The Protean Performance System

SuperFunctional Training 2

By Adam Sinicki

THE BIONEER
ACTION. PERFORMANCE. TECHNOLOGY.

The Protean Performance System

Adj. Protean:- The ability to do many different things, versatile. Able to change frequently or easily.

Hello and welcome to the **Protean Performance System**!

I chose the word “Protean” to describe this system, as I feel it a) sounds cool, and b) perfectly sums up what I believe to be the hallmark of complete physical fitness/human performance. That is: adaptability, versatility, and resilience.

My approach to training is inspired by the fictional superhero Batman. Batman is a character who has developed himself to “peak” physical and mental condition. To do this, he is typically depicted as training in multiple disciplines, for strength, endurance, mobility, and mental prowess.

Batman must be able to go toe to toe with an opponent, then chase them across rooftops, talk his way through a hostage situation, and still have a steady-enough hand to disarm a bomb. Being “strong” alone does not make you Batman. Having great endurance does not make you Batman.

This is a concept I believe can be applied to anyone. The most performant human is someone who can thrive in any situation. Yet, the majority of training programs seem to ignore this notion and instead hone-in on just a few aspects of performance.

Many people looking to “get fit” will take up what is effectively a powerlifting regime: performing only squats, deadlifts, and bench press. As we will see, this is not only mistaken for completely ignoring other facets of fitness (such as cardio or mobility), but also for training only a few constrained movement patterns. These compound movements may be a step above resistance machines for their functional, compound nature… but only just! In the real world, we never place huge loads on our back, and we rarely push against anything when lying on the floor.

None of which is to say the big lifts are not useful. They’re actually amazing! But they only represent one small piece of the puzzle.

If you want to perform like a superhero, you need to be able to be able to exert power while standing, at an angle, often on an unstable surface. And you need to be able to do it over and over, without tiring and without injury. And you need to do it while twisting the body.

Other people approach fitness a way to lose weight, or to slightly improve cardio so as not to get out of breath climbing the stairs. They are content to remain weak and inflexible, and to suffer with the aches, pains, and low-energy that are symptomatic of modern life.

Then there are all the other things we know can be trained. Things like brain function (due to something called brain plasticity). And even *specific aspects* of brain function, like focus, creative problem solving, or even emotional regulation. Vision, grip strength, and hearing can be trained. So can balance, task switching, and attention. There's all this untapped potential that most of us ignore, even when actively trying to better ourselves.

Imagine if you could be a little stronger, a little faster, a little more energetic, and a little sharper and more focussed. Imagine if you were a little more *Batman*.

Thing is, when I talk about this type of training, people stare at me like I've gone mad!

"How can you have time to train all those things? You don't live in the real world! What about the interference effect?"

This program is my answer to that. To show that you can train multiple things at once with smart programming; by applying effort strategically, and by spreading training throughout the day (which has many unique benefits, too). We'll see that each type of training enforces the others. And we'll see that it takes surprisingly little time and effort to see amazing benefits in many areas of your health and performance. I'll explain how it all works along the way. But the aim for this program was to be simple, easy-to-follow, and suitable for all levels, with any amount of equipment.

An added bonus? This type of varied and challenging training is FUN. It is inherently more interesting than simply performing curls and push ups (I believe, anyway) because it makes you FEEL like Batman WHILE you're training. It is *intrinsically* motivating.

I believe that all of us crave a little more excitement, challenge, and action in our lives. When you're climbing ropes and slinging medicine balls, you get to feel that way again.

Why You Should Train for Everything

The other objection I get is the following:

"Why do you *need* better hand-eye coordination?"

To which I would respond: why do you need to bench press that extra 5kg? Why do you *need* to do *anything*?

Simply being able to squat and deadlift huge amounts of weight is not "fitness." It has its uses, sure, but it's not a movement you particularly ever *need* in the real world. Nor is it the be all and end all of leg strength. How about single leg strength? How about rotation?

After a certain point, adding more and more weight will cause more issues in *other* aspects of your fitness. It will do more harm than good. You'll necessarily sacrifice spinal mobility, you'll become big and heavy; you may start feeling out of breath when you climb the stairs.

And to what end? There is no real-world scenario where you will ever need to back squat more than you can lift into that position. And if you're interested in developing more explosive legs for jumping and sprinting, you would do better with exercises that more closely resemble those movements. For running that means jumping off one leg or using car pushes, for example.

To be clear: for a powerlifting athlete aiming to be the strongest they can be on specific lifts, focussing purely on three movements with a little accessory work (General Physical Preparedness) makes sense. For everyone else? Not so much!

Just as there is more to strength than squatting, "strength" is not the ultimate expression of fitness and performance. Without endurance, you can only exert strength for a short amount of time. What if you need to run a great distance? And wouldn't you feel more alert and productive throughout the day, with greater blood flow, a lower heart rate, and improved metabolism? Why would you ignore this in favor of 5kg more on your squat? Max strength is rarely as important as strength endurance during sports or real-life situations, either. Being able to exert force over a long period is favoured by the military, by sports coaches, and by MMA fighters.

And how about speed? Would you rather be stronger than 95% of people and faster than 95%? Or stronger than 98% of people and faster than 50%? Due to the law of diminishing returns, this is the correct way to consider this question.

It's not just strength that people become obsessive about. Many others equate fitness to cardiovascular endurance. "Fit" to them, means being able to run long distances without throwing up. They lose mass and size, they lose the ability to move explosively, and they miss out on opportunities to explore the full range of motion their bodies are capable of.

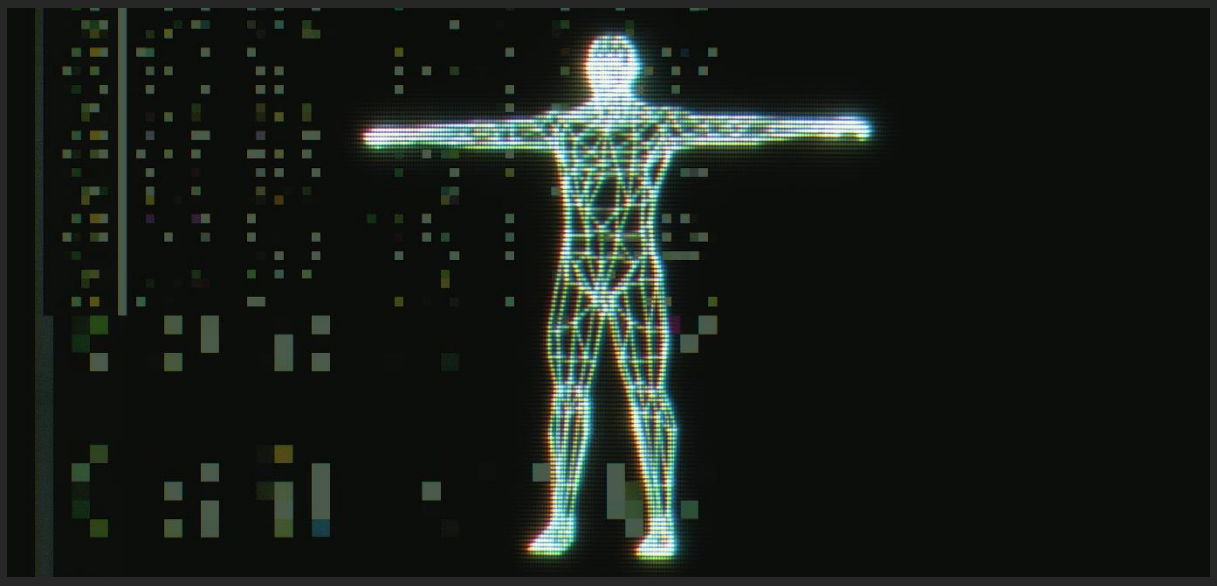
What about agility, proprioception and coordinated movement? How about reflexes and timing?

You might laugh at someone who learns to juggle to supplement their fitness training. When will they ever need that kind of hand-eye-coordination?

Well, they won't. Until they do.

And they are no less likely to need *that* skill, than they are to need to be able to squat 250kg!

What about quick decision making and general cognitive performance? The athlete who wins a contest is rarely the one who is strongest, or fastest, or most endurant. More important, is how they apply those traits on the day: by remaining focused, motivated, and calm.



How about bringing all of that together? Into one beautiful ensemble: a concerto of strength, agility, quickness, decision making, and explosive power. It's that kind of beautiful communication with the environment that wins fights, stuns crowds, and even saves lives.

When you can react quickly, think strategically, dodge gracefully, and strike with power and precision. When you can do all that repeatedly, with no sign of fatigue. *That's* the kind of total-body-and-mind fitness that can really impact your life in a positive way.

So, that's the objective. The next question is: what are these different aspects that we need to train?

I have compiled a list of what I believe to be the pillars of fitness and performance. This is by no means a comprehensive list, but rather a starting point. These are the basics that everyone should consider. These are the areas of performance that the **PROTEAN SYSTEM** aims to develop.

Pillars of Fitness

STRENGTH

Strength is the ability to exert force on the environment. This could be to move an object or yourself, to break an object apart, or to prevent movement.

Strength can further be broken down into subtypes:

- Max strength – This is the peak output you are capable of exerting, often measured in terms of “one rep maximums.”
- Explosiveness – This is the amount of strength you can exert quickly, also known as “rate of force production.” Explosiveness makes for powerful punches and powerful vertical jumps.

To be useful, strength should be accessible on any vector. It is not enough to JUST be strong in constrained movement patterns like the squat or deadlift. Rather, you should be strong when pushing horizontally from an upright stance, strong in the transverse plane, and strong in unbalanced, unilateral movements. This is how the real world demands us to be strong: whether loading a boot, moving furniture, or wrestling an opponent.

Strength should not just be muscular, but should bring with it denser bones, tougher connective tissue, and a powerful grip.

Strength should be developed through common, useful movement patterns, but also in specific muscles and combinations of muscles to prepare for unexpected demands.

SPEED

Speed is the ability to move quickly from one point to another. This can be further broken down into:

- Movement speed: acceleration speed, deceleration speed, lateral speed, and linear speed
- “Quickness” or limb speed
- Reflexes

Speed is a combination of rate of force production (explosiveness), along with efficient movement, and neural drive.

The goal is to be able to run quickly when you need to, which could genuinely save your life. But this doesn't just mean running in a straight line, but also being able to weave and change direction. You should be fast in a variety of environments: whether swimming or running uphill.

And that quickness should extend to smaller movements: whether throwing a punch, catching a ball, or ducking.

ENDURANCE

Endurance represents your ability to continue to express strength and speed for a long duration. As we've discussed, in a real-world setting, it is rare that you are ever required to perform a single feat of incredible strength. Far MORE often, you are required to exert that strength for a significant duration.

Carrying heavy objects long distances is more useful than lifting extremely heavy objects a single time.

You can be the best fighter in the world; but if you can't last more than one round without tiring out, you won't be winning any bouts. Endurance will improve your strength training, too, by increasing work capacity and allowing you to train work harder in the gym.

Again, there are different types of endurance.

- Aerobic endurance – The ability to run, walk, row, climb, or otherwise move long distances at sub-maximal exertion. This is the low intensity steady state cardio you experience on a 10K run. This is linked to the anaerobic threshold: the top speed an athlete can maintain before being forced to switch.
- Anaerobic endurance – The ability to move at top speed for an extended period of time. This is best trained with sprints and HIIT.
- Strength endurance – The ability to exert strength of long periods of time, closely linked to the similar concept: work capacity.

Endurance adaptations are both systemic and peripheral: you can have greater endurance in specific limbs and movements than in others. Thus, a "ready for anything" approach to speed and endurance should apply to individual movements AND the system as a whole.

AGILITY

Agility is a combination of strength, speed, and mobility – but combined with grace born from proprioception, balance, and posture. This allows us to leap high into the air, balance along thin beams, and contort our bodies in mid-air.

So, we must also train for that balance, that fine motor control, and that coordination. We can do this with more ambitious calisthenics, gymnastic strength training, yoga, and countless other protocols.

Mobility is the ability to move through a full range of motion with ease and control. Mobility should not be confused with flexibility. Flexibility refers to the ability to force yourself into a position using external resistance, mobility means getting into those positions using your own strength.

Mobility and agility matter in everyday life because they prevent injury: giving us control in end ranges of motion, allowing us to save a bad landing, or to right ourselves when we start to fall. And simply by gaining more range of motion and control in these positions, you'll be able to reduce tightness and discomfort.

COGNITIVE FUNCTION

Few people realize that they can train their brain just as they can train their body: that their habits and career shape brain regions and the connections between them via neuroplasticity. Even fewer people make this training a part of their routine.

But training the mind is what would ultimately lead to the most tangible rewards for many of us. Being more focused, better at creative problem solving, and more compelling as an orator would help you excel in your personal and professional life.

And even in sports: the athlete who comes out on top is very often the one who is able to tap into their strength, speed, and power under pressure. The one who can react quickly and effectively.

But if you thought there were a lot of aspects of fitness you could train… that's nothing! Here are just *some* of the aspects of cognitive function that can be trained:

- Focus
- Determination/mental toughness
- Problem solving/creativity
- Neural processing
- Fluid intelligence
- Emotional intelligence
- Working memory

Can it Really be Done?

But can you really train for all these different things?

What about the interference effect? The idea that training in multiple disciplines will begin to have detrimental effects? (For instance: steady state cardio may reduce fast-twitch muscle fibre density).

While this is a real concern to a point, the truth is that it's mainly an issue at the highest level of performance in each domain. Most people can afford to get a little stronger AND a little faster. A little more agile and a whole lot more focused. Hyperspecialization is something else entirely.

As a generalist, we see each of those components of fitness support and improve the others. Agility is enhanced by explosive strength. Strength is enhanced by endurance. Emotional intelligence is closely related to the physical intelligence that helps us better manage our own physiology.

This is only really scratching the surface of what can be trained. In my time as The Bioneer, I have researched *countless* aspects of human performance and training. I've seen that it is possible to train things like vision, hearing, neck strength, lung strength (inspiratory muscles), and much more.

Everything can be trained. And approaching your fitness like this will make you more adaptable to a wide variety of unpredictable situations.

The mission statement of this book and program, then, is to help you become the best you can be in as many of these domains as possible. Not because it is necessary for the life you lead now, but because it is awesome and because it may *some day* be useful.

This is what it means to be SuperFunctional.

This is Protean Performance.

How to Train Everything at Once

One of the biggest objections I get when I suggest this type of training, is that it would be impossible to program: that it would lead to burnout. This is a valid concern, but it can easily be mitigated with smart program design.

The aim is NOT simply to take your initial bodybuilding workout, and then pile powerlifting, cardio, and mobility on top. This is certainly a recipe for overload and injury. Instead, we are looking for "bang for buck" exercises that serve multiple purposes (see the ATSP Hierarchy in the next section) and we are swapping exercises from each modality for those of another: to achieve the ideal combination.

In other words: why choose push ups that only work the pecs and triceps, when you could choose finger push ups that *also* work the fingers? (I imagine you already have your protestations, but stick

with me as I will explain all in a moment!). We'll be gravitating towards movements that offer a huge number of benefits, such as kettlebell swings, planche progressions, and rope climbs.

We structure the exercises in a workout in reverse order of how taxing they are on the nervous system, and the perceived risk of injury. That means that a movement like a sandbag clean would be performed at the start of a workout (after a warm-up), seeing as this is a multi-joint movement that involves moving a large amount of weight. Something like a push up however, which doesn't involve the spine to the same degree and only uses a portion of the practitioner's weight, is far safer to use toward the end of a workout when you are already fatigued.

This structure is akin to a "power building" strategy, which is a training modality that combines powerlifting with bodybuilding isolation moves. In powerbuilding, athletes typically perform their big compound lifts at the start of their workout, and follow up with isolation movements to target specific muscles. This reduces the risk of injury, as something like a bicep curl or press up is significantly lower-risk than a squat or deadlift. It also means that you can attack those most challenging movements before you have any amount of fatigue to contend with.

Here, we are taking the precise same approach, except that we will be putting movements like planche and rope climbing nearer the start. Movements like farmers walks and high-rep push ups, that are low-risk, go toward the end. It's also important that we put endurance tasks such as these toward the end, seeing as we don't want to fatigue crucial supporting muscles prior to attempting big lifts!

We can think of each workout as a kind of "sliding scale" that takes us from complex, heavy movements performed for lower reps, through to simpler, more isolated movements. This goes all the way to resistance cardio finishers (like battle ropes and kettlebell walks) that challenge work capacity. This way, we train every energy system without causing risk of injury. We also stimulate hypertrophy in multiple ways and work different motor units.

Progression System

The problem that can arise when replacing common workout methods with more functional movements, is that it can make it difficult to progress. When you are throwing medicine balls and doing cartwheels, progressive overload no longer applies in quite the same way. It's very important that we train on the solid foundation of progressive overload: meaning that we need to measure improvement over time and adjust the challenge accordingly. It's also important that beginners

aren't given a training program that starts with 10 one handed LaLanne Push Ups and then promptly injure themselves!

The solution is to rely on calisthenics-type progressions. That means that you utilize easier versions of the movements until you feel confident enough to try the next one up. If you can't perform one handed LaLanne push ups, you can begin with regular two-handed LaLanne Push Ups. Can't do those? Then you can start with your knees on the floor.

You can also switch between progressions mid-set in order to ease yourself into these new movement patterns. This is called a "mechanical drop set" and is the equivalent of lowering the weight once you can't perform any more repetitions.

This is how you can practice finger push ups and still provide the necessary stimulus to develop your pecs: you perform as many finger push-ups as you can, then drop to your hands and continue the set immediately without pause. This also allows you to challenge strength and endurance in a single set.

Fewer Sets = More Fun

Another difference you'll find with this workout, is that I recommend performing only two sets of exercises a lot of the time. Sometimes even one! Why is this?

Three sets of ten is the default recommendation when it comes to designing workouts and the argument is that by giving full effort, resting for 30-120 seconds, then performing more, you increase your total volume. In other words, you can use the same exercise MORE in order to trigger more adaptation. You can this way adhere to the overload principle, making sure the muscles are challenged enough to trigger growth.

Using this strategy it is possible to maximize muscle damage, metabolic stress, and mechanical tension – the three main stimuli that cause hypertrophy and strength gains. Studies tend to support this notion.

The issue? Doing three sets of an exercise is boring. And it doesn't have to be that way!

If you perform three sets of rope climb, you will trigger a lot of strength gains and hypertrophy due to the large amount of effort and smart use of recovery. If you perform one set of rope climbs and then move to push ups, you will cause significantly less of an adaptation.

But if you perform rope climbs then *pull ups*, the same issue doesn't apply. Why? Because these two movements are similar enough that many of the same muscles are involved. Thus, you still get the increased muscle damage and time under tension in the lats and biceps. The only difference is that you're also varying your workout to make it more enjoyable. And if you perform rope climbs, monkey bars, and chin ups in the time that it takes someone else to perform three sets of chin ups, you get all those nice added benefits like grip strength, core stability, and coordination. With lots of varieties of movement, you'll also build robust movement patterns that can apply to any real-world circumstance.

A big aim of the Protean Performance System, and SuperFunctional Training in general, is to make your workouts feel like action scenes. Having a wide range of exciting and dynamic movements to challenge you is one way we can achieve that.

The ATSP Hierarchy

To help create training programs that train "everything," I devised a system that I call the "ATSP Hierarchy." This is outlined in more detail in my physical book **Functional Training and Beyond**. I will go over the concept here too, though, as it underpins a large proportion of the exercise recommendation I'm offering. Moreover, I have since adapted it and included an additional layer: "N." This stands for "Neuromotor Networks." I will describe what this represents in an upcoming section, as it requires a little more explanation.

The original ATSP Hierarchy looks like so:

ATSP therefore stands for:

- **A**ttributes
- **T**raits
- **S**kills
- **P**roficiencies

The idea is simple: to learn a proficiency (such as a hobby, a sport, or a career), you need to develop certain skills. For example, a martial artist needs to learn specific kicks, punches, and blocks. They also need to be able to dodge, go for 10 rounds etc. A football (soccer) player needs to be able to kick, header, run, etc. A writer needs to be able to focus for long periods of time, type quickly, and structure an argument.

Skills are born from traits; you enhance skills by developing those underlying traits. For example, whereas focussing on writing for long periods of time is the **skill**, the **trait** here is focus. Likewise, whereas a roundhouse kick is a **skill**, the traits that underpin it are balance, rotational power, and mobility. Traits are global "properties" that apply to different people, to different degrees. They can also, typically, be trained.

And traits are the result of **attributes**. Attributes are *specific physical attributes* such as "a high density of type 2a fiber in the internal and external obliques." The difference between a trait and an attribute is that a trait is usually made up of multiple attributes, whereas an attribute could (theoretically) be observed under a microscope. You can literally see muscle fiber, for example, so this is an attribute. "Strength" is more abstract, and thus is a trait.

This conceptualization allows us to prescribe specific exercises to enhance specific traits. And therefore skills. Therefore proficiencies.

For example: a baseball player needs to swing a bat (skill), so they need rotational power (trait). Thus they need to train the obliques, rhomboids, multifidus, etc. (attributes). We therefore prescribe exercises like the cable punch, the pallof press, etc.

This applies to the brain as well as the body. If you wish to become a writer, you need to write for long periods of time (skill), so you need to train your focus (trait). We can observe that focus ("executive control") correlates with the anterior cingulate cortex brain region (attribute). Studies show us that this can be developed with meditation. Thanks to brain plasticity, we can work specific brain regions just as we work muscles.

