**THE PROCESS AND TRANSFORMATIONAL MECHANISM OF IMITATION**

**From Chaos to Structure, Free-Will and Creativity:**

**A Neuropsychoanalytic Viewpoint**

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Ph.D. Thesis

Submitted to the Senate of Bar Ilan University

Ramat Gan, Israel December 2022

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HEBREW ABSTRACT……………………………………………………………………...א

ABSTRACT

The last century has seen substantial research on imitation, though the vast bulk of this has focused on the concept of imitation as a primitive reflex which appears immediately after birth and disappears soon later. This research project will focus on the mechanism and process of imitation as it will be regarded a primary mechanism in development. This semantic difference means that this mechanism which appears as early as the baby is born, will appear later in life for different functions and forms.

This research will look at the mechanism of imitation, appearing in the young child and fetal brain. There is continuity of neuronal functions from prenatal to postnatal life.

Contemporary knowledge indicates continuity in the development of instincts as well and supports the concept of genetic memory. Primary reflexes are shut up while in uterus, and appear immediately in pre-terms babies. The fetus grows in the mother's womb with the congenital instincts, the womb will be referred here as the "evolutionary environment" for purposes of this study.

This multidisciplinary thesis will consider and review different theoretical aspects of the Imitation mechanism. It will speak about philosophical aspects, evolutionary, epigenetic, physical and physics of this phenomena. It will research the clinical aspects and finally it will discuss other scientific research disputes concerning the definition of imitation and will suggest future research plans.

Memory traces open the road to collect and borrow structures from the world to build an inner model. The seven emotional systems drive predictions towards achieving their goals. Life is full of surprises, and what we predict might not always achieves its goal, and may reside with an unfulfilled emotional pain, pain which we call free energy. There are prediction errors, meaning that the free energy should be bound, to reach precision. In order to reach precision, we meet surprises by what is known as "working through" in our clinical practice which will be regarded in this research thesis - the borrowed structures moving repeatedly into precision. This is done by imitating structures, repeating while finding, novelty, meaning new aspects of the structure until we get to a new, creative conscious solution, which will become our next homeostatic state.

The mechanism of imitation found in early development is evolutionary and automatic. This mechanism did not receive the proper attention in psychoanalysis. It is fundamental to drive, growth, learning, and the creation of our mental life. This mechanism appears in primates and humans from the first hours of life. It is evolutionary, implicit, and repetitive. The reaction towards this mechanism evolved from devaluation, considering it a copycat, to overvaluation by Freud, who believed it is a mechanism used by charismatic leaders. It works very fast, and in that way, it is suggestive.

Freud saw imitation as dangerous to humanity**,** because of the tendency of the masses to blindly follow charismatic leaders. Baldwin claimed that imitation affects the modality of the senses, meaning it exists between the various senses. Jaak Panksepp said that the immediacy with which sudden visual and auditory stimuli can startle and frighten us, especially when such stimuli originate very close to our bodies, suggests a deep primal integration of these sensory systems with some of our most essential affective survival mechanisms.

This research will present the evolutional aspects of the mechanism, and will indicate its influence on the neurodevelopment of drives; it will show how it is part of the SEEKING system, the primary emotional system, searching for novelty, system of the brain as defined by Prof. Jaak Panksepp.

It will indicate how it is the sine qua non of creativity. As nothing comes out of nothing, everything comes from something.

Recognition of the fetal and infant brain opens the opportunity to understand primary reflexes which were mistakenly described by Sherrington as primitive. This semantic mistake left out their importance as an early mechanism for learning and adopting structures from the world, eliminating their meaning and significance.

Following an introduction and definition of the mechanism, including overview of current literature chapter three will discuss the epigenetic importance of the mechanism. Chapter four will explain its place among other internalizations mechanisms.

At the next chapter (chapter five), explanation of the brain system influencing this mechanism, the physical the physics with which the predictive brain is working. The sixth chapter will present the relation and importance of imitation to the neuropsychoanalytic clinic. The seventh chapter will offer current research work. It will indicate a dispute between researchers of imitation. Both researchers contribute to the understanding of different aspects of the mechanism whether it is the group who accepts the tongue protrusion in the just born baby, or whether it is the group who insist on the idea that imitation is part of repetitive typical movements, which are common in development. Both touch the two sides which this research project will take forward. Stating the imitation, is primary, evolutionary, non-declarative, repetitive in its nature, repetition that grows into new accurate development of a new creative concepts. It appears in the inner world, interpretational, and is happening is relation with the outer world (contagion). It is involved with each of the emotional systems of the brain and take a different path as it evolves.

At the end there will be an offer to further develop new research projects introducing more aspects of imitation which will help indicating his primary importance and functions.

# THE MECHANISM OF IMITATION

Whether newborns have the ability to imitate – that is, to voluntarily reproduce the behaviors of another (Jones, 2009) – has been studied extensively in infant psychology for the last three decades. The empirical evidence for the existence imitation in newborns is mixed. Alongside many published studies reporting that newborns can imitate a range of gestures (e.g., Field et al., 1982; Meltzoff & Moore, 1977), there are other reports of newborns only imitating one gesture, that of tongue protrusion (Anisfeld, 1996; Anisfeld et al., 2001; Heimann et al., 1989; Jones, 1996, 2006), and still others that fail to find evidence that newborns imitate at all (Hayes & Watson, 1981; McKenzie & Over, 1983). Oostenbroek et al. (2013) summarize the theories regarding imitation in newborn and Three theories have been offered to explain imitation in newborns. (1) neonatal imitation is an act of social communication mediated through an abstract representational system (Meltzoff, 1977, 1997); (2) the phenomenon is actually an involuntary, inborn reflex limited to tongue protrusion (Abravanel & Sigafoos, 1984; Anisfeld, 1996; Jacobson, 1979); and (3) imitation in newborns is a product of arousal (Jones, 1996, 2006).

