

Understanding the Function & Formation of Memory and the Application of Neurolinguistic programming to Reduce Fears, Traumas and Phobias.

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This research is based on the idea that a link exists between memories and phobias, fears and traumas and mainly they can be reduced in one's life by manipulating negative memories, the encoding process, and by using NLP as a therapy and its techniques like the Swish Technique or the Visual-Kinesthetic Dissociation Technique to overcome and remove those very phobias, traumas and fears. Since memory and cognition form an important part of the individual's life because of the functions it performs the focus of this articles mainly lies surrounding this topic and how NLP can prove to be useful. The encoding process in the memory takes place through different representational systems that are a part of Neuro- Linguistic Programming (NLP). Since NLP lists visual, auditory, kinesthetic, olfactory and gustatory as a part of this system, an attempt is made to explain how through these systems and its sub modalities (finer distinctions of the representational system) memories are formed and how emotions play a role in determining the retrieval of a particular memory and how that in turn leads to the formation of phobias, irrational fears and traumas like the fear of heights, water, etc or a traumatic event like the death of a loved one due to a disease or accident and in order to achieve all of this secondary researches, data analyses and information tools were used.

Keywords: Memory, Phobias, Traumas, Emotion, NLP, Therapy, Modalities

Firstly, think about a vivid memory from your yesteryears that you cherish and at the same time think about what you had for dinner five weeks ago on Wednesday. In most of the cases the latter question will be difficult to answer. "Why should this absolutely God-given faculty retain so much better the events of yesterday than those of last year, and, best of all, those of an hour ago? Why should repeating an experience strengthen our recollection of it?" In this article we will get an answer to some of the most intriguing aspects of memory as well as some for the questions posed by William Jones (1890) in the above quote. Since the ability to learn serves as a key to survive in this

modern world, we as individuals cannot learn unless we remember. Therefore, memory serves as an important aspect to lay our focus on. To begin with, perhaps the best way to define memory is that it is an active system that receives information from the senses, puts that information into a usable form, organizes it as it stores it away, and then retrieves the information from storage. (Baddeley, 1996, 2003). So then the question that arises is that how are memories formed and why do we forget about some?

According to Dr. Catharine Young the numerous experiences that we go through in our daily lives is converted into a pulse of electrical energy that moves along a network of neurons to something which is known as the short term memory and from thereon to our long term memory (a relatively permanent information storage system) through the areas of the brain like the hippocampus and then ultimately to several storage regions across the brain. If two neurons communicate repeatedly, the efficiency of communication increases between them. This process called long term potentiation given by Terje Lomo (a Norwegian physiologist) is considered to be the mechanism by which memories are stored for a longer time.

This research was done by Anil Thomas and co-authored by Deepali Agarwal, Anaisha Sadri and Rochelle Dsouza. We thank Mrs Shazneen Limjerwala, mental health Specialist and Academic Consultant for her insightful comment on earlier drafts of this article. We gratefully acknowledge the support of Mr. Anil Thomas for the mentorship and support. Correspondence concerning this article should be addressed to E-mail: office@ijnpgp