Traits and Attributes for General Performance

But we aren't using the ATSP hierarchy to train athletes. As I have explained at length, the objective here is to train as an *all-rounder*.

To do that, we need to work backwards. We need to consider which attributes are used by the greatest number of traits, skills, and proficiencies. And we need to choose exercises that provide the most "bang for your buck."

Consider something like the lizard crawl. This movement involves crawling along the ground like a lizard, and it can provide all the following benefits:

- Chest, tricep, and shoulder strength
- Hip mobility
- Core stability
- Rotational strength/anti-rotational stability
- Improved proprioception
- Contralateral coordination
- Mind-muscle awareness of the multifidus
- Cardio
- Strength endurance

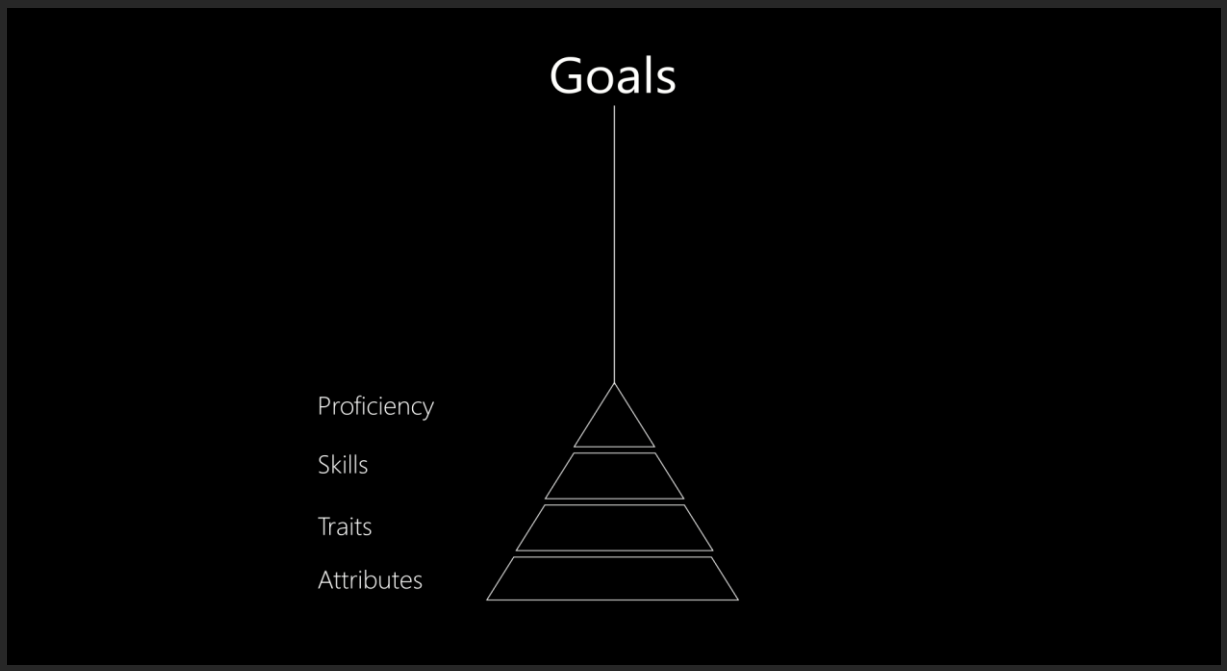
Compare this to a bicep curl that only really strengthens the bicep in a single range of motion.

How about the cross-body clean and press? This one single movement hits so many points as to be nearly perfect. You get a hip hinge and slight squat, some bicep and lat activation during the pull, rotation and instability, followed by a shoulder press. It's simultaneously a pull and a push, a lower body and upper body exercise. It's relatively safe with a light-ish weight and can even be used for conditioning, once you're confident with the movement.

The best part is that rotational lift from the ground. So, many people practice the deadlift to strengthen their backs and prevent injury, but we never practice picking things off the ground *while* twisting. This now requires stabilization in the hips and activation of the quadratus lumborum and obliques. How often do you put your back out "deadlifting" something from the ground? Do you deadlift your socks if they fall on the floor? No: you almost always pick these things up with one hand and *twist* as you do it. This is a crucial movement pattern for strengthening the spine and preventing injury, therefore.

This kind of exercise selection is one of the big focusses of the Protean Performance System. We are creating a program that consists entirely of these multi-beneficial movements; with a few exceptions that have been chosen for other reasons, explained below. This should help us see the greatest range of benefits.

I sometimes call these movements "SuperExercises." The idea is that if you can have a "SuperFood," then why not a SuperExercise?



Super Traits

Another concept related to the ATSP hierarchy is that of the "Super Trait."

Super Traits are traits that make it easier to learn *other* traits. These are "force multipliers." Good examples are:

- Energy
- Mental toughness
- Focus
- Recovery
- Plasticity
    - Muscular
    - Neuro

Energy is a super trait, because as you build more energy/work capacity, you can train longer and harder without reducing performance. The attributes underlying energy or work capacity include such things as heart strength/stroke volume, mitochondrial density, etc.

Plasticity is a super trait because it determines your ability to adapt *to* training stimulus. That is to say that two people engaging in precisely the same practice, with all the same physical attributes such as tendon insertions, may still have different results if one person adapts to the training faster than the other one.

As we'll see, plasticity is actually one of the defining characteristics of an adaptable athlete: a *SuperFunctionate*.

Training super traits should of course be considered a priority too!

"Missing Traits/Attributes"

Missing attributes are what I call those attributes that are very often neglected by most forms of training, and that are hard to train using "bang for buck" exercises. For example, you might consider things like neck strength, or straight arm strength to be "missing traits." By extension, "powerful serratus muscles" could be considered a missing attribute.

Unless you are a gymnast or calisthenics athlete, you likely have never trained your straight arm strength. And our modern lifestyles do nothing to develop this, either.

For complete, game-changing performance, we might wish to find ways to specifically train these attributes.

A lot of these missing traits are due to our modern lifestyles. The lost range of motion that comes from taking up static positions all day and never having any incentive to move outside of normal patterns is responsible for our missing abilities.

A loss of mobility often comes down primarily to a loss of *end range strength*. That means you are simply too weak at that point in the range of motion to work against the shortened antagonistic muscles or the neurological signals attempting to shorten them. These too are a response to lifestyle factors – if you never need to move outside a range of motion then your body believes that doing so is likely erroneous. (Take heed of this, it's building to something!)

Forgetting How to Move

The missing traits don't only describe smaller muscle groups that we have neglected to train: they also include those muscle groups that we have literally *forgotten how to use*. If that sounds a little bit dramatic… well it's actually just as bad as it sounds.

Consider your toes for a moment. Have you ever wondered why you can't move them independently as you can your fingers? The reason is that you haven't practiced. Because your feet are trapped in shoes most of the time, they don't bend and splay over terrain the way they are designed too: they only ever move as a single unit.

This is bad news because it means the neurons that control the toes in the motor cortex have actually become *wired together*. Neuroscientists say that "neurons that fire together, wire together." Those connections are strengthened and reinforced every time the individual neurons are used in conjunction with one another.

Eventually, this results in a situation where the cells are so strongly connected that you can't move one toe without it *also* moving the other. You have literally lost your "movement resolution" through disuse.

Similar things have likewise occurred throughout your body. Many people don't know how to move their shoulder blades, unless they happen to practice calisthenics. Many other people can barely activate their glutes because they spend all day sitting on them (this can, at the very least, cause some "sensorimotor amnesia" that leads to poor movement patterns in the gym in the short term). Few people, dancers excluded, can control their pelvis the way they should.

(One commenter on my channel described how learning to control his pelvis through dance made him significantly better at slack lining – he said it was as though a "weight had been removed from his waist.")

We're going to train with a wide variety of movements to restore these missing attributes and traits. Sometimes this will include isolation movements that precisely target the problem areas.

It's interesting, too, because if you think back to our evolutionary history, many of these missing attributes would naturally have been trained. Take for example the anterior tibialis: a muscle on the front of the shin that handles dorsiflexion. This also serves as a form of defense against high impact jumps (just ask Ben Patrick, the Knees Over Toes guy). It seemed strange to me that this should be "trained" at all, as we never would have naturally strapped weights to our toes, or balanced on our heels.

(To get this benefit from the program, try actively raising your toes when you are performing the deficit calf raises – as though trying to bring them higher than they already are. There's an extra morsel for people who read the ebook!)

Until I realised that swimming does this exact thing.

It's the same with shoulder impingement. It always seemed mad to me that moving shoulders overhead should result in shoulder pain for so many people. Shouldn't we be able to do this naturally? Well, according to Dr. John Kirsch, simply hanging can actually open up the shoulder more by moving the acromion. Of course we did plenty of brachiation swinging from trees and therefore *hanging* during our evolutionary history. And it might have been sitting in a hunched position that *caused* this issue in the first place!

The exercises I have chosen for this program also include those specifically designed to target missing attributes (or "missing fundamentals"). Such as hangs. Or planche push ups for straight-arm strength. This is another definition of a "SuperExercise."

"Fixed Attributes"

Another aspect to consider when using the ATSP model, is that certain attributes are fixed or set in stone. There is no way that you can change the insertion points of your tendons, the depth of your hip socket, or the length of your femurs. Likewise, while it is possible to change the proportion of fast-to-superfast twitch muscle fibers to a degree, this change is limited in scope. Some people are born with a greater density of superfast fiber.

This is the painful realisation many of us must come to: there is a genetic limit to what we're capable of. Someone very short with a high density of slow-twitch muscle fiber and unfortunate insertions in their lower limbs, will likely never become a professional basketball player. Conversely, someone with long limbs and an amazing vertical jump from birth, has the potential to go pro with training.

This is not to say that our short, limp friend can't become *better* at basketball. It is just to say that we must train around our physical dimensions.

Meanwhile, some people are going to have a much harder time than others learning something like the planche. It's why optimal squat technique varies from person to person, too.

But that's okay! This is another reason that I argue *against* specialization for the most part. It's also why I truly admire people that use their bodies in unique and creative ways – who train their unique attributes to the greatest of *their* ability. To become the best version of *them*.

Notes on the ATSP Hierarchy

A few more things to note with regards to this system.

First: traits can be more or less specific. For example, someone can be "strong." They might alternative be "strong in the transverse plane." Or they might have "explosive strength in the transverse plane." The more specific the trait, the easier it is to find a select few attributes and exercises to develop them.

Also important, is that the ATSP hierarchy works in **both** directions. That is to say that practicing a skill or a proficiency, will develop specific attributes. So, if you are a martial artist and all you do is practice martial arts, this will make you stronger and more mobile in specific areas. However, you will likely be able to further accelerate these improvements by also directly training the traits.

Finally: training is just ONE "input." Training alone won't make you a champion in any given discipline.

Other specific inputs include:

- Lifestyle factors (sleep, mood)
- Genetics (height, insertions, natural fiber type density)
- Practice/learning
- Nutrition/supplementation

By combining these elements with training, we can create a more comprehensive plan in service of general performance *or* specific life goals. This more developed system is what I call the "Ability Tree." Because I like RPGs.

Choose the goal, then work backwards by finding the proficiencies you need to achieve your goals.

Introducing the ATNSP Hierarchy and "Neuromotor Networks": Truly Functional

That said, it is a mistake to focus purely on attributes in isolation. This is, after all, what has led to many imbalances associated with bodybuilding-style training.

This is also where, I believe, another of the weaknesses inherent in exclusively training using modalities such as powerlifting lies (aside from the fact that powerlifting keeps you entirely in the sagittal plane and trains only a very limited number of attributes).

This is why I have since revisited the ATSP hierarchy/ability tree and added another layer: an "N" layer. N being "Neuromotor Networks."

If you train specific muscles in specific patterns (networks), this will result in those muscles becoming stronger when used *in that way*. That does not mean that the surrounding, unused supporting muscles (or fascia) will get trained. Nor does it mean the athlete will be as strong when using the same muscles in different patterns/networks.

Take the bench press. This movement requires you to lie flat on a bench and then press an extremely heavy weight directly upwards. Sounds good! Except that the bench press utilizes an unnatural network of muscles working together – with certain muscles playing an unusually large roles and others being entirely deactivated.

When you lie flat on a bench, you completely remove the involvement of the legs and core. This allows you to isolate the pectorals and develop greater max-strength and hypertrophy than would otherwise be possible.

The problem? You will not be able to *use* that strength outside the gym. Let's say you go to push someone over: if you have only ever trained the pushing movement lying down, you will have underdeveloped core muscles and you won't be used to activating the core and chest simultaneously. Even if you had enough natural coordination to execute the movement perfectly, you'd only be able to push a certain percentage of your own bodyweight before you ended up pushing *your own body* backward.

This is something JC Santana from the *Institute of Human Performance* pointed out to me. He explains that developing massive pecs and shoulders, while ignoring the role of the core, is like trying to "fire a cannon from a canoe." Impractical. We need to develop the canoe and the canon *together* to be powerful and coordinated. We need to build a bloody battleship.

To be clear: bench pressing is a cool skill and worth pursuing. If you want to become a world-class powerlifter, *absolutely* you should be bench pressing! But if you want to be a better athlete, a better fighter, a more agile *mover*… you are much better off performing movements like the staggered-stance cable press. Stand with one leg forward and push a cable out in front of you with one arm.

Now you are training yourself to steady your core *while* pushing the weight forward. You include some rotation in the core too, while pushing forward and bracing your rectus abdominis. Even your feet, glutes, and hip flexors play a role in planting yourself firmly into the ground and translating that to force from the hand.

How Neuromotor Networks Are Formed

Remember: every movement you perform, every action, begins in the brain.

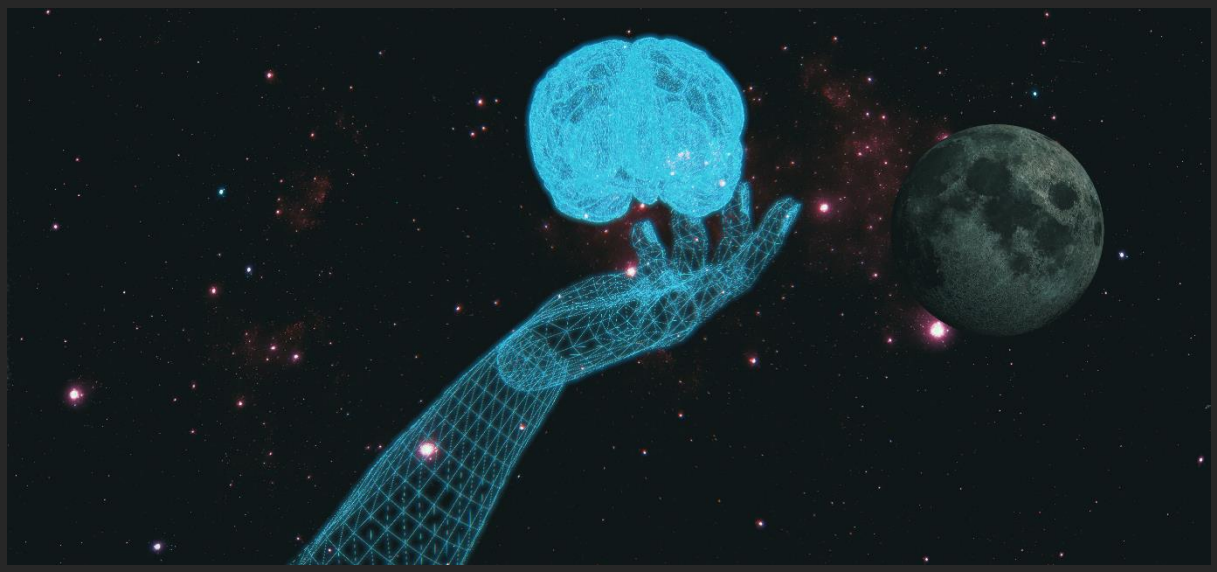
If you've read my previous books, you'll be familiar with this. But allow me to indulge once more to make a point.

Action begins in the posterior parietal cortex, a brain region implicated in free will. This is where we *decide* to move. Other brain areas also get involved with helping to coordinate the movement; with regards to your current position, goals, etc. (more on this in a moment).

However, the "prime mover," as it were, is the motor cortex. This part of the brain stores a map of your body, with each neuron (brain cell) connected to a nerve. When active, the neurons send signals through to the nerves which carry the signal to the muscles to innervate specific motor units.

These motor units each control a large number of muscle fibers in a given muscle. Thus, when this signal reaches the muscle, a contraction is triggered (as long as the signals tip the nerve over its "activation threshold"). The more motor units that are activated in a given muscle, and the larger those motor units, the greater the force of the contraction. For example, the bicep contains around 774 motor units, corresponding to 774 motor neurons in the motor cortex. It is impossible to activate all 774 at any given time, however.

Those motor neurons are meanwhile connected to the cerebellum, which is where we store our *procedural memories*. If you think of motor neurons like stars, the motor "maps" stored here are the constellations. These form the foundation of what I will refer to here as "Neuromotor networks." Each node (neuron) in that constellation projects outward to the motor cortex and trigger that sequence of muscle fiber contractions, in the set sequence.



These show us what order to use the motor units in. When you are a baby, you have no neuromotor networks and that's why you can't walk, talk, crawl, or even hold your head up. But as you repeat the same movements over and over, the networks become more deeply ingrained. (Or, more specifically, the excessive number of unuseful connections gets culled to leave behind only the most efficient, useful movements.)

Again: neurons that fire together wire together. This means that consistently activating two neurons at the same time, will eventually lead to those neurons becoming *physically* linked. With further repetition, that link is strengthened. This occurs through a number of mechanisms; such as myelination of the axons (tails) that helps the signal to travel faster and more efficiently between neurons.

This is how we learn useful movement patterns. When you practice powerlifting over and over, you learn to contract those *specific* muscles in that *specific* order. Those connections get strengthened, thus improving your neural efficiency, such that you can exert maximum strength in the right sequence without that effort "spilling over" into neighboring areas. This can even help to relax antagonist muscles that otherwise work against the movement. For example, when you perform a bench press, you need to relax the biceps. Failure to do so will mean your arm is pulling and pushing itself all at once! This doesn't come naturally without practice, as we usually contract the antagonist muscles to help stabilize a given joint.

This is also how a martial artist learns to punch with far more speed and power than a much "stronger" bodybuilder or powerlifter. The bodybuilders and powerlifters are strong when pressing weight over their chest, but when they try to throw a punch – which requires generating power from the hips and generating a "double pulse" of relaxation and tension (according to Stuart McGill) – they lack the coordination. They will likely throw the punch as they would use a bench press: from the shoulders and chest. Moreover, they won't be able to relax the antagonist muscles in the core at the right times. Their significant strength will actually, therefore, work against them!

Hypertrophy – the thickening of new muscle fibre – is thus only a small part of the big picture. You can focus on breaking down the muscle and building it back stronger, but being able to coordinate your movements will result in greater strength, much more quickly.

The Role of Fascia in Neuromotor Networks

But I make a distinction between the "motor map" and "neuromotor network" for a reason: the network extends *beyond* the brain.

We now think that fascia may actually play a role in this coordination of movement, for example.

Fascia is the "shrink wrap" that surrounds all the muscles, organs, and joints in the body. When preparing meat, you will have encountered this thin film. You probably thought nothing of it. Likewise, until recently, researchers didn't fully appreciate the critical role of fascia and believed it to be a kind of inert "stuff!" It doesn't help that fascia tends to evaporate when exposed to the air, either.

(DaVinci wasn't fooled, however, and actually included fascia in his anatomical sketches.)

But we now know that the fascia is completely covered in nerve endings. These include both proprioceptors (that sense bodily movements), and interoceptors (free nerve endings that sense bodily sensations). We also know that fascia contains smooth muscle tissue and thus contributes to the strength of contractions. Fascia also helps to keep organs suspended in their cavities, and to disperse impacts as a "tensegrity structure." In other words: the constantly balanced tension of the fascia helps to evenly distribute force. It also provides useful proprioceptive feedback that allows all the muscles to contract and react appropriately.

What's really interesting though, is the concept of "fascial force transmission." This shows that fascia can actually *convey* force between muscles. The fascia is also capable of reforming itself in response to common movement patterns and stimulus in order to strengthen along specific lines. This is carried out by fibroblast cells that serve as the architects of the fascial system (*Anatomy Trains* by Tom Myers).

In other words: repeating specific movements not only links the corresponding neurons in the brain, but may also *physically* link the muscles involved via fascia. You literally remodel your body around the demands you place on it and create useful networks of activation throughout the body.

And this is interesting, as the different connections between various brain regions is also thought to play a large role in shaping our cognitive abilities and personalities. Nothing should be viewed in isolation!

***

All this is to say that the bench press isn't optimal for learning to push an object or person horizontally *while standing up*. And that's an issue for the functional athlete, because that is how we push *anything* in real life.

Bars don't push back.

The bench press vs the cable/band press is just *one* example of this. Similar observations can apply across the board. The squat is an impressive movement with TONS of benefits, but when do you *ever* need to carry something even close to your own bodyweight *over your shoulders*? If anything, you will carry that weight in-front of yourself.

To put all this another way: muscles that are trained together, work together!