The aim of the present study was to examine the emotional mechanism of imitation and position it within the space between automatic imitation and creativity/innovation. Its appearance in early development has not been previously investigated, in the manner offered in this paper, nor applied in analytical theory. This paper offers a neuropsychoanalytical approach to the concepts of imitation and creativity. It will look at their function in development, sources in the brain, complexity and contribution to creativity. I will also put forward proposals for application in the therapeutic framework.

## The Dispute Around the Imitative Phenomena

Meltzoff and Moore (1977) showed that at 3 weeks old, infants mimicked tongue protraction, mouth opening and lips protraction. Based on their findings, they argued that imitation is a fundamental learning mechanism. Indeed, evidence showed that babies use imitating to learn skills (Yang et al., 2010), as well as social interactions and the way we behave (Nadal & Fontaine, 1989) before they use language. Meltzoff and Moore (1977) further argued that infants must have a common supra-modal system of action representation, one that converts the neonate’s visual representations of observed action into proprioceptive space and thereafter, from proprioceptive space into motor commands. This hypothesis became known as the theory of active intermodal matching (AIM) which Meltzoff and Moore (1983; 1985; 1989; 1992; 1994) subsequently refined with further experiments. According to their theory, neonatal imitation is (a) generative (displaying both variety and novelty); (b) self-correcting (aiming at an accurate performance); (c) specific to occurring movement such as the duration of the gesture (not simply the activated “organ”) ; and (d) temporally flexible (executed by memory after a delay and in the absence of any stimulus).

Contrary to Meltzoff and Moore, Keven and Akins (2017) focused on tongue protraction and argued that it is a sequence of gestures that undergo a kind of evolutionary maturation process. This, they argue, consists of the acquisition of tongue control, the integration of the central pattern generator for tongue protrusion with other aero digestive central pattern generators, and the formation of connections within the cortical maps of somatosensory area 1 and motor area 1. If correct, orofacial stereotypies are crucial to the maturation of aerodigestion in the neonatal period but also unlikely to co-occur with imitative behavior. They argue that this explanation can also be valid for other behavior Meltzoff and Moore (1977) showed.

By the time the infants are three months old they move on to other forms of social interaction such as gaze sharing and vocalization and, thus, no longer finds the imitation of basic facial gestures socially useful. Similarly, Keven and Atkins (2017) argued that imitation is a by-product of normal aerodigestive stereotypes, a set of rhythmic motor sequences that emerge as the first structured behaviors in human/mammalian gestation.

In this paper I am going to indicate in the following chapters that what these observations describe does not conflict with our perception of imitation. I will provide an explanation of basic reflexes; I will define the mechanism as implicit and I will argue that it is produced by the SEEKING system.

There must be a systematic explanation of how the neonatal brain recognizes specific gestures and selects the relevant neural pattern by means of resonance. To imitate the infant must have a systematic means by which this arbitrary visual input matches the proprioceptive feedback, which is produced by that repetitive stereotypy, using the concepts of oscillators and control systems. This kind of processing demands the involvement of a higher order brain structures. More research is needed in order to understand why infants orient themselves towards the face of the model, watch intently as the model poses, and then produce general movements in response to that neutral face.

It might be suggested that the infant turns towards the model’s face as a result of motion, novelty, or as a result of the orientation biases of visual cells in the Superior Colliculus (SC) (Johnson, 2015). When the model switches from TP/R to a neutral expression – or what amounts to a still face for the infant – the inhibition of aerodigestive response ceases, and a rudimentary form of turn taking in the neonate suppresses general movements as a class is activated. This is the kind of explanation that dovetails with models of early learning for gaze-following, emotional expression, facial recognition (of the mother’s face), and categorical perception (seeing faces as a special kind of object).

The prominent SEEKING system (Panksepp, 1998, 1998) was mentioned as the proper mechanism of "looking for novelty". It is the system which does not attach to an object so that it is free to look for novelties absorbing them and moving forward to new ones in kind of repetitive way. Panksepp (1998) describes the SEEKING system, as one of seven major emotional pathways in the brain that are an integral part of the will to live and the desire and zeal for investigation and understanding. He considers this a primary energetic and automatic system deriving from the survival instinct. This system is also known as the reward system.

Keven and Akins (2017) argued that tongue protrusion is stereotypy, one of the many rhythmic movements that appear before and after birth, which are neither goal oriented nor triggered by specific stimuli. Yet despite their apparent “aimlessness,” the ubiquity of stereotypies in mammalian development suggests that they constitute a functional stage in sensorimotor development. Thelen (1981) suggested that rhythmic stereotypies “bridge the gap” between disorganized and goal-directed behaviors, that they form a “substrate” for the directed behaviors to follow. Recent work on activity-dependent development suggests an answer that aligns with Thelen’s view: Rhythmic movements, such as TP/R, drive a series of activity-dependent neurodevelopmental events. These same repetitive movements appear in various places, beginning with the jerky movements after birth, the heartbeat, breathing and end with the preselection of the digestive tract. All these vital systems move repeatedly. In the respiratory system, this repeated movement is expressed by the protrusion of the tongue.

According to Lakin and Chartrand (2003) mimicry behaviors emerge in typical development when neonatal imitation behaviors are disappearing. They appear while the infant is acquiring cortical motor control but the actions are still non-intentional, and non-goal directed. on this stage, actions are triggered by a specific stimulus, not by general arousal. Even when involuntary, mimicry behaviors do also form a substrate for the directed behaviors to follow, and they have a clear social function.

Fairbairn (1946) argued that humans create a mental structure of their selves and others. The subject, is the mental representation of the self, whereas the object is a condensed appearance of the person with which attachment relation is happening. Therefore, when we think, for example of the mother as the object, we intend to say that the mother have a smell, a voice, a rhythm, her history comes out of her behavior, the culture she grew in is seen and appreciated from the way she moves. All that mean that the mother figure is a complex structure who has emotional relations with the child. These structures, which includes the subject, the object and their type of relations, are considered as an inner structure with which the child has to work and adapt.

