this article focuses on how to prepare for such a challenge.

After establishing the goal, it is then worth reflecting on why you want to achieve this goal and how much it means (see Figure 2). At this point it is worth getting a piece of paper and on one side of the paper recording the reasons why you want to achieve the goal. On the other side of the paper, you should record what the barriers to attaining the goal are likely to be.

Figure 2: Planning Goal Achievement

Goal: "Swim the channel"	
Reason for involvement	Barriers for goal achievement
1. "Achieve an important personal goal"	"Will find it difficult to find time to train; especially during busy periods at work"
2. "Be able to push myself harder than I thought"	"Times when I do not feel like training; when I want to do the 'hard' training on a different day."
3. "Enjoy swimming"	"Days when starting training when feeling tired"

Unless a swimmer has attempted to swim the Channel before, he/she will not know the size of the challenge. Identifying barriers to goal completion is difficult as the athlete can only guess how hard the challenge will be. They tend to have an idea on how hard they are prepared to push themselves, but do not know whether they will be able step up to the challenge. The programme should reflect the physiological and psychological demands that are needed.

Training for open water swimming performance should focus on 2 key areas: physiological performance and open water experience and habituation. Open water swimming is now part of the Olympic programme with races over 10 km will be contested at the 2008 Beijing Olympics. In the main, open-water swimming events are endurance and ultra-endurance in nature with durations ranging from 1 hour to ca. 15 hours. Accordingly training is dependent upon the race distance and the underlying determinants of the performance, primarily endurance based. A significant factor in open water swimming is the experience and habituation (this term is preferred over 'acclimatisation' as very little acclimatisation takes place in response to cold-water exposure) to open water. Most open water swimming events are in cold (<18°C) water resulting in a significant cold induced stress. Humans are homeotherms that must control core body temperature within narrow limits to maintain normal function and survival. Maintaining core temperature is achieved through a balance of heat production (a by product on energy production) and heat loss. Water is 25 times more conductive than air leading to a 4 fold increase in heat loss. In open cold water heat production becomes essential in maintaining normal function. At rest humans produce around 100 Watts rising to 1500 Watts during exercise. Thus, a high-energy turnover power output (speed) must be maintained. In addition to core temperature peripheral and skin temperatures play an important role in open water performance. When cooled peripheral nerve conduction velocity falls by 15ms<sup>-1</sup> for every 10°C and muscle power output falls 3% for every 1°C fall in muscle temperature, thus reinforcing the need for maintenance of power output to reduce the deleterious impact of cold on performance. The cold shock response occurs immediately on submersion in cold water leading to hyperventilation and a dramatic fall in breath hold time (the leading cause of drowning).

There are limited adaptations to cold water; however, acclimatisation (habituation) can reduce the cold shock response. Other factors associated with open water swimming include the hypertonic environment of sea water with a 3.5% sodium solution compared with 1% in cells. This hyper-saline environment leads to significant problems with feeding and abrasions that can have a profound effect on performance. Habituation (experience) is fundamental for the successful open water swimmer. In addition to coping with the physiological impact of the cold sometimes saline environment the ability to navigate, control and maintain pace whilst coping with the prolonged isolation of often opaque, deep water with the fear of wildlife makes open water swimming a significant physiological and psychological challenge.

Once the programme has been developed it is important to see how the short-term goals link to achieving long-term goals. Swimming the Channel involves completing ca. 40,000 strokes.

It is important to develop a mindset in which goal attainment is seen as the product of achieving minor goals. A key question the swimmer should pose themselves during moments of difficulty is: Can I swim one more stroke? The answer will almost always be a definite 'Yes'. It is worth unpacking why the swimmer believes this is achievable. At the point when a person decides to stop such a challenge, a key question to ask is: what thoughts and feelings were experienced at the time? The athlete would have provided a reason to justify stopping. Unpacking the decisions made to stop will provide insight into how to develop a greater sense of reliance in being able to cope with extreme fatigue in extreme conditions. Underpinning achieving the goal of swimming a long-distance is the attitude that it is achieved by swimming one stroke at a time. Once the swimmer has accepted that goal attainment is achieved by swimming 1 stroke at a time, extending swims from 1 hour to 2 hours is not so difficult.