Understanding the Function & Formation of Memory

To make this sound easier we'll illustrate the same biological process through an example. Suppose that you are introduced to a person and told their name. That afternoon you see them again, clearly, you have remembered their name but how exactly did you remember it? When you were introduced, you somehow entered the name into your memory; this is the encoding stage. You transformed a physical input corresponding to their spoken name into the kind of code or representation that your memory accepts, and you placed that representation in your memory. You likewise transformed another physical input, corresponding to their face, into a memory and you connected the two representations. Second, you retained or stored the information corresponding to their name and face during the time between the two meetings; this is the storage stage. Third, based on the stored representation of their face, you recognized them as someone you had met in the morning and, based on this recognition; you recovered their name from storage at the time of your second meeting. All of this is the retrieval stage. On that note how do some memories vanish or not get stored? Through the same example this process can be explained. Memory can fail at any of the three stages mentioned above. Had you been unable to recall their name at the second meeting, this could have reflected a failure in encoding (you didn't properly store their face to begin with), in storage (you forgot the name somewhere along the way), or retrieval (you didn't connect their name to their face in such a way that you could conjure up one from the other). Whenever the experience of some past event influences someone at a later time, the influence of the previous experience is a reflection of memory for that past event. This can be explained by the following example. You have seen thousands of coins in your lifetime. But let us reflect on how well you can remember a typical coin that you may have in your pocket. Take a few minutes to try to draw a coin of a particular denomination from memory. Now compare your drawing with the coin itself. How accurate was your memory for the coin? For instance, was the head facing the correct way? How many of the words from the coin did you recall? Researchers found that most people have very poor memories for very familiar things like coins. The key point here is that we tend to remember the information that is most salient and useful for us. For instance, we may be much better at recalling the typical size, dimensions or color of coins than the direction of the head or the text on the coin, because the size, dimensions or color may well be more relevant for us when we are using money (i.e. for the primary purpose of payment and exchange for which money was devised).

Memory tends to play a role whether or not we intend to learn. Mostly we keep performing the mundane tasks that we usually perform in our everyday lives. But if, in this everyday life, something salient or unusual happens then established physiological and psychological processes kick in, and we usually remember these events quite well. For example, most of

us have had the experience of forgetting where we left our car in a large parking lot but if we have an accident and damage our cars in the parking lot then specific 'fight or flight' mechanisms are initiated, ensuring that we typically remember such events (the location of our car) very well!

Different Memory Modalities

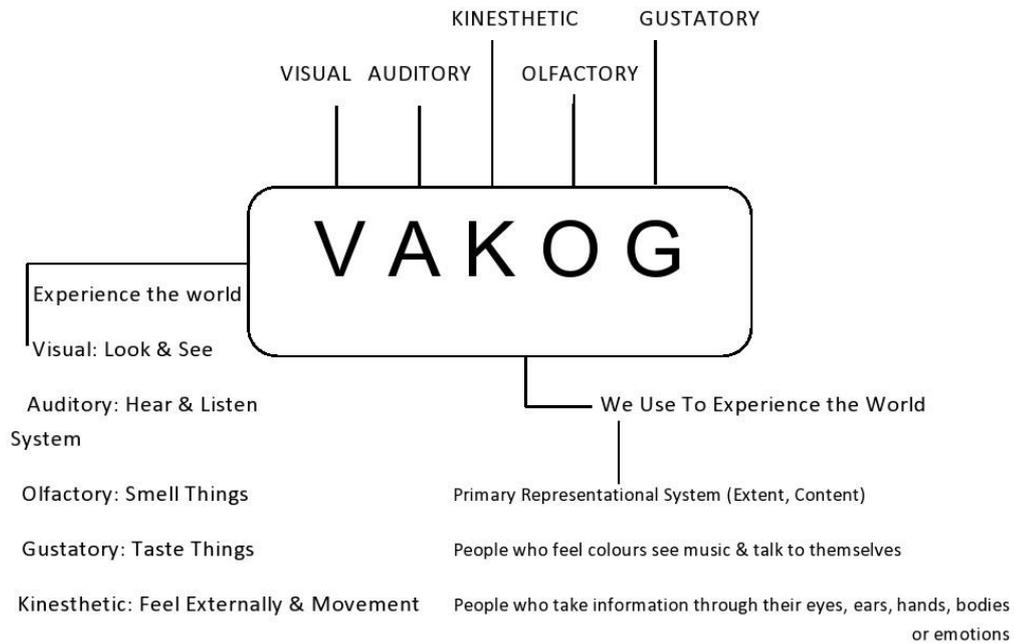
After having understood the different stages of memory, when a person tries to analyse how the memory that they encoded in the form of information comes to them as and when they want to recall or retrieve that particular piece of information, they are thinking about the different memory modalities that exist. Now, in order for memory to be formed, the first important step is to encode the information correctly. The numerous ways in which we take in information varies from person to person and these are called modalities in the context of memory. For example, suppose in a group setting, a question is asked that how does each one of them recall telephone numbers? Some of them will answer that they recall a number by the sound while others will say they recall it in script or print. Therefore, the most widely accepted modalities in memory are known by the acronym VAKOG: Visual (V), Auditory (A), Kinaesthetic (K), Olfactory (O) and Gustatory (G).

