

Use context and Gamespeed to transform speed and agility training

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OVERVIEW

In many sports, it is often said that speed kills and as a result, speed and agility training is generally considered as an integral part of a player's training. But how effective are we in developing the type of speed that is most effective in sport? We should always keep in mind that the ultimate aim of our training is to enhance performance. Consequently, we have to ensure that the practices we undertake enable a player to better navigate the range of scenarios they face in a game. This article will look at how using context and the concept of Gamespeed can drive actions that directly develop this killer capacity.

Aliens try to work it out

Imagine a *War of the Worlds* scenario. An alien species is trying to gain an understanding of human behaviour, by studying every aspect of human life. However they are flummoxed by what happens on a Saturday afternoon when groups of people get together at a marked-out field, dress up in coloured uniforms and undertake some strange ritual for no apparent reason, but which seems to stir unusual passions in both participants and audience. To better understand this activity, they allocate a crack team to get to the bottom of it. This team gathers innumerable films of the activities, and studies these endlessly. However, they are unaware of a fatal flaw in the films – unbeknown to them, the ball is never visible.

As a result, the activity seems unintelligible: people moving in a seemingly endless combination of movements which appear totally random. Some stay in a relatively small area, others seem to roam freely, sometime they run towards people wearing the same colour, sometimes they run away. The same thing seems to happen with those wearing a different colour, running towards and away from each other, and even

on occasions engaging in direct physical contact. Sometimes, and seemingly out of nowhere, one individual runs off and slides on their knees, followed by others in the same colour who jump all over the individual – while those wearing the other colour look disconsolate or remonstrate with each other. The group then seems to lose their enthusiasm, initial starting positions are taken up and the whole process starts all over again. What is this activity and how can they possibly explain these patterns?

Being scientifically minded, the alien team is convinced that the key to understanding this strange scenario lies in data. As a result, they measure everything meticulously, looking for patterns to explain what is happening. What movements do these people use, how often do they use them, what are the speeds of these movements, and how do these movements differ between different individuals? Patterns start to emerge, which convince them that they are starting to understand the activity. They are confident that the more data they gather, the better their understanding will be, but we know this will not be the case. No matter how much data they have about 'what' is happening, they will never fully understand it using this approach. It will only be

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when they have grasped the underpinning purpose of the activity – the ‘why’ of it all – and this will only be revealed when the ball becomes visible.

A far-fetched example, of course, but sometimes it is revealing to take situations to extremes to reveal inconsistencies and blocks in how we try to understand situations and patterns. Patterns are everywhere: geese flying in formation, people moving into and out of cities at certain times of the day, the passing of the seasons, and so on. Learning how to identify what happens will help us to understand these patterns but will never generate deep understanding; this will only happen when the purpose of the patterns and actions are identified and analysed.

No-one in their right mind would attempt to understand football patterns without knowing that the ball is key to understanding them and that they are further dependent on the purpose of the activity and the way in which a team approaches the game. And yet much of our analysis of speed and agility actions in sport does just that. We identify patterns that take place – a sprint, a change of direction – and then remove all context from them, describing them solely in terms of characteristics rather than purpose. For example It could be argued that the current fixation with ‘change of direction capacity’ could be such a trend. We attempt to isolate and quantify, often by totally removing context, driven by our own belief that we can only understand something if it is measured – metric fixation at its extreme⁵ – and always assuming that faster is better. Our findings from these measures then inform our understanding of how to perform, analyse and train direction change: but in doing this, are we simply replicating the aliens’ approach to understanding? Worryingly, this approach – where patterns are described but without analysing the ‘why’ – can also lead to an illusion of understanding, potentially worse than a lack of understanding. Truly understanding movement must revolve around context and a consideration of what an athlete needs to achieve with any movement – we must be driven by the ‘why’.

