



## Scientists behind Liverpool's 'mentality monsters'



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**Can neuroscience help footballers take better penalties and set pieces? According to Neuro11, and their recent work with Liverpool, the answer is yes. We talked with company CEO Patrick Häntsche and their "brain train" methods for athletes.**

After winning the FA Cup in 2022 against Chelsea after a dramatic shootout, Jürgen Klopp was repeating a well-known football cliché: "In the end, we all know that penalty shootouts are a lottery." But right after that, the German manager went on to reveal Liverpool had collaborated with a group of scientists specialized in training players for improved penalty performances. He was talking about Neuro11.

Liverpool won not one but two trophies with penalty shootouts that season. A few months before the FA Cup, the Red and the Blues also played the EFL Cup final and it ended 11-10. Klopp made sure to credit Neuro11, saying, "This trophy is for them."

Since then, Neuro11 has improved and expanded their work to a variety of sports, teams, and athletes. They recently collaborated with Adidas and started working with well-known **athletes** from different sports. With this collaboration, Adidas aims to help athletes understand pressure and how to handle it.

Neuro11's work goes beyond penalty shootouts. They describe their consulting service as "neuroscientific data-based training for elite athletes." Training sessions are conducted on the field, emphasizing the role of the brain in high-level athletic performance and teaching athletes how to leverage this knowledge. To understand their methods more, I met with Patrick Häntsche, co-founder and CEO of Neuro11, also a former footballer at the Bundesliga youth level.

We started by chatting about Klopp. I was curious to know more about his connection with Neuro11. When I asked Patrick about him, he said Klopp is just a really nice person who cares about others. He remembers details about people, asks about their families, and makes sure they're doing okay. We both agreed that this caring nature might be what makes him successful. With this understanding in mind, I embarked on a conversation with Häntsche to uncover the story behind Neuro11 and their pioneering work at the intersection of neuroscience and sports performance.

**🔗 I saw Neuro11 for the first time back in 2022 when Trent Alexander-Arnold's picture with the headset made the news. Articles mention that you help Liverpool with set pieces and penalties. How does Neuro11 contribute to the team's strategy and performance in these specific aspects?**

💬 On the one hand, we help the team by training all the set-piece takers and guiding them to get the ball where it is needed. During the set-pieces, electrodes are attached to the player's head to measure their current brain states. We then analyze this data and work together with the player to find out what parameters of his procedure truly help him to get into the zone. The player is thus able to learn more about themselves and develop the mental tools to reach that state more often. This is revolutionary because, thus far, every player has their own procedure, but it is often not clear which parts of the procedure are really helpful and which ones can actually not be as good as one had initially thought.

On the other hand, we support the coaches with our knowledge from the training and give them recommendations. Ultimately, it is up to them how they use it. The combination of their daily work (normal training and analysis) paired with our work gives them a better basis for objective decisions.

**🗣️ What inspired the founding of Neuro11, and how did the founders' initial interests in neuroscience lead them to the intersection of neuroscience and sports, shaping the organization's direction and focus?**

💬 We all have a passion for sports in general and especially for football. Niklas Häusler and I have known each other since the age of 10 from a summer football camp. We were always a little bit in touch. At the end of Niklas' PhD, we finally met up, and I told him about the huge potential of neuroscience in professional sports. Niklas then found out firsthand at RB Leipzig and the German Football Federation what I meant.

We expanded the team with business and neuroscientific expertise and figured out which neuroscientific techniques to first apply to professional sports. Together with the University of Bonn, we applied for and received funding scholarships from the EU and Germany. We then were able to transfer the scientific knowledge from precision sports (rifle shooting, archery, dart throwing, and golf) directly into football.

We developed a brain training coaching procedure and analysis that improves mental brain states and, as a result, increases precision. This is our Neuro11 brain training. We then founded the company and finally got in touch with Jürgen Klopp because we felt that we had developed something really special.

Neuroscientific techniques are the next frontier in athletic performance. The physical abilities are almost maxed out, so the next step is to train the brain directly. Not in any way, but scientifically validated. This is where we come in with our background. This is unique: Our background and the combination of neuroscience and elite sports. Our goal is always to be in a position to develop our training and methods independently of coaches, clubs, and organizations.

**🗣️ Neuro11 emphasizes the importance of achieving the flow state, also known as being 'in the zone.' How does the scientific understanding of the flow state differ from its description in the context of sports performance, and how does Neuro11 reconcile these differences in its training approach?**

🗣️ We always have to find the sweet spot between scientific explanation and practical application from a player's perspective. The easiest way to explain is that you are in different brain states at the same time, but the key is that you are more or deeper in one specific brain state, which we can call the "flow state" or "zone."

