

# How to TEACH YOUR BRAIN TO SKYYDIVE

by Vic Napier



**Y**ou may not realize it, but you probably spend a lot of time teaching your brain how to skydive. Dirt dives, creeper practice and touching emergency handles on the ride to altitude are some of the ways we train our brains to direct our bodies what to do while jumping. Since performance is only as good as the train-

ing we give our brains, knowing a little about how the brain learns might improve our skydiving.

Technically speaking, there is no such thing as “muscle memory.” Muscles have no capacity for remembering; instructions for physical movements, such as walking or bringing a coffee cup to our lips, are stored in a special place in the brain called the



NIKLAS DANIEL

## Advice FROM THE PROS



ORI KLUPER

“Some people have natural talent but no commitment. Commitment to training is the key to being a success in the sport. I am not a natural. But I am committed to my team and my practice. The secret to my success is simple—practice! (That’s not really much of a secret.)”

—**Amy Chmielecki** | D-24579  
VFS competitor (Arizona Arsenal)

“In preparation for a 4-way competition, I watch the team practice the formations on creepers. While I am standing over the team, it gives me a great visual [perspective] and understanding of what to expect. I focus mostly on the transitions between the formations in order to anticipate where the pockets of dead air (burbles) are going to be. In addition, to help with the visualization process, I also like to watch the team’s exits from previous training videos.”



BRIANNE THOMPSON

—**Niklas Daniel** | D-28906  
FS camera flyer (4-way, Spaceland Blue)

“I like to say to my AFF students, ‘Ground time is free, air time is expensive.’ I believe the best preparation for any jump, whether it be an AFF student jump or a competition jump at nationals, is done on the ground before boarding the airplane.



KARL EAKINS

“I will usually rehearse two or three times, but never more than five, as there can be too much of a good thing. Once I board the plane, it’s time to relax! One more mental review is OK, but spending the entire ride rehearsing tends to make me more nervous. I strive to be constantly smiling, as I’ve found that it’s amazing what a smile will do for me and those around me. As I approach the door, one deep breath, and a quick thought to myself—‘Yay! Here we go!’—and one more big grin for good measure. All of these techniques have worked well over the years in my competitions, and they have worked just as well when working with my AFF students.”

—**Merriah Eakins** | D-22063  
Freestyle competitor (Team Flew-id), USPA Coach and AFF Instructor

motor cortex. After we learn a task, the instructions are committed to the motor cortex so that higher brain functions are free for other things. This is why it seems like the muscles themselves remember—information stored in the motor cortex is below conscious awareness.

If the instructions for muscle movements are stored in the motor cortex, where are they learned? This is where things get very interesting and the almost magical powers of the brain come into play. Think about learning how to drive a manual transmission: The car has three pedals, but you have only two feet. With two hands you must learn to operate the steering wheel, turn signal and shift lever (which can be placed in any of five or six positions). You must manage to operate all these components correctly without running into a ditch, over a sidewalk or into other cars. How does your brain manage all this?

## Memory Chunking

Managing it is possible partly because of something called “memory chunking.” Before learning to operate a manual transmission, most people have already mastered automatic transmissions. The brain has already learned what to tell the right leg and foot in order for them to press the gas and brake pedals and has committed it to the motor cortex. That information is stored in a neural network in one “chunk.” Now it is just a matter of adding new learning for operation of the clutch with the left foot and coordinating pressing the gas pedal.

The brain has to be actively taught how to do this. We have to consciously tell ourselves to use the left foot to depress the clutch, then push the gear shift into first, then we concentrate on slowly lifting the foot off the clutch while adding just a bit of gas. And the car stalls. Or surges. Or we concentrate so hard on getting the car mov-

ing that we forget to steer. So we try again. And again. Each try brings us a little closer to smoothly operating a manual transmission because, bit by bit, physical instructions move from conscious awareness to the motor cortex.