How to understand contextual movement

As we have seen, although there has been some attempt to reconcile the need for context in speed and agility, the focus has often remained on generating metrics without fully considering the ‘why.’⁴ But

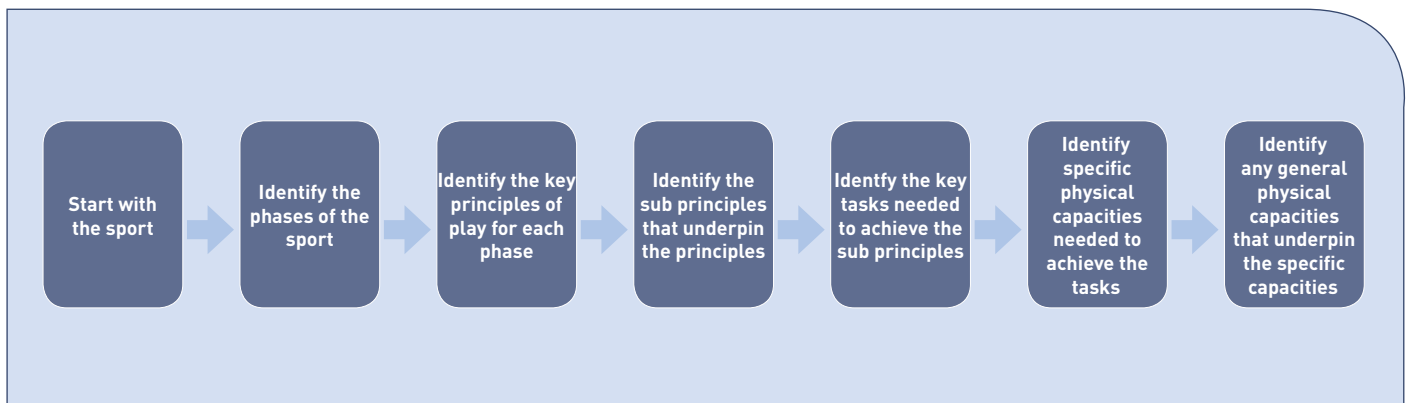
in order to do this, we need to generate a deeper understanding of the sport and move out of our traditional areas of expertise, encompassing insight from sports coaches and players.⁴ We need to let go of metric fixation and accept that many of the key aspects that drive sports movement currently defy measurement.⁵ Our outlook should also reflect all of the movements an athlete deploys and the drivers behind them, and not simply focus on highlight reel aspects of performance.⁴ Although these highlight reel aspects are important, we must also focus on the less noticeable – the mundane, movements which are often just as key to effective performance.⁴ The fact that many of these are rarely even mentioned in speed and agility analysis demonstrates the limitations of our current awareness and understanding. Clearly we need a system that integrates the insights of the sport with those of strength and conditioning. This is where reverse engineering comes into play.

Reverse engineering in context

Traditionally, reverse engineering is a process of understanding how a device works by taking it apart piece by piece to see how it works.³ When applied to sports movement, the reverse engineering process involves progressively breaking the sport down into smaller elements, which reveal what goals a player has to achieve, and methods by which they can achieve them.^{2,3} Understanding sport movement will always be a challenge with its almost endless variations, but in breaking down sport into progressively identifiable parts, the reverse engineering process facilitates getting to the ‘why’ of movement, and also ensures that this ‘why’ is always a key consideration in subsequent training decisions.

The reverse engineering process

The ultimate aim of any speed and agility development programme must be to facilitate enhanced sports performance. Although there are a few sports where speed capacities dictate success (eg, track sprinting), in most cases effective movement is just one factor (albeit an often important one) that dictates the ultimate success. Consequently, consideration needs to be given, not only to how movement contributes directly to performance, but also to how it integrates with, and facilitates, technical and tactical capacities. Reverse engineering facilitates this by identifying overarching principles and sub principles,



after which key tasks and general patterns can be identified and developed in a manner that assists players in achieving these overarching principles (see Figure 1).