Attributes vs Traits vs Networks

We have established that when you move two muscles together, those two muscles to become "linked." Thus, we see patterns of activation that equate to specific skills. These are the "Neuromotor Networks." And this is the missing link, as it were, between attributes, traits, and skills.

This is the biggest confusion people have regarding the ATSP Hierarchy. People ask me what the difference is between an attribute and a trait. Couldn't you skip traits altogether and go straight to skills? A skill is surely the combination of specific physical attributes?

The best way to think about this is like so:

> A tall person likely has two long femurs. These are attributes. They probably have long tibias too. These are also attributes.
>
> However, when you *combine* all those individual attributes, you get the trait: tallness (or tall legs).
>
> Likewise, a person can be "endurant" – capable of exerting strength and speed for a long duration. But this global "trait" is the combination of multiple physical attributes: like a favorable number of mitochondria and a strong heart with a great stroke volume.

So, what is a skill? A skill is an *expression* of a trait (or traits). It is a particular network, algorithm, or sequence in which the attributes that represent that trait are utilized.

So, a roundhouse kick is an expression of being explosive in the transverse plane and mobile in the hips. This, in turn, is the result of high fast twitch fiber density in the obliques, hip flexors, and glutes. The skill is the activation of those muscle fibers in the right sequence.

And therefore, what is a proficiency? Simple: it is a selection of skills performed at a high level!

Now, as for neuromotor networks, these are the common combinations of muscles in particular sequences that make up many skills. A functional coach should not just train the individual muscles that are used in the serape effect: they must train them *together* with movements like the medicine ball rotation slam, the X-up, etc.

The neuromotor network can, in some cases, be the entire skill, but most skills can also be broken down into small neuromotor networks.

And because we see the same neuromotor networks used in many different movement patterns (such as the contralateral swing seen when running, crawling, and walking), we can train these independently of skills in order to improve at many things at once.

As we will see, you can train attributes to develop a trait (train all muscles to become strong) but that won't necessarily be enough to support the development of skills. This is why we should also train networks.

Training Networks

We can and should train muscles together, and in the ways in which they are most often used, in order to see the optimal "transference" to useful skills in life and in sports. Conversely, training "unnatural" or "uncommon" patterns of movement, will result in a loss of coordination. This is also why we need a *wide variety* of movements.

Training with the band press not only develops all the necessary attributes that can be applied to throwing a punch, pushing a sofa, or grappling an opponent; it also develops the connections and coordination BETWEEN those muscles. The networks. The missing link between the attributes and the skill. The application of the traits.

Another example of this is demonstrated a study that showed how swimmers typically had lower jumping heights than members of the general population (study). This is not to say, however, that you cannot be a swimmer who also excels in other leg-based movement patterns. Just take a look at triathletes!

Remember how moving all your toes at the same time will eventually prevent you from being able to move your toes *individually*? The precise same thing happens when you *only* perform a bench press or *only* swim. The networks become SO deeply ingrained, that it is now harder to engage the individual muscles without automatically engaging the others. This is power, without grace.

Neuroplasticity in Action

If this isn't making sense to you, consider this metaphor for neuroplasticity taken from *The Brain That Changes Itself* by Norman Doidge. He describes the formation of neural networks as being a little like sledding down a snowy hill. Each time you take the same route to the bottom, you create a deeper ditch along that path. Thus, you start to get to the bottom more quickly and easily with less wasted energy.

But as a result, it also becomes much harder to take any *other* route to the bottom. Get too near to that deep groove and you'll fall back into the same-old route! So it is with practicing one type of pushing movement over and over, then trying to learn another one.

The entire body arranges itself around what you repeatedly do. To be highly adaptable, you need wider grooves, and you need more of them. We don't want to train the *skill* of bench press. We want to take that pec strength and apply it more broadly to changing situations.

The good news is that just as there are some attributes that are useful in a wide range of movement patterns, so too are there networks that crop up more often than others.

To go back to the previous example, the problem with the bench press is that you *never lie on your back and push something in the air*. However, the network of muscle activation seen in the staggered stance band press is VERY similar to throwing a right cross. Likewise, it is VERY similar to swinging a baseball bat. It is VERY similar to pushing a friend into a river. I am a bad friend.

One of the very best examples of this is the "serape effect." This is the activation of muscles that wrap around the body in an X shape, that are employed when throwing a baseball or javelin.

This is how we develop strength without becoming uncoordinated: we choose movements that involve logical combinations of neuromotor networks. What's more, is that we make sure to train the widest variety of variations in the movement as we can. We are going to avoid becoming so literally "set in our ways."

This is where lifting a heavy sandbag or even your own bodyweight can be extremely useful. Here, you are developing a "more robust motor pattern." (To paraphrase Nicolai Bernstein.)

We are making the groove for our sled *wider* and not deeper. We are creating a little wiggle room, a little space for creativity and on-the-fly decision making.

When you lift a barbell over your head, that movement is *the exact same* every single time. What happens now if you need to lift a friend onto one shoulder? There's a high chance you could put your back out, owing to your lack of experience with the uneven weight. What happens when you need to lift a tree trunk out of a ditch?

When you lift a sandbag over your head, however, the movement varies with each repetition. That's because the sand shifts *inside* the bag, moving the centre of gravity. Each time you do this, your body must refine the movement pattern in accordance with the new information coming from your muscle spindles, your equilibrioception (balance), and your vision.

We can train in a similar manner by using a few different variations of a movement. We can train the transverse plane (twisting motion) not only with the band press, but with one-armed push ups, with X-Ups, with toe touches, and more.

We can also use movements that link two or more movements together. An example is a hybrid movement called the renegade row, in which you perform push ups with your hands on dumbbells, then raise each one up to your chest in a row, supporting your weight on the other hand and keeping your body parallel to the ground.

Some athletes are strange because they often *do* need to perform the same movement over and over again. A 100 meter runner will run on the same surface (near enough) every time, and they will run in a straight line. There is an optimal biomechanical pattern for *their* biology.

In *life* however, we must move in countless different ways to accommodate a constantly changing and dynamic environment. This is also true when *Batmanning.*

And even in other sports, like football, *every* movement is completely different. A football player (soccer to you American readers) must know how to rapidly change direction, tackle from countless angles, jump different heights…

And with that said, even for the runner, things vary. Everything from the weather, to the athlete's own varying levels of fatigue will slightly alter the movement each time. Differences in momentum, speed, angle, weather, and more must be accounted for on *each stride*.

No two movements are EVER the same. So, to be truly functional, we should not train as though they are.

Proprioception

To this end, we must also remember something else: muscles are not merely force-output machines. Muscles are also sensory organs that provide us with a crucial map of our own body in space.

The feedback from our muscles AND from our vision, is what refines our movement with each repetition.

And this is key to recognize: neuromotor networks INCLUDE the input. Every movement begins with information coming in and this should be considered in training. This is never more obvious than when training a martial artist to instantly block a punch, without thinking. Only by including an opponent's jab in practicing this movement, can you make it truly automatic.

To use the same example again, bench pressing will not teach you to listen to feedback from the muscle spindles in your multifidus and rotatores; whereas band presses will.

The multifidus and rotatores are tiny muscles that run up the spine and contribute to lateral extension and rotation. They were once thought to be unimportant (noticing a trend here?), but we now know that they contribute hugely to our overall spinal stiffness (which is critical for injury prevention). In fact, these muscles contain the thickest strongest in the human body (reference)! But the real magic of the multifidus is in helping us to balance and brace. These muscles contain an unusually high number of muscle spindles, which detect the lengthening and shortening of the muscles to provide proprioceptive feedback. This then allows us to, for example, prepare our body to receive the impact that comes from reaching the bottom of the stairs. That's why it feels so odd when you mistakenly believe yourself to have one more step to walk down!

When you perform a band press, or likewise push someone in a wrestling match, your body relies on information from these proprioceptors in order to respond to the feedback and resistance. This is how you know whether you are able to push more without pushing *yourself* over. It's how you know to move your body to adapt to the forceful, changing tug of a wrestling opponent.

This, in conjunction with vision, hearing, and balance, forms your perceptual motor landscape. Multisensory integration occurs in order to give you the information you need to respond appropriately and exert the right amount of force.

This is as important to the overall mental model as the execution of the movement itself.

This is also true for a batter, who must practice hitting a baseball. They can't physically react to the movement of the ball because a good pitcher will ensure the ball moves faster than the signal from their eyes to their brain can keep up! The only way to react in time, is to respond to the *telegraphing* of the pitcher and to likewise consider the weight of the bat, the wind, the distance, and the level of the ground. Our bodies do this instinctively, in a fraction of a second.

Over repeated practice, the mental model that forms includes countless inputs and countless outputs.

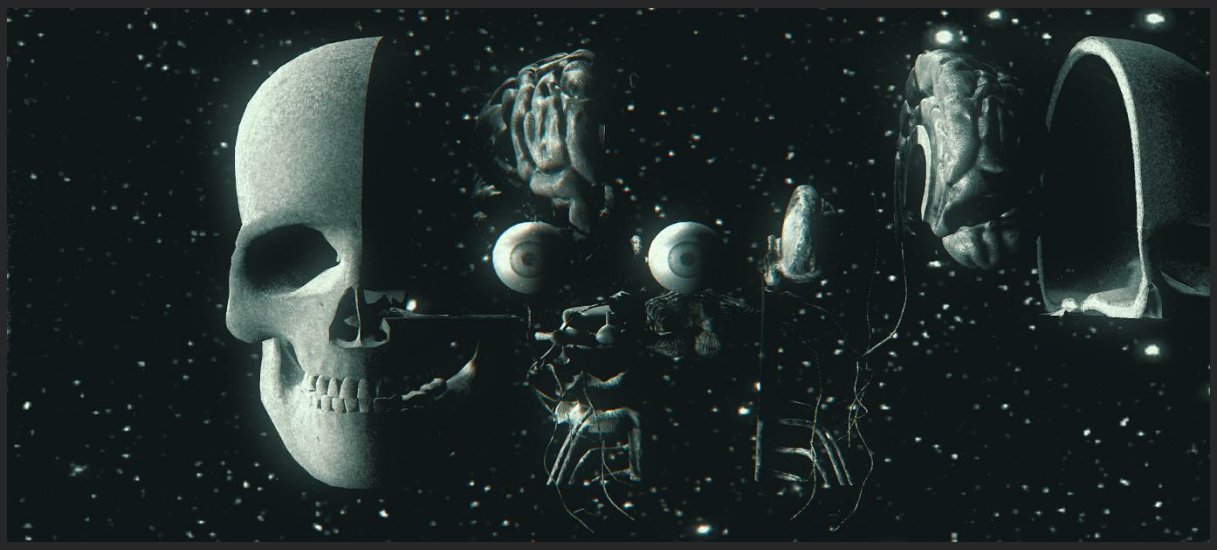
This is what neurophysiologist Nicolai Bernstein refers to as "repetition without repetition" and it applies equally to strength training. If the baseball player only ever hit balls indoors fired from a machine, they would lack the varied input necessary to formulate a useful, robust mental model. They would not be adapted to deal with the unpredictable throws of a pitcher.

Likewise, if you only ever press a straight bar from a flat surface, you won't be prepared to push another human that can fight back. And you won't be prepared to lift a heavy branch – or even push heavy furniture.

And this is DOUBLY true because lying on a flat bench *completely removes* the sensory input available through the spine.

Multisensory Integration

The best example of why multisensory *integration* is so important that I can think of, is the position of the head. When we move the head, we tit all visual input. It is only by marrying the information from the eyes WITH information from the muscle spindles in the neck and information from the ear canals, that we can ascertain whether we are falling over, tilting our heads, or standing on a sloped surface!



So important is this multisensory integration (and so powerful is the wiring together of neurons) that simply moving your eyes causes muscles on the back of your neck to twitch in anticipation of corresponding movement!

Models of Motor Learning

As we have seen, every single movement we make is different. Something as simple as getting out of bed in the morning will be affected by the position you are in to begin with, the firmness of the mattress on that side, any aches and pains you may be experiencing, levels of muscular fatigue in specific motor units, and the position of your partner on the other side of the bed. Do you then swing your legs out to one side, or sit up slowly? Do you reach for your glass first?

The number of possible permutations is limitless, and a huge number of muscles and senses are used in coordination to find a solution each time. How do we do it?

This is what Bernstein (there he is again!) refers to as the "degrees of freedom problem."

One proposed solution is that we limit the scope of the task. According to "dynamical systems theory," described by developmental psychologist, Esther Ellen. This is achieved through constraints. Constraints are rules that limit the number of options available to us.

There are three that are typically listed by this theory of motor leaning:

- Task
- Environment
- Organism

You begin with billions of potential movement combinations, but upon deciding to pass a basketball you immediately narrow that selection down to variations of different types of passes. This is the "task." More specifically, you must decide how you want that pass to go, whether you want to avoid certain other players, whether you want to disguise the movement with a feint, etc.

You also need to account for the environment: where are the other players? What is the ground like? How is the ball moving? This is environment.

Then there is accounting for your own body. How tall are you? What is your current position/footing like? How tired are you? This is "organism."

All of this helps to refine and select a precise movement, in a constantly fluctuating "self-organizing" manner.

All this makes an important case for training in a sensory-rich manner, and for understanding the importance of intent and environment when it comes to training. And it again shows us why we need to train lots of variations of the same movement, rather than sticking to a single version of a single move.

Strength Endurance, Explosiveness, & Strength-to-Weight Ratio

Once we start training on our feet and in a more sensory-rich manner, we quickly realize that we won't be able to build as much raw strength. When you are in a less stable position and the movement is *truly* compound (meaning it involves lots of muscles working together), you simply can't shift as much weight.

But this doesn't make us weak. Rather, it makes us strong *outside the gym*.

And this is especially true when we start to focus on the other key traits that make a truly formidable and dynamic human.

The first, is strength endurance.

Strength Endurance

Strength endurance is the trait that allows you to perform high repetitions of movements against resistance. Performing a single bench press of 150kg is a feat of "max strength." Performing 100 repetitions of push ups without pause is a feat of strength endurance.

Interestingly, bodybuilders typically train with much higher repetitions as compared with strength athletes, so in this way you could argue bodybuilding is surprisingly functional (in this regard)!

Here's the thing: rarely, in the real world, are you ever required to perform a feat of max strength. When have you ever had to lift something so heavy you could only lift it once *outside of the gym*?

As we discussed at the start of this book, you are far more often required to perform something closer to a 30% max lift but for a long duration. Think about carrying shopping from the car, carrying a fence panel from a delivery van, wrestling or boxing an opponent, rowing, climbing, playing a sport…

These are different adaptations: lifting your maximum *won't* improve your strength endurance. Thus, you see the typical image of a hugely strong individual who gets out-of-breath trying to walk up the stairs.

Strength endurance has countless other benefits, too. This relates to "work capacity," which describes the amount of work you're able to do in the gym. More work capacity = longer, better quality workouts = more progress. It also relates to injury prevention, as it keeps you strong and stable throughout a workout and throughout the day. If you hurt your back stooping to pick something up, it's possibly because the muscles involved in that movement have begun to fatigue throughout the day. These muscles work all day and if you head to the gym after a full day of work with poor posture and no lower back support, you're inviting injury.

Several changes occur as a result of training strength endurance. We see increased capillarization as more blood vessels form to deliver blood and oxygen to the muscles (this also enhances recovery), we see increases in mitochondria, and we improve systemic endurance. I.e. better cardiovascular fitness.

What many people fail to recognize about endurance, is that it can be "movement specific" as well as general. If you use long rep ranges, then you will increase mitochondria in *those muscles*. You might be fitter than a swimmer overall, but they might be able to swim further than you without tiring out (this would also have to do with more efficient neuromotor networks, which are also less energy hungry!).

Relative Strength

Another aspect to consider is strength-to-weight ratio. This is important if you want to remain fast, light, and powerful. If you can squat 250kg but you *weigh* 120kg, you aren't going to be able to move in an explosive manner. Conversely, if you can squat 250kg but you weigh 60kg, then you are going

to see huge improvements in your vertical jump and your running speed. (The latter is also extremely unlikely.)

Thus, relative strength is actually *more* important than max strength for real-world human performance, at least when it comes to movement.

This is especially true if we stop thinking of fighting as the best measure of human performance. Being heavy may have some benefits in a fight, but being able to sprint, jump, climb, and run long distances is surely more useful *on balance*.

(As a side note, this is a particular point I wish to make: training to be tough "in a fight" is misguided in my opinion. Many people who lift weights do so because they want to be tougher, on some level. Men, especially, lift weights so that they could "beat" other men. As we've seen, a big bench or squat in no way translates to a more powerful punch. In truth, they would be much better served by martial arts. But even martial arts won't protect you against a knife 90% of the time, or against multiple attackers. Conversely, being able to do *lots of things really well* is genuinely useful and actually *could* save your life. Forget "tough" and forget the ego.)

Explosiveness

We also need to think about intent and explosiveness. To move quickly and powerfully outside of the gym, you need a trait called "explosiveness." This comes down partly to the number of fast-twitch muscle fibers in a given muscle. Lifting weights requires the use of the more explosive, type 2 muscle fibers. However, a curl or a press will primarily train type 2a fibers, whereas plyometrics involve an increased amount of type 2x fibers (study). Type 2x is even *more* explosive than type 2a (but also quickest to fatigue).

Conversely, going for a walk or eating your breakfast cereal requires the very slow, precise, and energy-efficient type 1 fibers.

Over time, muscle plasticity allows an athlete to somewhat increase their ratio of muscle fiber types. Marathon runners gain more type 1 fiber, sprinters gain more type 2a/type 2x. Typically, fiber composition comes down to roughly 50% genetics and 50% training (study). Interestingly, the amount of plasticity also varies from individual to individual and CAN be trained in some ways. Some of the best ways to do this are with: increased creatine intake, increased blood supply to the muscles (which we know can be achieved with high repetitions to encourage capillarization).

But what is more important than the amount of muscle fibers, is just how rapidly you can engage said fibers.

When lifting your maximum weight, you are forced to lift more slowly, which in turn will alter the intent. In one study, it was shown that sprinters using the sled pull would see improvements in running speed when pulling a weight *up to* 75% of their bodyweight. Anything above this weight, however, became a strength-task and no longer benefited explosiveness (study).

The same benefits come from ballistic forms of training – such as kettlebell swings, Bulgarian bag spinning, battle ropes, etc. Anything where you are moving against resistance and the aim is *velocity* will improve your ability to recruit the larger motor units *more rapidly*.

In one study it was found that any form of strength training would increase discharge rates of motor units and decrease the recruitment-threshold of the same (study). That means that the motor units would more readily fire, and would more rapidly cool-down ready to fire again.

Muscle fibers can only “fire” or “not fire” in a binary fashion. They do so for an extremely brief period called a “twitch contraction,” lasting around 100 milliseconds. What we think of as a continuous contraction, is really a string of extremely quick ones. This is a “tetanic contraction,” and it is the reason that our hand shakes when we are lifting a weight that is very heavy, or when we are extremely fatigued.

Henneman’s Size Principle also tells us that motor units must always be recruited in size-order (smallest to largest). This means that the largest motor units only get recruited if the combined effort of the smaller motor units is not enough. Moreover, each motor unit is predominantly comprises of one type of muscle fiber (slow, fast, or superfast).

Only by lifting very heavy, or attempting to lift very fast, can we engage the biggest, type 2-comprised motor units.

Training with explosive movements increases rate coding speed (study) and lowers the activation threshold for larger units. This means that less force is required to activate those large motor units in future.

Thus, it is by lifting faster that this force becomes available *more readily*

Plyometrics

Plyometric exercises are similar to ballistic exercises, except they also train the “stretch-shortening cycle.” This is a lengthening of the muscle followed by a rapid contraction, with only a very minimal amortization (amortization being the pause between the lengthening and shortening of the muscle). An example is the countermovement jump. Here, you drop down into a squat, thereby stretching the muscles of the leg. You pause for less than a second at the bottom (amortization) and then contract to powerfully thrust your body upward. The stretching portion here appears to work as a kind of “run up,” thereby allowing more cross-bridges and greater force production. This is *not* about storing elastic energy then, which is why all parts of the movement must be performed rapidly.

Shock training, conversely, involves absorbing an impact during the eccentric phase. An example is the Verkhoshanksy depth jump, which involves jumping off a box and *immediately* launching back into the air. This utilizes and trains the myotatic stretch reflex to exert even more force. (This reflex causes muscles that elongate rapidly to shorten again. It actually helps us catch ourselves when falling, and it is what the doctor is testing when they tap on your kneecap.)

Rebound: The Flubber Effect

When training with plyometrics OR shock training, you will increase stiffness in the target joints (lowering tendon hysteresis and possibly even triggering changes in the fascia). When sprinting, there is a surprisingly little amount of ankle dorsiflexion, which is to say that the ankle doesn’t move much! Instead, an isometric contraction in the calf keeps the tendon taut, which in turn allows more rapid energy transfer through tougher tendons.

That said, plyometrics and ballistic exercises are less likely to lead to hypertrophy (muscle growth) owing to lower muscle damage. This is partly due to the lighter weight, and partly due to the smaller opportunity for cross-bridging between the actin and myosin filaments.

There are still benefits to training with heavier weights or slower cadences, then. Maintaining a contraction for a long time is a skill in itself (and a form of strength endurance). This is the SAID principle in action: Specific Adaptations to Imposed Demands.

