DECISION-MAKING/TECHNICAL ADAPTABILITY: A TENNIS SUPERPOWER

Can an Ecological Dynamics approach help develop decision-making and technical adaptability?

Professional tennis matches are awe-inspiring to watch. They are a showcase of exceptional skills. However, it is not the obvious athletic skills that are the only highlight, but also the 'unseen skills'. These are what distinguish players as successful performers (at every age and level).

In this series, we will look at a number of these tennis 'superpowers', which include:

- Problem solving
- Perception
- Decision-making
- Technical Adaptability
- Performing under pressure

Although every coach wants their players to have these abilities, the typical way they design their practices often ignores or even hinders their development.

Like all the other superpowers, this one flows from the premise that tennis primarily uses Open Skills, and specifically, uses 'Perceptual Motor Skills', meaning that these skills must adapt to the environment.
(For an article on Learning Tennis as an Open Skill, click here)

We will view these elements through the lens of an Ecological Dynamics (ED) approach (for an introductory article on Ecological Dynamics, click here).

The Problem of 'Transfer'

The main reason for my leaning into ED is the concept of ***'transfer of learning'*** ('transfer' for short). This is the measure and process by which practice and training are transforming a player's match-play performance. Every coach has felt the frustration of spending time training things that players end up not using in matches. The laziest solution is for coaches to blame the player. However, I have found that a mirror provides the clearest view of the problem.

It is not that coaches do not get players to do what they are supposed to in practice. It is that training is not *transferring* to match play. Are your training sessions only providing the 'illusion of learning'?

Because of the busyness and tight schedules of most coaches, a situation often arises in which coaches never see their players play matches. They are not even aware that skills are not transferring. Watching a few points at the end of a training session doesn't cut it.

Regarding our topic (decision-making and technical adaptability), a lack of transfer is often due to a lack of these abilities. In my opinion, ED provides a significant key to unlocking why poor transfer occurs and how to alleviate it. With transfer in mind, let's look at our topic in more detail.

Decision-making?

It is easy to see, and anyone who plays tennis knows, that **tennis is a decision-making sport.** However, even the term *'Decision-making'* is a little misleading. It gives the impression that it is a cognitive process of taking in all the variables, having your brain weigh the options, and making a final, reasoned selection to take action. This is how I previously approached decision-making; however, my view changed when I researched what the current research shows.

The timeframe to deal with all the myriad decisions required is minuscule. It is not very conducive to the idea that all these mental processes need to be complete before movements are executed. Animals use the same system (think of a predator in a multi-movement chase with prey). How much 'thinking' do they do?

'Affordances': Doorway into Decision-making

One cannot talk about decision-making in an ED approach without reviewing the concept of ***'affordances'.*** In simple terms, these are: ***'Action possibilities offered by the environment'***.

These possibilities *emerge* from the ***relationship*** between the environment (the court, the opponent, the ball, etc.) and the player. For example, a ball received head-high at net 'affords' the possibility of a powerful shot (in contrast to what is 'afforded' by a low ball).

> *"Recognizing affordances is like having a superpower on the court. It allows players to make split-second decisions that can change the momentum of a match."*
> Serena Williams-23-time Grand Slam singles title winner

However, affordances are always filtered through the player's perceived capabilities (in ED-speak called their ***'Action Capacity'***). They are detected by the player based on the 'fit' between the intended action and the player.

For example, a shorter player may perceive a high ball at net as an overhead, but a taller player perceives the same ball as a high volley: the same situation, different affordances.

I have seen examples of coaches getting annoyed at players in a feeding drill because the player doesn't perform the shot they are supposed to. Why? It didn't register as an 'affordance' for *them*. Even that short player, if they have poor overhead skills, may select a high volley instead of the overhead.

Why don't players do what they are 'taught'? The concept of affordances is the main answer and significantly impacts our discussion of decision-making.

