

Mental Preparation for Competitive Sprinting

Andrew Cruickshank¹, Susan Giblin¹, and Dave Collins^{1,2}

¹University of Central Lancashire; ²Grey Matters for Performance Ltd

Accepted author version for:

Cruickshank, A., Giblin, S., & Collins, D. (2015). Mental skills training in sprinting. In G. Platt (Ed.), The Science of Sport: Sprinting (pp. 153-164). Ramsbury, Wiltshire: Crowood Press.

In previous chapters, a detailed picture has been painted on what peak performance in sprinting looks and feels like. This has included ways in which it can be achieved through coaching, conditioning, physiological, biomechanical, analytical, and lifestyle support. In this section we take up the baton and look at the mental factors behind peak performance. In doing so, we identify some of the most important mental qualities and skills that help athletes to prepare for and perform when it matters most.

We begin by presenting a model which we have used to help athletes to develop and deliver on their abilities. We then consider some key mental skills which then help athletes to best use this model. After this we look at planning and organisation, covering processes that can be engaged on competition day. In the last section we describe some mental skills that can be applied from the warm-up all the way to crossing the finishing line (or handing over the baton). Like sprinting itself, we cover our ground quickly and hopefully successfully!

Promoting Peak Performance – A Guiding Model

Our model for guiding peak sprinting performance is provided in Figure 1. As shown, its structure is made up of three major parts: *components*, *plan*, and *execution*.

****FIGURE 1 HERE****

This model is based on the idea that peak performance relies on an athlete having the “right” attributes, combined together in the “right” plan, and delivered with the “right” execution. Although we say “right”, it is important to remember that there is no single “correct” set of attributes, plan, or execution strategy. Rather, each of these is shaped by the unique physical, technical, tactical, and mental attributes of each athlete (as well as their competitive level and goals). The exact nature of this individual “blend” may also vary from race to race, and will definitely evolve throughout an athlete’s career.

Similar to performance profiling^[1], identifying and working on the factors that help to deliver peak performances provides athletes with a model against which their training can be designed and evaluated. This approach also encourages a *process* orientation; one in which the athlete recognises and works on the things that *lead to* them running the quickest. This is especially useful when there are no key events on the horizon and therefore no “competitive buzz” to harness. As events approach, particularly important ones, the identified components are then packaged into a specific plan for the event’s specific conditions (e.g., indoors/outdoors; domestic/international) and demands (e.g., the need to hit qualification times; the presence of rivals). Finally, this plan is then delivered through a well-rehearsed execution strategy, which is again designed for the specific contexts of specific races. Before addressing the planning and execution phases of the model in more detail, we now identify some core psychological skills which help to develop, consolidate, and refine the components of peak performance.

Developing and Optimising the Components of Peak Performance: Expert Goal Setting

While identifying the components of peak performance is important, athlete success largely depends on core mental skills. Indeed, excellence most often comes from goal setting, planning and organization, commitment, focus and distraction control, imagery,

coping with pressure, quality practice, self-awareness, self-regulation, grit, resilience, seeking and using support networks, and realistic performance reviews^[2,3,4,5,6,7]. As athlete development is based on a cycle of ‘target-plan-do-review’, we focus here on goal setting.

Important for creating, focusing, and sustaining motivation^[8,9,10], we are yet to meet any athlete (or human!) that does not use goal setting to at least some level (e.g., ‘I want to win the next race’). Less common, however, is the expert use of this technique. Specifically, best practice depends on a detailed consideration of the *nature*, *content*, and *packaging* of goals. In terms of their *nature*, goals can be divided into three types which can be used on their own but ideally in combination. These three types are: process goals, performance goals, and outcome goals^[11,12].

Process goals: relate to the *process* of performance – in short, the factors required to perform a task at a desired (and realistic) level. These goals encourage a focus on the task at hand, motivation to do the task well (rather than the outcome of winning), required behaviours, and appraisal against the task or one’s prior performance on the task. As an example, a common process goal in sprinting may be to improve the explosiveness of one’s start out of the blocks.

