MIRROR-NEURONS – WHY „OUT OF NOTHING“ UNLIKELY „SOMETHING“ EMERGES

Human beings, particularly children, learn from observing and imitating other people around them.

Reason for this are mirror-neurons in your brain.

“A mirror neuron is a neuron that fires both when an animal acts and when the animal observes the same action performed by another. Thus, the neuron "mirrors" the behaviour of the other, as though the observer were itself acting.” (Wikipedia)

If I swing a tennis racket, the same mirror-neurons fire as if I watch tennis on television while the player swings the racket.

In your brain the same pattern of activity is measurable while doing or only watching a movement. That’s why these mirror-neurons are said to be responsible for learning movements by observation.

The science of neurobiology tells us, that there are some evolutionary steps a child completes that are programmed genetically. That means, the child would do these evolutionary steps without observing others. For everything else the child has to learn, mirror-neurons are responsible.

Pole vault is not a genetic program children learn automatic. That’s why this article is about learning using mirror-neurons.

The fact that mirror-neurons are responsible for learning movements by observing others explains some interesting phenomena of pole vault training.

For example: pole vault training-center hot spots.

In any category of human skills we observe peak performance on local hot spots. For pole vault in Europe there are hot spots in Clermont-Ferrand, Formia, Paris, Leverkusen, Goteborg and many more. In Switzerland on a smaller scale they are in Basel, Magglingen and Winterthur where you have over decades a few 4.00m+ Women and 5.00m+ Men.

Good athletes seem to be where such hot spots are.

Peak performance perpetuates itself at such hot spots. Why is that?

Considering that at such hot spots there are good coaches and good infrastructure could be two answers. But these answers do not explain why in Magglingen in Switzerland for example we do not have 5 guys jumping 5.50m+. Infrastructure is there for such performances and Coaches I would say too.

What makes the difference between a hot spot of some 5.00m+ jumpers and a hot spot of some 5.50m+ jumpers?

It is the history of that place. Mirror-neurons can work where they see good and better athletes. Step by step a hot spot can reach new levels.

If you train, where “everybody” seems to jump 5.50m+ you are more likely to become a 5.50m+ jumper than if you train on your own or in a group of 4.50m+ jumpers.

An example:

Coach A is an expert. He trains athletes jumping about 5.00m up to 5.80m. The infrastructure is very good.

Coach B is an expert too. The infrastructure is of the same quality. But his athletes only jump 4.00m to 5.00m.

Whether an athlete decides to go to Coach A or B will have an impact on his development.

At Coach A’s team he has visual role-models how to jump 5.80m. Not so in Coach B’s team. There he would have to explore the sphere above 5.00m on his own. No visual guidelines. It may seem to him that he has to go 110% to jump 5.50m using the biggest pole he can find. At Coach A’s team he would think that 5.50m is only a step of many and that big poles are much bigger than he would have thought at Coach B’s team.

Mirror-neurons in group B don’t get the right food to eat. It is that simple.

On the other hand, maybe the athlete doesn’t feel comfortable at Coach A’s place, because there is too much competition and he will end his career earlier not ever reaching his potential level. Also that can happen of course.

Also an athlete in Coach B’s team has the possibility to learn from better athletes at competitions and going to join them in a corporate training camp or at corporate training weekends.

An athlete that observes world class performance every day can observe what these athletes are doing, what they are not doing, what may be important in training and what not. An athlete without these role-models does not know when to do more, when to do less, when he needs to be more aggressive and when he can calm down an relax. There is no possibility for comparison, for exchange.

Of course that does not mean, that an extraordinary athlete together with an experienced coach could not achieve world class level on their own. But there will not be at once a group of 5.50m+ jumpers out of nowhere and a stable high level pole vault hot spot.

If that one world class or high level athlete at a certain facility ends his career before several younger athletes have reached a good level, there is not that much benefit for developing a high level of pole vaulting at that place.

Out of a group of 5.00m-jumpers there can be a 5.50m-jumper. If there are following enough 5.20-5.30m-jumpers maybe there will be a 5.70m-jumper and the rest can climb on a 5.50m level and so on.