In other words, if you want to learn to move quickly and explosively, you must *practice* training quickly and explosively. Lifting too heavy a weight means you *can't* move quickly, which changes the intent and the muscle action. This is why some powerlifters will measure "bar speed" as an important tool. They may also utilize "compensatory acceleration" by reducing the weight and *increasing* speed to enhance rate of force production.

Strength Control

Just as we should aim to vary the types of movements to give ourselves the widest range of options in any situation, we should also aim to vary the cadence of the movements. Sometimes we train fast, sometimes we train slow.

Quasi-isometrics are exercises performed extremely slowly – a push up might take a minute, for example. This teaches breathing while bracing the core, and it develops impressive strength endurance.

At the same time, though, quasi-isometrics require you to exert very precise amounts of force to control your movement. You need to engage just the right number of muscle fibers to slowly lower yourself and then raise your body.

In the "passive" variant of this movement, you are also aiming to fully relax the muscles that *aren't* involved in the movement. This develops the mind muscle connection and allows for more efficient and confident movement.

Finally, quasi-isometrics allow us to train the muscles through the entire range of motion. In a plyometric exercise, momentum will actually help you through certain portions of the movement. This is also true when using a regular cadence for normal resistance training. Thus, you will often find there are "sticking points" in your technique where you are weaker. By slowing the movement right down, there is nowhere to hide; you become powerful from *every* position.

In my book *Functional Training and Beyond*, I suggest a training method called "SAMDAM" or "Slow And Mechanically DisAdvantaged Movement." Here, you move slowly in an improvised manner between different challenging positions. Think an extremely slow lizard crawl, for example.

Overcoming Isometrics

Another powerful tool that we should integrate, is the “overcoming isometric.” This is a movement that involves pushing or pulling with maximum force against an immovable object. The benefit of this is that it allows you to attempt to recruit the maximum number of muscle fibers for as long as possible, increasing fiber recruitment and maximum strength *without* causing muscle damage (this also makes it effective as a recovery tool). This is highly effective for training the neural drive necessary to engage maximum strength, as even when lifting a 1-rep max you usually only exert maximum force for a small part of the strength curve (because momentum/gravity/the stretch response take over). We can also use overcoming isometrics with an “ballistic” intent. As well as maintaining maximum force for around seven seconds (the usual recommendation for the length of a contraction) we can also try and “pulse” to add more power as quickly as possible – thereby enhancing rate of force development.

For this to have useful transfer, it’s important to train at least three joint angles, as studies suggest the strength benefits only apply to 30 degrees of the range of motion. That means 3-4 sets of 6 seconds at three joint angles.

This is an ideal option for a warm up as it is a safe way to increase neural drive and mind-muscle connection. Post-activation potentiation also means this could help us to tap into greater strength subsequently throughout a workout.

More Aspects to Train

In short, I am painting a picture of a “generalist” athlete as someone who is light, powerful, and explosive. They are strong in any position, they are coordinated, and they can train for long periods without tiring. Max strength is also important: this is the well from which we draw in many cases. But it is not the single priority that it is often perceived to be. There is no use having lots of strength at the cost of endurance, quickness, or explosiveness. Nor is there much use in developing strength that can’t be accessed.

There are some more facets of performance that we likewise need to address and that are often overlooked. These are some of the “missing traits” described earlier.

Core Strength

Core strength is an often-misunderstood concept. Core strength does not just mean doing lots of crunches and getting a six pack (which is a single muscle, your rectus abdominis). Rather, it means developing strength throughout all the muscles of the core:

- Rectus abdominis (The sheet down the front that handles forward flexion of the spine)
- Transverse abdominis (The muscle that holds the core in and braces, often described as a "natural weight belt.")
- Internal/external obliques (The muscles on the sides that aid with rotation and lateral flexion – bending sideways.)
- Erector spinae (Muscles along the back that aid with extension.)

These muscles together help to rotate and bend the trunk but, more importantly, they also help to brace the core and keep it stiff. Stability is the ability to maintain a position against resistance and this is vital to performance.

(Some go as far as to describe the hip flexors, glutes, and even lats as core muscles – as they help to contribute to these goals. As do others!)

We've seen already that a strong core is vital to being able to push from a standing position. Likewise, though, *any* movement requires a strong core to be effective. As the "back mechanic" Stuart McGill explains:

"Proximal stiffness enhances distal athleticism."

In a kinematic chain, each arm needs to be sturdy to allow proper transfer of power and ground reaction force. This is the canoe and cannon analogy again. Or, as I often describe, imagine hitting someone with a nail attached to a bendy branch versus a flat plank.

Core stability even helps to prevent the torso *itself* from bending and thus "bleeding" vital energy that could be transferred to the target, whatever that may be.

We must practice powerful contractions in the core muscles to allow rapid turns and folds necessary for punching and kicking, throwing, or flipping. But we must also practice holding positions as in the dragon flag (which is an anti-extension move, as you try to prevent your legs from sagging) or the one arm push up (which is an anti-rotation move, where we must prevent the body from twisting sidesways).

Finally, we must practice core stability as a form of muscle endurance. This is what prevents the core from tiring out after a long day and then failing us in the gym when we need it most, or when bending over to pick up a sock!

Rotational Strength

Rotational strength should get special mention here as it is *so often* overlooked. Training in the transverse plane means making sure to twist and turn during training. Often, this means training the aforementioned serape effect.

The serape effect describes a neuromotor network – a combination of muscles often used together. These muscles are the rhomboids, the serratus anterior, and the internal and external obliques. Together, these form an "X-shape" across the front and back of the body (like a Mexican serape) and connect the left should to the right leg and vice versa. We use these muscles naturally when walking, but also when winding up to throw, when punching, when tugging... Exercises that work this network are particularly valuable.

This combination makes sense, if for no other reason than the distance between the shoulder and opposite foot being the longest distance in the body. Thus, we can engage the maximum amount of muscle using a diagonal movement this way.

Straight Arm Strength

Straight arm strength refers to the ability to lock out and hold the elbow straight while you exert force via scapula protraction or retraction. This requires strong biceps tendons, as well as strong scapulae.

Straight arm strength is crucial for gymnasts as it allows for movements like the planche and the L-sit. It is also beneficial for anyone trying to improve their overall pushing or pulling strength, as it allows for greater involvement of muscles like the serratus that extend the arm *beyond* the fully locked-out position.

Strengthening the biceps tendons can also protect against a number of injuries that can come from moves like the deadlift, or sports like tennis and martial arts.

Grip Strength

Grip strength is a “gatekeeper” of sorts for many other types of strength. Neurologically, we require a firm grip to exert maximum force. A strong grip improves strength in all lifts then, while also having countless real-world benefits from climbing, to wrestling, to manual labour, to general health.

A stronger grip and stronger wrists will also help to prevent injury elsewhere: such as in the elbows. tennis elbow (lateral epicondylitis) and golfer’s elbow (medial epicondylitis) are caused by tendons that cross both the elbow AND the wrist joint. Because we spend a lot of time with our wrists slightly flexed, and because nearly EVERY movement involves gripping this way, it’s also important to train forearm extension with movements like pronated curls or pronated wrist curls.

Cardiovascular Endurance

Cardiovascular endurance refers to the ability to maintain use of the aerobic energy system for prolonged periods. If we want to be capable of running long distances, walking long distances, or feeling energetic all day long, we need a strong and healthy heart/cardiovascular system. Moreover, this will improve general health and even increase anabolism (muscle building) by lowering the resting heart rate and putting us in a deeper state of “rest-and-digest” between bouts of exertion.

Foot Strength

Wearing thick heels has done a number on our general health and performance. The foot has countless important roles when it comes to athletic performance, injury prevention, and more.

For example, the toes should provide force during a jump or run. The flexor hallucis longus, for example, is a muscle that helps the big toe to push through the floor during athletic movement. This can work alongside dorsiflexion (pushing the foot down against the ground) to help us move faster and more explosively.

The toes should naturally splay and contort to the shape of the ground as we run, thereby providing a more stable base to push from. Changes in muscle length meanwhile offer useful information about the level and shape of the ground so that our body can adjust and prevent a twisted ankle. There's that crucial proprioceptive input again.

And by running barefoot, or using minimal footwear, we force ourselves to use a forefoot strike rather than a heel strike. This places the foot directly beneath the knee, directly beneath the hips, along the center of gravity. Thus, all the joints in the legs can compress like a spring to absorb impact. Running on the heel, meanwhile, causes the foot to strike the ground with the leg extended: sending shockwaves through the knees.

The way we get back this missing foot strength, flexibility, and proprioception, is by training/running barefoot or using minimal footwear. This is a simple change we can make to our lifestyle that will affect everything we do. And this is the perfect example of "adaptive immersion" – which I'll come to in a moment.

But with that said, I also advise caution. If you are not *used* to training barefoot or using minimal footwear, you should ease into this gently. Start by wearing some Vivobarefoot trainers or Feiyue shoes on walks (just two examples of minimal shoe brands) or even just around the house. Ease into less explosive upper-body workouts. Gradually incorporate them into short runs until you are ready to make the leap.

Hip Stability/Single Leg Strength

So many programs focus on building leg strength in a bilateral (symmetrical) manner. However, this completely misses the fact that we most often propel ourselves from a single leg, not both. This, in turn, requires hip stability, which can result in better athletic performance, reduced knee pain (as the hips prevent internal rotation etc.) and more.

Training on individual legs can yield greater symmetry both in terms of aesthetics and performance. Being able to jump equally well from *either* leg gives you many more strategic options in any situation. A freerunner, for example, has twice the opportunities to jump and can better time their approach.

Hip Movement

Many of us have lost the ability to move parts of our body correctly, due to lack of practice. Particularly noticeable are the stiff hips that many deal with, and anterior pelvic tilt. Back injuries are common due to many people not recognizing how to properly perform the hip hinge movement. Likewise, many people don't know how to consciously tilt their pelvis. If someone is not familiar with what it should look like, or feel like, how can they be expected to move in an optimal manner?

Frontal Plane Movement

Another important way to train the hips, that is often missed, is frontal plane movement. Frontal plane movement means side-to-side movement. We are often required to dodge from side to side in

sports and when trail running, but this is rarely trained in the gym. Again, this can result in weak hips leading to valgus knees, IT band pain, and other issues. It also leads to limited mobility and coordination in that plane.

Simply adding in some side squats/Cossack squats, skater hops, etc. can make a big difference in this regard. Better yet is to go trail running in barefoot shoes – meaning that you are running on uneven surfaces (woods, sand, hills).

IT band pain, in particular, is a common symptom among runners. The issue here is not the running itself (as is often assumed) but rather the fact that the runners are *only* running in straight lines! This lack of direction change and side-to-side movement leads to imbalances.

People who think that running is bad for them because of the "impact" or overuse injury are missing the point. Our joints are designed to last a lifetime. Overuse is not a matter of doing something too much, it's a matter of doing that thing more than anything else. Once again, this makes the case for diverse, dynamic training.

While high-level athletes are extremely impressive and should be applauded, their style of training is not the most beneficial to the rest of us.

Mobility

Mobility is the ability to move, with control, through a large range of motion. This is different from flexibility, which is the ability to move through that range with external assistance. Having someone push your leg up to your head is flexibility, raising your leg as high as you can yourself is mobility.

Mobility is important. More mobility means more movement options and greater reach. Mobility is the difference between kicking a ball that's at waist height, or not. It's also what allows someone to jump into a back handspring. Performing a handstand with tight shoulders is nigh impossible.

Most of us are far too tight and tense, which prevents us from moving normally at all. Tightness in the hip flexors, for instance, can cause back pain via the iliopsoas. This could eventually result in a painful injury during a lift. It can also lead to serious chronic pain and limited movement as we age.

Mobility is not limited by muscle "length" or any form of tension. Rather, this is controlled by the nervous system and muscle strength.

By using our muscles in a certain way throughout the day, our body learns what are normal and useful ranges. When we try and extend *beyond* that usual length, the myotatic stretch response kicks in: the muscle contracts to prevent us moving beyond that point and potentially injuring ourselves.

This is a useful mechanism. This is how you can reflexively catch your balance as you start to fall over: the muscles that suddenly lengthen contract and you right yourself.

But it also means that when you try and drop into splits, your body will contract and prevent you from doing so. We can fix this in a number of ways. One is by teaching the body to gently enter these safe ranges of motion once again, through practice and through controlled breathing. In *Relax Into Stretch*, Pavel Tsatsouline describes how you should practice relaxing and feeling comfortable in these positions. Instead of trying to push through pain, find the point of mild discomfort and *chill*.

We can also use methods like PNF (proprioceptive neuromuscular facilitation) which incorporates a muscle contraction to accelerate benefits. Here, you are tensing and then relaxing the muscles.

But the real secret is understanding that mobility actually comes from *end range strength*. This is the ability of the muscle to overcome the tension in the *antagonist* muscle at the end of the range of motion. Lift your left as high as you can and eventually you'll be able to go no further. Raise it just a little lower and push against your hand and you'll find you can exert very little force.

Do this over time, and you'll get stronger in that position while also learning to relax the antagonistic muscles. This is why the mobility routine in this program involves "positions of strength." These are stretches that require some effort on your part to maintain.

Weighted stretching can also be extremely useful to extend range of motion in a relaxed manner. This is also included as an option in the mobility routine.

Tendon Strength

Finally, tendon strength refers to the ability of the tendon to translate force to the joint. It is pertinent to think not in terms of muscles, but rather "muscle tendon units" (MTUs). Muscles gradually segue into tendons, aponeuroses, and fascia.

Resistance training will necessarily strengthen the tendons but what's important to recognize is that this can take much longer owing to the lesser blood supply. A new lifter can expect to see improvements in tendon structure within 2 months of training, as compared with muscle which takes just eight days (study).

This is why a slow and steady approach to training is necessary at first, to prevent injury. High reps can be good for increasing blood flow to the MTU. Volume and frequency become extremely important in general.

We also need to develop stiffness in the joints, which is achieved partly through strong tendons (low hysteresis, meaning low pliability). One way to increase this, is by training absorbing and returning energy with movements like single legged skipping or the truck push. Here, we are maintaining an isometric contraction in the calf and the tendon is therefore able to take the brunt of the impact and return that energy. The fascia may further contribute to this.

The aim of this program is to train *all* these things. And, if I may say so, I believe I have achieved that.

Adaptive Immersion Training

The best way to learn a language is through "immersion." Sitting in a classroom and trying to remember hundreds of words is a losing battle. Adding complex grammar makes matters worse.

But take that same person and drop them in the middle of Poland for six weeks and they'll come back with a pretty good grasp of the language. That's what the brain does: it adapts to its environment. This happens consciously but also passively as the constant process of trial and error reshapes the brain; forming stronger connections and discarding those that turn out not to be useful.

I believe we should take the same approach to training.

As I explained in *Functional Training and Beyond*: an individual with kyphosis, anterior pelvic tilt, weak abs, and a highly distractable brain is not "unfunctional." Far from it! This is the optimal body shape for sitting over long periods and the optimal mental state for enjoying the internet. In short: this is an adaptation to the environment.

We humans are the only creatures capable of completely designing our environments. What we have failed to recognize is that, through this process, we are also designing ourselves.

"We humans are the only creatures capable of completely designing our environments. What we have failed to recognize is that, through this process, we are also designing ourselves."

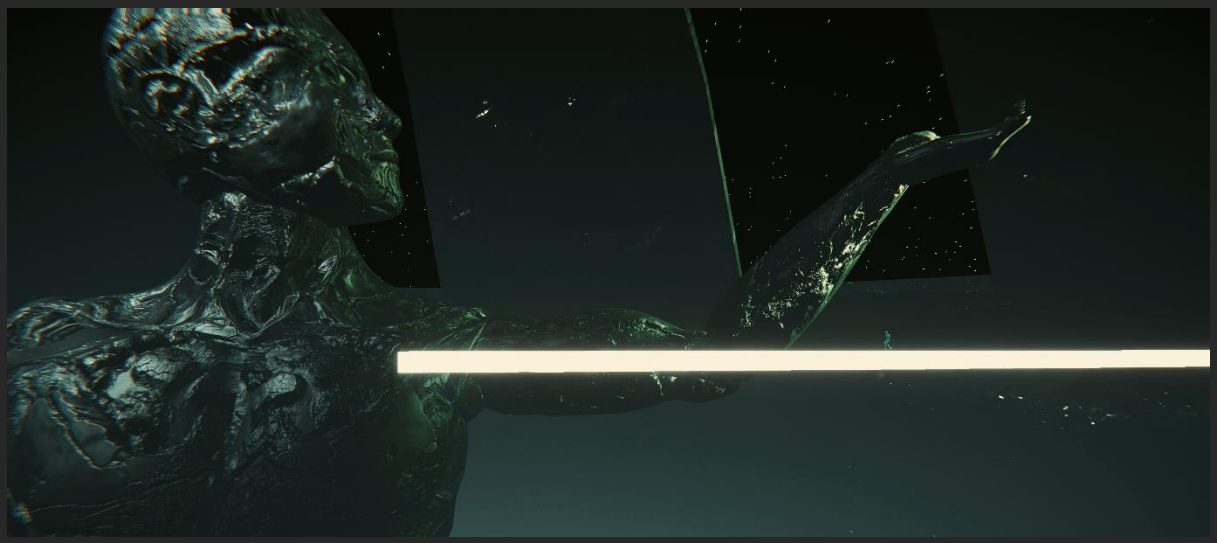
The problem is that our current lifestyles and environments don't challenge us to continually change.

Eventually, we begin to ingrain the same movement patterns over and over, to the point that change becomes difficult. Unlikely, even.

Moreover, everything has been designed for maximum comfort and minimal effort. The traits and attributes that ARE developed through normal living are very limited in scope. They are not varied enough to result in a dynamic individual. To illicit Protean Performance.

This is why I coined the phrase "SuperFunctional." The desire is not to be functional within my day-to-day life, but to be capable of performing outside of that box. To do and achieve *more* by becoming something else.

This is what training is: temporarily altering the environment and goals to encourage change. The problem? You are fighting a losing battle.



If you spend the lion's share of your day sitting in a single static position, *that* is your environment. Performing a few lateral leg raises is not going to be enough to override that stimulus. It won't trigger hypertrophy and the new neural networks won't override the old ones.

So, what *does* work?

Regular practice and high-volume, varied movement. That means running, walking, trail running, and sets of 100 lateral jumps. This, gradually, begins to challenge the time spent sitting to become a significant part of your routine and environment. The body has no choice but to adapt.

Training is about *averages*.

And the aim to use one *extremely intense* workout to try and compensate for a lifestyle that is 98% sitting is often what leads to injury. Little and often. High volume. This is far preferable. And it is much closer to the way our bodies are designed to operate.

This is the body in communication with the environment. This is when true transformation occurs.

This happens through a number of mechanics. Firstly, the high repetition movement will encourage angiogenesis: the formation of new blood vessels. It will thereby supply the muscles, tendons, ligaments, and muscles with more blood and nutrients; improving recovery and triggering growth and strength gains.

Blood supply is, to a very large extent, what largely *drives* muscle plasticity. Aerobic exercise (high volume movement), for example, can increase muscle plasticity in rats via elevated vascularization (study). Muscle plasticity is also increased by having more myosatellite cells (study). Creatine supplementation actually boosts myosatellite cell count, but so too does training with longer training sessions AND training for increased capillarization (study).

In other words, moving a certain way *a lot* will increase blood flow to that area in the short AND long term, to bring about far more profound changes than can be accomplished with a few reps.

(This is also why the Protean Performance System incorporates LARGE rep ranges. The aim is to create a BIG stimulus, regardless of how you divide the training throughout your day.)

This can also be a crucial tool for healing injuries – by increasing blood flow to those areas. If you have a bad knee, then performing a few band stretches a day is not sufficient to provide a full recovery. Especially if you are using compensatory movement patterns the rest of the day, or just not moving at all. This is a drop in the ocean! But *walking* or even walking backwards for cumulative miles (something that the "Knees Over Toes Guy," Ben Patrick, recommends), now THAT starts to be enough to bring about some real plasticity.

Secondly, the constant "greasing of the groove" will help to forge strong, beneficial neural pathways. This is another concept coined by Pavel Tsatsouline. If you want to become amazing at pull ups, you should perform those pull ups every single day. The aim is not to reach fatigue or create lots of muscle damage – it is just practicing engaging the neural pathways so as to strengthen those connections. Pavel says that strength is, essentially, a skill. And there is even benefit to breaking your training into smaller parts scattered throughout the day. This is known as "spaced learning" and it essentially allows time for the neural pathways to "go cold," so that the next training session offers an entirely *new* stimulus. This is often used for memorizing information, but there is no reason to presume the same process would not work for motor learning (study).

(At the very least, it might be beneficial to practice movements like handstands at the start AND end of a workout session.)

Fascial changes will occur this way, too, alongside changes in the brain.

The ideal way to train then, would be to completely change the environment. Such that you could be constantly training, passively, without even trying to. Instead of walking up normal stairs, you would climb a rope. Doors would be heavy so that you would need to push hard to open them. Mugs and other objects would likewise be made to be artificially heavier.

Better yet, would be to constantly alter the environment to provide continually changing challenges: to KEEP the brain in a plastic and constantly adapting state.

This is what I call “Adaptive Immersion Training.” But there are other ways to bring about this change.