There is evidence that embryos recognize their mother voice in the womb (e.g., Kisilevsky et al., 2003). They also recognize her vocal characteristics (timbre, prosody, pitch), the timing of her reactions to others, her movement patterns, breathing, and heartbeat (Ullal-Gupta et al. 2013). Importantly, there are evidence that her amniotic fluid is recognized by smell (Schaal,1998), as is her dietary intake (Schaal, 2000). Note that olfactory-gustatory processes are part of social responsivity. Additionally, studies found that birth accelerated the development of suckling behavior in premature pups, suggestion that birth regulates the initiation of sensory map formation in the somatosensory and visual systems (Toda & Kawasaki, 2014). Thus, the infant’s behavior and responsivity take place within the context of a rich multisensory social environment and is affected by early experiences.

Neuropsychoanalytic theoreticians suggest that what is considered automatically reflexive is not psychic, nor has its psychic significance. The critique of the understanding of the imitation mechanism as presented by Meltzoff and Moore does not meet the criteria of neuropsychoanalytic theoreticians. theoreticians Observations from the perspective of areas located at the top of the brainstem, opens a door to a refreshing and renewed understanding of the initial learning mechanisms and offers the research fields of learning and development a new challenge of implementing these materials within existing systems (see chapter 3). Beginning with the practice of psychotherapy, and ending with education and learning and all the relevant professional interfaces.

In order to clarify the area of investigation of the field, I will further present leading theories of imitation. It is important to understand that imitation is an umbrella concept and each theorist holds a different aspect of the overall phenomena. I will hereby describe different aspects taken, and add the details to form a holistic understanding of that phenomena I call Imitation, repetition and becoming.

Campos and Nieto (2017) contend that the imitation mechanism is not a reflex that disappears with development. They argued that it is actually the refinement of the system. According to them, the imitation is the precursor of intended behavior. However, they refer to conscious imitation, which is not the subject of this paper. The present work focuses on the unconscious, passive imitation. I would argue that this primary imitation construct the personality and requires the assessor to produce an abstraction of it to understand what the imitator is imitating. Being implicit and present in the non-declarative memory, it demands from the observer (the therapist) a translation that reach the awareness of the observer (the patient). Campos and Nieto (2017) focused on unconscious imitation, mimicry, and argued that it is a precursor of *intentional imitation* but it *does not fade* when the dyad develops more sophisticated forms of imitation.

One way to combine the two concepts of imitation and mimicry into one but still differentiate conscious and unconscious imitation was provided by Casartelli and Parma (2017). They argued that imitation is a multi-level concept, with distinct, although potentially interconnected, layers. This could reduce the ambiguities of experimental findings on imitation. Addressing imitation as a multi-level construct will facilitate the identification (and empirical testing) of specific sub-processes, reflecting different degrees of abstraction.

This kind of analysis of the imitation system which brakes the concept into its constituent parts, appears to be a good idea. However, breaking it down into its different constituent parts and that to the different parts will diminish the whole idea of imitation as it is perceived in this paper.

The imitation mechanism as described in the present paper is of great importance from different points of view. These include neuroscience, developmental psychology and social psychology. But above and beyond its importance in these and other fields, its significant lies in our understanding of primary learning processes and creation of innovative conceptions in the world. At the same time, the initial question of whether an imitation exists cannot be definitively answered. Therefore, I have again described the controversial status of this mechanism and the controversies it raises. I would try and integrate those controversies and show it is different points of view of the same concept, as it is taken as a whole.

Considering the discussion of imitation mechanism, we assume that:

1. Imitation will be defined as behavior targeted to learning, a-modal and multi-dimensional.
2. This Neuropsychoanalytical research work will point out, the chemical, the movement features, the emotional, interpersonal, and social elements of this concept.
3. The present study will examine the space between imitation, which appears to be automatic, non-declarative, and creativity.
4. It aims to analyze the evolutionary mechanisms that form the basis of imitation, at both neuroscientific and developmental aspects. It will pinpoint the source in the brain and the requirements of mental development that drive the brain system responsible for it. (Chapter 3).
5. It will examine both the proximity and the distance between definitions of imitation and similar mechanisms in psychoanalytical literature, and those of creativity. It will also look at developmental, analytical and neuropsychoanalytical literature for definitions of similar mechanisms (chapter 5) and propose what we believe to be the right path to take in order to transform automatic imitation into an intentional act of creativity, from analytical point of view.
6. It will also trace the cerebral and energetic structures requiring its application, to which end it will refer to the mechanism as defined by Panksepp (1998), the founding father of Affective Neuroscience, which studies emotional structures in the brain. It will also refer to the SEEKING system the energetic system which seems to be the source of the imitation “wish.” (Chapter 5).
7. This research will look at the repetition that paradoxically allows for freedom from automatic imitation, moving towards new concepts (also in chapter 5). The present study claims that it is precisely such repetition that produces the space that is necessary to build a subjective, unique object. Each subject always perceives the objective world differently. The subjective and objective worlds are not compatible. In other words, there is always a disparity between the objective world and the individual’s subjective creation (Piaget, 1976a). This disparity between objective and subjective is diminished by means of the imitation mechanism as clarified in chapter 5, which motivates the individual to continue moving on the repetitive pendulum, between objective and subjective worlds. The disparity is frustrating and creates a need to recreate the original objective creation – this is the meaning of repetition. Any attempt to return to the objective produces a different creation, and this will always be present in the subjective/objective disparity. In fact, the disparity results in creativity, and it is therefore this that results in uniqueness and originality.
8. This will bring us finally to the claim that there is no creativity without imitation and possibly no imitation without creativity. Normal functioning requires movement and a metamorphosis between the two concepts. At the same time, we will claim that the dual structure of imitation and creativity actually represents the need for both, object and subject, in order to create a third, something which is new, autonomous and has freedom of choice.