Performance goals: relate to *performance* on a task. These goals are useful for directing focus toward required behaviours or enhancing competitiveness (either against one’s personal bests or other athletes). Continuing our example above, a common performance goal for an athlete seeking to improve their starts may be to work towards hitting 10m in a specific time.

Outcome goals: relate to the *outcome* of performance – in short, the result achieved.

Motivation from this type of goal is usually based upon winning or beating others.

Outcome goals are arguably the most magnetic of all and it takes much discipline to remain focused on the process of performing on the day; in short, to stay focused on what you need to do as opposed to what it might be like if you won. Continuing with our prior example, an outcome goal for an athlete working on their starts may be to reach the first 10m ahead of their training partners or known performance of others.

Given their different implications, each type of goal is useful for one purpose or another; the trick is knowing which goals to set for what purposes, when, and in what combination.

Although the *content* of goals (i.e., what they focus on) will depend on the particular task or objective, athletes and their coaches/support teams would also do well to follow the SMART^[13] or SMARTER principle. As much as possible, goals should ideally be specific, measurable, adjustable (or agreed with coach/support team), realistic, time-locked, exciting, and rewarding. However, as many athletes often want more than what they've got and to do better than they've done before, a handy “bolt on” is setting “multi-level” goals. So, if a realistic target is one that the athlete should be hitting roughly 70% of the time, then this is taken as a ‘level 1’ goal; achieving this would be ‘good’ and progress made. Pat on the back! To account for the “I want for more” factor, ‘a level 2’ target would then reflect a level that the athlete may have a 40% chance of achieving (equalling a ‘great’ effort). Finally, a ‘level 3 target’ may then be one that the athlete has a 10% chance of hitting (equalling a ‘HOW PHENOMENAL WAS THAT?!’). In this way, athletes can recognise different levels of success and make an effort to really push beyond their limits (which are often self-imposed).

Finally, expert goal setting also requires targets to be *packaged* effectively. One of the most effective ways of achieving this, in our experience at least, is through application of

a “nested” approach^[14,15,16]. As shown in Figure 2, this involves setting short-term targets (e.g., daily/weekly goals) which are nested within medium-term targets (e.g., multi-month training blocks). These medium-term targets are then nested within long-term targets (e.g., extending over the length of a full season/multiple seasons). This structure therefore helps athletes to engage with day-to-day activities which support their medium and long-term goals (and vice-versa: see feed-forward/feed-back loops in Figure 2). It also helps to keep athletes adaptable, focused on *process*, and continually working toward (and not against!) the ‘bigger picture’. For example, an outcome goal of “I want to win my next big race” can be helpfully shaped into “if I want to win *this* major race in 4 years, then I’ll probably have to finish in the top 3 at *that* race in 6 months if I’m going to be on track.”

FIGURE 2 HERE

Planning for Peak Performance “On the Day”

As peak events get closer, attention should start to move away from how components may be improved towards how they can be packaged into the best plan for race day. Indeed, while it is tempting to “tinker” (i.e., to try and make things as ‘perfect’ as possible), there is a point where athletes need to accept and build confidence in ‘the cards they’ve got’. Hopefully this is a strong hand but if it isn’t, too much tinkering close to the event will make it even worse! Similarly, the best plans are created well in advance of race day so that they do not distract the athlete during final training phases, yet kept open enough for finer details to be included when event schedules and conditions become known. We now consider how planning at ‘macro’ and ‘micro’ levels can support peak performance on the day.

Macro-Level Planning: Race Day Planners

Race day plans have three key core roles: 1) to set out exactly what the athlete is going to/has to do before competing; 2) to reinforce the athlete's strengths/confidence; and 3) to prevent (or minimise) 'noise' from potential disruptions. Indeed, although it may seem impossible that an athlete could arrive at a major event without an important bit of kit, this can and does happen! As the pressure of competition can ignite even the most fireproof of situations, things that have never been noticed or gone wrong before must also be treated as possible disruptors^[17,18]. By anticipating various situations and developing strategies to deal with them, race day plans therefore help to avoid the challenges and errors of "thinking under pressure" when unexpected events are faced in competition (e.g., delayed start time).