That’s because human adaptation, I believe, is actually controlled by the following factors:

MODEL OF ADAPTIVE IMMERSION TRAINING

ADAPTATION = (Environment X Organism X Intent) X Plasticity

Notice the similarity with dynamical systems theory? The same constraints that inform our behavior in-the-moment also help to shape us over time.

Here, environment can also include habits and ambient factors like heat and sound.

But *intent* is the important missing feature. You can be in the most stimulating environment in the world, but if you don’t engage with what’s going on around you, you won’t experience the benefits.

Likewise, while it’s hard to change the environment, I can change my intent in order to bring about that adaptive immersion training.

When I read to my two year-old daughter, I practice this by performing the story as well as I possibly can (minimal mistakes, maximum dramatic delivery). This increased effort will increase the amount of attention placed on the action. It will increase production of acetylcholine and dopamine in the relevant areas, shining the “spotlight of attention” (to paraphrase Andrew Huberman) on those crucial neural pathways. This will result in increased plasticity: in this case, resulting in greater presentation skills and oration.

This is not hypothetical: my presentation on my own YouTube channel has improved dramatically, I believe as a result of this practice.

You can make anything else training too. When writing, if you try and write as elegantly and quickly as possible, you will be training your fine motor skills.

This is what I refer to as “incidental training.”

In short: everything can be training if you aim to do it faster, or more precisely, or with greater finesse.

Why is plasticity included in the model? Simple: because plasticity is what ultimately defines the *amount* of change we will see in an individual. Give two identical athletes the precise same training protocol, the precise same diet, and the precise same mentality and initial (fixed) physical attributes.

This is plasticity as it applies to both the brain AND the muscle. But what’s interesting about this, is that even plasticity is malleable. And in fact, it is affected by the other elements in the model. Attention increases plasticity, and so too does the environment.

There is No Natural Man

There is no such thing as the natural man. There is only man, the adaptable.

A lot of modern fitness revolves around the notion that we must return to our roots: that we have forgotten to move the way that we were intended to move. That we no longer use our senses the way they evolved to be used. That we are non-functional. That we are tamed.

We are weakened because we spend such large amounts of time sitting at desks, which force us into compromised positions that our bodies were never designed for. Our hip flexors shorten and tighten, our backs round.

I put it to you that we are not “non-functional” at all. Rather, the kyphosis of your spine (hunch at the top that comes from typing), and the tight psoas muscles are in fact *functional* adaptations. We have merely adapted to the environment we are in. And by environment, I refer not only to our physical surroundings, but also our habits and experiences.

The true function of the human being, and of any successful organism, is to adapt to its environment and goals. This occurs over generations of course, but it also occurs within our lifetimes. And we have now demonstrated this through looking at dynamical systems training and other theories of movement.

We see this most profoundly in infancy. Our relatively underdeveloped nervous system is reflective of our ability to adapt to the demands of any environment. A child born today is no different from one born hundreds of years ago, yet it seems infinitely more advanced because of the ability to adapt to the environment. The culture. And the norms.

Indeed, the success of the individual often comes down to that inherent plasticity. Intelligence it could be argued is the result of plasticity + environment. The same is true for athleticism.

The aim shouldn't be to return to a prehistoric state then. Because that is not some pinnacle of human health or performance. Nor is it the "one true state."

Humans have lived in caves, in the trees, and in the seas. Even today, we see indigenous cultures with widely varying skill sets. The children of the Moken people have adapted to be able to warp their eyes to the point of seeing underwater: counteracting the refraction of light. They can narrow their pupils to the very limits of human performance.

The Bajau, or sea nomads, are capable of diving for as long as 13 minutes, and as deep as 200 feet.

Meanwhile, the Tarahumara are runners, capable of running more than 400 miles over the course of just over 2 days.

What does this show us? It shows us the incredible ability of the body to adapt to its surroundings. It shows us that we have not begun to touch on the limits of what we're capable of.

Jyothi Raj is the "human monkey," who is capable of climbing sheer rock faces with the grace of a squirrel monkey.

Alexander Alekhine is a blindfold chess player, who once played 26 games of chess without ever looking at a board, simultaneously. He won 16, drew 5, and lost only 5 of those games.

So adaptable is our nervous system, that if we were to remove it from our body and insert it into a different organism, it would adapt to those new conditions. We've seen this in studies where monkeys learn to control robotic arms through neural implants as though they were their own. And in cases of hemispherectomies where half the brain is removed, and the remaining half adapts to perform the functions of the whole.

Our ambition should not be to return to our earlier states, then. Nor should it be to remain as we are. Now that we are beginning to understand the plastic nature of our brains and bodies, our ambitions should be far greater.

We can think differently. We can move differently. Better. We can redesign our condition from the ground up! Surely, this is the truest form of self-expression.

Because when we expand what we're capable of, we expand our horizons and possibilities.

To me then, the highest form of training is one that challenges this adaptability: that develops as many diverse traits as possible, to thereby create as many opportunities as possibility.

Change the environment, change the organism.

We ignite such drastic change in ourselves, again, by changing the environment.

The sea nomads can dive as they do because that is the life they live.

If you wish to profoundly change your capacity, then simply training for two to three hours a week is insufficient.

You must change the environment, to change the body.

You MAKE it your routine. You move differently.

And often this is as simple as changing your intention. Changing the intentionality of your actions.

Don’t just read: read as well and as fast as you can while still retaining the information.

Don’t just walk: walk barefoot and feet each muscle contract in your feet. Change your gait. Explore the expression of your body.

Change the environment, change the organism.

Incidental Training

This is the idea behind “incidental training” then: to train throughout the day and not JUST during workouts.

This is important, because this is a MUCH bigger stimulus than the few hours per week you spend in the gym. Performing some hip mobility exercises will NOT be sufficient to overcome 40+ hours of sitting (unless you go extremely intense and risk injury).

What MAY be sufficient, is to spend the first hour of the day squatting while answering emails and taking calls. Or to get up 5 times throughout the day to pump out air squats. Or to, at least, squat in the morning while taking a shower.

Likewise, we can utilize the time that it takes for the kettle to boil in order to train our grip, or perform some shoulder mobility exercises.

If we make these incidental training opportunities into a part of our everyday routine, then we are sending a huge and powerful signal for our body to change. We are doing this without causing huge amounts of stress or damage (think slow and steady) and we are reversing many of the unwanted side effects that come from being sedentary throughout the day.

The key to effective incidental training, is to avoid overtraining or harming your workouts. Likewise, we must avoid causing injury due to lack of warming up. Thus, the best forms of incidental training are relatively simple movements that rely a lot on skill. But keep in mind that there is little downside to practicing mobility, concentration/brain training, balance, or other less physically demanding traits in-between workouts.

(That said, avoid static stretches prior to workouts, as these can lead to reduced strength and control, along with increased incidence of injury. Then again, this isn’t as high-risk as some people would these days have you believe, just not optimal.)

Finally, using incidental training will increase your energy levels and reduce your likelihood of injury. A BIG cause of injuries in the gym is the fact that people go from sitting in one place for nine hours to throwing heavy weights around. That sitting has caused them to lose sensation and control in muscles like the glutes. It has weakened and stretched areas like the lower back. This is also why it feels like *such an effort* just to do a press up come the evening.

But if you are constantly moving throughout the day, then the body is always "ready to go" and everything is fired up. That's not to mention the improvements in circulation, mitochondrial efficiency, sleep, and metabolism (think of it as spiking your metabolism multiple times throughout the day instead of just once).

This is game changing and if you take one thing from this program, it should be this.

You can find a selection of ideas for "incidental training" in this book. If you want to take this concept even further, you can even break each workout into its separate "gauntlet sets" and instead practice them *throughout* the day. Use a light warm-up (1 minute of hopping on the spot and a few reps of the easiest progression in the movement pattern in question) and then perform the two high repetition mechanical rep drop sets.

This is a convenient option for those that struggle to find time to perform their workouts in one go. But if can also be an advanced option for those that want to go beyond basic results. I recommend practicing the workouts in "one go" to begin with if you are new to training, as this is a big shift in mindset and approach. But eventually, being "constantly moving" and "constantly training" can make profound impact.

Doing this will mean you are less fatigued during each set, allowing for greater effort and, therefore, results. Likewise, you'll find that this constantly sends blood to the working muscles, encouraging maximum growth and recovery. This also repeatedly spikes your metabolism for fat burning and THEN recovery and growth/protein synthesis. The results are a rapid transformation and a feeling of being constantly ready for action.

And yes, this is what I do myself.

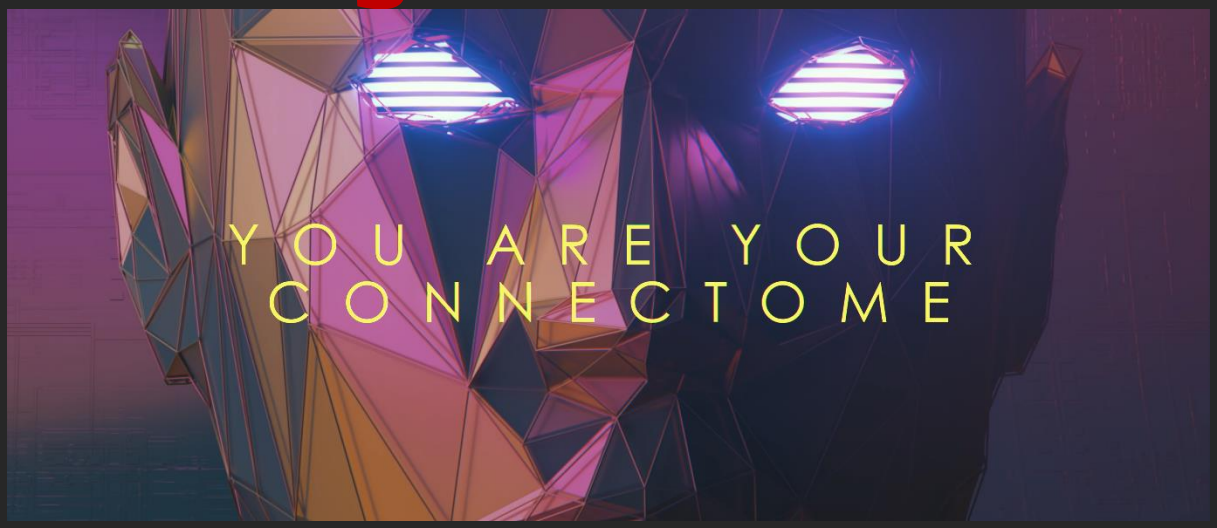
***

We must think about physical fitness in terms of averages. The body adapts to the environment by becoming the average of everything you do.

If you spend 98% of your time sitting and 2% of your time in the gym, this is barely enough to register biologically. That's why people have to push so hard in the gym: to create sufficient stimulus in a small amount of time to raise their "mean" requirement for strength and mobility. This often leads to injury.

By moving more throughout the day, by using super high rep ranges, and by changing the environment, you can trigger profound changes even with light effort.

Training the Brain



We Need to Get Serious About Cognitive Training

One of the central arguments of my training philosophy, is that we can and should train the brain as much (if not more) than the body. What good is being physically fit if you feel lethargic? If you have sluggish reactions? Or if you can't focus for more than five minutes?

We know now, that thanks to brain plasticity, it is possible for the brain to adapt and change shape. In this sense, the brain works just like a muscle and responds to training in much the same way. Use a certain brain region more and it will increase in size and strength as new neural pathways are formed and enforced.

Use different brain areas in conjunction and we see those brain regions grow connections between them. This is why we see common "functional connectivity" between brain regions: networks of activity (such as the default mode network for imagination and daydreaming), or the salience network (for directing attention).

Just like functional training for the body, functional training for the brain needs to target the right brain areas, in the right combinations, in order to offer near and far transfer. Computer-based brain training programs too often focus on a single modality and thus fail to offer any real-world benefit.

In short, memorizing numbers on a screen often only succeeds in making you *better at memorizing numbers on a screen*.

In the real world, we constantly listen to input from multiple senses and combine processes from multiple different brain areas. This lets us to rise to dynamically changing situations. And this is how we must train the brain.

This is good news! Because it means that, really, training the brain and the body *must* go hand-in-hand. We shouldn't view cognitive training as something "extra" we have to do on top of building muscle. Instead, the two are so closely intertwined as to be essentially indistinguishable.

Movement for the Mind

Case in point: the most important tool for challenging and developing the brain is movement.

Whenever we move, the brain plays a huge role in defining, coordinating, and executing that movement, as we have seen. Neural maps encode the movement patters which are then executed via the motor cortex. Before this can happen, though, the body must first orient itself, listen to input from the muscle spindles, and select the optimal action based on multiple predictions. These processes occur in the cerebrum, cerebellum (the center of our proprioception), and the motor cortex. The motor cortex is particularly fascinating for the fact that it houses a kind of "physics simulation" of the world based on countless previous interactions and predictions throughout our lives. Meanwhile, the same processes used in the cerebellum to predict and plan movements also seem to be involved in much of our "higher order" thinking.

Indeed, Neuroscientist Daniel Wolpert believes the brain evolved "for movement;" that this is its primary function and everything else is a happy accident. He points out that we have AIs that can reliably beat chess masters, but that we have yet to develop a robot arm that can rival a toddler in terms of graceful and diverse movement.

Every time we make a movement, we visualize the way we want the movement to turn out. If we then perform that movement perfectly, dopamine and BDNF are released and the neural pathways that led there are enforced. That feeling of accomplishment is the result of this, and it encourages us to keep trying and repeating that successful movement. Thus, we develop movements that help us to survive in our given environment.

Likewise, our brain lights up whenever a stimulus does *not* meet our expectations. A good example of this is when an object we are tracking suddenly speeds up or slows down. This triggers the release of dopamine via the substantia nigra to increase attention and learning (study). Increased dopamine

is linked with increased attention and BDNF (brain derived neurotrophic factor) (study). This, in turn, leads to an up-regulation in the formation and strengthening of neural connections. In other words, when a movement is challenging, we focus on it and our brain gets ready to learn.

This is why we enjoy watching dance and action movies. Our brain loves to observe movement, physics, and biomechanics (perhaps specially thanks to features like mirror neurons that make us feel as though *we* are moving). A much simpler version of this is sending a cat bananas by suddenly speeding up or slowing down the movement of a piece of string.

This is also why we love computer games. These are designed to feed into these dopamine pathways by constantly punishing and rewarding slightly different movements and combinations of button presses.

Learning, in general, is one of the main ways we stimulate the release of BDNF and increase brain plasticity. We see that rats that explore more new locations produce more BDNF (study). Novel *movement* through these environments is perhaps the most potent stimulus of all. In one study, it was found that practicing complex motor skills could increase BDNF production in rats more than running in an exercise wheel (study).

The Incredible Plasticity of Infants

Much has been said of the incredible plasticity of infants. Of their ability, for example, to learn multiple languages without an accent – or even develop perfect pitch. The reigning theory is that there are particular stages during development where certain skills are acquired much more readily. In fact, children develop so many neural connections that it is really the *pruning* of those connections that results in useful learning.

But rather than a pre-defined window that is hard-coded into the DNA, perhaps the same systems reside in us? We may not be able to return to the same density of connections, but perhaps we can once again achieve a state of “superlearning.” The reason children’s brains are awash with BDNF, nerve growth factor, and other plasticity-enhancing chemicals could be that they are *completely immersed* in an entirely novel environment. Every SINGLE movement a child makes is new and must be constantly refined. Every single input is alien and novel. A baby must learn to move their arm towards objects in their field of view. Before even that, they must learn to distinguish between different objects using contrast cues. They must learn to orient their heads towards sounds and marry that visual and auditory information.

I wonder if we could create a similar environment someday using virtual reality: an interaction so entirely novel that it would force huge amounts of learning and plasticity.

Of course, more plasticity is not always positive! There is such thing as *negative* plasticity, and without some constancy in our networks, we would be changed by every single experience.

At the other end of this spectrum, though, is the huge *lack* of plasticity we exhibit as we age. As we get older, most of us begin to experience fewer and fewer genuinely new things. We have learned to walk, to drive, to chat with friends, and to navigate the area we live. We have fallen into repetitive job roles (or retired) and our movement has become more limited owing to unfavorable adaptations, injuries, and age-related decline. (In truth, many of these changes are the result of *no longer moving regularly*.) As our senses dullen, even the amount of information available for our brains to process is reduced! A reduction in BDNF is associated with many markers of cognitive decline (study).

This is why it is SO important to keep moving. To keep moving in varied ways. To learn new skills. And much more.

Working Memory

The brain's plastic nature also means that we can choose to train specific traits and attributes, just as we do when training the body.

The brain is organized roughly into different functional brain areas that are used for specific tasks. For example, we have a visual cortex for processing visual information, and we have Wernicke and Broca's area for language.

But, as with muscle, the real power of the brain comes from utilizing the different brain regions *together* (hence the aforementioned functional connectivity). We don't use skills in isolation – even the simplest task requires input from our memory, our vision, our equilibrioception, our higher-order reasoning, our emotional regulation, and more. In short: the brain has neuromotor networks too. Every single action requires a slightly different utilization of brain areas – but there are some common templates we see used again and again.

We see this in what neuroscientists call "*dynamic* functional connectivity." This, more recent area of study, describes the constantly changing nature of the precise brain regions used during any task.

To train the brain effectively, we must understand this dynamic action of the brain.

A good example is training working memory. Working memory is the memory store we use to manipulate and hold onto information. If I tell you a phone number and you try to remember it while you find a pen, you are using your working memory.

Working memory is limited, and psychologists have typically described this limit as being “7 +/- 2”. This is to say that a “good” working memory is 9 and a poor one is 5.

But the truth is that we rarely use working memory in a “domain specific” manner like this. Because our working memory is ALSO what we use when we remember the positions of our teammates and opponents on a football pitch. It’s what we use to reach for an object while looking at someone else.

Moreover, working memory is what we use to “stitch together” our very perception of the world around us. Consider the way our vision works. Because only our fovea has a high resolution, we are only capable of focussing on a small piece of our visual field at any one time (we wouldn’t be able to process all the information in our visual field anyway!). While you might think that you experience the world around you like a movie or a series of photographs, in fact you are only experiencing a very narrow slice of the information coming in from your eyes. The rest of your vision is actually *fabricated* from information in your working memory. Your eyes dart around a scene, get as much information as they need, and then create an image of what’s around you. This constructed reality is comprised of memories and extrapolations.

The same is true for sounds and even the position of your body in space. You might think you know where all your limbs are, but you can’t truly be conscious of the positions of every joint and muscle at any given time!

This does however mean that a lot of the information you rely on is *out of date*. This is what gives us “inattentional blindness.” We are effectively blind to anything that happens outside our attention. (Though, fortunately, we have special receptors that react to sudden movements or changes and direct our attention toward them via the salience network.)

AND it means that your working memory is a bottle neck that can limit or enhance your field of view and reaction times.

The N-Back test is a useful brain training tool for the working memory that challenges the user to remember sequences of positions and sounds simultaneously and look out for repetitions. These sequences become progressively longer.

But the limit of N-Back training is that it only trains the working memory in this very static, unrealistic manner. Tools such as 3D object tracking software may be more effective then, as they allow us to practice using working memory in the multi-sensory manner in which it was intended to be used (study).

This is also why vision tests may be insufficient for measuring vision as it pertains to activities like driving. It’s why athletes are increasingly training their “sports vision” to improve awareness, reaction times, and more. It’s why researchers are looking into the use of such tools to improve

visual processing speed in older adults (study). This can enhance the ability to quickly make a decision based on the visual information available.

Just as the body needs to alter the movement to fit the current position of the body, as well as gravity, momentum, and the stability of the ground; so too does the movement need to be organized around the other senses.

Again: the input is an important part of an effective neuromotor network, which is why a martial artist should not just practice their blocks alone; they must practice blocking *actual punches*. Do this correctly, and eventually the blocks will become instinctive to the point that you don't need to think about them.

As Bruce Lee says:

"It hits all by itself."

(Or in this case, it blocks all by itself…)

This is once again where "repetition without repetition" comes in: as you must build a robust map of responses to countless different varieties of input.

This, of course, makes sense when trying to fill out a large table with data. And it makes sense when trying to prepare for a number of possible strikes, in any number of positions we might find ourselves in at that time! This is also why we need to practice lifting unusual objects, lifting on uneven terrain, and running downhill. We need to build the experience to let our bodies adapt to any situation. And this is when the brain really comes alive with neuroplasticity enhancing chemicals.

There seems to be a lot of confusion surrounding the notion of training in a range of situations. We've been taught that mastering a movement requires repetition of that movement. That we should practice one kick 1,000 times, and not 1,000 kicks once.

So, why would you want to perform a squat on an uneven surface? Or while throwing and catching a medicine ball?

I thought of a little demonstration of why we need varied practice to build robust mental models. That is the Tennis Ball example.

The Tennis Ball Example

Let's imagine that you want to improve your hand-eye coordination for tennis. What you might do in this situation, is to take a tennis ball, and bounce it against the wall with your racket. This would

improve your reaction speeds and your technique. But, more importantly, this would *also* improve your ability to predict the movements of the ball.

Remember: the brain is actually quite slow at processing data and presenting a complete image of the situation around you. By the time you've formed a "snapshot" of the ball and where it is in space, it's probably too late for you to hit it. This is due, among other things, to your body's need to "wait" for the final signal from your body before creating a complete picture (usually proprioceptive feedback from your feet, which are furthest away from your body). It's also due to simple limitations in the speed of synaptic transmissions (nerve signals), and more.