Another way the brain manages complex motor instructions is to move them farther and farther away from conscious awareness. Once you get the hang of shifting gears you think about it less and less and can concentrate on coordinating the gas and clutch pedals. Soon you can carry on a spirited discussion with a passenger and not even remember shifting. Really basic muscle chores, such as breathing, are learned before birth, and the instructions are stored at the bottom of the brain very close to the spinal cord.

## Signals From the Environment

Something else is happening, as well. Unknown to us because it also occurs below the level of awareness, our brains are integrating signals from the environment into our learning. Without having to think about it, we know about where the clutch pedal is when the engine begins to power the wheels, and we learn what the engine sounds like when the gas pedal is depressed a particular amount. These inputs from the environment are stored in a part of the brain called the sensory cortex and coordinate with information in the motor cortex—all without our even realizing it. Not only is the brain directing particular muscle movements, it is also coordinating them with signals we perceive in the environment. We never have to give a thought to letting up on the gas pedal when the engine starts to race because our brains automatically learn to coordinate the sound we hear with the position of a foot on the gas pedal.



WENDY SMITH

“I believe that the majority of potential issues that we may encounter on an instructional jump (or any jump, for that matter) can be caught on the ground and corrected before they ever surface in the air. The hard part is maintaining the discipline and composure to slow down the training process in an environment where we are typically working against

the elements of time, weather and even aircraft seat availability. If you are prepared for problems before you leave the ground, you are much more likely to handle them correctly in the air.”

—**Tom Noonan** | D-24313

USPA Coach Examiner and Tandem Instructor Examiner

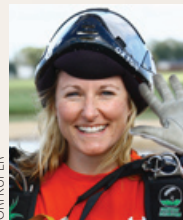
“Skydiving preparation starts a long time before any jump is executed. Preparation should begin with learning the base components that the jump will contain. When coaching a team, I really emphasize the importance of learning as much as possible by watching video at home to understand what the moves are supposed to look like and how they are supposed to be done before coming to a training camp. This allows a lot of energy to be focused on the specifics that the individual or the team needs to do to make that move faster and more efficient.”

—**Thomas Hughes** | D-28864

CP, FS (4-way, Spaceland Force; 8-way, Paraclote 8; 10- and 16-way, Arizona Airspeed) and VFS (Spaceland Vertical Force) competitor



THOMAS HUGHES



ORI KUPER

“One thing I always do, both while walking [a jump] and visualizing, is breathe—as in long, conscious, deep breaths—full-on exhalations incorporated into the focus I’m building. When I prep with this kind of breathing, the focus I build is rooted in calm—both in my mind and muscles—which opens the door for confidence, awareness and execution.”

—**Melanie Curtis** | D-25688

CP, FS (4-way, Elsinore BTE) and VFS (Elsinore VFS) competitor; USPA AFF Instructor

“For 4-, 8- and even 16-way, I think the true mental preparation happens between training camps. This happens as you watch video and debrief with your teammates to figure out how to execute blocks more efficiently and learn the grip and key plan for each point. These details are simply too much to think about in the plane and even while prepping each jump; they need to be ingrained. In earlier years, I used to walk all the blocks and walk from a star to each random before I went to bed every night. This process helped me memorize the formations and make my role in each point feel like second nature to me.”

—**Ben Liston** | D-23040

FS competitor (4-way, Mass Defiance; 8-way, Dallas Rogue; 16-way, Rogue Knights)



STEVE FELDMAN

# How to TEACH YOUR BRAIN TO SKYDIVE

It gets better yet. Years ago, a psychologist attached electrodes to the legs of downhill skiers and asked them to simply imagine skiing a particular course. Amazingly, the electrodes detected small electrical impulses from nerves in the legs of the skiers. Not only that, but when the skiers imagined particularly difficult parts of the course, the electrical impulses became stronger and more frequent. Since then, experiments have shown that simply imagining physical movements activates the same networks of neurons in the motor cortex that are used to actually perform the movement. Simply imagining how you use your body to skydive helps train your brain to skydive in real life.