The Role of Intention

The 'rule' in decision-making for tennis is that the tactical intention rules*.** The point of the game is to win, and tactics are the map to doing so—intentions direct decisions.***

A player will become more sensitive to particular affordances based on their intention, which, in turn, dictates which affordances present themselves. However, it is an interwoven dynamic relationship. Your opponent most likely does not want to give you those possibilities, but when they appear, we act on them.

For example, the intention of making the opponent move will shape which tactical decisions are more 'inviting'. Does the player make a short angle to open the court? Do they drive the ball down-the-line? Do they hit a drop-shot? Every one of these tactical options depends on the situation (which changes moment by moment).

ED reveals that players are in an interconnected relationship with the environment (Situation) that ED-speak calls '***Perception-action coupling'***.

Players pick up information from the situation (the shot they have hit, the relative locations of player and opponent, the ball received, etc.) and, based on their tactical intention, their whole mind/body system 'self-organizes' to create a movement solution which ***is*** the decision (not a brain-first-then-body process).

> *"The Action is the Decision. Perception, decision-making and action are not separable stages."*
> Duarte Araujo-Psychology and Motor Learning Professor

The concept of affordances changes the way ED views decision-making, not as a 'mechanistic', brain-controls-the-body process. Rather, it is an 'embodied' (ED-speak for our mind/body system working interconnectedly) response to an affordance, based on the unfolding information of the environment/situation.

Technical Adaptability

This is where technical adaptability factors into our discussion. Decision-making and technical adaptability are two facets of the same process. **Technical adaptation is the face of decision-making** and therefore, the main priority of technique.

Even if a player has a good ***tactical*** intention, the accompanying ***technical*** decision/action is predicated on the affordances that become available based on the ***reception*** of the ball. Here is a quote from all-time great Rafa Nadal (who probably knows what he is talking about).

> *"Every shot is different. Every single shot. No ball arrives the same as another, no shot is identical."*
> Rafa Nadal-22-time Grand Slam winner

Every slight variation requires the body/mind system to change course and adapt. Even with the intention of making the opponent move, receiving a higher/deeper ball makes the drop shot option a poor choice. Receiving a faster/wider ball makes the down-the-line drive very risky, etc.

The situation presents a problem that the player must solve by finding an effective movement solution. This is a very different process from learning a 'stroke technique' (e.g., the 'Djokovic backhand') and trying to cram it into ever-changing situations. **That approach doesn't equip players with functional solutions to the problems tennis presents.**

In my opinion, there are two key issues in the technical adaptability discussion:

1. **SKILL VERSUS TECHNIQUE**

   The first step on the road to developing technical adaptability has been mentioned in previous articles in this series. It is to understand the difference between 'technique' and 'skills'. Technique for most coaches means pre-programmed 'form'. However, technique without a decision is just a disconnected movement.

Skills, on the other hand, are defined differently. Here is the ED definition by Professor Rob Gray of Arizona Start University:

*'A **skill** is the ability to use **information** from the environment to **find & execute** a **movement solution** to realize an **affordance** that will achieve one's **goal/intention.**'*

Making players more skillful is a more practical goal than teaching them 'proper' technique. Think 'adaptation' not repeatability.

2. 'FUNDAMENTALS' VERSUS TECHNICAL PRINCIPLES

Prescribing to a player the 'right' takeback, swing shape, footwork and follow-through renders it non-adaptable**. *Do not misunderstand the point. Efficient & effective biomechanics are critical for success in tennis, but they are always determined by a tactical intention and must adapt to the situation.*** Technique is never 'proper' unless it gets the tactical job done. There are no 'pretty stroke' points gained in tennis.

I hear coaches constantly respond *'But isn't the 'right' technique the 'fundamentals'? Isn't that where everyone should start?'* The challenge is in the definition of 'Fundamentals'. Unfortunately, as the poor joke goes, '*Show me three coaches, and you will get four opinions on fundamentals.'*

I would propose that technical positions to adopt, or specific movements to repeat, make for non-functional fundamentals. The ED research uncovers that players do not learn by being taught the correct 'form' and then plug it into the situation. Instead, the situation dictates the appropriate functional form.