We will show how this concept is relevant within the umbrella of psychoanalytic concepts of internalization (Olds,2012), and we will indicate its importance to the psychoanalytic clinic.

Having established this, it will then try to ask whether imitation has any relation to other introjection mechanisms or to other concepts found in clinical practice and It will refer to the innovation that makes this possible. In doing so It will be illustrating the way in which imitation is bound up with defense mechanisms described in clinical neuropsychoanalysis and supported by case histories.

The clarification of these concepts will be made through an applicative reading of primary and secondary theoretical texts, which will ultimately contribute to therapeutic work in the neuropsychoanalytical clinical setting..

## A. Methodology

This theoretical study provides an applicative overview of developmental and analytical literature on the subject of imitation, while raising questions about the space between imitation and creativity. It will examine developmental and psychoanalytical research literature on imitation and its application in clinical practice, in light of the hypotheses specified above. It proposes a neuropsychoanalytical concept of imitation, encompassing analytical, developmental and neuroscientific knowledge of the concept and outlining the structure of the mechanism.

The section addressing application (in chapter 6) will look at descriptions of observations carried out on newborns, toddlers and children on the basis of the “infant observation” methodology (Miller, 1989), as developed at the Tavistock Clinic in London. This method was first developed by Bick to train professionals and develop their awareness of the minutest events in the lives of newborns and infants, which illustrate processes in small children’s minds. This type of observation helps familiarize the observer with the conscious and the unconscious structures found in parents, babies and small children; these are intergenerational systems which will be explained in chapter three. The infant observation method is a training methodology and a cornerstone of analytical study in many institutions worldwide. It is a thorough, precise, repetitive method allowing for follow-up of the smallest details in observed behavior, which illustrate emotional structures in the unconscious.

We will use this approach to draw conclusions about all structures and uses of imitative-creative behavior, as learned from observations of newborns, toddlers and children. Infant observation methodology is used by therapists of adults in understanding the childlike aspects of their patients that emerge in psychoanalytical therapy. Such observations can also indicate the structures of imitation and creativity, the space between the two and possible applications in analytical and especially neuropsychoanalytical practice, while keeping sight of implications for adult therapy. It will also introduce vignettes from therapies in which the concepts are applied.

## B. Significance and Contribution of the Study

This study seeks to address theoretical and practical research on the concept of imitation and its connection with creativity. The assumption in this study is that the characteristics of imitation and creativity constitute a major part of the clinical practice. An understanding of the structure of the imitation mechanism, the way in which it is associated with development and the way it functions, will contribute to a material change in understanding imitation mechanisms as found within the overall defense mechanisms and as needed for various new applications in neuropsychoanalytical practice. The definition of the concepts can help both therapists and patients avoid the automatic, impulsive imitation frequently found in clinical practice, and develop a route to a conscious use of those mechanisms with a view to enhancing awareness, creativity, innovation and reinforcement of originality. These understanding can bring in a potential curative element to the clinic.

The imitation mechanism and its uses, as demonstrated in the literature, were hitherto understood as a mechanical, automatic mechanism devoid of meaning. The lack of an accurate definition caused confusion in the terminology, to the point where it was perceived as purely negative. Understanding the true mechanism and its usage will free theoreticians, therapists and patients from being trapped in a process predetermined by personal, private or social history, and enable them to find meaning in freedom of choice and a new and unique creativity.

Using the imitative mechanism, which is built from imitation repetitions and then becoming, will allow therapists to evolve the applications of forms and structures which are inherent and appear in future generations. Defining these appearances will open a new understanding and new options to clinical methodology and transformations.

### 1. At the Conceptual Level

This study proposes a new definition of concepts used in the psychoanalytical profession. It claims that the imitation mechanism, its structure and major role in development, has been overlooked. The mechanism is depicted in analytic concepts but has not been properly interpreted. General psychoanalytic theory and the theory of clinical practice are deficient in that they ignore the imitation mechanism. Taking imitation into account in developmental processes will open up new possibilities for applying clinical theory in analytical work, such as a new use of subjects that are paramount in analytic theory (e.g. an understanding of transference and countertransference as being based on imitative elements, and needing interpretation and clarification). Moreover, it will show us how to move forward to applying current knowledge from the field of neuropsychoanalysis in clinical practice.

After this review and processing of the relevant developmental and analytic literature, it will demonstrate imitative and creative work in infants, toddlers and children with descriptions of infant observations. To illustrate imitation in adults it will also include some case histories.

### 2. At the Clinical Level

In clinical practice today, it notices a similarity between patients and therapists, for better or worse. On the negative side, patients imitate and emulate their therapists. In the absence of any dialog on imitation, therapists suggest interpretations taken from mimetic rivalry (Palaver, 2011). If the therapist’s interpretation does not consider this mechanism, the patient clearly borrows from what the therapist tells them, but use of interpretation sounds like automatic imitation (Bazan, 2008). This type of therapeutic work may produce change, but not transformation.

It claims that a helpful interpretation can open up a new path for the patient. As a fundamental, primal and evolutionary mechanism, imitation is present in all human negotiation and certainly in therapeutic dialog. Understanding, acceptance and an appropriate creative application of it in therapy will result in transformation. Work that interprets the place of imitation can contribute to the authenticity of therapy; without it there will not be transformation; that is, the individual will experience a repetitive echo of developmental history, so that his family and historical background will repeat itself by processing the interpretation, both mentally and emotionally. Giving weight to imitation will release the automatic mechanism in favor of freedom of the individual creativity and leave determinism behind.