- **Visual:** Known to be the most widely used modality in NLP, a person with a preference for visual modality will encode information in the form of images mostly. They visualise in order to store and retain information. For example it is much easier for them to recall an image in their head when they have to retrieve information rather than to remember what someone said instead.
- **Auditory:** This modality consists of hearing and then reciting that information. The focus is more on the phonological aspect of communication. Example: Some people understand pieces of information better when they read it aloud or hear someone speak it aloud.
- **Kinaesthetic:** A person with this kind of modality encodes information through body language, gestures or expressions. Example: While studying for a test, the student walks back and forth to learn the material.
- **Olfactory:** These individuals take in information through the sense of smell. They connect a particular smell with a specific memory as that memory holds importance to them.
- **Gustatory:** This modality is known to be the least common out of all. It consists of encoding information by associating it with a particular taste.

Understanding the Function & Formation of Memory

Figure 1

Illustration of NLP Representational Systems



Note This Diagram represents the VAKOG model in NLP. The ways in which we encode information is mainly through five senses which are visual, auditory, kinesthetic, olfactory and gustatory.

Sub modalities and Memories

The finer distinctions or the subsets of modalities (also referred to as representational systems) mentioned above are known as sub modalities. They are the building blocks by which we code, order and give meaning to the experiences we have and basically the means through which we structure our experiences. Like how do you know what you believe in and what you do not believe in? You code two different kinds of beliefs in different sub modalities.

We then create meaning by using different sub modalities to code our experience. For example, we can distinguish between someone we like and someone we dislike because of this. Like when we set a goal, for example, the more attention we pay to the sub modalities and the finer our distinctions, the more clearly and creatively we can design our future. The following table with the help of examples will give you a better understanding of the concept of sub modalities:

Table 1
Sub modalities (finer distinctions) and its examples

Modality	Visual (sights and images)	Auditory
Examples of Sub modalities	<ul style="list-style-type: none"> • size of the image • distance and location: how close or far is it and where exactly is it located • brightness and colour: whether the image that they are visualising is colourful or black and white and as to how bright it is • movement: whether it is a still or moving image that they are seeing, etc. 	<ul style="list-style-type: none"> • whether the voice that they are hearing is that of one person or many • pitch • rhythm • clarity • tone of the voice • location that the voice is set in.

Understanding the Function & Formation of Memory

Modality	<i>Kinesthetic</i>	<i>Olfactory</i>	<i>Gustatory</i>
Examples of Sub modalities	<ul style="list-style-type: none"> • the texture on which the movement is taking place whether it is smooth or rough • the temperature: hot or cold • location of the movement • pressure • vibration 	<ul style="list-style-type: none"> • Consists of different types of smells. 	<ul style="list-style-type: none"> • Consists of the various different types of tastes.

Note: This table represents the finer distinctions or sub modalities of the representational systems (VAKOG) along with the examples of those very sub modalities that NLP uses in therapy and its various techniques.

Emotion and Memory

According to the Oxford Dictionary, emotion is defined as a strong feeling derived from one's circumstances, mood, or relationships with others. We, as human beings go through various emotional experiences that are important and critical as emotions modulate virtually every aspect of cognition. Everything that we perform as functions in our life encompasses different emotional states like, happiness, sadness, etc. and these very emotions in turn affect one's ability to encode, store as well as retrieve information. Thus, it is important for us to understand the link between emotion and memory. Emotions play a role in determining whether we can recall a stored memory at the time we try to revisit it. It appears that can lead us to create long lasting memories of the event. When we are led to experience feelings of delight, anger or other emotionally charged situations, vivid recollections are often more possible than during everyday situations in which we feel little or no emotional attachment to an event.

