

# FRIENDS OF NVT

OFFICIAL NEWSLETTER OF INNEURACTIVE



WHAT'S IN OUR LATEST ISSUE:

## INTRODUCTION

Welcome to Volume 10, Issue 2 of the Friends of NeuroVisual Training Newsletter. In this edition, we unravel the intricate world of goalkeeping with our main feature, "A Symphony of Sound & Sight: How Goalkeepers Perceive the World." Delve into the groundbreaking research that unveils how professional goalkeepers navigate their surroundings with a unique temporal binding window, offering insights into their distinct sensory integration.

In our How-To section, discover the secrets to honing goalkeepers' reactions and processing skills with the guide "Create Drills that Enhance Reaction Time & Processing in Goalkeeping." Unearth the methodology, equipment, and coaching insights that go into crafting a game-realistic drill, designed to challenge and refine the perceptual prowess of goalkeepers.

As we explore the specialized world of goalkeeping, we extend the conversation beyond the goalposts. The article suggests innovative ways for outfield players and non-players to enhance their multisensory processing, offering a bridge between the unique skills of goalkeepers and the broader athletic community. By incorporating NVT techniques alongside traditional training, athletes can narrow their temporal binding window and elevate their perceptual skills.

Engage with the captivating insights, immerse yourself in creative drills, and take a step closer to understanding the world as goalkeepers do. Thank you for being part of our shared journey towards excellence in NeuroVisual Training. Here's to a volume filled with knowledge and inspiration!

- Introduction
- A Symphony of Sound & Sight: How Goalkeepers Perceive the World - Robert Hasselfeld
- "How To": Create Drills that Enhance Reaction Time & Processing in Goalkeeping - Robert Hasselfeld
- Announcements
- Disclaimer



@FriendsofNVT

## Symphony of Sound & Sight: How Goalkeepers Perceive the World – And How You Can Be Just Like Them

At the beginning of October 2023, a research paper on goalkeepers took the football (soccer) world by storm. The focus of the study was proving that professional goalkeepers perceive the world differently due to a narrower temporal binding window. Meaning that the time it takes to integrate different sensory inputs (i.e., visual vs. auditory inputs) is shorter than those of outfield players and non-players.

The method of choice for the study was the sound induced flash illusion (SIFI) which is a test that involves a perceptual phenomenon where a single visual stimulus accompanied by multiple auditory stimuli create the illusion of multiple flashes. The athlete going through the test will observe a visual cue while hearing multiple beeps, when this occurs the brain perceives additional flashes. The test is designed to explore how auditory cues influence visual perception and highlights how the brain integrates multisensory information. To extrapolate to goalkeeping, think of a scenario where the goalkeeper cannot see the ball due to player traffic but hears the shot leave the striker's foot. Integrating the audio before the visual and using that information to decide what to do next is the temporal binding window at work. Note, the authors do not appear to suggest a kind of synesthesia, rather a heightened form of sensory integration with faster integration of the inputs.

The study leaves an open question about whether goalkeepers' multisensory advantage results from inherent skills or a learning effect through repeated exposure to audiovisual stimuli. The age-old debate of the innate skill vs trained skill of high-end athletics continues. Addressing NeuroVisual Training (NVT) and its role in neuroplasticity becomes crucial in understanding that the perceptual learning effect likely plays a significant role.

Through experience and learning, the brain can adjust the temporal relationships between sensory inputs. Enhanced neural connections or changes in synaptic efficiency may result in alterations to the temporal binding window. Goalkeeping is a specialized position that requires separate training outside the team training, and if you've ever seen any YouTube or TikTok goalkeeping clips, you'll see just how creative coaches get with drill set ups. These are often 1v1 or even keeper and ball in isolation.

Constantly obscuring the view of the goalkeeper, putting them in unnatural starting positions, creating rebound scenarios, large angle changes into reaction saves, starting them backwards, forcing the goalkeeper to react only when they hear the ball being struck, and having the goalkeeper somersault before a shot all challenge their perceptual skills. All these uncanny and unusual starting positions force the goalkeeper's brain to adjust and potentially narrows the goalkeepers' temporal binding window over years of this training. Consider the training one might use for a sprinter in the starting blocks. They have auditory and visual cues to start the race, but they also have very consistent starting positions and advance notice for their quick reaction off the blocks. Goalkeepers must be as fast as a sprinter but with the added complications of varied scenarios in which to do their craft.

Regions in the brain (reticular activating system, limbic system for example) are tasked with integrating sensory signals. These systems will tune in or tone down sensory signals based on past training and experience. Thereby offering an opportunity to condition these systems as appears to be suggested in the current article.

But how can the rest of the field players and non-players catch up and improve their multisensory processing? If only there was a style of training that could help...oh wait, there is! For field players and non-players looking to enhance multisensory processing, incorporating consistent NVT alongside traditional training offers a solution.

For example, take a standard passing drill for outfield players and have them put on some strobe glasses and set the frame rate accordingly. As the players are passing back and forth, their visual field will be interrupted. Players may have to determine the speed and trajectory of the pass in bits and pieces based on the visual interruptions, but this will force the players to rely on their ears. Understanding the sound association with the pass can give players clues as to the pace of the ball, if the passer is taking one or two touches, etc. Being able to merge these inputs and use them to make decisions can aid in narrowing the temporal binding window and can help improve their multisensory processing.

We have many training modalities that can be used to work on multisensory processing ranging from strobe glasses to Marsden Balls w/ an auditory memory card overlay. Bridging the gap between goalkeepers and others is achievable through the adoption of NVT techniques.