On these principles, the race-day planner in Figure 3 includes key primary behaviours (i.e., obvious functional tasks), coping behaviours (i.e., planned responses to challenges), and outcomes (i.e., what the athlete wants to be thinking/feeling at different stages)^[19]. Also included are other important preparation behaviours (e.g., mental rehearsal). Please note that this planner relates to preparation for the first race of a day, or a day when there is only one race. Planning for multiple heats over multiple days will clearly require an extension of this outline, and the inclusion of more strategic components (e.g., tactics, such as laying down an early marker or slipping under the radar to set up a big impact in the semis/final). A planner for use ahead of a relay would also include team-oriented content.

****FIGURE 3 HERE****

By setting out physical and mental activities against specific time slots, this planner encourages a sense of control, reduced/manageable anxiety, and protects against avoidable errors. Additionally, by ensuring that the content of the plan is led by the athlete and includes key guiding phrases, this can also frame self-talk in the lead up to an event. Importantly, all

of these outcomes help athletes to get and then stay in their *individual zone of optimal functioning*^[20] (i.e., when they experience an optimum mix of emotions). It should be noted that Figure 3 can also act as a template for the race day planners of coaches and other support team members. More specifically, any individual involved at the event can use this to detail their own schedule and the behaviours, thoughts, and emotions that allow them to perform at their own peak. Additionally, these planners are often best developed with the help of others. In the case of the athlete, for example, input should be sourced from the coach(es) and any other relevant members of the support team (e.g., physiotherapist, psychologist). This open discussion can help to make sure that all areas are considered as well as optimise team-level involvement and commitment. Importantly, all of these features can optimise the athlete's feelings of control, support, and confidence in the lead up to race day, as well as on the day itself. By having a shared understanding of ideal preparation for the athlete, these plans can further help to keep all members of the team on the same page; especially handy in the 'white heat' of competition where distractions are plentiful.

By its nature, the race day planner encourages a focus on the *process* of performance rather its potential outcomes. However, although these plans are highly detailed and include apparently obvious activities (e.g., packing snacks and fluid before departure to the venue), this does not mean that they should be rigidly adhered to if this is not required. Indeed, the race day planner might be most successfully used as a 'check and balance' tool, allowing for a level of adaptability and improvisation to deal with any truly unexpected events (i.e., those which have not been prepared for). That said, some athletes will benefit from adhering tightly to this plan. As with any skill or technique, using the planner as a reminder or more as a strict guide should be based on the individual's needs and preferences.

Over the long-term, developing and using race day planners for *every* event increases the chances that beneficial behaviours will be engaged before competing. More specifically,

as the planner provides a reminder to use behaviours that optimise preparation and ultimate performance, which are then reinforced by the consequent feelings of control and confidence, athletes are then more likely to use these at the next event. Indeed, if these race day planners are consistently applied, individuals will soon recognise when they are missing! Importantly, by seeing the athlete feel comfortable and confident, these outcomes are then also likely to be experienced by the coach and other support team members. Finally, the race day planner can also be used to help athletes (and others) evaluate the *full* process of their performance on the day (as well as the race outcome itself). As part of a thorough review that supports long-term development, focus should centre on the plan's success in preparing the individual, as well as its usefulness for dealing with the expected *and* unexpected challenges of competition. This process can then lead on to the continued refinement of race day planners for the future.

Micro-Level Planning: Pre-Performance Routines

Having developed a plan for managing the broad period before an event, another more detailed plan can then be used from beginning a warm-up right up to the firing of the starting gun. Indeed, while peak performance requires the seamless transfer of skills from training^[21], the perceived pressure to perform often gets in the way of this process as the event nears. In this way, developing and using a pre-performance routine (PPR) can be a reliable way to get (and stay) physically and mentally switched on.