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Figure 2

Illustration of an Emotional Stroop Test Experiment

CANCER	PEACE	EVIL
REVENGE	HORROR	PICTURE
ANIMAL	HOUSE	DEATH
BEAUTY	TUMOUR	SADNESS
DANGER	LOVE	TEARS

Memory and Phobia, Fears & Trauma

After having learnt the connection between emotions and memory, we now move on to understand how memory and phobias, fears and trauma is linked.

“Memories of dangerous events are essential for individuals’ survival, but are potentially harmful and maladaptive when they cause excessive fear and anxiety”. Fear is considered to be a conscious state consisting of associative and non- associative components, caused by the exposure to real or imagined threats (Costanzi M, Cannas S, Saraulli D, Rossi-Arnaud C, Cestari V, 2011). Now the question is how does the brain form a "fear memory" that links a traumatic event to a particular situation? It is said that a

Understanding the Function & Formation of Memory

pair of researchers (Jun-Hyeong Cho and Woong Bin Kim) at the University of California, Riverside, have found an answer to this question. By using a mouse model, the study's lead author Jun Hyeong, said it has been hypothesized that fear memory is formed by strengthening the connections between the hippocampus which responds to a particular context and encodes it, and amygdala which triggers defensive behaviour, including fear responses. He then went on to explain that the human brain is capable of forming a fear memory associated with a situation and that in turn predicts that danger is highly adaptive and then as a result individuals finally avoid those dangerous situations in the future. For example, imagine you had a car accident in a particular place and got severely injured. You would then feel afraid of that incident or sometimes also of a similar place/location like that even long after you've recovered from the physical injury, this is because our brains form a memory that associates the car accident with the situation where we experienced the trauma.

This associative memory makes us feel afraid and we avoid such threatening situations in the future. According to Cho, during such incidents, the brain processes a set of multisensory circumstances around the traumatic event, such as visual information about the place, auditory information such as a crash sound, and smells of burning materials from damaged cars and the brain then integrates these sensory signals and forms a memory that associates the traumatic event with the context.

Moving onto Phobias next, they are extreme and persistent fears of certain objects, situations, activities, or persons. Like acrophobia, is the fear of heights, hemophobia, is the fear of blood, etc. Studies show that the amygdala is critical for encoding and storing associations between harmful and neutral stimuli, and that stress hormones and mediators such as cortisol and norepinephrine play an important role in the formation of threat associations. For example, after getting burned on a hot stove, a child will most likely not go near a stove or even try and operate it in order to avoid the harmful heat and pain that they experienced earlier. Similarly, by this process phobias are formed.

A Pilot Study was conducted to display the link between Memories and Phobias

It said individuals with social phobia often reported experiencing negative, distorted images when in social situations. In their negative images they tend to see their worst fears being realized. Individuals with a fear of blushing, for example, may have images in which their face predominates and appears much larger and more flushed than it actually is. Clinically, such images appear to be problematic for a number of reasons. First, patients often believe that their negative

images are an accurate reflection of how they appear to other people. They therefore think they come across much worse than they actually do, which tends to maintain their social anxiety. Second, the negative self-images seem to motivate patients to use self-protective strategies that are themselves problematic, such as covering one's face to hide a blush. Such behaviours prevent patients from disconfirming their fears (Salkovskis, 1991) and may also have the consequence of contaminating the social interaction by making patients appear unfriendly and aloof (Clark & Wells, 1995; Rapee & Heimberg, 1997). The study was a preliminary attempt to identify whether imagery with re-scripting focusing on early memories would generally be helpful in social phobia if given to an unselected group of patients in a tightly controlled fashion. Thus, this in turn showed that a link exists in between memory and phobias and many need to be treated to overcome these fears. The results suggest that re-scripting unpleasant memories linked to negative self-images may be a useful adjunct in the treatment of social phobia.