Back in 2012-2015 when my first athletes started pole vaulting they saw me jumping 5.00m to 5.20m. I was able to tell them something but also to show them. Learning by oral teaching is much harder than if you can say “look how easy I jump this pole/height.”

Athletes do believe more in the next step if somebody is already doing it. Mirror-neurons get visually an idea of the task.

Out of nothing the level of your pole vault team (not the level of the best, I am talking about the average) can grow but mostly that will happen slowly.

As said, you need an experienced coach first. Without a good coach fortune won't send you the next pole vault champion.

Next is infrastructure. You need a place where you can constantly pole vault the whole year 2-3 times a week 2-3 hours.

What's next? Well-chosen athletes. If you have time to coach jumping twice a week for 2 hours, then 5-6 athletes are a lot. If you want to make them jump 4.00+ (women) and 5.00+ you cannot pick anybody. You only have time and energy for 5-6 athletes and some people won't jump that high in their life.

This example shows you how much time and/or groups at the same training facility are needed to get more than one 4.50+ or 5.50+ jumper. It's like a pyramid. If you constantly have about 8-10 athletes jumping 3.80+ or 4.80+ then you might have 3-4 athletes jumping 4.20+ and 5.20+ and you might get more than one up to 4.50+ and 5.50+.

Again mirror-neurons at work. All the upcoming athletes see more jumper of a certain level and believe to get there.

In Bern, Switzerland, there have been 3-4 5.00+ guys at the same time 20 years ago. That was enough to bring one to 5.50m and to bring some more up to 5.00m-5-20m, but a decade ago everything got lost there. They also had two girls 4.40+, today they are back at 4.00m level. Why is that? The pyramid was not large enough. If you cut out a piece of a pyramid the level will drop to the next lower level. Only if you got lots of athletes the pyramid is stable because mirror-neurons get their food all the time.

For example you have one 3.50m girl, one 4.00m girl and one 4.50m girl. That pyramid is not stable. If the top girl drops out the menu for the mirror-neurons isn't that great anymore. The 4.00m girl has to find out everything on her own. If there would be two 4.00m girls they could help each other, battle each other, but in my example there is only one.

That was the case in Basel. Oli Frey emerged out of a group of 5.00m-jumpers. He jumped 5.50m and his much younger teammate Marquis Richards got up to 5.55m about 7 years later. Oli quit and shortly after Marquis quit. All of a sudden, there was no role-model in Basel for younger athletes. Mirror-neurons had nothing more to observe. It will take time in Basel to get back to the level of the last two decades in men's pole vaulting.

At my place quite the same, since the 90's we have from time to time a 5.10-5.30-jumper and have some around 4.80-5.00m. There can be one very good athlete out of nowhere, but to raise the average-level, a bigger pyramid is needed.

For women's pole vault the task is a bit easier. Even for a 4.50m-level women mostly have someone around them jumping that height or higher. Of course there are differences between men and women. But they have someone they can battle with in training. They see similarities in speed and/or force or grip-height. It might also be an advantage if you see that boys can jump for example 4.30m with horrible technique. You

may think: ok that can't be rocket science for me to jump 4.30m or 4.50m because I am smarter in technique. So women's mirror-neurons at most places have something to observe above their level what makes it possible for them to use the men's pyramid.

The conclusion to build and maintain a pole vault hot spot: Build a pyramid of pole vaulters and try to enlarge the pyramid. From time to time the pyramid will shrink and you will have to enlarge it again to maintain the average level of your athletes.

Every 3-5 athletes need about 2 hours 2-3 times a week pole vaulting-time at the facility.

A nice pyramid consists of 10-15 women and 10-15 boys. Totally 20-30 pole vaulters. For men that would be 3-5 athletes at 5.00m+, 5-10 athletes between 4.00m and 5.00m. For girls 1m difference.

20-30 athletes, means 6-8 groups of 3-5 athletes. Smaller level bigger groups, high level smaller groups.

Doing 2-3 times pole vault a week with these 6-8 groups, means about 18 slots of 2 hours on the facility per week. That's 36 hours of jumping-time at the facility. In 6 days that's 6 hours of pole vaulting a day (3 groups every day).

To cover 36 hours of pole vaulting a week, including preparation, analysing and writing training programs for 20-30 athletes from beginner to pro you need 1,5 full time pole vault coaches.