Used to create a sense of control and prime the athlete's neuromuscular system during physical warm-up^[22], PPRs relate to behaviours, emotions, and thoughts^[23]. As one example, the "PPR Funnel" that we have used with athletes is shown in Figure 4. While the timing and content will vary across athletes and events, the outline shows how mental and physical processes can promote a focus on the task, appropriate arousal, and confidence. A trigger is used to initiate the athlete's entry into the funnel (e.g., a certain time before the race start) and then further triggers used to prompt progress through each phase (e.g., walking out onto the

track). As the PPR picks things up where the race day planner left off, athletes are therefore aware of what they should be doing at all times before the race and (hopefully) feel in control and confident. PPRs can also play a key role when athletes are faced with unexpected events. For example, an athlete can adapt their PPR to handle delays in the call room or false start situations – we discuss this in more detail later. For now, it should be noted that back-up planning should be included when developing a PPR (as shown in Figure 4).

****FIGURE 4 HERE****

Of course, athletes in relay events will need to adapt their routines to include team-based processes (e.g., team communication, baton practice). Although the routine of the first leg runner may not vary much from that used for their individual events, the rest of the team must prepare themselves for additional challenges – again, more on this later. For the moment, and as a particularly effective aspect of preparation, we now discuss pre-performance imagery.

Imagery

As imagery engages the same areas of the brain that are used in real experience, this skill can be applied to warm-up for a task without physically doing it^[24]. In this way, athletes should include visual, auditory, emotional, environmental, and kinaesthetic information to enhance the vividness and impact of the produced images^[24]. For example, athletes can imagine themselves walking confidently onto the track, feeding off of the noise from the crowd, getting set in the blocks, anticipating and then hearing the starting gun, exploding from the blocks, hearing their foot-fall, forcefully exhaling, pumping their arms and legs, lifting their head and fixing gaze on a point beyond the finish, and powering to the line.

In terms of movement, athletes are advised to rehearse their *full* sprinting action rather than individual parts of their technique immediately before racing. Indeed, such routines are

best conducted with ‘real rhythm’ in ‘real time’ to replicate the actual flow and duration of peak performance^[24]. Imagery should also be performed under similar physical conditions to real performance; for example, when warming-up starts in full race kit and with a raised heart rate. It should also be relative to what the athlete can deliver (so not imaging skills they have never demonstrated before). Imaging performance from one’s own view, as if watching oneself on television, or a combination of both can be effective depending on the individual needs of the athlete and the purpose of the imagery.

As well as warming up movement, imagery also plays a key role in mood-regulation and motivation; outcomes that are especially useful for coping with the uncontrollable and unexpected features of competition. For example, when heat and lane draws are made, the athlete could add this information to their imagery routine and produce a more specific rehearsal of their race plan (as deployed during their PPR). Imaging oneself coping with the challenges of the call room can also help athletes to maintain focus, manage arousal levels, and promote confidence when space to engage in physical warm-up is limited.

Promoting Optimal Rhythm

As well-learned skills often break down when efforts are made to explicitly monitor them (i.e., move right leg like this, then left arm like that, etc.)^[25,26,27], a focus on kinesthetics, speed, sound, or rhythm encourages athletes to focus on global movements that are linked to top performance^[28]. More specifically, ‘holistic cues’ such as the sound of one’s foot-fall can promote optimal rhythm and reduce conscious control and overthinking. Indeed, research shows that pre-performance strategies that include holistic, movement-based cue words (e.g. ‘BANG’) can promote automatic and efficient skill execution^[29].

Promoting Automatic Control

As athletes approach the blocks and take their marks, the volume of thinking should further decline with focus now on the final cues that sustain attentional focus, emotional set,

and physical readiness. To promote automatic control (when racing feels effortless, involves little conscious thought, and time flies) it is important that these triggers encourage a narrow focus of attention and direct this toward race-relevant factors. As an example, one useful strategy involves the athlete fixing their gaze on a point past the finish line (known as the ‘quiet eye’)^[30]. This technique has been associated with decreased conscious thought and extended subconscious processing of the task at hand^[31]. Additionally, auditory triggers also play an important role in helping athletes to react to the starter’s orders. For example, an athlete could focus on their breathing rhythm until called to their marks by the starter. At this point the athlete could respond by performing a few vertical jumps, and then deeply inhaling and exhaling before settling into their blocks. On hearing “set”, the athlete focuses on taking a sharp intake of breath and then forcefully exhaling when the starter’s gun is fired.