This effect on the motor cortex is very small, but that does not mean it is useless. A huge challenge of skydiving is the distraction from the visceral excitement that we all enjoy. This is especially true for low-time jumpers, but even very experienced jumpers love the excitement of skydiving. Unfortunately, that excitement competes with our ability to concentrate on the skydive. The more the motor cortex can direct our physical movements, the less we have to think



ORI KUPER

about them and the more we can concentrate on things such as entering the right slot and remembering whether to turn right or left during the next transition.

## Imagery

Combining imagery with the physical movements we want our brains to learn helps to imprint those movements into the motor cortex. Informal dirt dives are a good way to rehearse the dive and practice what we plan to do with our upper bodies, but we practice exactly the wrong things with our legs because we are using them to stand and walk. It is not a surprise, then, that legs seem to be the hardest thing to control in freefall. This is why creepers are such a great idea. They allow us to approximate the same arm and leg movements we will use in freefall and give us a realistic picture of what we should expect to see, priming the sensory cortex for its role.

However, creepers can give only an approximation of what we plan to do in the air. We use our hands and feet to move the creepers around and don't have the luxury of the wind blowing our arms and legs back where they belong, simultaneously feeding our sensory cortex with information. This is where imagery pays off. In your mind, everything can be exactly as it will be in the air.

On the ride to altitude, spend a little time teaching your brain exactly what you want it to do. Take a few deep breaths, and close your eyes or concen-

## Advice FROM THE PROS

"In the plane, what seems to work best for me is to visualize the dive with my eyes open, thinking about looking at and working with my clone (the person across from me in the formation), the grips that I will be presenting or taking, and seeing each whole formation so I know where I will need to move for the next point. Some people seem to want to walk, creep and visualize faster than they'll ever go in the air. I find that my prep is most effective when instead I keep the steps calm, methodical and even a bit slower than I hope to go in the air. The adrenaline of the actual jump kicks things up to full speed."

—**Ben Liston** | D-23040  
FS competitor (4-way, Mass Defiance; 8-way, Dallas Rogue; 16-way, Rogue Knights)

"When I'm exiting outside the base on a big-way, I have two main visualizations—the 'point of view,' which is through my eyes, and the 'cameraman,' which is pointed down on my part of the formation. In big-way we don't have a method of simplifying formations into letters or numbers, so my thoughts are broken into present (exit), identify (see where the base is and where I'm going) and intercept (go to where my slot will be, not necessarily where the base is on exit). Present-identify-intercept will take me to the correct radial so I can make the final approach.

"As I am doing this, I am breaking down my slot into very simple, easy-to-remember terms. I don't think about being a diamond closer or whacker or slot flake. Rather, I know that my right hand docks on a black leg with purple grippers and my left hand picks up the wrist on a red suit with grey grippers. Colors are one of the easiest ways to remember a slot and can be easily duplicated in both the 'point-of-view' and 'cameraman' visualizations."

—**Kate Cooper-Jensen** | D-7333  
Big-way FS organizer



ILSE UNGEHEUER

trate on a detail of the container in front of you. Imagine the body movements you will make during the dive, and as you do, put a little tension on the muscles you will use. If you are going to extend a leg to make a turn, imagine doing it and simply put tension on the muscles you use to extend your leg. Don't leave out the rest of your body. As you imagine your body turning, turn your head a bit, approximating the movements you'll make during the jump. Think about where your hands and arms are, as well as what you will see.