### Managing the experience

Long-distance swimmers need to be confident that they can manage swimming in cold open water. Research shows that athletes experience considerable mood fluctuations during long duration-intense exercise<sup>1</sup>. A long-distance swimmer can expect to experience waves of fatigue. Fatigue can be accompanied by other emotional states such as anger and anxiety, or fatigue can be accompanied by feelings of satisfaction. In cases where athletes experience a range of debilitating emotional states such as fatigue, anger and sadness, this tends to be accompanied by both negative self-talk and negative images. It is important to recognize that these are emotional states are transient, and if the athlete can use strategies to change these emotions from negative to positive or to neutral, the accompanying self-talk and images tend can change to be positive<sup>2</sup>

In an event that lasts several hours athlete should expect to feel fatigued. Open water, distance swimming is no different; waves, wind and sea conditions are analogous to the runners going over hills. However, it is how the athletes learn to cope with these feelings that is important. Developing data on emotional and cognitive changes experienced during hard exercise is the starting point for intervention work. This can be done retrospectively by asking athletes how they felt during certain parts of an event and what type of things were they saying to themselves when experiencing these emotions. The practitioner should encourage the swimmer to challenge the link between emotions and self-talk; questioning whether it is possible to interpret fatigue without the accompanying unpleasant emotions. Evidence shows that when an athlete feels fatigued, this could be interpreted as indicative of goal achievement drawing closer. In such a scenario fatigue is likely to be accompanied by excitement and joy. In addition, athletes experience fatigue and happiness simultaneously when achieving a challenging goal such as completing a marathon<sup>3</sup>. Strategies designed to improve self-talk have been found to effectively cope with performance-related stress<sup>4</sup>.

Recent research proposes that using "if-then"<sup>5</sup> rules can be an effective strategy for emotion management. If-then rules work by reinforcing the link between the undesired thoughts and emotions and the desired behavioural response. Using the retrospective data on emotion and self-talk, it is worth exploring different coping strategies. An effective strategy in swimming is to develop the mindset that goal completion is achieved one stroke at a time. Focusing on technique can be an effective strategy to disassociate with fatigue. A second strategy that has found to be an effective way of dissociating with fatigue is listening to music. Swimmers will need to hum songs and engaging with this song can be helpful. Music can be helpful through synchronising with the rhythm of being motivated by the lyrics<sup>5</sup>

### If-then rules

1. Explore potential parts of the events where negative image and thoughts can creep in. Record this information.
2. Develop desirable alternative scenarios for negative events
3. Make if-then rules for each scenario
4. Repeat each if-then rule in the morning and then again before training.
5. Record in your training diary the effects of if-then rules on coping with stress.

### Focus Box: If-Then Rules used in Open-water distance swimming

<i>IF</i>	<i>THEN</i>
"If I feel cold"	"then I must concentrate on my technique and use self talk to change

	thinking towards warmth until these feelings pass”
“If after 5 hours I feel like this I will never make it”	“Then I will dissociate with swimming for a while by humming the tune of selected songs”
“If I start to feel sick and start to vomit”	“Then I will inform my support crew and allow them to make the appropriate choice of intervention i.e. mouthwash, for the next feeding stop”
“If I start to get stiff”	“Then I will run through my stretching routine at the next feeding top and alter my stroke to offset the stiffness”
“If I start to think about how long I have been going”	“Then I will shift my thoughts to pre-planned approaches to move my thoughts from time i.e. running through favourite films”
“If I start to think that I will not be able to get into shore, having been able to see the coast for hours”	“Then I will focus on swimming reinforcing the message to continue putting one arm in front of the other”
“If I start to concern myself with water lies beneath me in the opaque, depths”	“Then I will reassure myself that there is nothing to fear and reinforce the positive elements of prior experience”
“If I start to doubt my ability to cope with the cold, or the distance or the environment”	“Then I will use positive self talk drawing on my training and experience to reinforce my proven ability to cope with the challenge” also “Then I will think, can I swim for 30 minutes (the time to the next feed), breaking down the swim into manageable chunks”

Some athletes prefer to focus on external factors to swimming such as what they will be doing in a week’s time. However, strategies that try to disassociate completely with the task at hand can be de-motivating and lead to further increases in unpleasant emotions. Such strategies tend not to be successful, because the individual finds it difficult to disassociate with the primary task. When an athlete starts thinking about doing more desirable things, this can lead to questioning why he/she is engaging in such a difficult challenge.