While this normally marks the end of a PPR and start of the execution, in other cases problems are presented by false starting (either by the athlete themselves or their competitors). Given the chance of this occurring (or any other distraction), a “secondary PPR” or recovery mechanism can help to manage the increased pressure to control reactions in the second start, prevent over-hesitation, and channel the adrenaline derived from the initial start. For this, a combination of instructional self-talk (i.e., telling yourself what to do) and behavioural triggers can be used to regain control and to then guide re-entry into the original PPR funnel at the correct stage. For example, on experiencing a false start an athlete may:

1. Use self-talk to self-instruct and reframe the situation: “OK – relax and go again. Nothing’s changed.” [*conducted on walk back from stopping point on track back to the blocks*]

2. Visually fixate on their blocks to avoid any distractions from other athletes/to maintain focus on the job [*used on walk back from stopping point on track back to the blocks*]
3. Use their passing of their blocks on the walk back as a trigger to check for any unwanted physiological and mental tension – big exhale of breath at this point to “re-set”
4. Use self-talk to re-enter final phase of main PPR and get into its rhythm (“Re-enter and rhythm”)

Clearly, the content of this secondary routine will depend on each athlete. Additional self-talk that offers self-assurance and reinforcement may also be required if it was the athlete who false started rather than a competitor.

In-Race Processes

To protect (or recover) automatic execution during a race, a focus on something in the external environment is usually more beneficial for skilled athletes than a focus on internal states (e.g., fatigue) or technical elements (e.g., arm positioning). As such, athletes are often best to also focus on auditory cues during the stages of a race to prevent their thoughts from interfering with automatic execution; such as footfall or respiratory rhythms. If auditory cues are difficult to sustain due to noise from the crowd, a single cue word that replicates rhythmic or holistic aspects of performance can be used to initiate or regain control (e.g. ‘ping, ping, ping’ to represent short, snappy ground contact time).

In terms of relays, self-talk and visual and auditory cues can also be used to support take-off and communicate baton transfer. For example, athletes may fix their gaze on a point at the start of the change-over zone and repeat ‘wait, wait’ until they see their team mate’s foot strike this point. This focus also works to limit distractions posed by incoming athletes

and/or the teams' race position. The athlete then begins to accelerate, focusing their attention on forcefully exhaling until they hear the command 'hand' from their teammate. On receiving the baton, the athlete then fixes their gaze on the top bend of the track and repeats 'boom, boom, boom' to replicate the rhythm of powerful cadence when accelerating.

Concluding Comments

We hope that this chapter has illustrated some important mental factors and processes for peak performance in sprinting. Against our *components-plan-execute* model, we paid particular attention to expert goal setting. In doing so, we have discussed how a 'multi-level' and 'nested' approach can enhance motivation and help athletes to continually work towards their 'bigger picture'. We then focused on planning/preparation and ways in which athletes can get in the best mental (and physical) shape possible when they take their marks, and then to the finish as quickly as possible. Self-regulation, attentional control, emotional patterning, mental rehearsal, rhythm, and automatic control were all identified as particularly important for this process. As noted throughout, the precise way in which all of the presented factors are addressed or used *will* vary from one individual to the next. Indeed, an approach which one athlete finds effective may be one that has an almost opposite impact on another. As such, we encourage any athlete or coach who has found our contribution useful (or hopefully parts of it at least!) to carefully explore, experiment with, and continually refine these principles and tools. May they bring much speed!

Figure 1. The “components-plan-execute” model of peak performance.

