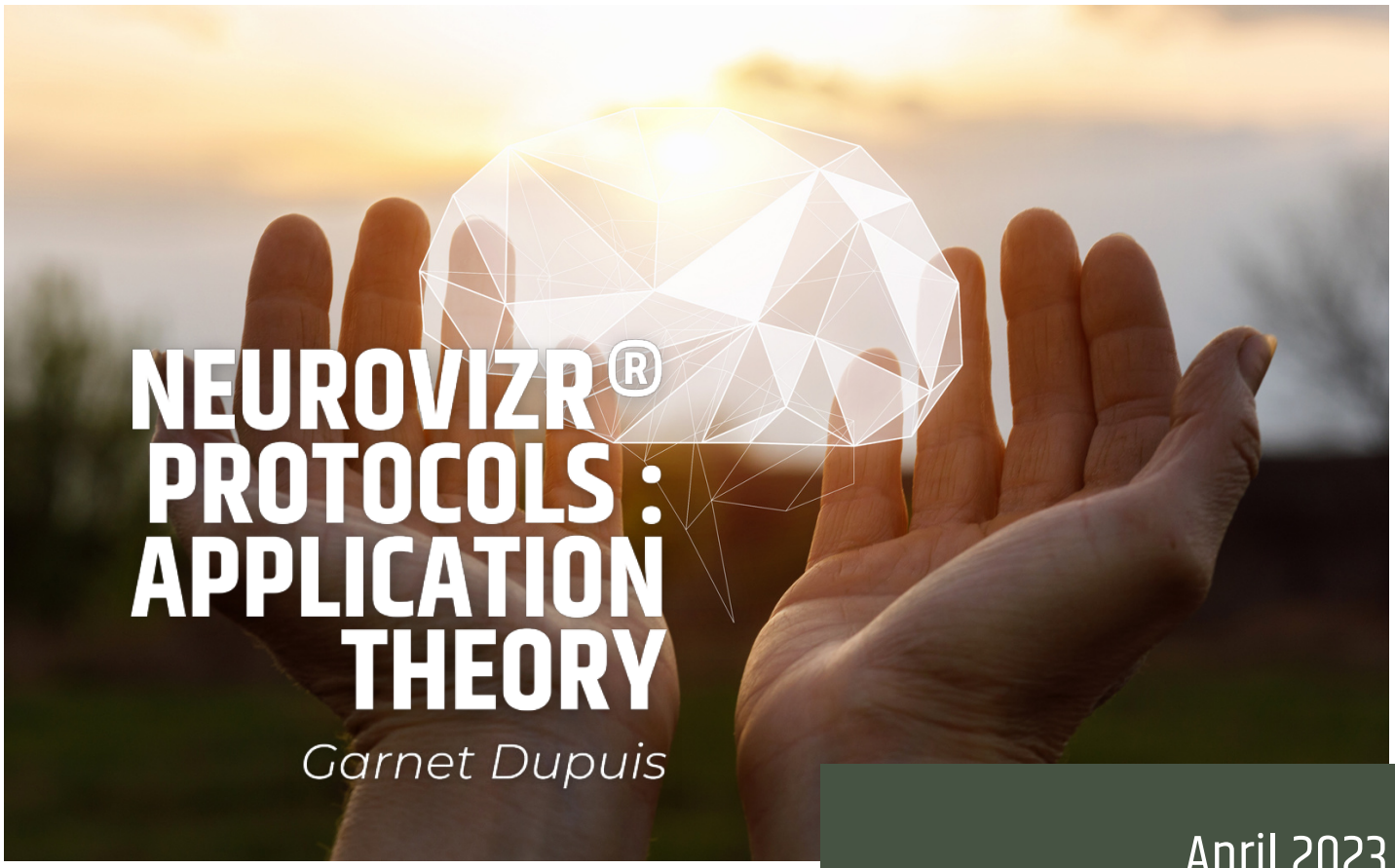
neurovizr®



# NEUROVIZR® PROTOCOLS : APPLICATION THEORY

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## THE VALUE OF THEORY:

This document examines the theoretical principles underlying the dynamics that permit the development of protocols. Combining these theories with the General Information presented in the associated document yields deeper insights into the protocols themselves. If the protocols are approached simply "from the outside," there is a tendency to become too rigid and rule-bound, which will limit the ongoing discovery and adaptation of the protocols to real-life experience and feedback. It is probably best to consider the protocols more honestly as "recommendations" that can be used as essential guides while also being flexible enough to accept learning and possible modification over time.