#### Relevant Links

Study: [https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)01130-2](https://www.cell.com/current-biology/fulltext/S0960-9822(23)01130-2)

Training Examples: [https://youtube.com/shorts/jWyWgvr2io?si=DKQmcNYCF6sjoD\\_j](https://youtube.com/shorts/jWyWgvr2io?si=DKQmcNYCF6sjoD_j)  
<https://www.youtube.com/watch?v=B-3iwEz0Y3Y>

# How To Create Drills that Enhance Reaction Time & Processing in Goalkeeping

In the dynamic and fast-paced world of modern goalkeeping, the ability to react swiftly and precisely to close-range shots is a hallmark of excellence. Goalkeepers are considered the last line of defense and regularly face split-second decisions that can make the difference between a save and a goal, victory, and defeat. The key to mastering this demanding position lies not only in athletic attributes but also in honing in reaction & processing time. In this article, we'll look at an exercise that trains reaction and processing time but also exercises multisensory processing, making it a good demonstration of how specialized this position is. We'll talk about the methodology behind the setup, what you'll need, and what to look for as a coach.

## The personnel and equipment you'll need for this drill are as follows:

- Head Coach and an Assistant Coach
- One Cone
- Three Wall Guys
- A Goal
- Soccer Balls

First, place the soccer balls in a pile directly behind the goal and position your assistant coach with this pile. The cone is set to the middle of the goal and on the goal line. Two of the three wall guys create a working frame for the goalkeeper. What this means is we shrink the goal to an area that we identify as a realistic amount of space for the goalkeeper to save in; at close range, nobody can cover the entire frame, and setting these wall guys up gives the head coach an area to aim for that will challenge the goalkeeper. The third and final wall guy goes 4 yards off the goal line and directly into the center. This wall guy will act as a distraction/interruption for the goalkeeper. ( See Figure 1 for drill set up).

This setup aims to target specific NeuroVisual attributes that we want to exercise in tandem with the goalkeeping technique.

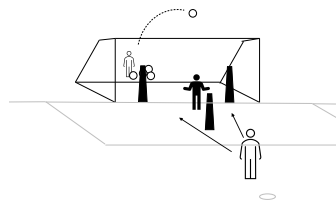


Figure 1: Drill Set Up

Having the goalkeeper visually focused on the head coach exercises eye discipline. We will exercise peripheral processing by placing the server behind the frame and out of sight. This peripheral processing work is possible due to the requirement for the athlete to stay visually focused on the head coach. By setting the third wall guy 4 yards off the goal line and aligning with the head coach, we create an interruption of information, which forces the goalkeeper to integrate different sensory inputs to decide where to go, when to go, and what technique to use to make the save. The close-range setup of this drill will exercise fast reactions and decision-making, amongst many other minor attributes/skillsets for the goalkeeper.

To begin the drill, have the goalkeeper set on the middle cone facing the field in a ready position, eyes focused on the head coach. The assistant coach will toss a ball over the back of the goal towards the head coach, who will then one-time volley a shot at the goalkeeper. The goalkeeper is to stay visually disciplined on the coach and track the ball in their periphery.

When the ball is struck, the goalkeeper must avoid guessing at all costs and respond to the shot. After the save or goal, put the ball off to the side and repeat until all the soccer balls in the pile are used.

This drill is great because it is very game-realistic (apart from the ball being distributed from behind the goal) in the essence of exercising reaction and processing skills. Along with dealing with visual distractions/interruptions and losing sight of the ball as it travels through the air towards the goal. Sometimes, you'll observe goalkeepers 'failing to launch' or staying 'rooted' to the ground when the distraction is in play, and this can indicate that their processing speed needs

improvement. If this is observed for several reps, remove the wall guy in the middle and see if this failure to launch is improved.

This drill exercises impulse control and precision, critical aspects of the goalkeeper position. Fighting the urge to guess where the ball is going is an intricate part of the game, and guessing can often lead to poor timing, hand positioning, body shape, and footwork, negatively impacting the save's precision. The nature of the goalkeeping position is to respond to shots, not anticipate them. What keepers do anticipate is shot trajectory, but all that information is available after the ball is struck. Yes, you can infer where shots will go from strikers' cues, but at the higher levels of the game, these cues are hidden, and the ball becomes the Truthsayer.

## Areas of focus for the head coach or NVT Trainer:

- Watch to see if the goalkeeper is guessing or moving too early. Anticipation can sometimes hinder performance in reactions; sometimes it helps.
- Watch how the feet react to the shot; an often-observed habit is goalkeepers jumping into a wider set position.
- Watch how the hands respond to the shot. Do they rise to the chest quickly or stay low and disciplined? (Rising up quickly can indicate a startled response).
- Observe the posture of the goalkeeper; are they hinged forward, flat-footed, or negative?
- Do they respond or stay 'rooted' to the ground? (failure to launch can indicate slow processing)

When reflecting on the study of the multisensory processing of goalkeepers we discussed in Article 1 and comparing that study with the nature of this position's training structure, it makes sense why goalkeepers perceive the world differently. It's a combination of learning skills and trained skills over years of specialized training. However, intelligently designed drills can work multiple NeuroVisual attributes without the athlete knowing it. Non-soccer trainers and NVT coaches can use similar drill creation methodologies to develop genuinely unique exercises that are science-backed and sport-specific, which can drastically enhance performance.

## Announcements

Check out this article regarding neuroplasticity, <https://flip.it/EFTV6K>. A simple dive into brain training and NVT.

Check out our store, <http://www.inneuractive.com/shop> ! We regularly add new products and are excited for the upcoming launch of our NVT warmup panels.

We encourage our Friends of NeuroVisual Training community to engage with these enriching resources. Your commitment to staying updated fuels the advancement of our field, and for that, we are sincerely appreciative.

Disclaimer: Nothing in this communication should be construed as a practice of medicine, an endorsement, or political action. The opinions are the opinions of the authors.