Imitation is present not only in the interpretation that the therapist imparts to their patient, but also in the world of the therapist. The therapist holds on to the need for interpretations gleaned from acquired academic knowledge or therapeutic training over years of study with reputed and respected teachers and supervisors. However, imitation of their teachers, in all aspects, prevents him from distinguishing that he is constantly, repeatedly, producing new creations that he can follow up in clinical practice. If he tries to analyze the material he works with from a reflective viewpoint (Schon, 1983), he will produce a new, creative theory together with his patient, a theory that works both in theory and in practice, an understanding of the automatic mechanism and its therapeutic benefit, which lies at the very heart of this study.

# II. Overview of the Literature on Imitation

The literature differentiates between imitative behavior and mirroring. Imitation is seen as a process whereby behavior maps the other person’s reaction, while mirroring is precise, exact behavior of the same process. The common approach is that a baby is a mirror of the “other”. This research project will claim that imitation is using the mirror neuron but that the imitation is more complex. It is the proactive action of a baby whose goal is mapping. The behavior of carers is as if inclined to mirror the baby, reflecting their exact behavior. Yet parents do not literally mirror their babies, they are exaggerating and emphasizing the baby’s mood and movements. They give creative interpretation to the baby's emotional state of mind.

They use specific intuitions and quiet moments to attract the baby’s attention (Gergly and Watson, 1999)all with the aim of enhancing communication. This is how they encourage the baby to bond, while their actions regulate communication and contribute to developing the baby’s emotional regulation. It is very difficult to pinpoint mirroring behavior precisely, since in effect, an immediate change occurs at the time of mirroring and it is not possible to find a behavior which is actually a perfect copy of the other person’s actions.

Imitation has many functions and this study will discuss both its mechanism and those functions. It will be considered as a neuropsychoanalytical concept that links the physiological mechanism – the brain system that enables its existence – and the psychological functions that are made possible by the physiological system. The debate will address the emotional structure as proposed by Freud and will include the contemporary dialog, so helping to clarify its complexity and meaning, developmental processes and intra-personal, inter-personal and social impact. It will then identify the place of imitation in analytical opinion as presented by Freud himself and will attempt to analyze defense mechanisms from a critical viewpoint, including the understanding of imitation as a fundamental mechanism at its very basis. In an effort to reinforce the understanding of the mechanism of imitation, It will turn to Freud’s contemporaries, beginning with James Mark Baldwin, who identified the importance of the imitation mechanism at the intra-personal and physiological levels as will be further explained. I will also refer to the importance of this mechanism at the social level, as discussed by Gabriel Tarde, a sociologist and another contemporary of Freud. Each of these figures offers a different way of observing the system. In true neuropsychoanalytical tradition, It will try to bridge all aspects to create an integrated concept. The aim of this study is to illustrate the effect of imitation at physical, emotional and social levels.

In his Philosophical Investigations, Ludwig Wittgenstein suggested a philosophical basis to help illustrate a new way of investigating the imitation mechanism. Wittgenstein directs us to his perception of laws, with a primary focus on the laws of language. He believes that any given language develops from instinct, rather than as a conscious act. Nevertheless, we are accustomed to thought processes on a causative basis and choose not to make do with accepting reality “as is”. Wittgenstein makes a dual demand: we must develop the ability to experience and live through the present experience and not try to assign an interpretation to it. Accordingly, it is not necessary to attribute any meaning to the experience. To develop this ability we require a passive, rather than an active or critical approach.

Wittgenstein suggests that we allow ourselves to be led passively: “We work with language blindfolded”. Henceforth I will refer to this experience as “being led”.

The basis that Wittgenstein defines for language contexts is applicable to mapping the concept of the imitation mechanism. I will borrow from Wittgenstein’s view of experience to describe the environment in which imitation is activated, and claim, as illustrated below with Jaak Panksepp’s help, that it is a primal evolutionary mechanism.

Panksepp (1998) describes the SEEKING system, as one of seven major emotional pathways in the brain that are an integral part of the will to live and the desire and zeal for investigation and understanding. He considers this a primary energetic and automatic system deriving from the survival instinct. In humans, this system can be identified as early as in fetal development. It is an evolutionary system that, so Panksepp claims, is also present in the brains of animals. According to Panksepp, the system is not directed at a specific object, but open to the world in a similar manner to Wittgenstein’s description of the experience of “being led”, not reliant on anything causative or explainable by logic. The present study claims that the energetic basis that activates the imitation mechanism has its origins in the SEEKING system*,* as defined above. The SEEKING system, as part of the survival instinct, is the root of a desire to build social relationships. This research project will try and indicate a way with which it is done. It will try to explain in the next chapters how will the SEEKING system use this mechanism and imitates objects with the goal of supplying that which is needed to survive. This, in effect, is the imitation mechanism; It will provide a more detailed clarification of the SEEKING system below.

Piaget (1952) identifies imitation just a few months after birth. He sees it as a safe way of developing symbolic thinking. When infants copy other people, objects or events, as in a deferred play setting, it is regarded by Piaget as real imitative activity, the way in which children develop their abilities. He makes a distinction between real imitative and pseudo-imitative behavior, such as the kind that appears in the first year (e.g. sticking out the tongue). In real imitative behavior, children learn to perform actions that constitute a signifier and a signified, rather than replicating the actions of the other. Thus, in Piaget’s view children learn to behave symbolically. He claims that they are able to learn to play symbolic games from the age of 18 months, notwithstanding earlier records indicating imitation at an even earlier stage of life. This would imply a considerable distance between primal, apparently automatic imitative action and later symbolic, creative action.