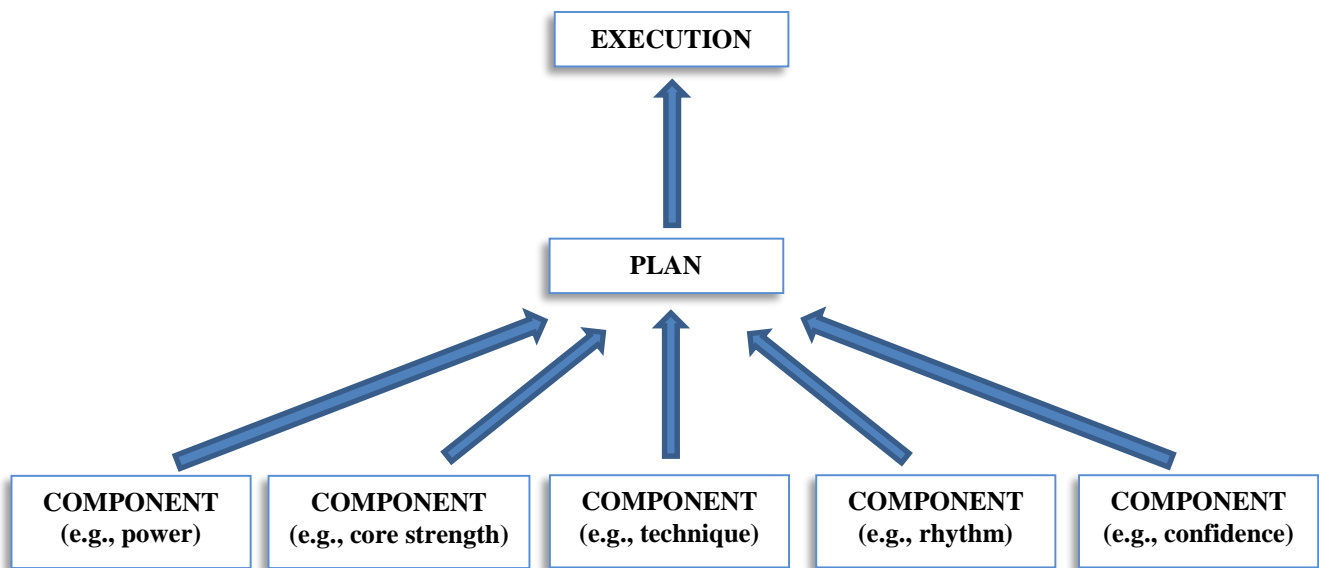
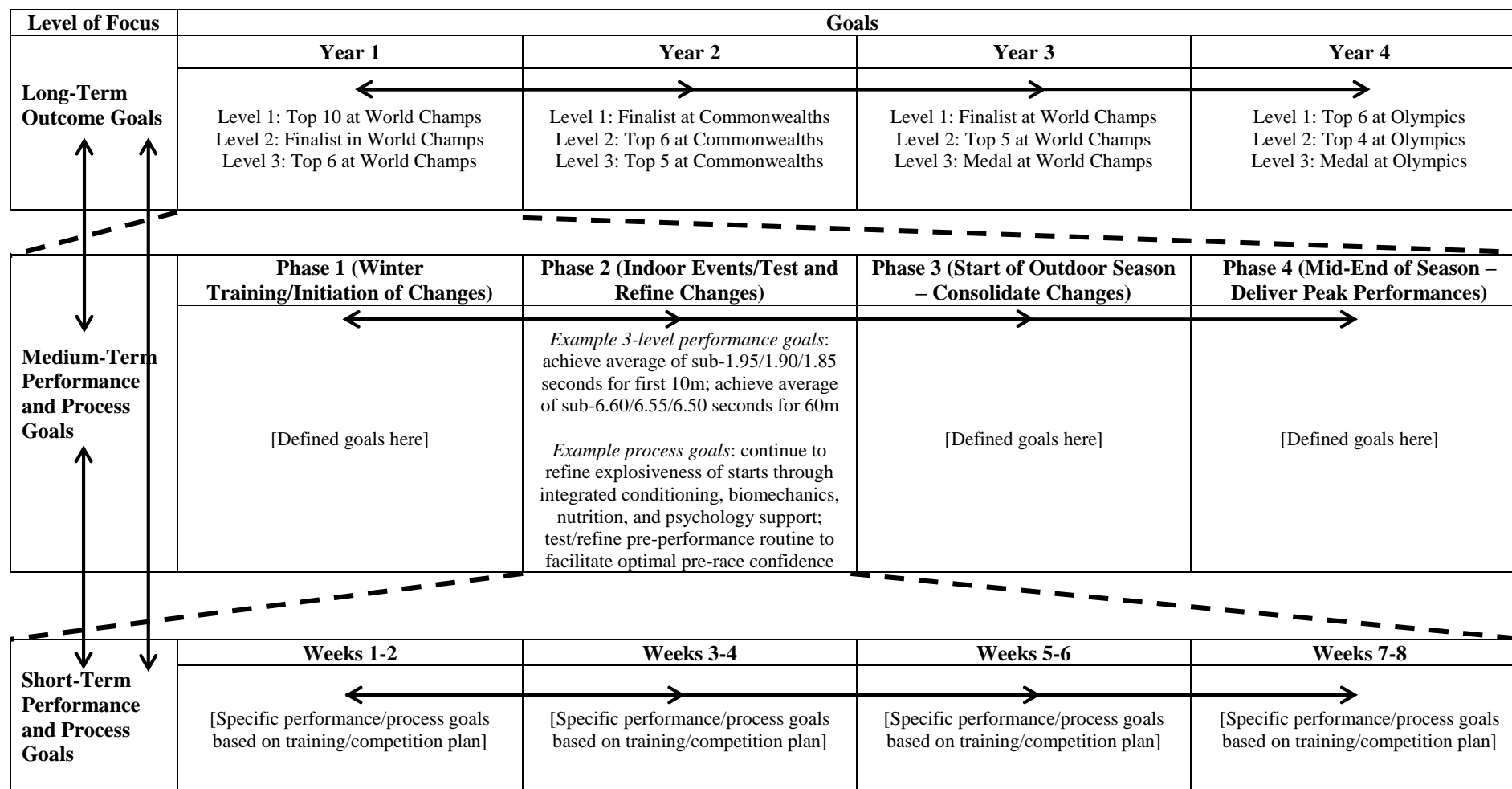