The point is: your body doesn't really "react" to the ball at all. Rather, it predicts where the ball is going to be, based on its current trajectory, speed, and angle. You then use countless *previous* experiences with the tennis ball to understand its weight, bounce properties, texture, etc. In other words, it's only through repeat exposure to the movements of a tennis ball that you become better at anticipating its future movements and thus better able to return it.

If you want to improve at tennis, you *must* hit the tennis ball.

What happens if you now throw a *different* ball at a tennis player when they're not expecting it and tell them to catch?

You get a restraining order.

But chances are, they'll be better than the average person at catching it. They have improved their reaction speeds to some extent, they have built on their hand-eye coordination, and they have learned to orient themselves around a moving ball.

BUT they won't be *as much* better as you might expect. Because they have learned how a *tennis* ball moves. If this ball is heavier, bigger, or harder, they may miscalculate how to move when trying to catch it.

So, how can you become better at *general* hand-eye coordination? Such that you would be ready for an event like this?

The answer would be to practice catching/hitting/kicking *multiple* balls. In different weather conditions. Against different surfaces.

This would teach you, again through experience, to more accurately calculate the likely trajectory of *any* ball given its weight, apparent material, and current speed. You are putting more data *in* and getting more varied algorithms out.

This is "practice without repetition." This is the equivalent of lifting a sandbag instead of a barbell: you learn to adapt to shifts in the center of gravity and to unexpected variations of the movement. You create skills that can move outside of the gym.

Let's be clear: the tennis player should bounce the tennis ball.

They should practice in different weather conditions, with new and old balls (mostly new, seeing as that's what they'd be using), and at different levels of fatigue.

But they need to learn to bounce *that* type of ball specifically. Because that is what they are interested in. But for everyone else, bouncing different types of object will have better far transfer toother skills.

There is no argument that the best way to get better at something is to practice that thing. But if we're talking about being "generally prepared." If you want to be able to thrive in the most situations possible, then you need to train with as much input as possible.

The best part is that this also helps to keep the brain plastic and young. And THAT is why I recommend training with multiple different conditions.

In this workout, we incorporated some aspects of this. We'll be using a reaction ball to train reactions and sports vision during the warm up, as well as juggling which has been shown to actually increase grey matter in brain regions that are responsible for sports vision (study). The juggler must be aware of multiple different items moving in the air at the same time and keep track of them. A reaction ball is an oddly shaped ball that bounces unpredictably when thrown. This costs a few dollars, or you can make one yourself (just tape some smaller balls to a tennis ball). Because the movement can't be predicted, the athlete has no option but to react quickly and to switch between mental models as the trajectory of the ball alters.

The crawling we'll be doing, the trail running, and the training with sandbags and other functional tools, will all further help to build a robust mental map. As will movements like rope climbing. Research by Tracy and Ross Alloway shows that exercises such as climbing trees, crawling along beams, and running barefoot can help to increase working memory. This makes sense, as you are again stitching together large amounts of information from your vision but also from your proprioceptors and equilibrioception and calculating that on the fly. Crawling along a narrow beam is to the proprioceptors what juggling is to the vision. Training that incorporates asynchronous limb

movement, balancing, and manipulation have similarly been shown to improve focus, visual spatial processing, and more (study).

The best training is training that is immersed in a rich tapestry of visual, spatial, and auditory information. The brain has countless areas that specifically integrate these senses by effectively "lining up" maps from the different senses. The superior colliculus, for example, contains layered maps that process information from different brain regions separately and contribute to eye-head coupling, sound localization, and other critical tasks. This is one of the most important features of the human machinery… and it can be trained!

Working Memory and Movement

Potentially even *more* game-changing, is the fact that working memory is also involved in movement. Imagine throwing a punch: here, you must stay loose, you must rotate your hips powerfully, you must turn over your hands as you hit (assuming a boxing-style) and you must keep your guard up. These are just a FEW of the things you must keep in mind.

Doing all this is hard. It is likewise hard when trying to perform a dance move, or when maintaining balance by adjusting the position of your entire body. In short: body awareness requires working memory bandwidth! And so, by training the working memory, we can also see improvements in coordination, agility, and rapid skill acquisition. This is not hypothetical! In one study, it was found that children with greater working memory capacity could learn new basketball shooting skills more rapidly than their peers (study). Another study showed that karateka could improve their sparring performance by training working memory (study). Falls can be reduced in the elderly using working memory training (study).

Thus, it follows that crawling and balancing can actually *improve* working memory (study)! Unstable surface training, though not generally useful for hypertrophy or building strength, *can* offer working memory benefits (study)! Slacklining is *especially* useful in this domain, and also improves jump height (study).

Embodied Semantics

The cerebellum is often described as a kind of predictive engine that the brain utilizes for formulating movement patterns. However, it has also been speculated that this same speculative capability is what ultimately led to our capacity for higher-order thinking. This might be why studies increasingly show activation in the cerebellum during activities we would usually think of as abstract.

It is even possible, according to theories of embodied semantics, that our entire ability to communicate and reason abstractly may be based on our physical experience of the world. We understand stories people tell us by "feeling" them as though they were happening to us.

This is a possible answer to the question: “what is the “base” language of the human brain?” We take for granted our ability to understand English (or whatever our predominant language might be). But how does the brain derive *meaning* from the words it hears? What did the brain know *before* English? When we learn a new language, we initially translate each word to our mother tongue. But what are we translating our *first* language into?? According to this theory, it is our ability to virtually simulate actions and experiences in our mind’s eye that allows us to extract meaning. If I tell you a story about walking through a cold wood, you will picture yourself moving through that wood. You might feel the crunching of twigs underfoot, and you might feel the cold on your skin. This information is derived from your own experiences of walking through woods and the connections between those experiences and the words that represent them. (Remember: this is a multisensory experience, so aphantasia – the lack of visualization skills – is not a roadblock to understanding.)

The same goes for any descriptor, or even concepts layered in abstraction – such as numbers. We only understand math because we have experienced the concept of quantities. The human brain’s truly remarkable feat, then, is in layering abstraction on top of abstraction. We use symbols and code to represent different qualia and concepts, which allows us to manipulate more information than the limits of our working memory would normally allow.

But it all comes down to our ability to internalize the world around us and to use our body and senses in an integrated manner. Thus, moving through space, listening to our body, and developing our working memory can have a transformative effect.

Processing Speed

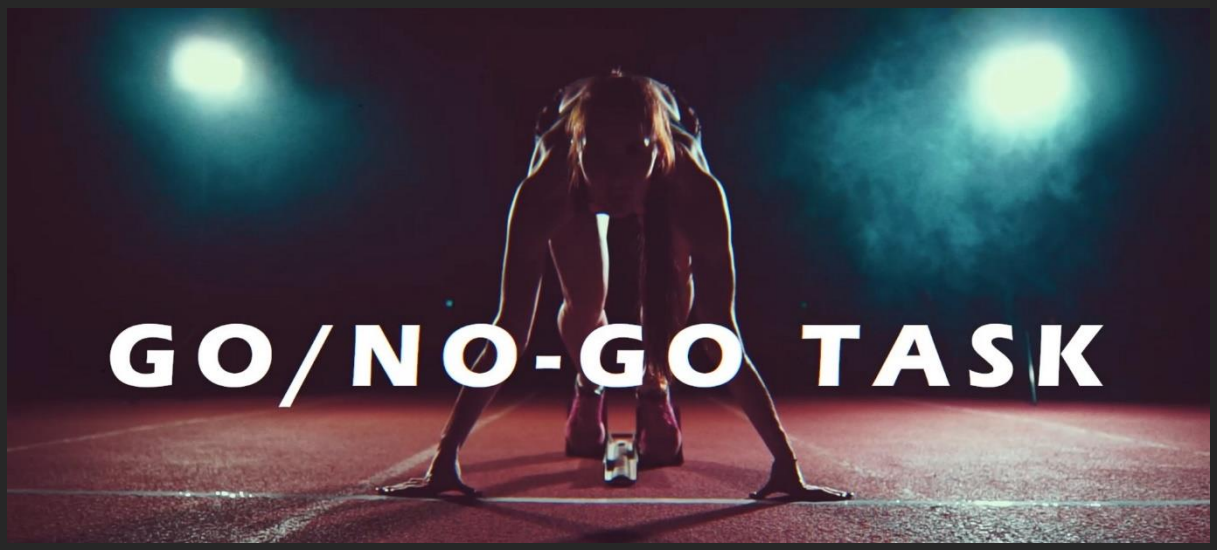
Building robust mental models and rehearsing those movements over and over will allow you to react almost without thought in a wide variety of situations. If you can remain highly focussed, then you may also be able to enter a “flow state” – rejecting all competing thoughts and inputs vying for attention and maintaining a steady and efficient pattern of activation across brain regions (study).

But sometimes you will still need to interject and use your conscious decision-making skills to adapt to a dynamic situation.

Rapid decision making *based* on context and sensory information is another bottleneck that must be trained. This can help to reduce the OODA loop – the time it takes for us to react to unexpected stimuli. Or to:

- Observe
- Orient
- Decide
- Act

In short, when something new enters our awareness, we must disengage from what we are doing, orient ourselves toward that object (either physically or cognitively), make a decision about what to do, and then act on that decision. This is very different from the kinds of instant reflexes that are based on embedded motor patterns. We must switch from reflexive behavior and instead using our executive function.



A good example of this is inhibitory control: the ability to supress a reaction as appropriate. For example, military personnel must be able to hold their fire when confronted with civilians. This is difficult in a high-pressure situation. However, studies show that training with tools like the “Stop Signal Task” (which asks you to react quickly unless you hear a “stop” signal) and “Go/No-Go Task” (which requires the participant to either respond or not respond to similar stimuli) it is possible to improve this ability. One study showed that using a combination of these tasks, as well as a stroop task, and visual search task, military personnel would be able to reduce civilian casualties (study).

This study also used a Simon Task, which asks the participant to press “left” or “right” depending on the word they hear. It is made more difficult, however, by the fact that the position of the word will vary. Sometimes you must press the left key when the word “left” appears on the right. This requires rapid processing. The Stroop task is a similar alternative.

Tools like the Stroop task have been shown to improve the ability of Lacrosse players to target the right part of a goal (study).

The brain training portion of the Protean Performance System suggests using certain optional brain training tools. Most of these tools can be found for free online, or can be created with a little imagination.

Brain States

One of the most powerful forms of brain training, as demonstrated by countless studies, is meditation. Meditation is, in particular, closely linked with focus. Due to the crucial role of focus in

unlocking plasticity AND in using working memory, this can in turn help us to unlock greater performance across the board.

But traditional views of meditation, and brain training in general, are oversimplified in my opinion. The mistake is in viewing focus and attention as the *only* beneficial results of meditation. There is so much emphasis right now on "being in the moment" and "living in the now." We all want to be in "flow" all the time, meaning that we are 100% engaged with the task at hand and capable of performing without distraction.

While there is great benefit to being in the flow and "getting out your own way," there is also great benefit to being reflective. To daydreaming. And to letting the mind wander.

This is when we activate the "default mode network" of brain regions associated with daydreaming and absent-minded thinking. Daydreaming may very serve a similar purpose to actual dreaming: to help organize ideas, experiences, and qualia in useful ways. This could enhance future access to those memories and lead to the formation of new, novel ideas. After all, creativity is simply the process of forming unique combinations between existing ideas!

Plasticity, likewise, requires both periods of intense focus and prediction error, and periods of rest and relaxation. This is just like muscular hypertrophy in its "biphasic nature" – we need to work the muscles hard in the gym to create muscle damage, but we also need adequate rest and nutrition to then repair the muscle tissue and allow it to grow thicker and stronger.

In fact, there is correlation between these processes. The body can generally be split into two states, as dictated by the two branches of the autonomic nervous system:

- Fight or flight (sympathetic dominant)
- Rest and digest (parasympathetic dominant)

These are very similar to what bodybuilders and athletes consider their catabolic and anabolic states.

If you spend all your time being highly focussed and alert, you will become tired and wired. It's even possible that you might experience "adrenal fatigue" (though evidence for this effect is fuzzy).

In fact, studies suggest that the very highest performing Olympic-calibre athletes and Special Operations personnel demonstrate greater ability to switch *between* these states. They are extremely aroused and alert during combat/drills/training, but also far more relaxed and better able to recover during rest (study). The Shaolin temple understands this principle well, too. There, they will prescribe an amount of Chi Gong (a form of moving meditation) aimed to balance out the amount of training the individual does.

For the *non-athlete* this is even more important. Being highly focussed is not conducive to being creative. The conditions necessary to rapidly enter data are exactly *opposite* to those needed for coming up with new ideas that will move a business forward. (Monotonous output benefits from extrinsic reward and pressure, whereas creative, divergent thinking benefits from relaxation and *intrinsic* motivation).

Many people attempt to market flow states as a panacea for all of life's problems. They use terms like transient hypofrontality to describe it as this magic "brain state." (Transient hypofrontality describing a state where frontal regions of the brain are suppressed to allow for purely reflexive action.) What truly characterizes a flow state, however, is simply the continuous and efficient use of the precise neural networks associated with the given task. That is: heightened focus. I have not seen any evidence to back up claims that flow states correlate with heightened anandamide (a neurochemical associated with creative thinking, euphoria, and marijuana use!). Nor do I believe that flow states necessarily involve the shutting down of the prefrontal cortex – just lessened activity owing to the more focussed use. After all, when brain imaging is used to analyse the brains of rappers in flow, we see that the medial prefrontal cortex remains active. That is a "higher order" area responsible for the internal generation of ideas (study).

It's mistaken to claim that there is a single pattern of brain activation that will make you better at writing essays AND make you better at skiing. The pattern of brain activation for those coming up with game-changing ideas is the *opposite* of flow. It is scattered and random and chaotic. (Too much of this is also bad, however, and can be associated with problems such as schizophrenia.)

And after all: if movement, focus, and tennis was all you needed for optimum brain function, then athletes would be the ones winning prizes for their scientific breakthroughs! We need to practice highly abstract and creative thinking JUST as we need to practice focussed flow.

This way, we can perform amazingly in a fight, be witty in conversation, focus on our work… but then relax and unwind while also coming up with great ideas that will allow us to improve our lives.

Likewise, we must learn to control the aroused state – such that we don't become overly stressed to the point of entirely shutting down our executive control. The ability to switch between these two states and even to use them simultaneously is dependent on the ability to increase arousal while simultaneously buffering the effects of cortisol. Again, we see this in the very top performers and studies suggest this may correlate with increased production of neuropeptide Y (NPY) and DHEA.

The goal is to be able to become "psyched up" without being "psyched out."

This can also benefit from an increased emotional control and vigilance. The ability to stay focussed on a task and to combat the effectives of stress and fatigue.

As JC Santana of the Institute of Human Performance pointed out to me, the amount of concentration it takes for an MMA fighter to react to an opponent for the entire duration of a highly fatiguing fight is huge. However, losing focus for even a moment can be the difference between winning and losing.

Training endurance in a manner that requires a large amount of concentration is one way to train this (train in the way that you are required to perform on the day). But studies also show that meditation can enhance psychomotor vigilance (study). In fact, it may even decrease the need for sleep!

Types of Meditation

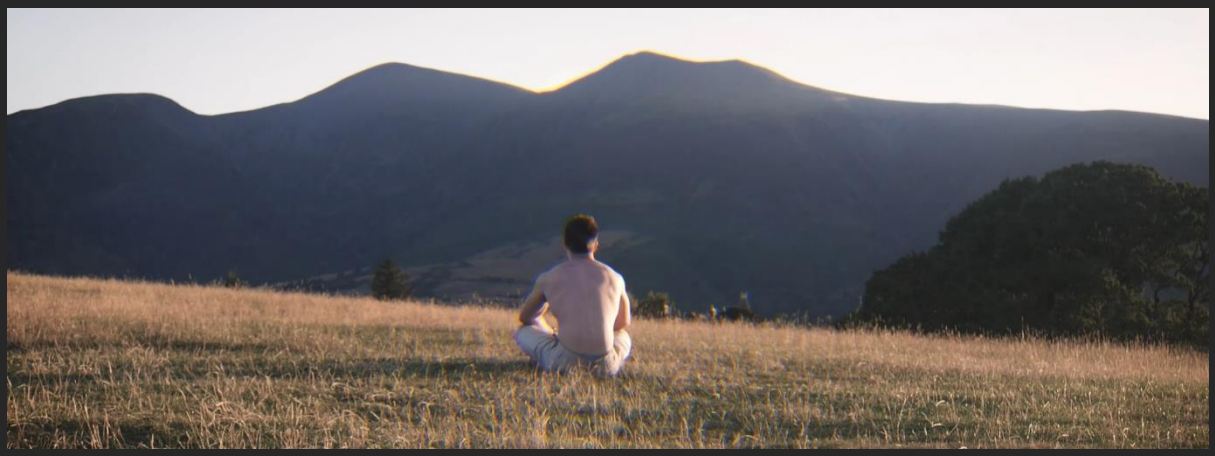
Meditation can broadly be broken into two types: directive meditation and non-directive. Again, this is where I am going to veer from the traditional view and suggest a slightly different protocol for optimal mental focus.

Most of us are familiar with directive forms of meditation. These include practices such as focussing on breathing (as in breath awareness meditation), an object (as in gazing meditation), the body (as in bodyscan meditations), or a word or mantra (as in transcendental meditation).

We can also place meditations that aim to clear the mind or disengage with the thoughts into this category. That might include many forms of mindfulness meditation.

Using this type of meditation can help us to rise above anxious thoughts, and to thus develop emotional resiliency, psychomotor vigilance, focus, and working memory. They generally train us to be more aware of what we're thinking of, and therefore to define our own mental state and how we wish to respond to the world around us. In that regard, mindfulness has a lot in common with the philosophy of stoicism.

Many people find the act of the meditation itself to be highly therapeutic. By focussing intently, you can quiet activity in unused brain areas, thereby reducing anxiety. This can even lead to an experience of "ego death" where you only experience the present moment and lose any sense of nagging doubt or insecurity. Combined with calm breathing practices, this can be highly rejuvenating.



This is an intensely relaxing process that may represent a form of "true relaxation" that we rarely engage in anymore. Many of us now "relax" by shooting zombies and worrying about work!

If you're feeling burned out and exhausted, you might need to consider using recovery strategies such as these. As mentioned, some forms of meditation have even been suggested to reduce sleep need. Yoga nidra is an especially popular option in that regard.

But what this *also* does is to develop focus. Studies show that directive meditation can develop the anterior cingulate cortex: the part of the brain associated with sustained attention. If you need to write a long essay then, practicing meditation could help you to achieve that. This type of meditation also increases IQ and appears to enhance whole-brain connectivity.

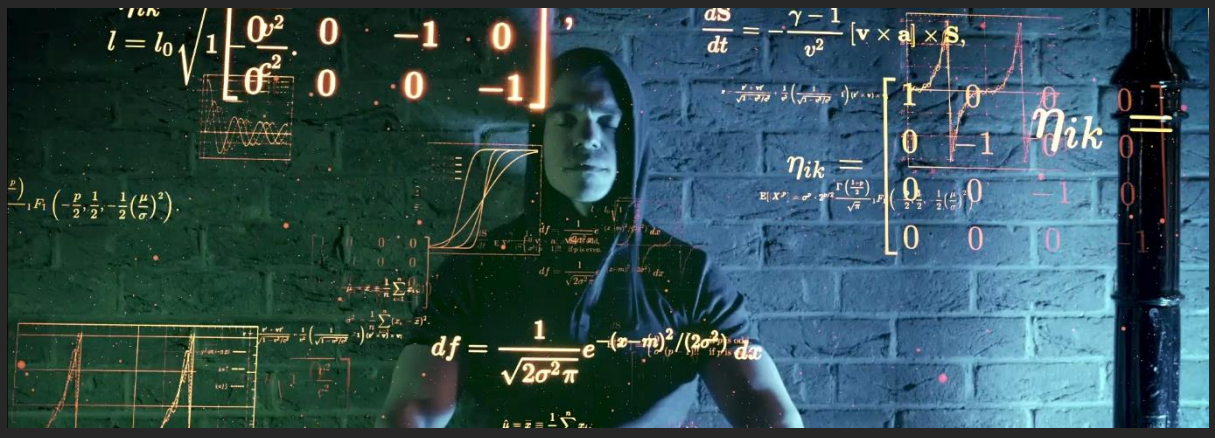
Two directive forms that I use regularly and recommend for SuperFunctional Training are:

- Bodyscan meditations – This involves progressively focusing on each body part and muscle from head to toe. As you do this, you should aim to completely relax that muscle and release any stored tension. This has all the benefits of directive meditation while also improving the mind-muscle connection, proprioception, and muscle activation. What's more, is that it can be used prior to a workout to help identify any potential pains or possible injuries.
- Hakalau meditations – This form of meditation tasks the practitioner with observing peripheral vision. This process is highly calming as the narrow focus is actually a trigger for activating an arousal state (sympathetic nervous response). At the same time, this can help to improve peripheral vision, which we have already seen is a crucial component of sports vision.

Just as I like "bang for your buck" exercise, I also like "bang for your buck" brain training/meditation!

If meditation isn't your thing though, don't worry: there are other practices that can likewise develop these abilities.