Many studies over the past 20 years have reported imitative responses in very young children. These studies have led researchers to reconsider Piaget’s prevalent approach that the ability to imitate comes into being several months after birth. Laboratory studies (cited below) have shown that just a few hours after birth, babies already exhibit a wide range of movements that imitate experience, such as sticking out the tongue, moving lips and hands in exact coordination with the movements of others (Meltzoff and Moore, 1977). Despite identifying an early capacity for imitation, as demonstrated in laboratory studies around the world, the interpretation of its appearance continues to be a source of controversy. There is, for example, the interpretation which views the phenomenon as a transient, evolutionary one, limited to a smallish number of movements and linked to an automatic impulse release mechanism (Jones, 1966). Other theories, such as the one proposed by Andrew Meltzoff and Keith Moore (1997), view the newborn’s imitative responsiveness as an expression of a richer ability, one of matching the different modalities of the senses, similar to the match between the visual and proprioceptive systems. This conformity is demonstrated by imitating facial expressions. The infant imitates the expression of whoever is observing him and produces a facial expression that he cannot see. He has no way of knowing whether his own expression matches the one he is imitating. Thus, one can say that if the newborn tries to match his own specific behavior to that of the imitation model, he is matching his facial expression to movements that he cannot see but can feel. It may also be said that active intermodal behavioral mapping occurs, whereby the infant creates a matching process. This would indicate that, from the outset, infants are not in a social vacuum, but make a connection between their behavior and the behavior of others. The SEEKING system is the energetic source that makes this creative process possible. As the SEEKING mechanism is looking for innovations by its need to read the newest details it watches what was met by the senses and gets a better view of all the details anew. The imitation mechanism, on the other hand, allows the individual to create a match between the different physical and interpersonal systems on a social level. Other studies claim that infant imitation is not limited to when a baby tries to reproduce what the other person does, but tries also to match the affect and mood of the imitated person (Field & Cohen, 1982). Tiffany Field notes that newborns are inclined to exhibit facial expressions of happiness, surprise and sadness. Another fascinating possibility (arising from an adult study) indicates that adults seek to imitate facial expressions of emotions, and ultimately even feel the emotions they are imitating (Meltzoff, Ekman, Levenson and Friesen, 1983; Meltzoff 1990). By means of the imitation mechanism, the newborn creates within himself the object facing him, using the same mechanism also to express the other person’s emotions towards him. Accordingly, childhood imitation can play a uniquely crucial role in creating intersubjectivity. This develops the ability to empathize with another’s emotions (Panksepp, 2014).

A further combination appears at a later stage: the newborn imitates the adult, and the adult is likely, according to his particular personality and responses, to respond to the imitation with an imitation of his own. The response and reinforcement deriving from imitation in the infant-adult relationship will also affect the infant’s social-cognitive development. If the adult exaggerates the imitation of any specific social behavior and the baby imitates that, then a system of mutual regulation is created between the two, each according to his own characteristic personality. This mutual response forms the basis for intersubjectivity, which is the earliest source of social cognitive development. Mutual imitation enables children and adults to examine the extent and manner in which they are able to bond with one another. The imitation mechanism plays a social and communicative role, just as cognitive mechanisms play a teaching one. The imitation mechanism enriches an individual’s knowledge, thus becoming a social learning tool, as evidenced in language acquisition. It is also responsible for the transmission of social traditions (Tomasello, Kruger and Ratner, 1993; Tomasello 1999). Currently there is an ongoing debate in the literature about whether imitation is a mechanism of transgenerational transmission only in humans or also in animals (Whiten & Custance, 1996). Some researchers claim that in animals the capacity to learn a new behavior via the creation of an imitation model is very limited. Studies are being carried out on the imitative abilities of chimpanzees and even birds concerning how they make new learning possible. However, despite this lively debate, there is no doubt that imitation is very helpful to the process of learning in humans and is most important in language development and the acquisition of words and new language structures. Imitation appears to have the greatest value in humans in determining the intention of the other person’s communication and in creating verbal activity.

## A. The Psychoanalytical Approach to the Imitation Mechanism

At first glance, Sigmund Freud does not seem to address the subject of imitation in his writings, but a more in-depth reading proves otherwise. Although Freud does not expressly refer to the imitation mechanism, and in fact seems to adopt an ambivalent attitude to it, as we will see below, he does sketch an outline of a mechanism, which is essentially identical to what I call the imitation mechanism, on three separate occasions:

With respect to the evolutionary process of sensation Freud (1895) refers to the skin, as representing the overall sensory system, in the sequence of the developmental process of organisms. The assumption is that sensitive ectoderm is the source of all neurological systems.

Freud refers to the way in which the human body absorbs energy from the outside world into the sensory neurons and discharges it through the motor neurons, in other words through motor activity. The primary function of energy is to activate different physical systems by transformation of stimulus into response. He also speaks of the existence of energy reserves created from the transformation of energy, which are later called “memory”.

Haimovitz, in his book The Freudian Revolution (2012), argued that “there is a covert assumption here of Haeckel’s theory (Haeckel,1874),namely that ontogeny recapitulates phylogeny and the primal function operates within a more highly developed (secondary) neurological system in a manner absolutely identical to the functioning of the primal system.” He is effectively saying that human development repeats evolutionary development, a claim that forms the basis of the concept of repetition in emotional development, as depicted in Freud’s writings. Later in this study, I will refer to two other scholars who were contemporaries of Freud, the neuropsychologist James Mark Baldwin and the sociologist Gabriel Tarde. I will record every mention of the concept of imitation and eventually expand upon it to show how their understanding of the issue is integrated into the imitation mechanism as depicted by Freud.