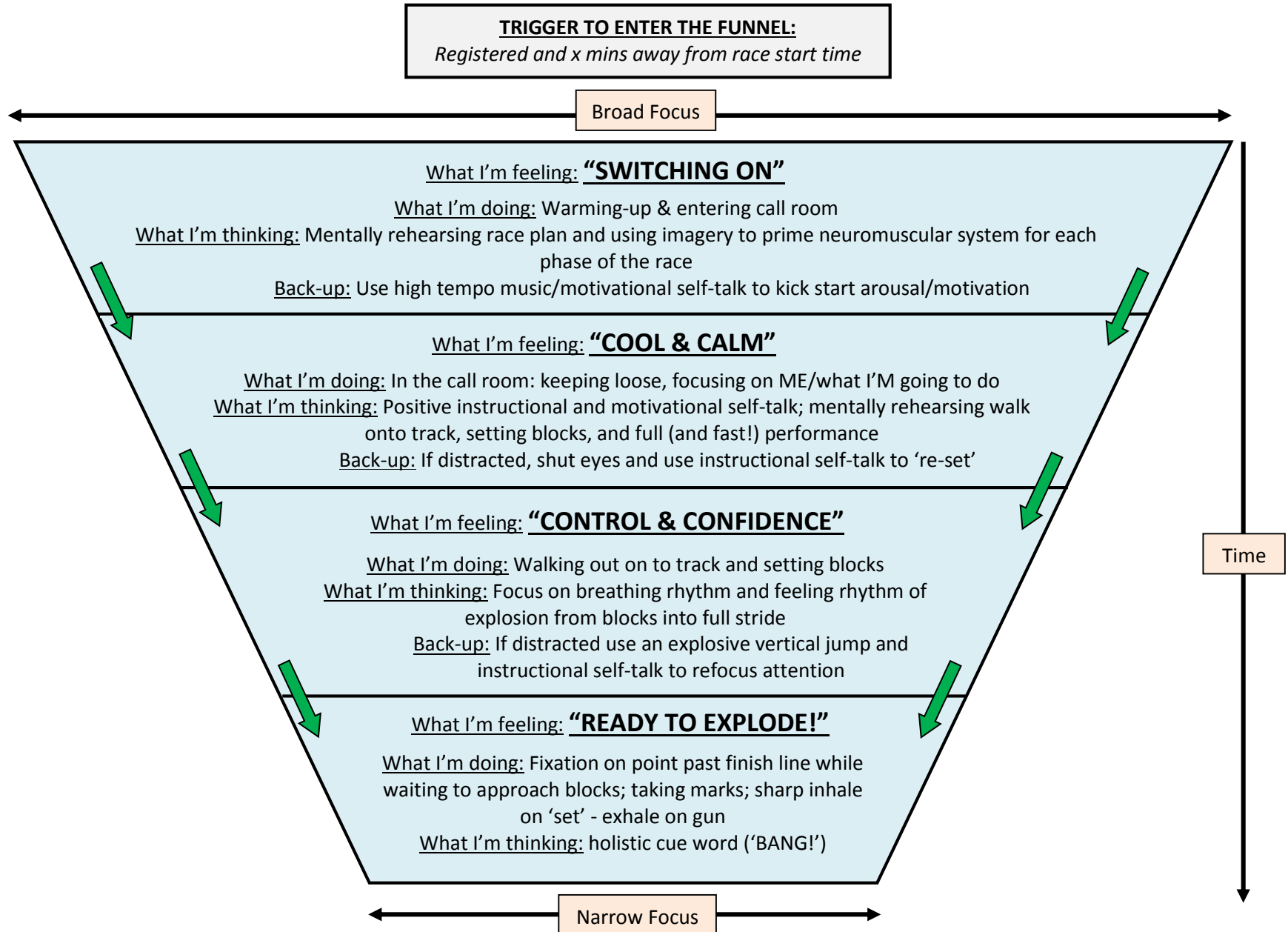
Figure 2. An outline representation of “nested” goal setting