Furthermore, I love learning, and learning is always best when shared. NeuroVizr® users that make positive discoveries are encouraged to share these discoveries. We are better when we are together in our learning.

## ABOUT EXPECTATIONS:

Adjusting expectations to match real probabilities is the first principle to incorporate into the development of a protocol. If the expectation of the outcome is overinflated or the timeline unrealistically short, even very good responses and results can be harshly assessed – not because of the outcome itself but rather because the expectation of the outcome was unrealistic. Even your "wins" can be mistaken as "failures."

## REMEMBER STATE & TRAIT:

Recall that a "state" is a short-term expression of some stimulation. The "state" change formally requires the activity of the stimulation. A "trait" is a long-term expression that results from sustained and reinforced stimulation over time. Once formed, the "trait" is self-generated and self-sustained and does not require the associated activity of the stimulation other than occasional positive reinforcement.

## ACHIEVE THE MOST WHILE DOING THE LEAST:

More is not better. Enough is enough. The approach in developing a protocol should be guided by the goal of the "minimum threshold to trigger an action"... and not pushing the system to its "level of maximum tolerance". Crossing the line of "maximum tolerance" typically results in a "kickback" in the evolution into adaptation. For example, in sports medicine/training protocols, constant heavy exertion leads to actual loss if not injury. Often training protocols within the week involve heavy days, easy days, and off/rest days. Because our brain is physical too, the lessons learned in somatic development can often be applied directly to brain training as well.

## THE HONEYMOON STATE:

Most types of stimulation generate a "honeymoon state" in which the body/mind appears to be affected positively by the stimulation. This "honeymoon state" can fool the user into thinking that they have "hit the therapeutic jackpot" when actually, the "honeymoon state" is simply a reactive metabolic up-regulation triggered by the new stimulation. The attractive positive state is likely due to the "novel" informational quality of the stimulation and not a specific therapeutically targeted solution to their condition. The "honeymoon state" typically fades within a short period of time with a return to normal psychological/metabolic regulation. "Love at first sight" absolutely does exist but, admittedly, it is rare.

## CAN YOU JUST HAVE FUN?

Admittedly, many NeuroVizr® users really enjoy their sessions. The saying that the NeuroVizr® is "brain exercise disguised as entertainment" has a lot of credibility based on the common feedback from users.

So, is there any problem in using the NeuroVizr® to "just have fun"? Basically, no – there is no problem at a simple level. Various sessions each have their own unique appeal, and your form of "fun" might be different than mine – but that's OK. There is some cautionary advice related to how much "fun" you can have at any given time.

More may not be better (I discovered that fact with chocolate cake a long while ago). Positive, "fun" short-term "state change" can be relieving and spark a smile. All good.

## HELP RIGHT NOW:

Another way of considering positive short-term "state change" could be called "Help Right Now." All of us sometimes find ourselves in an uncomfortable spot or mood. It may be for a good reason or strangely just grab us. Finding healthy ways to shift out of the mood makes a lot of sense. You don't get rewards for suffering unnecessarily.

A quick "time out" with the NeuroVizr® can be just the ticket.

- Choose a session that seems attractive and maybe connected to the mood shift you seek.
- Add in some Guided Breathing before and after to boost the state shift. You know the "state change" may not last all day – but then again, why not give it a shot. It's like stepping out of the heat and into a cool air-conditioned room (heh, I live in Thailand). What a relief!

## SHORT TERM NEUROPLASTIC STATE CHANGE - 4 STAGES:

There are four basic stages or steps that happen as the Brain as a Whole responds to Neuroplastic Change:

- Neuro-Stimulation (the "input reaction"); 0 - 2 hours
- Neuro-Modulation (the "reaction response"); 2 - 8 hours (8/2=4)
- Neuro-Relaxation (the "relief response"); 8 - 24 hours (24/8=3)
- Neuro-Differentiation (the "relief result") 24 - 48 hours (48/24=2)

Now let's break these down to better understand.