### **Preparation for the event**

It is easy to be daunted by the prospect of having to spend over 10 hours swimming in cold, dirty and choppy water. The event needs to be broken down into small manageable chunks. Whilst this approach to goal setting has been well voiced, relatively less attention has focused on managing the expected thoughts and emotions that will be experienced at key points during the performance. Preparing to manage these experiences should be considered carefully. In addition to using “ if-then rules”, imagery scripts should be developed in which the swimmer re-enacts coping successfully with difficult phases of the event. Imagery needs to be based in the experiences of the swimmer. This is why it is crucially important to have experiences that are similar to those that will be experienced in the event.

It is difficult to replicate all relevant experiences. Of the most challenging experience to replicate is coping through excessive fatigue. It is possible to construct a practice to replicate coping with excessive fatigue, but this needs careful management of psychological and physiological responses. It is a highly important to get the athlete to buy in to the value of this approach. The athlete needs to see this type of training session as an opportunity for psychological and physical preparation; in short, they need to see the value of being able to cope with extreme fatigue in environmentally challenging conditions. As indicated previously careful management is needed. Repeated bouts of a hard exercise will deplete physiological resources and in turn will lead to a persistent and consistent state of fatigue (4). Studies indicate that athletes can experience overtraining during such training cycles. Moreover, overtrained athletes do not recover following appropriate rest. The mechanism to explain why overtraining occurs is not fully understood. We argue that beliefs on the influence of fatigue on performance and well-being are highly important in the development of adaptive responses to repeated bouts of hard training. Athletes need to accept that they will experience intense feelings of tiredness following hard exercise. Whilst most athletes can accept this position, difficulties start arising when an athlete feels that they underperformed during training. Believing that you underperformed during training coupled with feeling downhearted, is a combination of feelings that can exacerbate feelings of fatigue. This will lead to a downward spiral of negative mood and poor performance.

Replicating the most difficult part of the event will require the individual to be in a highly fatigue state and asked to produce high-quality performance. There are several different ways to exacerbate a highly fatigue state; back-to-back hard training sessions, inadequate nutrition, and poor sleep strategies that have been used previously. After getting the athletes in this fatigue state, the athlete should spend more time mentally preparing before the session starts. Although the mental preparation should be a part of every session, this is an opportunity to further enhance beliefs that he/she has the ability to cope with extreme fatigue in environmentally challenging conditions.

Adopting training approaches that use multiple episodes of training leading to high levels of fatigue are valuable in replicating both the physiological and psychological stresses associated with open water swimming. Using multiple sessions in a single day and prolonged sessions on consecutive days are common practices in open water swimming. Classical preparatory sessions for English Channel swimmers are ca. 6-7 hour swims on consecutive days. In adopting this type of approach the swimmer is able to develop proactive strategies for dealing with the challenges of open water swimming detailed above in both a non-fatigued and a fatigued state. Furthermore, replicating start times that are often in the dark and preparing to finish in the dark assist in preparing the swimmer for worst case scenarios and developing coping strategies for those eventualities. Effective preparation involves maximising the use of the full range of likely experiences.

### **Conclusions**

Distance swimming requires physical and mental toughness which can be developed through guided training. Exposure to swimming in open water can build a base of successful experience which the swimmers can use as performance reminders. Psychological preparation in terms of anticipating extreme fatigue through engaging in self-talk, using imagery and 'if-then' rules should be routinely employed.

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<sup>1</sup> A.M. Lane (ed.), *Mood and human performance: Conceptual, measurement, and applied issues* (pp1-34). Hauppauge, NY: Nova Science.

<sup>2</sup> *Journal of Sports Science and Medicine*, 4, 52-57. <http://www.jssm.org/vol4/n1/7/v4n1-7text.php>

<sup>3</sup> A.M. Lane (ed.), *Mood and human performance: Conceptual, measurement, and applied issues* (pp265-274). Hauppauge, NY: Nova Science.

<sup>4</sup> *Journal of Experimental Social Psychology*, 43, 295-302.

<sup>5</sup> *Journal of Experimental Social Psychology*, 43, 295-302.

<sup>6</sup> *Journal of Sports Sciences*, 24, 899-909