Using the reverse engineering process, football, for example, can be broken down into two main phases: transition and organisation.² Both of these phases can in turn be divided into offensive and defensive categories. In transition situations, possession has been lost by one team and gained by another: these situations often offer offensive opportunities, and defensive risks, and subsequent actions are designed to either exploit these opportunities in the case of the offensive team, or mitigate the risk for the defensive team. Organisation settings, on the other hand, refer to situations where offences and defences are generally set and in position. In these situations, opportunities for the attacking team are reduced, as are the risks for the defensive team. Offensive strategies, as a result, revolve around manipulating the environment to create greater opportunities by moving defenders out of position through movement of the ball and players; defensive strategies generally revolve around maintaining order within the environment to minimise risks.²

Once the phases of the game are identified, it is possible to identify overarching principles which apply to each of these phases.² Importantly, these will be generic – for example, a team losing possession will attempt to assume a defensive structure that minimises risk, but they will also be unique, depending on the tactical approach taken by a team. For example, some teams will attempt to win the ball back as quickly as possible using a high press, whereas others may focus on preventing a rapid forward movement of the ball, thus allowing players to get back into their organised positions.

Knowing the team's approach, each phase of play allows a number of sub principles to be identified.² These are essentially the key approaches that players and teams will deploy to achieve the main principles. So, for example, for a team winning possession the main principle may be to exploit defensive disorganisation to create scoring opportunities. To achieve this, their sub principles may be to move the ball forward rapidly into space, this in turn involves moving the ball away from where it was won and into a different channel. Once these sub-principles are identified, the tasks that need to be undertaken to achieve these sub-principles can be identified. For the team players winning the ball, they will be encouraged to identify unoccupied channels and move effectively into these channels while ensuring they are in a position to receive a pass. Performing these tasks effectively will require a range of movement capacities that can then be the focus of an effective speed and agility training plan.

Identifying movement requirements through this process has a number of key advantages. Firstly, it enables an effective breakdown of the entire range of movements needed by a player to carry out all of the phases of the game. Secondly, it ensures that when these movements are trained, their ultimate goal is key, ensuring that – for example – transition movements are trained as transition movements, that direction changes reflect the tasks they are designed to achieve, and so on. Thirdly, it emphasises the need for a player to be able to deal with a range of scenarios, thus requiring a wide movement vocabulary and bandwidth around many of these movements. This then enables effective application of Gamespeed during transition and organisation phases, as well as in offensive and defensive situations.

Figure 1. The reverse engineering process

Is it time to move away from speed and agility?

It is important that any tools that we use in our quest for enhanced performance are fit for purpose. It is therefore important to consider how well what we currently do under the banner of speed and agility actually prepares a player for sports performance: and whether the terms, and what we understand by them, are the best way forward.

Terms and definitions are a key part of sport science: being able to define terms in a manner that is universally accepted, understood and measurable is a key tenet of science. However, we must be comfortable with the fact that science is only a part of a coach's toolkit, and that some aspects of performance defy quantification.⁵ It is always important to consider whether the definitions we use actually help us or whether they limit our understanding and thus our application.

In developing definitions, we often have to frame a phenomenon to facilitate accurate measurement. Although this does have advantages, there are also downsides: we must always keep in mind that whenever we frame, we naturally exclude.

So, in the process of defining speed and especially agility, we potentially lose aspects of performance that might not fit the definitions, but which are actually integral to game performance. As our definitions are designed to facilitate measurement, we tend to focus on that which can be measured and exclude that which cannot. In this way we casually introduce bias, a bias which then shapes and guides how we try to understand and train speed and agility. A further challenge here is that we suppose that these capacities are separate entities, yet in the majority of cases in sport they are integrated, with what we would define as speed affecting agility performance and what we would define as agility impacting upon speed performance.