Scientific evidence shows an association between the flow state and accuracy. This means that if you are able to be in the zone before your action, then your accuracy is much higher. From an athlete's point of view, it happens when your body is relaxed, but your mind is fully focused. Athletes know that feeling when it randomly happens in a game, but we try to purposely get them into this state by finding what works best for them in training.

**🗣️ You gather data from various set pieces, including penalties, as part of your work. For example, how do you analyze the history of penalties during the preparation process?**

💬 We have developed a model to prepare players for penalties, and history plays a role in this model. But we need to be aware of so many different factors, that it would be negligent to focus only on history, whether it is positive or negative. If it was negative, sometimes it helps to dive into it and objectively explain to the player why the penalty outcome was negative. It is also necessary to prepare a player for an upcoming penalty that will have completely different circumstances than previously, so other factors can be more important than their history.

**👉 There is a common belief that Germans are very good at scoring penalties. This is often attributed to their perceived calmness and professionalism. Is there any truth to this? Do you observe cultural differences?**

💬 We believe that the personality of each player makes all the difference, and you have to train each individual according to their personal preferences, which is influenced by the culture. Not only for scoring a penalty, you need a plan, but also for corners and free kicks.

If you are able to create a proper plan that suits your personality, either by yourself or with the help of your coach, you have reached the first step. The second step is to train and to adjust the plan according to your training results. The third step is to follow your plan in competition. If you follow the steps, your success rate will increase. But it is completely independent of the culture, it depends only on the athlete's personality, the personalized plan, and the execution. In terms of scoring penalties, maybe we, as Germans, were sometimes better prepared than others. But this is history.

**👉 You work with many teams and athletes. Are there any particular challenges or barriers you've encountered in introducing neuroscience-based training to athletes or sports teams? Do athletes or coaches ever oppose your scientifically supported training programs?**

💬 In general, the feedback has been great, but of course just like in real life, you will always have people that are more open to new ideas than others. This is normal, and we respect this. In the end, it is all about the player themselves realizing that they can use our help to perform even better. When this happens, we are very happy to support them with all we have.

## **🔗 How do you address the unique psychological and physiological demands of different sports or athletic disciplines when designing flow state-focused training?**

🗨 In every sport, you have to focus at a certain moment in order to perform at your best. We worked out when that moment was for the different sports and situations. The next step was to prepare for the different circumstances in each sport, such as the culture or a different approach to the game by each athlete. Our advantage is that we can use our knowledge from competing ourselves in different sports to get new perspectives into e.g. football through applying techniques from golf or basketball. Our athletes really like this approach, because sometimes they are faced with a challenge in their routine and can find a solution by having explained the approach from another sport. That makes our work in different sports so valuable for our athletes.

## **🔗 I assume that there can also be individual differences for athletes. The time they play, the place, conditions, attention span etc. How do you tailor the program to meet the needs of individual athletes?**

🗨 We have to adjust our training to the current situation of the athlete. It can happen that an athlete is faced with a challenge in the competition where they are not able to find solutions. To solve these kinds of current challenges in discussion with the athlete, is more important than our "pre-planned" training. After the experience of guiding over 500 sessions and the databases we have, we are able to react to the specific needs of the athlete. That means e.g., we know when to adjust the level of difficulty so that the athlete has the right degree of mental challenges in practice or knowing when we have to explain more or less during a session. Though our training itself is always based on similar mechanisms.

## **🔗 What are some specific strategies or techniques you use to help athletes transition seamlessly between practice sessions and competitive environments while maintaining the flow state?**

🗨 First of all, you are never able to copy the pressure you feel during a game, but it can be helpful to simulate competitive pressure during training in different ways. Our goal is to prepare an athlete for the competition through our training. During competition and especially in high pressure moments the athlete is able to use the learned tools and methods to be as successful as possible.

That's why it's sometimes more challenging to train young players. They don't realize how high the pressure is in their sport at the highest level. They are not able to judge, e.g., a penalty in the right way and think they are a good penalty taker solely because it was a goal. It is our job to prepare the younger players for the big moments, and that is a process with success and failure. Advanced players that we have trained are more likely to be confronted with high-pressure situations and know exactly what that feels like. They actually often wish we had trained them when they were younger!

**🗣️ Looking ahead, what are some of the key areas of innovation and growth that Neuro11 is focusing on to enhance further its impact on the field of sports neuroscience and mental training?**

🗣️ We want to show people out there that every single one of us can control their brain and behavior. Once we are able to get that message across, we hope to provide a platform for improving your daily life.