Using imagery in skydiving is not a quick fix or a cure-all. Like anything else, a skill becomes more valuable as you learn to use it more effectively. Here are a few tips:

Do not bring more attention to body-position mistakes than is necessary. Coaches and instructors sometimes make the mistake of repeating what they don't want the student to do. This gets awfully close to teaching the brain to do exactly the wrong thing. If an instructor says, "Now, don't extend your leg way out like that; extending your leg is not a good idea because it will start a turn, so don't extend your leg," he may not realize that by bringing so much attention to "don't extend your leg," he might be teaching the student to do just that. This is especially true when reviewing a jump on video. Not only does the brain hear "extend your leg," but it receives visual cues, as well. Sometimes in forward, reverse and stop frame. So an instructor should not draw attention to something he *doesn't* want his student to do, he should bring attention to what he *does* want him to do.

## Staying Positive

This tenet applies to experienced jumpers as well. It is easy to dwell on a mistake made during a skydive, particularly when it results in derision from others on the dive. Rather than dwell on a mistake, acknowledge it, and move on to the positive aspects of the dive. Reliving mistakes only increases the chances of making them again. A better response is to practice the correct procedure, both physi-

cally and mentally, and imagine having done it that way. The same thing goes for how we talk to one another after a dive. Keep the negativity to a minimum, and gently suggest what might work better next time.

Make dirt dives and creeper practice as realistic as possible, even to the extent of considering wearing goggles and helmets. Anything on or around your face can be a distraction, so adding those things to the sensory inputs your brain receives is a good idea. In addition, it will reveal whether wearing them will cause any change to what you will see on the actual jump. (Those dirty, scratched goggles will only be a distraction if you put them on right before exit and are unprepared for how things look out of them.)

Try to notice the movements you make in everyday life that are similar to those you use as a skydiver. For example, reaching for a wallet in your right hip pocket may be much like reaching for your pilot chute, or looking over your shoulder while backing up your car may be a lot like clearing your air before deployment. Simply making a conscious observation that these movements are similar to the ones you will do while skydiving helps cement them into the motor cortex and increases the chances of doing them correctly in the air.

Spending a little extra time on the ground teaching your brain how to skydive can pay dividends in the air. Dirt diving, visualizing and lots of practice can help maximize each performance.

### About the Author

*Vic Napier, D-7555, made his first jump in 1980 and has logged 2,100 skydives since. He holds an FAA Master Rigger certificate, operated No Excuses Rigging for 10 years and has held USPA Static-Line, AFF and Tandem Instructor ratings. He earned an MBA in 2003 and is presently working on a PhD in psychology. He lives in Tucson, Arizona.*



TERRY LOVELL



BENJAMIN FORDE

"When I'm competing, the best thing I can do for myself is to keep things simple, let go of details and focus on the jump. For example, [if the dive is] star, donut, meeker, zig-zag/marquis, I will stay away from thinking about block technique and trust my training. I push away any thoughts that are negative and keep my focus on the sequence of the jump."

—**Eliana Rodriguez** | D-23390  
FS competitor (4-, 8-, 10- and 16-way, Arizona Airspeed)

"Before I take AFF students on their first jump, I have them make eye contact with me, we take three deep breaths together, and then I ask them to smile for me. When they tell me that they are ready to skydive, I reassure them by telling them how awesome they are and how well they're about to do. I have found that encouragement and positivity are the best tools to get nervous students to perform well and at their best."

—**Brianne Thompson** | D-30035  
FS competitor (4-way, Spaceland Blue), USPA Coach and AFF Instructor



NIKLAS DANIEL

"There is a time and a place for self-criticism and self-evaluation. Self-criticism is a major part of learning; it may even save your life one day. However, the words 'time and place' are the key to finding success with self-evaluation. When you are in the execution phase of your skydiving practice, you should only be thinking forward; if you fail, immediately forget about it and move on. Being self-critical during the execution phase will take away from your progression.

"When you land and are in the hangar then begin to debrief yourself. This type of practice will maximize your learning progression. At \$23 a jump there is no time to shake your head in freefall and think, 'Man I really screwed up that exit.' That kind of thinking can ruin the rest of your skydive! Just move forward and think about what you can do better when you get on the ground!"

—**Amy Chmelecki** | D-24579  
VFS competitor (Arizona Arsenal)

