10 NeuroTracker Performance Concepts
1. The brain offers a massive performance edge
One of the major findings of modern sports science is that superior cognitive abilities are a key determinant of elite performance.

2. Awareness is critical for seeing the game
Perceiving complex sports action going on all around is extremely demanding; NeuroTracker helps athletes be in the right place at the right time.

3. Attention is a skill that matters at all levels
NeuroTracker effectively hones selective, distributed and sustained attention; all critical for being ‘in the zone’.

4. Speed greatly increases mental demands
The faster the movement of a game, the harder it is to follow, which is why NeuroTracker uses ‘speed thresholds’ to optimize conditioning effect.

5. Peripheral vision is under-utilized
Processing of peripheral motion is a high level cognitive skill that benefits from training and technique, both of which NeuroTracker is scientifically specialized for.
6. Opponents can be anticipated more easily
Reading body language is a visually complex process, NeuroTracker conditions the exact mental muscle used for reading intentions

7. Neuroplasticity offers ultimate trainability
NeuroTracker directly and intensively stimulates brain activity to use its ability to rapidly adapt to performance needs

8. Sports science methodology fits perfectly for mental conditioning
NeuroTracker provides an unrivalled level of training isolation, overload and repetition for maximizing performance gains

9. Cognitive profiling can reveal hidden skillsets
New measures of mental performance allow NeuroTracker to offer objective insights into overall strengths and weaknesses

10. Athletes feel confidence from cognitive gains
NeuroTracker athletes consistently report game action slowing down and feeling more in control under pressure
1. The brain offers a massive performance edge

A range of sports science studies across a wide number of sports show time and again that when elite players are compared to sub-elite players, the differences in mental performance are huge compared to the differences in physical prowess. Reading and responding to game flow, predicting opponents and ball trajectories, and responding rapidly under pressure are key areas where elite performers gain a critical edge in competition.

In contrast to advanced strength, fitness and skill conditioning, development of mental performance is left largely untrained outside of natural gameplay.

As a scientifically proven way to boost mental capacities that are central to sports performance, NeuroTracker is a vanguard technique in the field of cognitive sports training.

2. Awareness is critical for seeing the game

In order to excel on the field, awareness is fundamental. One of the most significant demands on awareness is multiple object tracking; the ability to maintain multi-focal attention on several moving targets at the same time. NeuroTracker tests and trains this skill at a pure level, which when applied in the field involves:

- perceiving players moving around the athlete
- identifying movement patterns in and out of vision
- seeing and predicting motion trajectories
- processing biological motion perception

Rather than coaching athletes for specific plays or situations, NeuroTracker sharpens a player’s cognitive tools in a way that can be applied to any game situation. This is similar to the root gains from doing squats in the weight room, which brings improvements like sprint acceleration and vertical leap to a wide range of performance needs. A key benefit NeuroTracker brings to the table here lies in the arena of decision making - the speed and quality of action-response choices rely heavily on reading the scene fluidly and comprehensively.
Multiple object tracking at speed demands high-level mental resources and fluid concentration. Attention is the force necessary to apply these resources and channel them into mental focus.

A player’s capacity of attention is strained when overwhelmed by information and also when under psychological and physical pressure - conditions common in sports. As attention is a conscious ability, the skill in applying it when needed varies greatly depending on the athlete or the situation.

Just a momentary attentional lapse results in a significant loss of awareness in the heat of action – causing even the very best to lose mental focus in critical moments of big games. NeuroTracker excels at training attention because amplifies the demands and pressure of this skill, resulting in failure the very instant there is a lapse. Mastery of several forms of attention are required for performing at the highest levels, each of which NeuroTracker trains in a specialized way.

Types of Attention trained by NeuroTracker

**Dynamic attention** is required to pay attention to scenes with fast motion in and out of sight, as well as changing structure. This is key in adept pattern recognition and tactical awareness.

**Distributed attention** is essential for gaining awareness of multiple targets spread out across the field of view. This is especially relevant for peripheral vision, as targets at wider angles are much more difficult to track.

**Selective attention** is the channeling of higher quality attention onto what matters most, as well as avoiding wasting attention on distractions. Team game situations constantly require prioritizing of attention onto multiple attacking threats and passing opportunities, while blocking out other players and distractions.

**Sustained attention** allows athletes to continuously and rapidly update their mental picture of the field through extended bouts of game action. Sports push athletes to the very limits of this skill due to the extreme demands on both the fluidity and stamina of attention.
4. Speed greatly increases mental demands

Awareness of sports scenes can be managed when there is little movement, but when motion speeds up, the demands on the brain increase dramatically. Most sports bring with them massive challenges in terms of dynamic, fast moving scenes.

NeuroTracker tests mental focus limits by progressively overloading each athlete at their speed threshold. Through a scientific manipulation of trial speeds, NeuroTracker precisely builds up the raw tools for staying in the zone for any high-pressure game situation. Masses of data across numerous sports show that athletes consistently achieve substantial gains in speed thresholds with NeuroTracker training.