Neuro-Stimulation is like giving information/food to a hungry brain. It has an appetite and is hungry for the info/food because it is the way it can keep the learning going and solve the problem. It is mandatory for self-organization and adaptation. It triggers a mobilization of self-regulation and things immediately begin to improve even at this very early stage. Dr. Doidge thinks there needs to be some stimulus to revive brain circuits that have become dormant. Yummy!

Neuro-Modulation now kicks into gear, and all of the multiple Brain Networks have an improvement of functions. This decreases the super-sensitivities that have formed as the Brain has been lacking certain Adaptive responses. Perhaps most importantly, the Neuro-Modulation stage allows the Brain Stem "Reticular Activating System" (RAS) to "reset," which is wonderful because it means that the "arousal level" that was causing all those "super-sensitivities" to manifest gets "calmed down" and normalized (whew, that feels better:-). The brain can modulate its functioning - balancing excitation and inhibition. Dr. Doidge describes this as quieting a noisy brain and as improving the brain's "signal-to-noise ratio."

Neuro-Relaxation happens after the Neuro-Modulation does its work by re-setting the "arousal levels" and calming those "super-sensitivities." All the Brain Networks and associated circuits get to "Rest & Restore" themselves. Catching up on sleep is important for brain healing - in deep sleep, it's known that the brain undergoes a sort of cellular clean-up process. This is great because now the (#2 above) Neuro-Modulation activities get to keep at work by "flipping ON" many dormant circuits to engage in Movement, Mental, and Sensory Neuroplastic stimulating signals. The signals are made more potent at converting their "brain signals" into "mind messages."

It is only with corrected self-regulation via brain modulation, brain rest, and adequate energy restored that the brain rhythms can be restored. This is the stage when a person has the chance of overcoming the maladaptive learning involved in the Limbic Trauma Loop (aka PTSD) as well as other maladaptations.

Neuro-Differentiation is the resultant long-lasting stage when enduring positive learning can be integrated into the Stable State brain functioning. Now the new habits take charge. The recovered brain is now in a position to start re-learning lost functions. Any learning process involves neuroplastic change, as Dr. Doidge demonstrated in his first book, "The Brain That Changes Itself."

## IN SUMMARY :

**SUMMARY REVIEW - 4 Activation Phases:**

- INPUT creates a REACTION that triggers a mobilization of self-organization and adaptation.
- RESPONSE to the INPUT REACTION to "reset" the "arousal level" and balance excitation & inhibition.
- A RESPONSE of RELIEF permits "Rest & Restore" and a chance of overcoming the maladaptive learning.
- The RESULT of RELIEF allows new habits to begin to take charge.

**SUPER-SIMPLE SUMMARY REVIEW - 4 Activation Phases:**

- INPUT triggers adaptation (Stimulation)
- RESPONSE resets arousal levels (Modulation)
- RELIEF permits "Rest & Restore" (Relaxation)
- RESULT allows new habits (Differentiation)

## GOING FOR THE LONG GAME:

The goal of long-term "trait change" is obviously attractive and is supported by the science of neuroplastic potentials in the adult brain. Here, a planned strategy is required. Fortunately, there is a reasonable amount of information on the neurological change dynamics that can be used to create a reasonable journey from clusters of short-term state changes into prolonged development into long-term trait characteristics. The "Fire it to Wire it" principle acts reliably with regular stimulation and reinforcements.

## LONG TERM NEUROPLASTIC TRAIT CHANGE – 4 PHASES:

The long-term process involving neuroplasticity is regarded in four interrelated and overlapping stages. Please note that the first step in developing long-term trait change must begin with encounters in short-term state change. The four are:

**Functional Neuroplasticity:**

- Takes place in "moments" (seconds to minutes to hours);
- Preexisting under-functioning synaptic connections that already exist are aroused into higher levels of efficient function;
- Related physical neuronal pathways already exist;
- Anatomically, each neuron has upwards of 10,000 dendritic synaptic connections;
- Analogy: the routes and roads already exist but have not been used much for a period of time.