Baldwin (1899) was Freud’s contemporary, a philosopher and psychologist at Princeton University and a prominent figure in the field of developmental psychology, who made a major contribution to the development of evolutionary theory in psychology. Baldwin was in professional contact with Alexander Luria in Moscow, whose work is a cornerstone of the neuropsychological and neuropsychoanalytical approach. He moved neuropsychology forward from the phrenological angle – rigid and localized – to a multi-systemic dynamic approach. We have to remember that Freud himself was a neurologist before he was a psychologist and that his theory was created from a combination of the two fields. Later, due to having no means of checking his hypotheses, he abandoned neurological research and switched to psychological investigation. The agenda of the international neuropsychoanalytical community was to create a bridge between the two disciplines, to connect body and mind (Solms, 2015). Today, Luria’s work remains more relevant than ever and is still studied in neuropsychoanalytical circles. Small wonder then that these two researchers were in contact even at that time. In his book, Baldwin (1899/2020) described the imitation mechanism from an evolutionary point of view, illustrating the importance of the mechanism in human development. He claims that imitation is heteromodal, meaning that it exists between the various senses in a manner reminiscent of how the present study looks at the imitation mechanism. In other words, imitation is not a conscious act but a passive one of “being led”. Potential knowledge is all around us in the world, echoing through our senses quickly and immediately. In an attempt to explain how the system works in patients with brain injuries, Baldwin offers the following precise theory, which I quote below from his writings on his observation of a patient with a brain injury and the development of his understanding of the imitation mechanism and its implications. It is a mechanism, which has not previously been examined in this way. One can see how the description of the evolving observation of the injury shows all the characteristics of the imitation mechanism, clearly exhibited by the difficulties and disruptions experienced by people with brain injuries. How the mechanism works or does not work is illustrated in this passage, written by Baldwin.

“For example, resuming our analysis of consciousness: you speak a word; I at once write it. Tomorrow, by reason of a brain lesion, I am unable to write the word when I hear you speak it, but I can still copy the word when you set it before me. The lesion has simply deprived me of the use of my internal visual copy by cutting the writing-reaction apparatus off from its connexion with the auditory seat from which this visual copy was accustomed to be ‘rung up’. But the simpler imitation of the external visual copy remains possible. A step further: I see a man and at once write his name. Here the visual image of the man rings up the auditory image of the name-word, this rings up the visual copy-image of the written word, and this I imitate by writing. If anyone had asked me why I wrote the man’s name, I would have said: ‘Because I remembered it’. But each of these images is itself a ‘copy’, when needed for its own appropriate reaction. A young child, on seeing the man, would say ‘Man’, i.e. would imitate the auditory copy which the sight of the man rung up. And a certain child of mine would probably hasten to ask for a pencil in order to draw the man, i.e. to imitate the schematic outline man fixed in her memory by earlier efforts to imitate the external thing.”

Baldwin adds that the method whereby different copies “ring up” from one to the other is by way of association; that is, different elements of imitation make a connection according to what is in the memory, and from here the ability to connect with one another on the basis of how closely they are linked to the original, external object. It is this associative “echo”, dependent on the external object, which ultimately creates the internal object, which, through an additional associative process in the memory, will lead to the creation of a new copy. The process of creating a link between the different elements of the first copy and various elements present in the memory leads to the creation of a third copy; this is a creative copy.

Baldwin’s description of this process is in keeping with the sociological process described by Tarde (1888/1969), when he talks of imitation contributing to the creation of new ideas, based on an echo of existing ideas between people. Tarde conveys the sociological process that manifests an abstraction of a parallel process described by Baldwin with respect to the physical system.

What Tarde says is:

“When an individual reflects a specific subject, to the point where one idea follows another, some disappear and some remain, and then some guideline is found to resolve a problem, and from here it moves on rapidly to a place where it is seen – is this not how history occurs? Ultimately a kind of collective thought is created, with no brain of its own but the brain of several students and researchers and inventors that change knowledge by the imitation and solidarity of their brains, they position the thing in writing, which serves as a mode of transmission across generations in time and space, and it is this that corresponds with the transmission of images to the individual brain. Accordingly, things eventually come to light and this is how history is created.”

So how does progress occur? Progress is actually a collective thought with no brain of its own; it is made possible because of imitation, by means of solidarity between the brains of a number of thinkers and inventors, each carrying forward the invention of the other. Such thinkers focus their inventions by writing, making it possible for their ideas to transcend time and place. Ideas occur almost by chance and are transmitted in different ways. Reflection and transfer are implicit, enthusiasm for one subject moves on to the next and ideas flow, they are led on in a variety of ways, quickly, from one individual to another, from one society to another, within a society and within individuals. This takes place by an accumulation and replacement of one idea by another. Ideas are there and are unconsciously recruited for individual thought.

Progress and the reliance on previous ideas create different kinds of safety and equilibria. Inventiveness gives us faith, security and constant development.

Imitation is a unifying experience for society. But “every suitable combination of ideas must first and foremost flourish in an individual before it can enlighten the nation’s mind” (Tarde, 1888/ 1969). The chance of a new thought combination depends on the possibilities for an encounter in places of intellectual stimulation and opportunities for thought, where there is a greater chance of more novel creativity.

Tarde wrote in the 1880's of the logical laws of imitation (Tarde 1888/1969). The powers of imitation – based in wishes or desires, take on real social significance. Societies organize themselves according to conflicting conventions or beliefs that reinforce and restrict one another. The social establishment is dependent on those conditions. Inventiveness and imitation are daily occurrences in society. What is invention and what is imitation? Both originate in ideas, volition, value judgment or some objective. These are all results of belief or desire. Desire and belief are the psychological strength behind every invention and imitation.

To clarify the link between what Tarde says and what has hitherto been described in the present study, allow me to explain: The claim to be discussed in this theoretical research work as surprising as it can sound will define that desire and belief coming from the brain’s SEEKING system, as defined by Jaak Panksepp: as a flow of ideas or feelings taking place unconsciously will follow in this research as continuing by virtue of the imitation mechanism. This study claims that “being led” is a status that enables the SEEKING mechanism stay unconscious (nondeclarative) and maybe receive information in the format of structures. By imitation it makes creativity possible, as will be further explained below.