Lastly, Traumatic memories can be formed after an experience boosts stress hormone levels and emotional arousal levels. Various researches have shown how memory capacity, and memory processes that are affected by traumatic events could transition to the development of many disorders, thus showing how the brain shapes a traumatic memory by linking it to a particular situation that predicts danger or harm. It is believed that traumatic memories are conditioned threat responses. Example: For the survivor of a bike accident, the sight of a fast approaching truck resembling the one that crashed into their bike at the time of the accident may instil fear and anxiety in them instantly just by the mere sight of the truck. These responses are initiated regardless of whether they come with conscious recollections of trauma or not.

About NLP and How It Works

“Neuro-linguistic programming is a way of changing someone's thoughts and behaviours to help achieve desired outcomes for them.” It was developed in the 1970s at the University of California, Santa Cruz and its primary founders were John Grinder, a linguist and Richard Bandler, an information scientist and mathematician. From there on the popularity NLP has increased with each passing day. Among its many uses it is also used in the treatment of phobias, anxiety disorders, etc. To form a wholesome understanding of it, it is a psychological approach that involves analyzing strategies used by successful individuals and applying them to reach a personal goal. It relates thoughts, language, and patterns of behaviour learned through experience to specific outcomes. Proponents of NLP assume all human action is positive. Therefore, if a plan

Understanding the Function & Formation of Memory

fails or the unexpected happens, the experience is neither good nor bad it simply presents more useful information. Modelling, action, and effective communication are some of the key elements of NLP. Often certain behaviours protrude from some of our self-limiting beliefs which induce negativity in us. NLP techniques take a deeper look at changing the beliefs while understanding its negative implications. For example, a belief can stem from a negative statement that you've repeatedly said in your head over time: "I can't acquire the skill of dancing", "I can never cook". NLP presuppositions are a way to bring about useful changes by demystifying and replacing these beliefs. The belief is that if an individual can understand how another person accomplishes a task, the process may be copied and communicated to others so they too can accomplish the task. Advocates of this school of thought believe the senses are vital for processing available information and that the body and mind influence each other. Therefore, if a person wants to understand an action, they must perform that same action to learn from the experience. There are natural hierarchies of learning, communication, and change. The six logical levels of change are:

Purpose: This can be an involvement into something larger than oneself, such as religion, ethics, etc. This is the highest level of change.

Identity: It is the person you perceive yourself to be and includes responsibilities and the roles that you play.

Beliefs: These are your personal belief systems and the issues that matter to you.

Capabilities: Consists of your abilities and what you can offer as an individual to the world.

Behaviours: The specific actions you perform.

Environment: It is the setting/space you live in, including the people around you. This is the lowest level of change.

The purpose of each logical level is to organize and direct the information below it. According to the NLP theory making a change in a higher level will result in changes in the lower levels. During therapy the subject goes deep into their unconscious mind and sifts through layers of beliefs and perceptions to become aware of an experience in early childhood that is responsible for a behavior pattern.

Case Study on How NLP can be used to reduce fears, traumas and phobias

A war veteran overcame the severe flashbacks and panic attacks he suffered for 20 years after a horrifically traumatising experience during his service in the navy through NLP. Ken was a 49 year old Falklands veteran who experienced three terrifying events. A missile hit HMS Antelope and 24 hours later it exploded. Ken had to pull bodies out of the water as he was helping to get his colleagues off the ship. Before taking therapy (NLP) Ken rated his wellbeing, as a result of these events, as 5 out of a possible 50. 7 to 10 days later he said, "The memories don't seem to bother me anymore. I'm not fearful. I've had 20 years of a wasted life. I feel joyful". The question is how did such a magical yet surprising transformation take place in such a short time span? The answer to this lies in the fact that although Keith was trained and experienced in using the debriefing model it was only when he learned the rewind technique that he realised trauma could be treated both quickly and reliably. The rewind technique, also known as the fast phobia cure, evolved from the technique developed by Bandler. Simply, the technique works by allowing the traumatised individual, whilst in a safe relaxed state, to reprocess the traumatic memory so that it becomes stored as an ordinary, albeit unpleasant memory rather than one that continually activates a terror response. This is achieved by enabling the memory to be shifted in the brain from the amygdala to the neocortex. The amygdala's role is to alert us to danger and stimulate the body's reaction. Normally, all initial sensations associated with a threatening experience are passed to the amygdala which in turn is passed on to the hippocampus and from there to the neocortex where it is translated into a verbal or narrative memory and stored. When an event appears however, there can be sudden information overload and the sensory memories stay trapped in the amygdala, where the trauma memory has no identifiable meaning instead of being passed on. It can only be re-experienced in some sensory form, such as panic attacks or flashbacks. Therefore the rewind technique allows that sensory memory to be converted into narrative, and be put into perspective.