**Synaptic Neuroplasticity:**

- Takes place over days to weeks;
- New and different synaptic pathways are created to accommodate new demands;
- Related physical neuronal pathways already exist.
- Analogy: the roads already exist but new different routes are created using the same roads.

**Neuronal Neuroplasticity:**

- Takes place over months;
- New and different physical nerves (neurons) are created to allow the new synaptic connections and patterns.
- Analogy: for the new routes to be created, new roads must be built.

**Systemic Neuroplasticity:**

- Takes place over years;
- The new physical neurons and their evolving signal connections and pathways are integrated into all of the global systemic metabolic, adaptation, and self-regulatory aspects of the organism as a whole.
- Analogy: the new roads and routes are incorporated into the entire city transport system with adaptations in traffic flow and commuting patterns.

THE 'FIRE IT TO WIRE IT' PRINCIPLE ENSURES LONG-TERM RESULTS WITH REGULAR STIMULATION AND REINFORCEMENT.

## BRAIN PRIME & BRAIN TIME - MANAGING BRAIN CHANGE:

When working to develop NeuroVizr® protocols, the dynamic concept of Brain Prime & Brain Time provides an advanced perspective that illuminates the path in elegant designs. The Brain Prime stage is the triggering aspect of neuroplastic brain change. It precedes the second stage called Brain Time. Brain Time is the integration process that results from the triggers created by Brain Prime.

The Brain Prime stage is frequently referred to as Brain Priming. So, Brain Prime is the stage and Brain Priming is the action that takes place during that stage. In general terms, there are two types of "brain priming":

- Psychological Priming
- Physiological Priming.

Both are forms of "Brain Priming" while the psychological aims more for the cognitive aspects of memory and performance and the physiological more towards somatic processes. "Priming" is a type of implicit learning wherein a stimulus prompts a change in behavior. Priming, which may occur after a single learning episode, is a type of implicit learning.

"The general theory underlying priming is that the brain, which has been primed by a prior method of activation, is generally more responsive to the accompanying training. Priming presupposes that enhanced neural activity prior to or during training can facilitate the acquisition of long-term potentiation (LTP) or long-term depression (LTD)-like mechanisms."

The priming paradigms that are supported by the greatest amount of evidence are:

1. Energetic Stimulation – based (e.g., electromagnetic);
2. Motor Imagery – based (e.g., visualization/mental rehearsal);
3. Sensory – based (e.g., light/sound activations - NeuroVizr®);
4. Movement – based (e.g., pre-task no-load movements);
5. Pharmacological – based (e.g., ingested compounds).

The Light/Sound brain stimulation native to the NeuroVizr® is intended to elicit a Brain Priming effect. The Brain Engagement principle inherent in the experience acts to trigger basic neuroplastic responses in the brain that open the neurological "doors" to reshaping both behaviors and structures in the brain. Combinations of focused attention, marginal demand, and attractive subjective states act as positive "stressors" or "triggers" that induce a "readiness response" state in the brain that sets the stage for the resulting Brain Time dynamics.

Until the Brain Prime/Brain Time dynamic is appreciated, it seems counter-intuitive to state that the main neurological effect of the NeuroVizr® Light/Sound Experience actually begins when the Light/Sound ends. Obviously, the Brain Priming effects of the light/sound signaling are rich in immediate stimulation and satisfaction. By analogy, the attractive satisfaction of eating a delicious meal is easily evident; however, once the eating ends, the critical stage of digestion begins. Hence, the need to appreciate the relationship between Brain Prime and Brain Time.

The Brain Time stage follows and is a consequence of the Brain Prime stage described above. To put it very simply, if you do Brain Prime first – anything that follows works better.