Timeline	Physical Activities (What I'm doing)	Mental Activities (What I'm thinking/feeling)
Wakening- Up to Departing for Venue	<ul style="list-style-type: none"> - Wake-up call, open curtains - Check hydration and start/adjust appropriate fluid intake - Shower - Check forecasted weather conditions - Check kit and prepare/pack snacks and fluid against checklist - Brief walk and stretch to loosen up (within hotel if cold/wet) - Breakfast (follow nutrition/hydration strategy) - General chat with support team/watch news on TV/avoid social media - Return to room and collect items 30 minutes before departure time - Make way to meeting point 15 minutes before departure time 	<p>Guiding Phrase: "Relaxed and prepared"</p> <ul style="list-style-type: none"> - Ease myself into the day/loosen up
Travelling to Venue	<ul style="list-style-type: none"> - Ensure leg space in vehicle - Listen to the radio/music - Avoid social media 	<p>Guiding Phrase: "I know what I need to do"</p> <ul style="list-style-type: none"> - Start to gradually switch on - 1 x run through arriving at venue and coping with media attention and interactions with/distractions from competitors (imagery) - 1 x run through pre-performance routine/race (imagery)
Arriving at Venue to Starting Warm-up	<ul style="list-style-type: none"> - Register, receive heat/lane draw, confirm timings - Find spot to set up base (not too close to holding area or competitors to enable segmented preparation and prevent distractions) - Walk/get a look at track and get a feel for the conditions 	<p>Guiding Phrase: "Complete my set up"</p> <ul style="list-style-type: none"> - Jobs done - Get comfortable with surroundings - (Re-)Familiarise with venue and protocols
	<ul style="list-style-type: none"> - If start time already delayed, go for a brief walk and find somewhere to sit away from venue/central area (depending on length of delay, make any necessary minor adjustments to pre-performance routine with coach/support staff, run through imagery of routine and race, listen to music, play games on tablet device) 	<p>Guiding Phrase: "Tick over and stay ready"</p> <ul style="list-style-type: none"> - Ease back on mental intensity

Figure 3. Competition preparation strategy (as based on Rushall & Potgieter, 1987, and Wilson & Richards, 2011)

Figure 4. The “Pre-Performance Routine Funnel”



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