5. Peripheral vision is under-utilized

Of the river of sensory data we take in, about 80% of it is dominated by 2 billion messages of visual information per second. Although we believe we see the world in detail, details can only be acquired via a tiny focus point in the center of our view. This means we have to rapidly dart our focus point around to build up a detailed view a scene (a behavior we are unaware of). This scanning for detail saps a lot of attention and causes heavy blurring in-between scan points.

Although fine grain visual information can be important, in a complex and dynamic environment, tracking movement is more important than seeing detail, particularly when the surroundings are familiar. This scene based awareness requires tracking and predicting many motion paths across the whole field of view. This is one of the most strenuous tasks for the visual centers of the brain, often leading to loss of peripheral awareness in the midst of intense high-pressure situations - one of the greatest risks for collision-based injuries.

A key finding by sports vision specialists is that amateur athletes tend to over-scan for detail at the cost of their peripheral awareness. In contrast elite athletes scan much more selectively, fixating on only necessary points of detail. This allows them to draw on much more information from the whole scene, as well as minimize disorientation from darting focus around in the heat of action. Sports scientists have established that training peripheral attention with a visual pivot is an effective way to acquire this improved awareness.

NeuroTracker uses a visual pivot to enhance visual awareness through conscious technique. NeuroTracker is also the ultimate tool for training peripheral vision. Complex motion at speed, a wide field of view, and 3D (critical for effective multiple object tracking) ensure that training stimulates the key areas of the brain that are strained on the field.
6. Opponents can be anticipated more easily

Successful prediction of a player’s next action depends largely on reading movements of several key parts of the body such as joint angles or rotations across limbs. Then, by processing how these changes relate to overall movement, a player’s intentions can be anticipated. In cat and mouse confrontations in sports, prediction of action-intentions just hundredths of a second earlier defines who comes out winning the play.

This skill relies on biological motion perception, which is known to involve large regions of the visual cortex and relies on *multiple object tracking* – even though we assume we see overall motion, in fact we must spread our attention to separate points, especially at close range.

Research in the lab has shown that NeuroTracker training can directly improve a person’s ability to ready human body movement. As paying attention to surrounding movement is often required while anticipating opponents, NeuroTracker offers a solid opportunity to raise gameplay levels in close-up action.

7. Neuroplasticity offers ultimate trainability

The biggest discovery in history of neuroscience is *neuroplasticity*; the brain’s innate ability to adapt to environmental demands through functional reorganization, increasing pathway efficiency and growing new neural networks. In terms of the extreme cognitive demands of sport, neuroplasticity is a major factor in any athlete’s performance potential.

In principle the process is similar to how muscles improve to meet performance demands when put under physical stress. However, in the case of the brain, improvements can occur -

- more substantially
- on much shorter timescales
- with much longer lasting effect

As NeuroTracker is a pure training method with no false practice or technique effects, increases in speed thresholds represent raw functional gains in the brain’s mental muscle.
8. **Sports science methodology fits perfectly with mental conditioning**

One of the most robust principles of sports science is that training is more effective when the various attributes of performance are broken down into parts and conditioned intensively in an isolated way, again and again.

This methodology of isolation, overload and repetition provides the backbone of professional training across sports the world over. It is the defining characteristic of all strength and conditioning programs.

NeuroTracker methodology epitomizes this approach with pure isolation of key mental skills, progressive cognitive overload through manipulating speed thresholds, and optimized repetition through acute stimulation delivered in 3 minute packages. This combination of neuroplasticity with ideal training methodology is the reason NeuroTracker brings radical gains in performance.

9. **Cognitive profiling can reveal hidden skillsets**

Skillsets can vary dramatically from athlete to athlete, even for players in the same positions on the field. The majority of recognized skillsets are drawn from physical and skill based performance measures, principally because these are the easiest to measure.

Mental abilities are much more difficult to measure, and traditionally a coach’s knowledge of what goes on in an athlete’s brain is usually drawn from subjective opinion. However, measuring mental attributes of performance is vital in understanding how athletes compensate with physical and skill based strengths and weaknesses.

With a genuine grounding in science, NeuroTracker is geared for providing accurate and objective measurements of cognitive skills. Results can be correlated with other performance statistics to discover unrecognized weaknesses and provide a fast track to boosting overall game-shape. Baselines also offer a valuable benchmark for return to play readiness after recovering for injury or concussion.
NeuroTracker performance transfers studies with elite sports teams show positive correlations with competition stats and thousands of coach assessments. Alongside this, NeuroTracker athletes across the board report psychological benefits from NeuroTracker improvements. Typical anecdotes range along the following themes:-

- Staying ‘in the zone’ more when the pressure is on
- Seeing game action play out more slowly
- Having more time to think about passing and tactics
- Feeling less overwhelmed in the midst of fast action
- Being more sure of seeing and avoiding interceptions
- Having a better idea where teammates are heading
- Having a sharper edge on players at close range
- Having a more of a sense of sideways vision

Though subjective comments, increased confidence and certainty when faced with overwhelming game action are valuable traits for any athlete under pressure.

For more information on NeuroTracker performance concepts or science papers, contact info@cognisens.com