The Brain Time dynamics have been studied and become better understood. Neurologically, the processes have been recognized as occurring in four sequential "Activation" phases. These Activation phases are: (see above for details)

1. Neuro-Stimulation (the "**input reaction**"); 0 - 2 hours
2. Neuro-Modulation (the "**reaction response**"); 2 - 8 hours
3. Neuro-Relaxation (the "**relief response**"); 8 - 24 hours
4. Neuro-Differentiation (the "**relief result**") 24 - 48 hours

One of the most intriguing aspects of the neurology of Brain Time is the evolving timeline of the Activation phases. In simplicity, the markers of 2 hours, 8 hours, 24 hours, and 48 hours jump out as a template for plotting the Brain Time interactions. It is apparent that the developing phases of the Brain Time Activation processes have a strong relationship to the natural Circadian cycle that acts to regulate neuroplastic integration. Consequently, we have four periods in which we can expect heightened communication and potential reinforcement of beneficial neuroplastic change or effect:

1. **0-2 hours** (the "Input Reaction" or Stimulation Phase)
2. **2-8 hours** (the "Reaction Response or Modulation Phase)
3. **8-24 hours** (the "Relief Response" or Relaxation Phase)
4. **24-48 hours** (the "Relief Result" or Differentiation Phase)

In each of these phases, there is an opportunity to more successfully "imprint" neuroplastic information. The most impressionable phase is the Stimulation phase in which the brain is highly sensitized to the information input. This Brain Time condition can be called "hyperplasticity" and is very pronounced in the immediate 1 to 2 hours following the initial Brain Prime stimulation.

The second Modulation phase (2 – 8 hours following the initial Brain Prime stimulation) is also a potent period for impressionable change because the vigilant "on guard" gates of arousal are softened and more accepting of possible change.

You can think of the following two phases (Relaxation, Differentiation) as sets of "rolling waves" of further maturing integration of the impressionable messaging that is introduced into the brain. Entering the "sleep cycle" within the normal biological Circadian Cycle is an important, if not critical element in beneficial neuroplastic change. Adequate restorative sleep is a key factor in maximizing the Brain Prime/Brain Time neuroplastic cascade of effects and is found in the third Activation phase of the "Relief Response/Relaxation". Each phase has its unique features (see above in the discussions and summaries) and will act to guide the brain into a thematic change derived from the specific messaging input.

To manage your brain change, understanding and applying the dynamics of Brain Prime and Brain Time is essential. Positive neuroplastic change in our adult brain is absolutely possible and requires an artful application of scientifically grounded methods. Using the NeuroVizr® Light/Sound as a powerful and reliable Brain Prime experience opens the doors of a long list of possible Brain Time techniques and applications. Essentially, anything you do in your Brain Time after a NeuroVizr® Brain Prime experience will work better. And that is good!

## WORKING WITH TRAUMA:

The NeuroVizr® can be used to help resolve the results of upsetting, challenging, and even traumatic experiences. It must be stressed that medical-level unprocessed trauma should be treated by qualified trained professionals. It is plausible that such a trained professional may successfully utilize the NeuroVizr® in the spectrum of their treatments. This does not mean that untrained and unqualified persons can easily use the NeuroVizr® in the same capacity. In this regard, we shall refer to medical trauma here as "Trauma" (with a "big" T) and common upsetting, challenging traumas as "trauma" (with a "small" t).

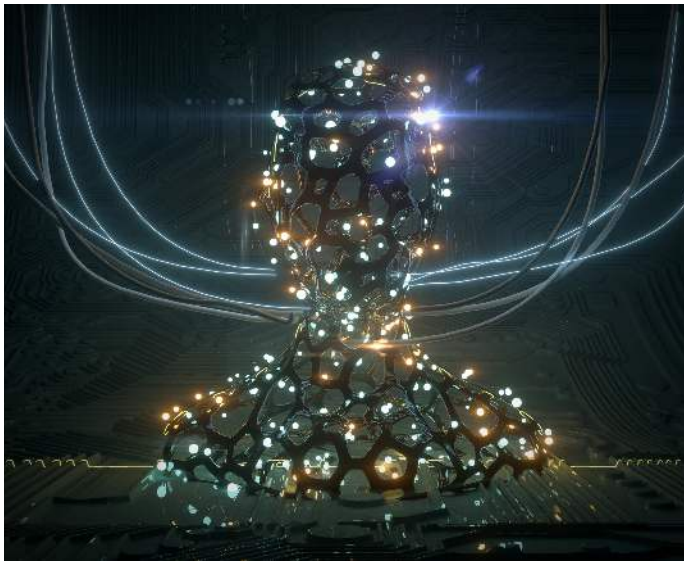
Specifically, in the Brain Optimizer collection, we have Brain Processor sessions (see the associated document entitled NeuroVizr® PROTOCOLS – General Information for details). These sessions have a direct relationship with the classic Eye Movement Desensitization & Reprocessing technique (EMDR).