Some of the techniques used in NLP

About the Swish Technique

Imagine a person who walks into a therapy room with a bad habit they have had for years and have struggled to get rid of it. After the session they walk out of the room completely energised and never indulge in that habit again. This is the power that this technique holds for many and it has worked as some kind of magic. Known to be a classic NLP technique it proves to be one of the most useful techniques to help people overcome automatic habits that are hard to let go. Compulsive or obsessive behaviours like Smoking, nail-

Understanding the Function & Formation of Memory

biting, overeating, etc are few of the many swish-able problems. In this the person addresses an unwanted behaviour response to a specific stimulus by changing key sub modalities as these habits are often linked with a trigger or cue image. Once we understand the structure of our thoughts and feelings, we can change that structure. The transformation happens during the swish pattern technique when the client realizes that becoming the person they want to be is worth letting go of the bad habit.

To sum it up one must be able to see themselves as happier, healthier, and much better off individuals without their bad habits

Through a Case Study we will show you how the Swish and Anchoring Technique in NLP is used to overcome anxiety, stress and depression:

These techniques were used by the author (Pummy Sheoran, 2016) for the treatment of a 24 year old female client, over a 5 weeks period. A significant reduction in anxiety and depression symptoms through both objective testing and subjective reporting indicated that NLP techniques are effective in treating guilt induced anxiety, depression and stress. The findings demonstrate that the NLP based techniques offer quick and effective interventions.

Relaxation Anchoring: The author showed the client how to stop tightening muscle groups, to pay attention to the out-breath rather than the in-breath and to orient towards enjoyable internal imagery. This technique helped the twenty four year old female client to achieve relaxation of mind as well as body.

Swish Pattern: The client reported that she got depressed by hearing an unknown voice on the left hand side, telling her that she was a sinner and that her mistake was unpardonable. The swish involved this voice fading away into the distance, as her own voice, powerful and affirming, came in telling her more rational beliefs, like, "Mistakes happen. Nobody is perfect." Repeating this swish several times during the session resulted in lowering the guilt she had attached to her mistake.

About the Visual-Kinaesthetic Dissociation

V-K dissociation is a hypnotic technique which involves the person separating or dissociating the observing ego from the experiencing ego (Fromm, 1965). This technique is extremely useful for helping people overcome or comes to terms with past trauma. It does this through separating (dissociating) mental pictures (Visual) and their associated feelings (Kinesthetic). During the procedure, the patient is encouraged to find a special place (Callow, 2003) in order to relax. The patient is then encouraged to

imagine watching themselves in the original trauma in a safe environment. This can be done by looking out of the window, etc. Often, it is a good idea to encourage the patient to reframe the scene so that they are in a comfortable position. The colours, shapes and images that are elicited by the patient can also be changed: this provides the patient with more control of the setting. By this they are establishing a dissociated perspective, and that as a result is then guiding the traumatised person to reprocess the traumatic memory so that they are able to update the meaning that their unconscious mind equates with that experience in present time. The reprogramming effect of this technique integrates new perspectives that results in the individual's nervous system no longer triggering the unnecessary activation of the 'fight or flight' reaction

Conclusion

Thus, to conclude we can answer a number of questions about memory through this article like can phobias and fears be reduced by manipulating negative memories of those phobias and fears or can the encoding process be manipulated if the person's psychological issue is not severe and many more by understanding how memory functions, what are the underlying processes and by relying on a range of techniques that NLP has to offer.

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Understanding the Function & Formation of Memory