For example: consider the use of mental math. Simply performing sums in your head can develop the dorsolateral prefrontal cortex, which plays an important role in executive control. Unsurprisingly, this practice also enhanced working memory, which is our ability to hold and juggle information in our mind's eye.



Like other forms of directive meditation, this can help to improve your ability to choose *not* to focus on stressful things. Or to stay task-oriented. Researcher Matthew Scult and his team suggest that this could present interesting new options for treating emotional disorders.

Of course, the potential performance benefits are also clear, making this an interesting area for sports psychologists!

The point is that by simply choosing to focus the mind on something difficult, we become better at focussed thinking. This could of course *also* lead to greater attainment of real-life ultra-instinct; the flow state.

Seeing as the brain only has enough energy to utilize around 3% of neural tissue at any given time – or to attend to roughly 110 bits of information per second according to psychologist Csíkszentmihályi (the man responsible for discovering "flow" but not responsible for its mischaracterization!) – resource management becomes important. Training focus in this way allows us to dedicate more and more attention to the task at hand, when necessary, *without* distraction.

So, to get the benefits of meditation, you don't necessarily need to sit like a yogi and breathe through your nose. You can just perform math in your head! Alternatively, you might try other alternative forms of directive meditation, such as the "productive meditation" suggested by *Deep Work* author Cal Newport. Newport suggests a form of meditation where you commit yourself to working on a single problem until you come to a conclusion.

This involves inherently less focussed attention owing to the disparate concepts you'll likely juggle when solving problems. But it has the added bonus of helping you to practice a real-world skill: the direction of all your mental faculties toward a single problem.

I also use a form of meditation I call "memory sorting." Here, I will attempt to picture specific things from my memory. This might mean visualizing the route I take to get somewhere, or it might mean trying to remember specific details – like what I had for lunch several days ago. I also like to try and bring to mind specific details of places I have visited or used to frequent; perhaps an old classroom from my school days.

Non-Directive Meditation

But I maintain that the best effects will come by pairing directive forms with non-directive meditation. An example is Acem meditation, developed in Norway in 1966. Here, you repeat a mantra as in transcendental meditation, but you ALSO combine this with a "free mental attitude." The aim is to let your mind wonder naturally from thought to thought. This is subtly different from forms of mindfulness meditation where you "watch thoughts float by," in that there is no requirement to disengage from them. You can simply let your mind go where it pleases.

I like to use the cue "it's okay to let go." That might be personal to me, but it's an occasional reminder I need to let go of my worries and commitments and to simply "be." I can often feel my entire body unwind at this moment.

Studies show that this type of meditation activates the imagination network – the default mode network. This is the part of the brain that we use when we're absent-mindedly daydreaming, and that has been implicated in many breakthroughs, such as Einstein's special theory of relativity. Only Acem meditation actually shows *greater* activity in these regions than is seen at rest.

It turns out that this process is not just intended for idea generation but might also play an important role in helping us to organize ideas, memories and concepts in the hippocampus and other brain regions – resulting in greater creativity, goal-oriented behavior, and efficiency.

I use a similar strategy that I call "big ideas meditation" where I will tackle a random idea or challenge. For example, that could mean musing on the creation of the universe, the nature of consciousness, or what I would do if I was tasked with writing the next *Bond* movie! This is a fun exercise that involves utilizing my brain in a variety of different and creative ways.

This is an exercise in creativity that teaches me to think on a large, creative scale. Again, this is the kind of benefit I *want* from my brain.

***

Meditation is simply the intentional inward direction of attention, or lack thereof. It simply means using your focus and control to flex specific brain areas; so as to become better at using them. What you achieve with this, is determined only by the brain regions you choose to work out!

My underlying hypothesis is that instead of *only* focussing on relaxing the mind and entering parasympathetic states, we should combine this with other forms of meditation. Being mindful and

in-the-now is great, but it's not objectively superior to any other brain state! Not if you value creativity, forward planning, or even a little bit of motivating eustress (the positive form of stress that motivates us to get stuff done).

We should practice different forms of meditation and combine them; just as we wouldn't focus purely on one muscle group in the gym.

THE PROGRAM

Enough theory! It's time to put everything into practice with a program designed to build multiple attributes and traits. Let's just recap on what that means and how we'll be approaching it:

- The workout consists of "bang for your buck movements." These are movements that don't just build strength in one area, but which combine strength with mobility, muscle control, endurance, etc.
- The workout places the most intensive and complex movements at the start, with the simplest at the end of the routines.
- Workouts end with a cardio "finisher" to train work capacity/endurance. These also have additional benefits.

Following, you will find a full list of all exercises involved in these workouts, with detailed instructions for each. The recommended training split is PPL-FB: Push, Pull, Legs, Full Body.

In the more conventional PPL (Push Pull Legs), you categorize movements based on whether they involve a pulling or pushing movement for the upper body, or whether they target legs (and the core is usually trained on leg day but also throughout the program). This allows a greater number of exercises to be used with more emphasis on stimulating growth in the target areas.

PPL-FB introduces a fourth "full body" day to encourage compound movements and to try to train each muscle group during that day.

Following The Program

The following routine is designed with several things in mind.

Firstly, the exercises selected have been chosen for their "bang for buck" quality. By this, I mean that each exercise targets multiple attributes, thereby feeding into the widest number of traits and skills. As an example, something like the Cossack squat will develop:

- Strength in the frontal plane
- Hip mobility
- Single-leg strength
- Balance/coordination

There have been previous attempts at a SuperFunctional workout that were extremely complex as they attempted to address every possible trait and attribute. There were multiple mesocycles, a huge selection of movements, etc.

That is no longer the goal, as I don't believe it suits most people. Instead, in a bid to strip back the program to its most simple essentials, I have instead aimed to cover the most common, critical attributes, traits, and networks. This should be something that everyone can adhere to, and that will enhance performance in a huge range of areas.

Furthermore, this new routine represents an evolution in my training and thinking. These few exercises should ultimately cover more ground than the far more complex previous version. They are also chosen for adaptability and portability. The end result should be a workout that can be used by anyone, at any level, with very minimal equipment, in any amount of space. Nevertheless, it will build strength, explosiveness, speed, agility, mobility, balance, focus, and more. I've been training this way for the last year and I've never been so free from aches and pains, so mobile, or so capable of a wide variety of movements.

How it Works

Every exercise is designed to be highly adaptable to different levels and to build muscle strength AND endurance in a single session. A target has been given for the number of repetitions and there are basic, easy, medium, hard, and very hard variations for each exercise.

Your goal is to complete the number of repetitions using the highest ratio of difficult movements possible. As soon as you reach failure (or technical failure) with the most difficult movement, you will drop *immediately* to the easier option. If you absolutely cannot continue with even the easiest variation, you may take a 10-30 second "intra-set rest" break, but then continue the movement.

Consider the following example:

2 x 50: Goblet Jump Squats > Goblet Squats > Jump Squat > Air Squats > Assisted Squats

If you need more than two intra-set rests, you default to the easier progression.

Here, you must complete as many goblet jump squats as you can with no break. This means jumping while holding a weight in front you. That may be 0 repetitions, it may be 10, or it might be 50 (in which case, you need to up the weight next time). As soon as you reach failure, you stop jumping. When you reach failure again, you put down the weight and begin normal jump squats. As soon as

you can no longer does those, you perform regular air squats. Finally, if you can't finish the set or if you can't perform a single squat, you will finish by assisting yourself using a wall, a partner, or even a railing.

If you find you can only perform 20 assisted squats in a row, wait 30 seconds, then do ten more. Wait 30 seconds, then do 5 more (reduce range of motion if necessary). If two intra-set rests are not enough to complete the set, move on.

Anything that involves weight can be adjusted to meet the needs of the athlete. For pure hypertrophy, I recommend using roughly 75% of 1RM, so that you can complete around 10-12 reps. If you're more interested in max strength though, you might opt to increase that weight to 85% of 1RM. Those interested in speed and power primarily should, according to research, add around 30% of bodyweight and focus more on speed and intent.

You will get all these benefits regardless, however. So, if you only have access to a certain amount of weight, work with what you have.

This is highly adaptable, because someone who is very new to training might JUST find themselves doing 30 assisted squats, broken up with rests. Someone who is advanced might do 10 goblet jump squats, 30 goblet squats, and then 10 jump squats.

Overload and Progression

50 reps of anything is extremely difficult for many people. While high rep ranges are the aim then, there are actually three levels to aim for. This means the workouts will look completely different depending on your level. A complete beginner may perform 10 reps of push ups against a wall, whereas a pro might be doing 10 reps of weighted clapping push ups, followed by 10 more reps of clapping push ups, followed by 80 more push ups!

Always listen to your body. Stop if a movement feels unstable. And consult with your physician before beginning any new training program.

Some of the more advanced movements here do not lend themselves to conditioning and so should always represent a smaller proportion of the set. They will be indicated.

Advanced Mechanical Drop Sets: Introducing The Gauntlet Set

This structure is a tweaked version of the mechanical dropset that I call a "gauntlet set." This format has countless benefits, beyond being simple, quick, and highly adaptable.

Firstly, it allows you to work the full range of different types of strength. You are working not only your explosive strength and rate of force development, training your fast twitch fibers, but also your strength endurance and your cardio. At the same time, this near continuous time-under tension. causes blood to pool in the muscles and creates a build-up of metabolites. These factors will encourage hypertrophy and strength gain. There's also an element of mental toughness/endurance involved.

Henneman's Size Principle teaches us that we only recruit the muscle fibers/motor units we need for a specific task in reverse order of size. So, when you lift a spoon, you use the smallest motor units that account for primarily slow-twitch fibers. When you lift something big and heavy, you use those smaller motor units AND the big ones.

By combining forceful movements with higher-rep, lower-intensity movements, we are able to fatigue both the slower twitch fibers and the fast ones. Moreover, as fibers start to fatigue, the body will begin to recruit more large motor units to "finish the job." We see this as the limbs start to shake – the result of larger motor units taking over, which aren't as capable of fine adjustments.

In short, if you perform a push up normally, it might feel like 30% of your one rep maximum (1RM). But if you perform a push up after 30 clapping push ups, it will feel and act more like your 75% RM. Training using extremely high rep-ranges can achieve something similar, but this won't train explosiveness (due to the different intent) and metabolic fatigue will negatively impact the recruitment of those larger motor units.

By training with explosive movements/heavier weights *first*, we are able to hit the fast twitch muscle This way, we don't need to perform three sets of each movement. This saves us time, allows us to increase variation, and generally become more well-rounded athletes. Squats and bench presses are skills. We shouldn't be interested in those movements for *their own sakes* unless we are powerlifters. We're interested in the traits that they provide, but also the many OTHER traits we can get elsewhere.

Finally, by combining multiple different movements in a single set, you are creating a much more interesting and varied workout routine that requires focus and "transition" movements. This also offers "contextual interference" meaning that you're not simply performing batches of the same movement. This actually enhances learning (study)!

And it's much more interesting and fun. Who has time to stand still performed 30 reps of a single movement?

If your training is mind-numbingly dull, you're doing it wrong!

Note: Quasi-isometric movements are movements performed extremely slowly. Here, a single push up rep can take 30 to 60 seconds. This requires a lot of strength and control in the muscles and teaches you to really feel yourself move through the full range of motion with no cheating. This develops finesse in the muscles and develops them as proprioceptors. I recommend performing with your eyes closed to heighten the input from the body.

Huge Benefits of Going High Rep

Gauntlet sets also function as a form of metabolic conditioning or high intensity training. These long rep ranges turn the sets into endurance challenges with insufficient recovery (metabolic conditioning) while the high intensity will be enough to increase the efficiency of mitochondria. Again, this increase in mitochondria will occur in the muscles used, which is why training this way with multiple different movement patterns will improve overall endurance to a high degree not seen in many other training methodologies.

We're also burning a lot of calories to improve body composition (and strength:weight ratio) and we're using up available energy to encourage the "after burn effect" which spikes fat metabolism for a time after training. And of course, we're raising the heart rate and training the lungs. In short: we're using high reps of push ups and air squats like others use battle ropes.

Finally, this high rep training is fantastic for increasing hypertrophy (muscle size). Because the muscle is kept continuously under tension, it is flooded with metabolites that stimulate growth. The more challenging movements at the starts of the sets encourage muscle damage and offer muscle tension, which are both also important stimulants for growth.

The Protean Performance System recommends a day of low-intensity running (Low Intensity Interval Training, or LISS), which offers slightly different benefits on top of those established here. Those include an increased heart size and strength to lower stroke volume and resting heart rate, improving fitness throughout the day. Again, the key is to offer the body variety in stimuli. We want to train all energy systems.

The Protean Routine

The Ultimate Activation Warm-Up

You should not need to warm-up prior to a workout. Wild animals do *not* warm up before chasing prey or climbing trees.

And yet the reality for most people is that they absolutely *should* warm up before training. Why is this?

Simple: because workouts are too jarring a transition from how we use our bodies most of the day. Sitting at the computer for 8 hours means long-term degradation (tight hip flexors, kyphosis, lower back fatigue), but also *acute* issues such as loss of proprioception. Sitting on your buttocks all day for example, makes it harder to *engage* said buttocks during training. This leads to quad dominance, which increases the likelihood of injury, and hampers optimal athletic performance.

Meanwhile, blood has been sent to all the wrong places and pooled there, leaving your system cold and unready to spring into action.

It's the lack of movement throughout the day that makes it hard for us to engage in anything seemingly energetic or active.

Consider how sitting for 8 hours at a desk will cause the glutes to go to sleep and the hip flexors to become tight and short. It's THIS that then makes a squat "from cold" dangerous.

The goal of an effective warm-up then, is to reawaken the muscles that have gone to sleep during the day so that we can better engage them AND so that we can avoid injury that comes from incorrect movement patterns. The warm up will also provide some "post activation potentiation." Essentially, by utilizing the muscles we reduce the amount of stimulus necessary to cause subsequent firing of nerves and neurons (by increasing the resting potential). This effect is what makes you feel super light after you take off a weighted vest and it essentially lets you tap into greater strength.

This warm up is unique, in that it will also aim to improve mental focus and coordination. This is the purpose of the anterior reach that will get us listening to our proprioceptors and improve balance. Likewise, the reaction ball-wall will get us moving while also waking up our visual system. This can be primed in just the same way that the muscles can be. Again, by raising attention and awareness, we improve the quality of the workout and reduce the likelihood of injury.

We do also want to get the blood flowing, which will further help to aid performance and avoid injury.

Best of all, this warm-up is devised to offer benefits of its own. If your warm-up is boring and doesn't involve anything of value in itself, then it is dead time in the gym. This warm-up is a workout in itself that ALSO just happens to prepare you for the training to follow. You'll be improving mobility, increasing grey matter, boosting focus and sports vision, and improving coordination.

Watch the included warm-up video to see each movement demonstrated and to hear more about the benefits.

The Warm-Up

5 Minute Body Scan Meditation
Knee Circles - 10 Each Direction
Arm Windmills, Opposite Direction – 10 Each Way
Alternating Toe Touches – 5 Each Side
High Kicks – Swing each leg straight up 5 times, then sideways 5 times
Anterior Reach / CLA Reach – 5 Each Side
Posterior Reach – 5 Each Side
Bird Dog – 5 Each Side
Deep Squats – 5 Reps
Balance Board (Optional) – 2 minutes
Reaction Ball-Wall OR Juggling OR Skipping – 2 Minutes
Skater Hops – 10 Each Side

Overcoming Isometric – 4 x 7 seconds at 3 joint angles.

For the overcoming isometrics: train push, pull, or legs and abs as the subsequent workout demands. On full body day, use all four. Options include pushing a wall, locking a power rack in place, trying to lift something too heavy etc.

The five-minute bodyscan meditation is a great way to focus the mind before training but also to feel the muscles and even to serve as a kind of "diagnostics check" prior to training.

The basic idea behind a bodyscan meditation, is to sit quietly with eyes closed and focussed on feeling and then relaxing each muscle starting from your forehead and moving all the way to your feet. Feel what each muscle is doing, contract it slightly, then allow it to fully relax. Make a note of any discomfort or tightness and adapt your training accordingly.

This diagnostic check helps us to recognize any soreness or stiffness we might be feeling, and to adapt our training accordingly. Better yet, it helps us to further improve our awareness of our muscles and body.

We then follow with a series of dynamic stretches and gentle movements designed to improve range of motion and get the blood circulating.

THE WORKOUTS

Note: For demonstrations/explanations of each exercise and the best way to complete the full workouts, consult the video guides that came with this document.

When you begin this training for the first time, start with the lowest rep-count and movements that you can perform EASILY. Even if you are advanced, this is a new program and you should get a feel for it before upping the difficulty. You have been warned!

Legs Day

2 x 10/30/50 One Legged Jump Squat With Knee Thrust (Alternating) > Lunge Scissor Jump > Reverse Lunge

2 x 15/20/35 Weighted Pistol Squat > Pistol Squat > Weighted Lunge Walk > Lunge Walk

2 x 10/20/25 Romanian Deadlifts > Weighted Good Mornings > Bodyweight Good Mornings

2 x 10/25/50 Goblet Jump Squats > Jump Squat > Air Squats > Assisted Squats
(Alternative: 2 x 50: Overspeed Kettlebell Swing > Kettlebell Swing > Jump Squats > Air Squats > Assisted Squats)

2 x 25/50/100 Hindu Squats > Bunny Hops > Backward Jogging > Backward Walking

2 x 20/30/50 Weighted Cossack Squats > Weighted Side Lunge > Side Lunge > Skater Hops

2 x 20/30/35 Weighted Glute Bridges > Unilateral Glute Bridges > Glute Bridges

2 x 20/30/35 Deficit Calf Raises (With or Without Weight) > Calf Raises

2 x 15/25/50 X-Ups > Bicycle Sit-Ups > Elbow to Knee

2 x 20/30/50 L-Sit Flutters > Lying Leg Raises > Lying Leg Flutters

2 x 50/100/150 Bilateral Loaded Carry > 100-Up major > 100-Up Minor

1 Minute Quasi-Isometric Air Squat > Quasi-Isometric Assisted Air Squat

Pull Day

2 x 15/25/30 Weighted L-Sit Rope Climb > L-Sit Rope Climbs > Wall Climb > Towel Pull Ups > Decline/Assisted Towel Pull Ups

2 x 20/50/75 Weighted Decline Rows > Decline Rows > Bodyweight Rows > Incline Rows > Reverse Plank With Leg Raises

2 x 15/25/50 One Arm Bodyweight Rows With Rotation > Band Pull

2 x 10/20/30 Front Lever Flutters > Tuck Front Lever Kicks > Bodyweight Scapula Rows > Band Scapula Rows

2 x 15/25/35 Weighted Explosive Pull Ups > Weighted Pull Ups/Explosive Pull Ups > Pull Ups > Kipping Pull Ups > Pull Up Negatives > Assisted Pull Ups

2 x 20/30/50 Hanging Leg Raises/Weighted Hanging Frog Kicks > Hanging Frog Kicks > Seated Leg Raises

2 x 20/30/50 Curls > Hammer Curls > Drag Curls > Cheat Curls

1 Minute Dead Hang

1 Minute Quasi-Isometric Pull Up/Bodyweight Row > Quasi-Isometric Band Row

Push Day

2 x 15/30/50 Weighted Ring Dips > Ring Dips > Weighted Dips > Dips > Assisted Dips > Tricep Dips > Assisted Tricep Dips

2 x 15/25/50 Handstand Push Up > Assisted Handstand Push Up > Decline Pike Press > Pike Press > Shoulder Press

2 x 20 Planche Push Ups > Straddle Planche Push Ups > Tuck Planche Push Ups > Pseudo Planche Push Ups > Knuckle Push Ups > Knuckle Push Ups on Knees > Wall Knuckle Push Ups

2 x 10/15/30 One Arm LaLanne Push Ups > LaLanne Push Ups > Ab Roll-Out > Ab Roll-Out On Knees > Walk Outs to Plank

2 x 30/50/100 Explosive Push Ups > Push Ups > Push Ups on Knees > Incline Push Ups

2 x 15/20/50 Fingertip Push Ups > Fingertip Push Ups on Knees > Push Ups > Push Ups on Knees

2 x 15/25/50 Weighted One Arm Push Ups > One Arm Push Ups > Staggered Stance Band Press

2 x 20/50/100 Sandbag Tug Crawl/Slow Lizard Crawl > Lizard Crawl > Foot-Hand Crawl

1 Minute Quasi-Isometric Push Up > Quasi-Isometric Incline Push Up > Quasi-Isometric Band Press

Full Body

2 x 10/25/30 Cross Body Kettlebell Clean and Press > Squat Press > Dumbbell Squats > Assisted Squats

2 x 10/15/30 Sandbag Snatch > Sandbag Clean > Sandbag Bent Row > Bent Dumbbell Row

2 x 10/25/50 Man Makers > Devil Press > Burpees > Incline Push Ups

2 x 10/25/50 Bulgarian Bag Spin/Gama Cast/Halo/Kettlebell Halo

2 x 15/20/30 Dumbbell Runners

2 x 15/20/30 Overhand Curls

2 x 15/25/50 Medicine Ball Slams/Sledgehammer/Band Woodchopper > X-Ups > Knee to Elbow Crunch

2 x 10/15/20 Bodyweight/Band Face Pulls

1 x 50/150/200 (Each Side) Famers' Walk Briefcase Carry / Briefcase Carry 100-Up

1 x 50/100/150 (Each Side) Single Leg Skipping > Skipping > Skipping No Rope

5 x 1 Minutes Bag Work/Shadow Boxing (With 30 Second Breaks)

5-10KM RUN – LOW INTENSITY

This 5-10km run is here to strengthen the cardiovascular system and lower resting heartrate, improving overall energy, mood, and health. It also aids with recovery by increasing circulation to deliver more blood and oxygen to the muscles. This should be done at a slow pace (1 hour+ for a 10km).