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In effect, the terms speed and agility, and especially what they have come to represent, may have become more of a hindrance than a help to our understanding of sport-specific movement. What we need to guide us is a term that better encapsulates movement as it occurs in sport. We could simply use the term ‘movement’, but this can be problematic. Talk about movement in strength and conditioning circles and what comes to mind are patterns such as the squat or lunge and the process of screening performance in these movements.⁴ Another term really needs to be used, one which encapsulates the goal and nature of movements in a sports context – and for this, the term Gamespeed fits well.⁴

Gamespeed

Gamespeed has been described as ‘a context-specific capacity, where an athlete uses movement of optimal velocity, precision, efficiency, and control to interact with the environment in order to maximise the performance of a sport-specific task’.⁴ This description has a number of important considerations. First, it is sufficiently broad to encapsulate a wide range of key aspects of sport-specific movement, all with the crucial proviso that movement is performed in an attempt to maximise performance of a specific task in a given environment; as such, it is ultimately context-specific. This ensures that any attempt to develop ‘Gamespeed’ has to encompass the reverse engineering process, thereby ensuring that the ‘why’ is always kept at the forefront of consideration and that movements deployed allow for the achievement of a given task. Gamespeed is driven by the purpose (the why) and not by method (the what). For example, simply adapting sprint techniques to better reflect how they are performed in a game only scratches the surface of true Gamespeed.

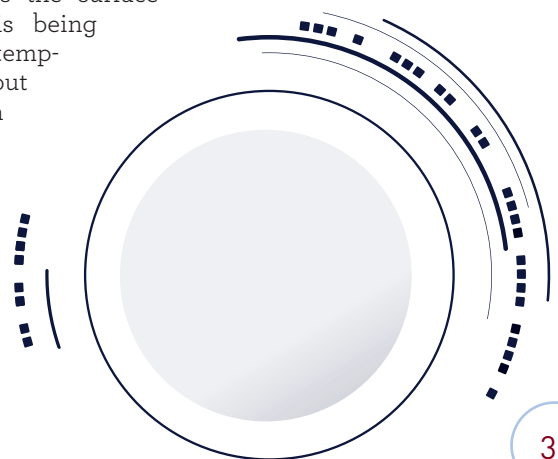
Re-evaluating environmental constraints

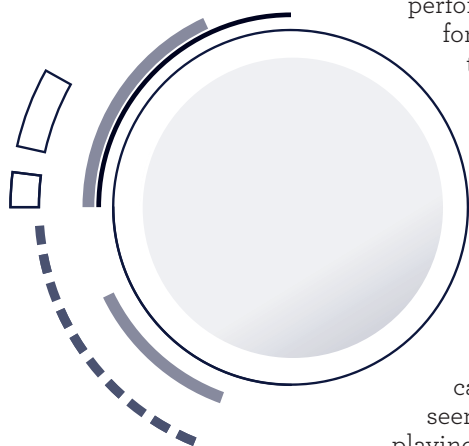
When considering Gamespeed, the constraints to performance can be considered

to accrue within three broad areas: organismal constraints, task constraints and environmental constraints.⁴ Although strength and conditioning has traditionally focused on the physical aspects of organismal constraints, of late there has been a general appreciation that perceptual, cognitive and motor constraints are equally as important in explaining Gamespeed performance. Without doubt, this has been a hugely positive development, but it has to be said that task and environmental constraints, that also play a key role, have remained largely excluded from the strength and conditioning literature when explaining Gamespeed performance. Yet the reverse engineering process gives a clear indication that the principles and sub principles to be achieved are contextual, and that the performance of the key tasks are directly impacted by the specifics of the environment.

Unless we carefully consider the task that the athlete has to undertake and the constraints this imposes on the athlete, understanding the optimal strategies to deploy is impossible. In order to do this, we need to consider the rules of the game, the tactical approaches utilised and the technical skills needed to achieve the task. The effects of the offside rule in football, for example, directly influence the movement patterns an attacker will take to stay onside; likewise, it conversely affects the patterns that a defender will take to trap an attacker in an offside position. These factors, in turn, impact upon spatial elements in the game, which necessitate a consideration of the environmental constraints.

Initially, environmental constraints would suggest factors such as the surface on which the game is being played, the prevailing temperature, and so on, but this analysis misses a critical factor: the fact that the spatial set-up of the environment directly affects the performance of a task. Unfortunately,





this level of analysis rarely receives any attention when trying to explain performance. Factors such as the tactical formation a team assumes and how this integrates with the opposition formation directly affects the spatial distribution of the environment.⁴ This dictates the space an athlete has to work in and impacts upon the tasks they have to perform to achieve the sub principles and principles of the game, as well as the optimal strategies by which to successfully navigate these tasks. This analysis can also help explain how players can seem like world beaters one week when playing against a certain formation, but struggle the next when facing a different set-up.