Because the process is capable of unlocking unprocessed memories, it may also release painful emotions and sensations. This is a positive experience; however, it must be respected and guided, especially when the emotions and sensations are strong. This is where working with a professional has significant advantages.

With Trauma (and sometimes even with trauma), after a session, a person may have headaches, a "spaced-out" feeling, dizziness, tiredness, and exhaustion. Sometimes, symptoms of anxiety, anger, or depression may be pronounced for a day or two. As uncomfortable as they may be, they are considered positive indicators of the movement in reprocessing the "stuck" memories. Although the analogy is very loose, consider the recovery period immediately after strong physical exercise and also the day or two after when in the recovery stage of the strong exercise. It is possibly uncomfortable but not inherently negative.

In theory, if the NeuroVizr® "trauma" work is self-administered, the user should spend time either mentally reflecting upon the blockages they seek to unlock or, perhaps even take pen and paper and honestly list or describe their challenges, feelings, beliefs, and expectations. Also, now reflect on your present circumstances as honestly as possible. When working with a professional, that person will have their own preferred preparation processes.

If self-administered, find a safe and comfortable environment in which you feel secure and will not be surprised by others or unintentionally interfered. There is an effective neurological technique to self-calm if you feel anxious. It is sometimes called the "Butterfly Hug". Cross your arms and place each hand on the opposite shoulder – breathe slowly with an accent on a longer exhalation.



## WHEN CHANGING YOUR BRAIN MEANS CHANGING YOUR MIND:

We have a physical brain but mostly experience it as a subtle psychological "mind". Deciding to engage in neuroplastic brain change regarding mental attitudes and beliefs is a very promising adventure. Essentially, one arrives at a sobering realization – if you want things to be different, you are going to have to change. The change must come first, and the differences will follow – not the other way around.

The fundamental challenge here is your current attachment to your view of yourself, life, and reality itself. To quote the title of a book – "breaking the habit of being yourself" is the task. Here we have an advantage when using the NeuroVizr®. The NeuroVizr® can help shift your brain into more "open-minded" states in which the "glue" that holds your beliefs and attitudes in place is "softened". That is a massive benefit. (For a detailed explanation, see the paper entitled "Decoding the Entropic Brain").

From the exciting research of Carhart-Harris and Friston, we have the informative concept known by the acronym R.E.B.U.S. (Relaxing Existing Beliefs Using Psychedelics). The message here is that it is possible to make brain/mind change easier by first "relaxing" current "beliefs". This can also be thought of as "softening the glue of stuck neurological patterns".

Our brain has a normal capacity to experience uncommon or non-ordinary or altered states of consciousness. Simply because a state is "uncommon" does not make it "abnormal". Psychedelic compounds do not "cause" this capacity but rather permit access to it on a rather reliable basis. However, there are many other "agents" or methods that can also grant us access to this quality of brain activity, including various types of meditation, yogic practices, breathing techniques, extreme exertion, temperature, and even certain pathologies. The NeuroVizr® has the capacity to safely coax our brain into such non-ordinary states and assist in "relaxing existing beliefs".

Ironically, high levels of personal confidence and attitudes of "certainty" often act as obstructions to deep mental change and growth. The almost invisible layers of normally unconscious, untested, and unchallenged "certainty" stand stubbornly in the face of new learning and evolution in understanding. Here the "deep mind" constructs a fortress of "axioms" that are cemented into the structures of "The Mental Movie of Me" that has been playing over a lifetime. Recall that an "axiom" may be defined as a "self-evident proof that requires no proof". If that isn't a time bomb just waiting to explode, I don't know what is. (For details, please see the paper entitled How to Change a Brain that Resists Changing.)