So what is the solution? Rather than 'fundamentals', I find it more helpful to refer to **Technical Principles,** which allow for adaptation. As Rafa reveals, the shot's 'technique' can change based on the ball received height, direction, spin, speed and distance. Even for a starter player, these significantly impact the actions performed. Principles focus more on *controlling the forces* of the shot (including biomechanics), which is critical in an impact sport like tennis.

The ones I have found most helpful in my coaching journey were learned from my mentor, top international coach, Louis Cayer. Instead of limiting adaptability and handicapping decision-making, these develop techniques that are effective (able to make the ball do what is required for the tactic) and efficient (minimize energy waste and injury).

Improving these technical principles in various situations will empower players with a greater 'field of affordances' to select from, and provide improved movement solutions to solve problems with:

- **Timing:** A centred impact, in an optimal relation to my body, tailored for the intended shot. Where I hit the ball in relation to my body allows me to control the racquet's Path, Angle, & Speed, which, in turn, controls the physics of the ball to execute the tactic. Timing is the movement goal that maximizes the potential to perform a player's tactical intention. (for a detailed article on timing, click here).

- **Momentum:** How the body moves to generate the force required (also specifically tailored for the intended shot). The linkage and sequence of my joints, starting from the ground up. Keep in mind that many shots in tennis are not about maximizing power (e.g. a drop shot).

- **Rhythm:** Adjusting how the speed of the racquet changes through the shot. This supports timing and also helps generate racquet speed/appropriate momentum.

So, when it comes to **technical adaptability**, developing ***skills*** with functional ***technical principles*** through practice that has lots of variability, and problem-solving tasks (that include decision-making) will produce more effective development.

Coaching Implications

Is there any coach who doesn't want to see their players with solid decision-making skills and technically adaptable? But why do so many players lack these abilities?

Poor decision-making can result from poor practice design. Teaching players 'proper technique' through repetitive feeding drills may contribute to why so many players lack decision-making skills and adaptability. In other words, the way coaches train their players may have actually created their own problem.

Transfer occurs by practice providing many experiences for players to find multiple movement solutions to problems. For example, learning 'slicing' on groundtrokes by playing a slice-only game in the service boxes rather than feeding balls and prescribing pre-programmed slice technique.

As UK coach **Steve Whelan** observes, *'One is trying to teach **a movement** while the other is shaping the information they interact with so different coordination patterns can emerge'.*

> *"It makes little sense for coaches to train players in scripted, predictable drills to prepare them for the unscripted, unpredictable situations of match play."*

Here are four priorities when designing training activities that develop decision-making and technical adaptability to maximize transfer:

- **Watch players perform in match-play:**
  A coach cannot know or measure transfer unless they see them play. This may mean creating more play opportunities 'in-house' so coaches can observe without having to travel to events. Or, attempt to get video of tournaments. Either way, watch them play!

- **Include decisions as much as possible to train 'skills':**
  Set up activities in which players are presented with problems to solve by receiving different balls. Allow them to choose Neutral, Offence and Defence on every shot.

- **Train using a 'Tactics-first' approach:**
  Keep the tactical intentions front and centre for every shot practiced. Help players learn to recognize & realize the affordances presented to them when they play.

- **Train 'Technique' through application Technical Principles rather than imposing 'proper form':**
  Help players learn better movement solutions and increase the potential 'field of affordances' by learning technique that is effective, efficient and adaptable.

Summary

The article explores how an **Ecological Dynamics (ED) approach** can enhance tennis players' decision-making and technical adaptability—two "superpowers" essential for effective match play. It argues that traditional coaching often fails to transfer skills from practice to competition because it emphasizes rigid technique over adaptable skills.

ED reframes decision-making as an embodied process of perceiving and acting on "affordances" (action possibilities offered by the environment), guided by tactical intention, while technical adaptability enables players to adjust movements to ever-changing situations.

By focusing **on** skills rather than static technique and helping players learn technical principles like timing, momentum, and rhythm, coaches can design practices that develop players' ability to solve problems dynamically, leading to more effective transfer into match play.