Apart from the spatial distribution of the players, the capacities and tendencies of each player will also directly impact upon the approaches taken. We mistakenly assume that specific capacities offer affordances that are general across all scenarios: a high top speed, for example, will always confer an advantage.⁴ Unfortunately, this is not the case. For example, an athlete with excellent top speed capacities may perform well in games where a great deal of transitions occur and/or against opponents with limited top speed capacities. However, they may be far less effective in scenarios where transition opportunities are limited and a team deploys a low block defence. Similarly, their advantages may be nullified when they face an opponent with equal or higher top speed capacities and their strategies may have to change.⁴ Consequently, Gamespeed performance can never be solely explained by a single athlete's organismal capacities, but must rather be considered in terms of how he or she interacts with the task at hand and in the environment involved.⁴ Gamespeed performance is thus dependent upon the interaction of the task, environmental and organismal requirements, together with a comparative analysis of the same considerations of the opponents, interactions that changes with each application.⁴

Gamespeed fitness

So how does this affect how we train? Well, first we must get out of the habit of assuming a player's Gamespeed potential can be solely be determined by our test metrics. These are a factor, but are too narrowly focussed, conferring advantages in some scenarios

but offering little advantage in others. Our focus must involve a wider consideration of how to successfully complete the tasks that lead to the successful application of the sub principles and principles of each phase of the game, and ultimately to game success. This will often require effective application of the OODA loop from both a defensive and offensive perspective.^{1,4} In doing this, the focus should be on building a Gamespeed fitness topography of breadth and height, and not just simply on height.⁴ An example of this concept is a baseball pitcher who can seldom rely on a single pitch, no matter how overpowering this is, to reach the top. Instead, top pitchers develop a range of pitches, that provides them with options which enable them to keep the opponents guessing and also enabling them to choose the option that best suits a given situation. If we relate this to Gamespeed, having excellent acceleration capacity (height) for example, would always be a training focus, conveying a potential advantage in multiple scenarios. However, by building a bandwidth (breadth) around this, by developing the ability to shift into acceleration from a range of prior movements, to accelerate in a range of directions, to switch between acceleration and deceleration, to use shapeshifts to disguise intentions, and so on – all this enables an athlete to apply acceleration to a wider range of tasks and to cope in a wider range of spatial setups, providing even further potential advantage. Similarly, increasing the overall breadth of Gamespeed fitness also provides competitive advantage where, by building competence across the full gamut of the Gamespeed movement syllabus, a player is better able to successfully navigate a greater range of challenges. For example, building effective jockeying capacities, sideshuffling capacities etc, can help an athlete navigate a range of defensive organisation situations thus enhancing their Gamespeed.

Another rarely considered aspect of Gamespeed is that movement often occurs as part of a team. Consequently, we could argue that we must also consider Gamespeed fitness on a collective basis and not solely on an individual one – ie, Team Gamespeed. During offensive transition, for example, a key sub principle is moving the opposition out of position, so that other players can move into the vacated space to open up scoring opportunities. Therefore, although our traditional focus may be on the ability to open up space by getting away from an opponent, sometimes the goal is not to open space on an individual basis but to pin and

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drag an opponent, pulling them from their position, and allowing a teammate to then move into that position. Only through applying the reverse engineering process will these elements of Gamespeed fitness become clear to us.

Summary

If our goal is to develop better players, then we need to ensure we have a full understanding of what successful performance of the sport entails. Effective movement underpins many aspects of performance in sport, yet our current speed and agility-focused approach often fails to fully address a player's movement needs. Switching to a Gamespeed approach, guided by an effective reverse engineering process, can help ensure contextual relevance to our training and ensure that an athlete is best prepared for the challenges they face. Focusing on developing an athlete's Gamespeed fitness of breadth and height can then help them best navigate the intricacies and challenges of their sport.

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