Running also has a host of other benefits that can't be found elsewhere. This is great for mindfulness thanks to the rhythmic nature and the rapid amount of visual information that you take-in (optic flow). Running mindfully and with correct biomechanics is also very important for improving gate, balance, and strength.

And for the very best benefits, you should aim to run off the road and through woods and other unstable surfaces. This forces you to use your ankles and feet to absorb the impact and maintain balance, it strengthens the glutes, and it avoids issues like the previously-mentioned IT band pain.

If you can't run to begin with, walking is a perfectly suitable alternative.

Power Training (Optional)

If you are advanced in your training and you are interested in developing additional speed and power, then you can opt to incorporate a sprint. Sprinting is a fantastic form of training that builds explosiveness, leg strength and size, and general athleticism.

However, sprinting is also highly taxing on your nervous system and requires a long recovery period. To this end, you should think carefully about incorporating the strategy to ensure you are able to recover fully.

I recommend 100 meter sprints using a pyramid set based on rate of perceived exertion (RPE). This is a scale out of 10 where 10 would be your max effort (top speed). This method will build you up to top speeds while providing adequate cool-down and warm-up. Rest for 2-5 minutes between each "set."

RPE 3
RPE 7
RPE 10
RPE 7

This should be followed by the 5KM run.

Hill sprints are a great alternative for those that want to minimize injury risk (hill sprinting forces you to go slower and to land on the ball of the foot) while maximizing cardio/strength benefit. You could also use sled or car pushes.

If you incorporate power training, you should think hard about incorporating strength training. Using both will greatly tax the nervous system and leave little time for recovery. Only use both if you are experienced and certain your body can handle it. And consider dropping the full-body day from your training.

Strength Training

If you are advanced in your training and you wish to add extra emphasis on raw strength, then you can optionally incorporate additional strength training. Alternatively, this can replace the full-body day.

This should take the form of:

4 x 75-80%1RM Deadlift

4 x 75-80%1RM Squat

4 x 75-80%1RM Bench Press

Full disclosure: I do not use this in my own training. The bench press is ultimately a feat of strength that builds a lot of shoulder and pec strength in isolation, but does not necessarily translate to real-world activities.

The squat is a great move for building leg strength, mobility, and a functional movement pattern. However, loading that much weight onto your shoulders is not easy if you don't have access to a gym/squat rack. It also involves a high risk of injury, while not being a directly useful movement in itself. If you can't lift that much weight onto your back to squat, you are unlikely to ever need to squat that much in real life!

For that reason, I have always preferred front-loaded squats, which also reduce spinal compression. These involve less weight, but seeing as I am not solely interested in max strength in a number of key lifts, this is not an issue for me, personally.

I firmly believe that being able to front squat for high reps with a 75kg sandbag is more useful than being able to back squat 150kg, once. I respect your opinion if you disagree!

Likewise, with the deadlift: it's great because it lets you move a huge amount of weight and builds back strength. But it also requires a lot of set-up, and perfect form. And for all "picking stuff up off the floor" is a useful and important movement, I personally don't remember the last time I had to lift 150kg and then place it right back down. Again, if functional performance is your goal, I don't think that focussing on adding 10kg to an already impressive deadlift is going to yield the greatest benefits for you.

A cross-body kettlebell clean and press performed for high reps, however, will build strength *endurance* in those same areas to minimize injury risk during day-to-day tasks. Especially when combined with good mornings, bodyweight rows, etc. All these are in the program.

Again, your mileage may vary. If you are a strength athlete, if you love moving heavy weight, or if you just like the "big 3," those are all great reasons to stick with them. Which is why this is an option.

Some More Ways to Optimize the Protean Performance System

This system is devised to be highly adaptable. I wanted to shy away from having 30 different workouts for different levels, goals, and cycles. Thus, I encourage you to adapt this program as you see fit!

One of the most obvious ways to do this, is by deciding whether to increase the number of reps or the weight. If you see the following:

2 x 10/25/30 Unilateral Kettlebell Clean and Press > Squat Press > Dumbbell Squats > Assisted Squats

And you are currently doing 10 repetitions of unilateral clean and press only, you can then decide to a) keep the exercises and reps the same but increase the weight (say from 20kg to 30kg) or b) move up to the 25 rep target and use a mechanical drop set. Now you might be doing 15 unilateral KB clean and presses, followed by 7 squat presses and a few regular squats.

I designed this program assuming that the mechanical dropsets and strength endurance would be the main goal. But ultimately, that is up to you!

The workouts are also designed to be broken apart. That is to say, that if you want to train throughout the day (more on this in a moment), that is definitely an option.

I also highly encourage you to use your rest time productively: by performing some of the brain training activities recommended here. A session of dual n-back between sets is a perfect way to train the brain *and* the body. This also solves the problem of "finding time" to train both the brain and the body, at once!

PROTEAN MOBILITY ROUTINE (& COOL DOWN)

The role of the cool down is to return blood to circulation from the muscles. Going directly from heavy training to stopping can cause feelings of nausea and dizziness.

At the same time, THIS is now our opportunity to incorporate more static stretches that could otherwise hinder our training. This also gives us the opportunity to work on mobility, improving overall dynamism and athleticism.

My aim was to devise a sequence of movements that would flow seamlessly from one to the other while stretching nearly every muscle/joint that is useful for our training goals. This simplicity means that you can practice ritually to know that all your mobility needs are taken care of.

For instruction and demonstration, be sure to check out the included video.

This mobility routine should be performed at the end of each workout OR at the end of the day (on days you don't train, or if you spread your training throughout the day). Those that see mobility as a priority may optionally repeat the routine twice and/or increase the holds to 1 minute.

Mobility Routine

Split Squat
30 second (each side)

Cossack Squat
30 seconds (each side)

Deep Squat
30 seconds (each side)

Prayer Squat (Namaskarasana)
30 minute

Squatting Internal Rotation
30 seconds (each side)

Cobra Stretch
30 seconds

Downward Dog
30 seconds hold

Overhead Squat
30 seconds

Crab Reach
30 seconds (Each Side)

Half Bridge OR Full Bridge
30 seconds

5 Minutes Hakalau Meditation

NOTE: If you have any history of back problems then avoid the back bridges. “Back mechanic” Dr. Stuart McGill recommends against the use of movements such as back bridge as they place compressive force on the spinal vertebrae. But we should also weigh this up against the fact that Yogis and others have been performing the movement for thousands of years with no ill effects. The potential performance benefits here are impressive and individuals such as pro gymnasts demonstrate that it is possible to have a flexible AND strong spine.

Incidental Training List

So, just how do we “change the environment?”

Other than training throughout the day, we can also take advantage of small moments to train. We can turn mundane tasks into opportunities for development. The following list should provide some inspiration but is by no means comprehensive. Your challenge is to find options that fit around your own routine and lifestyle.

- Grip trainer: This is something you can do anywhere. My advice is to find a specific time to do this. Keep it by your computer and use it when the computer boots, or keep it by the kettle and use it while the kettle boils.
- Isometric neck pushes: Using your own hand to provide resistance, training your neck is again something you can do anywhere and at any time. Once more, it makes sense to fit this into your usual routine.
- Squatting: Whether playing with the kids, playing videogames, or picking something up off the floor; any time you are working close to the ground is a perfect opportunity to work on your deep, resting squat.
- Calf raises: These can be used anywhere but work especially well if you’re by a curb, such as when waiting for the bus.
- Stair jumps: Don’t walk up the stairs, jump up two or three at a time. This is a small jolt of activity that will get your heart pumping. And if you don’t use it, you lose it.
- Chair L-Sits: Any time you’re sitting on a hard wooden or plastic chair you can support your weight on your hands and raise your legs.
- Overcoming isometric crunch: Alternatively, while sitting, place your hands or forearms on your legs and attempt to bend down so that your head touches the floor.
- Left-handed tooth brushing: Using your left hand will increase your fine motor control on that side of the body and this alone is a coordination challenge that requires a lot of concentration. You can also practice writing with your left hand.
- Mental math: Waiting in a queue? Perform mental math to train the working memory and concentration. More on this in the cognitive training section of this book.
- Carry things: If you are going anywhere, carry something heavy to get there. For example: if you are going to a shop, bring a kettlebell and make it a farmers walk. Swap hands on the way home. If that’s too embarrassing, you can keep a kettlebell by the stairs. Carry it down with you every time you go down and carry it up every time you go up.
- Pull up bar in doorway: Perform 5 pull ups every time you pass through the doorway with a pull up bar. This is the classic example of “greasing the groove” offered by Pavel Tsatsouline.
- Verbal fluency: If you need to read aloud, try to perform as best as possible. This is a good example of how simply focusing more on a task and putting in more effort can trigger plasticity. You will improve your speech and verbal processing.

- Crawls: Crawling is great for incidental training. You can crawl anywhere you would normally walk, you can crawl around the house, or you can crawl when playing with your kids/pets.
- Bearfoot shoes: Buy and wear minimal/barefoot shoes. This will passively train your proprioception, foot strength, knee and hip stability, and more. It's game-changing and I would consider it a top priority for anyone that truly wants to be more functional.

Protean Brain Training Routine

The new Protean Performance System (SuperFunctional 2.0) has been devised to incorporate brain training alongside the strength, speed, endurance, and mobility training. Some areas where this is achieved include:

- Reaction ball as part of the Ultimate Activation Warmup
- Bodyscan meditation as part of the Ultimate Activation Warmup
- Hakalau meditation following the Protean Mobility Routine
- Inclusion of crawls that benefit from quadrupedal movement that requires coordination across the midline
- Inclusion of other balance-heavy movements and “repetition without repetition”
- Endurance challenges that require psychomotor vigilance

However, we can also combine this with additional brain training designed to supplement this and provide missing aspects that focus more on creative problem solving, strict working memory training, and executive function.

This routine is designed to be used 3-5 times per week. For best results, perform in the morning OR interspersed with your workouts.

- 5 Minutes “Mental Math” meditation (perform challenging multiplications with total focus) OR 5 Minutes N-Back
- 5 Minutes Stroop/Simon Task
- 5 Minutes Ambidexterity Training OR 5 Minutes Juggling OR 3D object tracking (VR)
- 5 Minutes Acem/Big Idea Meditation

This should be adapted to become more difficult as you improve. If you start on Dual 2-Back, you should progress over time to 3-Back, 4-Back, Triple 2-Back etc. Likewise, you should increase the number of items juggled and introduce more difficult conditions (juggling while balancing).

There is the option to replace juggling with virtual reality brain training apps that include 3D object tracking and focus on sports vision/visual attention. The best example I have found is *REAKT Performance Trainer* for the Oculus Quest 2. This is an ideal substitute but I recognize it is not available to everyone.

The role of ambidexterity (cross dominance) training is to train fine motor control and to trigger a lot of plasticity as a result. Becoming ambidextrous has a huge number of benefits in itself, helping to improve connectivity between hemispheres of the brain, creating more tactical advantages in combat and other sports, and improving symmetry when running, walking, and more. Imagine producing slightly less force off of your left leg than your right. Imagine what a huge difference that could make over the duration of a 500-meter race.

Yes, we should be aiming to improve control over *all four* limbs.

(There are some that worry ambidexterity training can lead to cognitive disorders. This is due to a misunderstanding of the evidence. While some studies show a correlation between ambidexterity and certain developmental issues (such as stuttering). The key word here though is *developmental*. The truth is that ambidexterity may actually be the result of perinatal disturbances that *also* cause other issues. You won't develop a stutter by learning to be ambidextrous!)

And remember: muscles aren't just for force production. Muscles are also for acquiring sensory information from the world. You won't just have more control over your left hand, you'll be better able to feel where your left hand, arm, and fingers are in space. This will improve your ability to balance, and to move yourself in a graceful, coordinated manner.

Far from it in fact. Did you know that many surgeons are actively encouraged to develop ambidexterity? This is not because they are expected to use their non-dominant hand, but rather because it can lead to something called the "intermanual transfer of skill-learning." That is to say, that learning to perform a skill with your left hand can actually *improve* your ability to perform that skill with your right hand!

Again, we already have some in-built ambidexterity training with this program. Juggling, and crawling both will improve ambidexterity. Single leg training will improve proficiency on one leg. But we can supplement this, again, with specific drills.

The most important ambidexterity drill is simply to write with the left hand. I like making this a productive form of writing. In particular, I like keeping a dream journal which may enhance creativity (and improve odds of lucid dreaming). Again: bang for the buck training!

You can also take any other activity requiring fine motor control that you perform regularly and do that with your left hand instead. Switch your cutlery over. Play an instrument “backwards.”

Advice for Adapting Diet

A detailed diet-plan is beyond the scope of this document, but I did want to touch on the basics of a healthy diet and some aspects that people often miss.

The role of your diet is to provide both fuel to power your movements, and building blocks that can be used to build and repair tissue and chemistry. If your interest is in gaining or losing weight, the best strategy for *most people* to start with, is to track calories. By calculating how many calories you burn on a given day (called your Active Metabolic Rate, or AMR), you can then work out how many calories you need to consume in order to make a net profit or loss. For gaining weight, you should aim to consume more calories than you burn off. To lose weight, the opposite is true.

The AMR is calculated based on the BMR (basal metabolic rate) which is a measure of your calories burned at rest. The BMR takes height, weight, and gender into account to “guestimate” the number of calories required for basic functions like blinking, breathing, and thinking. The AMR then tweaks this number based on how active you are throughout the day. You can find plenty of calculators online that will produce this number for you. Alternatively, you can use a fitness tracker.

However, it is also important to consume the necessary amount of protein if you wish to add muscle. Protein is made from amino acids, which are in turn used to construct muscle tissue. The International Olympic Committee Consensus on Sports Nutrition states “strength or speed athletes require 1.7grams of protein per kg of bodyweight per day.” It’s also important for athletes to consume adequate amounts of carbohydrates and fats to maintain energy and hormone levels. Whereas protein and carbs contain 4 calories per gram, fat contains 9 calories.

To this end, many people diligently calculate their caloric intake, while also keeping their macronutrient requirements in mind. This is referred to as “tracking macros.” The easiest way to do this, is to use an app like *MyFitnessPal* which will allow you to scan barcodes and look up popular meals. Food packaging should also provide the required information. I personally find that constantly tracking calories is a little too mind-numbingly dull, so my solution is to eat very consistent breakfasts and lunches. I have a selection of around 3 breakfasts and 10 lunches that I stick to, each of which I know the rough calories for. I try to avoid snacking in between. By the evening, I know that I am significantly under my calorie limit, which gives me free reign to eat a lot more! Consistency and routine can be powerful allies when it comes to dieting.

Simply tracking macros is effective for most people interested in “body recomposition.” However, it is also limited in some circumstances. Firstly, tracking macros alone does not account for micronutrients. Getting enough vitamin C, magnesium, calcium, omega 3, potassium etc. can be the difference between optimal performance and recovery or slowly falling apart. Micronutrients like these are used for countless jobs throughout the body, from producing enzymes and neurotransmitters, to building bone and strengthening contractions.

It’s also important to *avoid* those foods that are very destructive. This generally means avoiding overly processed snacks and empty calories. Spiking your blood sugar repeatedly with chocolate bars and chips while supply nothing in the way of useful materials can do a number on your health and performance. The quality of protein sources will have a big impact on the bioavailability and variety of amino acids you have to work with.

Likewise, calculating an AMR will tell you nothing about a person’s metabolism or hormone balance. As with all aspects of fitness (and probably life), people have a tendency to get tribal and defensive when it comes to counting calories. You will hear claims that counting calories is the “only way” to lose weight, that it is infallible due to the law of conservation, and that failure to lose weight using this method is the fault of the individual.

This is overly simplistic. It is true that you can’t gain weight on a calorie deficit, that is indeed simple math. But what the die-hard advocates forget, is that the AMR is a very rough calculation that misses out a LOT of crucial factors.

Two people the same height, weight, age, and gender, may very well have completely different metabolic rates. If you don't believe that this is the case, just consider how anabolic steroids affect someone's ability to build muscle and burn fat. To a lesser extent, certain oral contraceptives can also have a big impact. Likewise, someone with hypothyroidism is also going to burn calories at a *significantly* lower rate.

None of these things would be reflected in an AMR. And while none of them might be true for you, the fact is that we all have very different chemical makeups.

Tracking macros and calories is still the best starting point for someone hoping to change their physique, or to fuel a new functional training regime. But it's important not to get hung up on this as the whole story.

If you aren't seeing the results you want from your diet, then you may want to consider alternative approaches such as paleo, intermittent fasting, keto, or low carb. Many people swear by these options and you might just find that one of them works well for you.

Likewise, you should consider your micronutrients and look for any potential deficiencies that might be holding you back. Consider using blood tests, or making a trip to your physician–there just may be an underlying medical issue that is preventing you from performing and looking your best.

And again, consider how outside factors such as your training (too much or too little), sleep, exposure to sunlight, and stress levels could be impacting on your hormones.

Conclusions

Congratulations on making it this far! I know this was a dense and science/theory heavy text. However, I hope it has given you some background as to why I have suggested the training methods and protocols in the Protean Performance System. This program represents the sum of my own research and training over the past ten years. In that time I have gained multiple qualifications, read hundreds of books, experimented on myself, trained many others, and learned from some fascinating and extremely knowledgeable individuals.

Since writing the first SuperFunctional Training, almost two years ago, I have not only gained more knowledge, but also more experience in training others. I have responded to feedback from the *thousands* of people who followed that program and refined this one to make it simpler, more fun, and easier-to-follow. I have cut away a little of the fat and focussed on what made the most tangible benefits for people. I have come to terms with some sacrifices that had to be made: I have removed elements that were there due to expectations from others, rather than being genuinely useful.

This program is not only far easier to follow, but far more efficient. The results come faster and with greater effect.

I have been using this program myself (with some necessary variation owing to running the Bioneer channel) and I have seen the results. I was already training regularly, but over the last year I have noticed myself feel more confident in my movements. I have regained lost skills. I have become sharper and wittier. I perform better in computer games, when driving, when playing sports, and when learning new movement patterns. I am faster, I can jump higher than I could in my teens, and I have more energy, and mobility. On top of this, I look more ripped, especially in my core.

In honesty, it's the increased mobility that has had the most profound effect on me. Regularly putting my back out is a thing of the past. And handstands, pistols squats, and other advanced movements now come easier than ever.

Of course, I still have a lot of room for growth! Which is why I'll be continuing to follow this program, or some version of it, for a long time to come.

Stick with this program. Give it at least a few months and let me know about your own results. And remember: this is not set in stone. Everyone is different. These ideas should serve as a guideline. So adapt and change as you see fit. This is a process!

Thank you for supporting The Bioneer, and best of luck with your training!

Highly Recommended Further Reading

Functional Training and Beyond by Adam Sinicki – The philosophy and history that underpins the practical advice and theory in this package.

Functional Training by JC Santana – A luminary of functional training. One of the originals and one of the best texts on the topic.

Peak: The New Science of Athletic Performance That is Revolutionizing Sports – A fantastic overview of athletic training and human performance optimization.

Bruce Lee: The Art of Expressing the Human Body – Bruce Lee's notes on training. Incredibly ahead of his time, featuring overcoming isometrics, HIIT, metcon, and more.

Overcoming Gravity by Steven Low – THE book on calisthenics. You will learn so much about your core and other aspects of gymnastic strength that it will completely change the way you perform *every* movement.

Anatomy Trains by Tom Myers – The most comprehensive/important text on fascia as it applies to training and health. A lot of this is theoretical, but it opens up some fascinating areas for further research and discussion.

Ultimate Back Fitness and Performance by Stuart McGill – One of the best books discussing the musculature of the back and how to train it for less pain and better performance. McGill preaches a little more caution than I personally believe is necessary (writing off movements that have been practiced for thousands of years) but there is LOT to like in here.

Knee Ability Zero by Ben Patrick – Ben inspired a number of inclusions in this program. His training has helped countless people restore full knee function and even gain pro-athlete levels of performance. This book is a very gentle introduction to that.

The NEW Encyclopedia of Modern Bodybuilding by Arnold Schwarzenegger – Bodybuilding has more in common with functional training than many people realize. And many of these principles are fundamental to understanding hypertrophy and muscle growth. Also highly inspiring.

Conditioning for Dance by Eric Franklin – Don't let the target audience put you off: this is a hidden gem of a text for those serious about human performance.

Beyond Training by Ben Greenfield – A great biohacking book (a dirty word, but a good book!) and one of the most interesting and useful texts if you want more on endurance training.

The Brain That Changes Itself by Norman Doidge – Despite a bias toward psychotherapy that many would disagree with, this book is otherwise one of the most interesting and impactful discussions on brain plasticity there is.

Convict Conditioning by Paul Wade – A great book and building functional and powerful performance, without the gym.

Disclaimer: This book and program are intended for education and entertainment. Please check with a physician before beginning any new training program, and proceed with caution.

Other than that… enjoy!