According to Tarde, many ideas pass through society without any academic or scientific development. Thoughts flow from person to person without the exercise of any judgment. Some ideas disappear, some remain. This activity can be seen throughout the history of humankind. In the 19th century, with the development of transport, communication traffic also evolved. The transfer of thoughts from one person to another became broader, faster and more successful (Ritzer, 2000).This is how two qualities began to co-exist: one creative, the other critical. One connected to growing knowledge, a combination of invention and discovery; the other connected to the struggle between alternative inventions, the existing and the new. This struggle can be resolved in one of three ways:

1. One of the two participants become stronger.
2. If it is necessary to settle the conflict urgently, victory will come by way of a violent conquest and the exclusion of the opponent. This can cause a further struggle and a disruption in the continuity of natural imitation and the dissemination of ideas.
3. Ultimately, the two antagonistic parties reach an agreement, or one, wisely or voluntarily, will remove himself by putting forward a new idea or a new discovery (Tarde, 1888/1969).

Baldwin and Tarde, in their preoccupation with different aspects – the social and personal level – approach the structure of imitation on different abstract levels. But the outcome of their disparate understandings is similar. Note the following passage from Baldwin:

“When an external stimulus starts one of them that starts up many others in a series, and all the reactions which wait upon these copies tend to realize themselves. Thus, the great practiced habits of the organism get confirmed by stimulation again and again, while the increasing variety of the conspiring copies constantly recruited from the new experiences of the world make up a large and ever larger mass of elements, or centers, which vibrate in delicate counterpoise together.” (Baldwin, 1984).

According to Baldwin, all attempts to understand the imitation mechanism have ended in failure. The present study will try once more to describe the mechanism and point to its use in other emotional structures. We propose to consider the imitation mechanism as a repetitive one, in keeping with the mechanism proposed by present-day biologist and psychoanalyst Ariane Bazan, in her article examining the “efferent copy” in language processing (Bazan, 2012). Bazan maintains that this mechanism is located in higher cortical parts of the brain.

This is in stark contrast to Panksepp’s theory that the SEEKING system, which this research will be claiming is the motivating force activating the imitation mechanism, which is located in lower sub-cortical areas of the brain.

Therefore, back to Freud, who coined many basic concepts of the human mind. I believe that Freud’s works – consistent with Haeckel (see p. 12) indicate that physical systems imitate one another at both evolutionary and physiological levels. Skin, as discussed by Freud, fulfills the principles of the imitation mechanism described above; it is passive and reliant on sensors to process information received from the external environment. It thus embodies the experience of “being led”. Formed simultaneously with the formation of the nervous system, at the very beginning of fetal development (Bazan, 2008), skin is therefore primal and essential to survival, as is the nervous system. In many ways, this parallel development can be compared to the reciprocal imitation between the two systems, as manifested, for instance, in skin conditions that originate from the nervous system, and so forth (Pines, 1980).

Freud’s negative position on the imitation mechanism is expressed in his book Civilization and its Discontents (Freud, 1930/1961) where he also refers to Gabriel Tarde. Tarde talks of the impact of imitation on society (Tarde 1869 / 1969), claiming that the imitation mechanism is a social mechanism existing in people who work alongside one another and express ideas in a similar manner. Freud uses Trade's claims to question the application of suggestibility in therapy. He believes that imitation serves to exert power over others, making the mechanism a dangerous one that could lead to mass hysteria under a charismatic and threatening leader. According to Freud, this mechanism can result in the imposition of negative behavior, a disruption of independence, uniqueness and self-development.

Freud’s negative attitude to the concept of imitation can be understood also with the help of René Girard (Girard, 1977). Girard, a multidisciplinary social historian and philosopher, anthropologist, literary and religious scholar, places the concept of imitation firmly at the center of his theory, attributing a negative value to it as a “mythical theory”. He founded Contagion: Journal of Violence, Mimesis and Culture, whose *raison d’être* was to research, critique and develop the theory of mimesis, with imitation at its basis.

According to Girard, imitation is an essential, compulsive inclination in human beings. He uses the term “mimetic desire” to describe his claim that we are born with desire, desire for another, and in fact are not autonomous. What one person desires is what the other desires. The “actual” value of what we desire is meaningless; what is important is the fact that the other person has designated something as the object of his desire. Violence comes about when two or more people desire ownership of the same object and try to achieve practical ownership by force. Girard makes a distinction between hunger and desire, a distinction that will be useful later in this study in order to differentiate between instinct and drive. Mimetic theory also provides the key to the issue of social recognition. Girard claims that social culture rests on the shoulders of religion, which is the basic element of social violence through ceremonies that lead to mounting aggression towards a scapegoat. As he wrote in Violence and the Sacred (Girard 1977), what is most important is mimetic desire, the primary source of the aggression and violence that characterize the human race. Girard’s opinions raise a question as to their unilateralism, since mimetic theory cannot overlook the fact that envy produces both competition and creativity. Girard himself says that imitation also forms the basis of love relationships (Girard, 1999).

It is here that we see Freud’s mistake. He was right when he said that the impact of imitation is quick and, by the unconscious nature of the mechanism, has the ability to carry people away. But it was this point that was necessary for therapeutic thinking. As a rule, in the absence of any dialog on the imitation mechanism in the clinical therapeutic framework, interpretations suggested by therapists do not consider the patient’s “imitative” dependence on the therapist. Hence, Freud’s concern – and Girard in his wake – as described above, about the patient’s compulsion, impaired independence and uniqueness. This kind of therapeutic work is designed to bring about change but not transformation. Change is a state of movement to another status, resulting from the impact of the environment or the therapist. Transformation is a product of the profound structural change to which therapy aspires: change that frees the individual from the compulsion flowing from the primal, spontaneous, unconscious imitation mechanism, which is the outcome of the family unit in which he grew up, the imitative desire for the object of desire of another person or of society.

Nevertheless, this hurdle as depicted by Freud is not an insurmountable one. The key is an understanding of imitation as a tool which is not necessarily restrictive, even as a mechanism with the capacity to lead to creativity. It is here that we find

Freud’s third reference, in his Project for a Scientific Psychology. He indicates a role for imitation in the development of identity.

In Sections 16-18 of the Project for a Scientific Psychology*,*[[1]](#footnote-2) he addresses the creation of primal thought processes, claiming that the primal thought process is devoid of words. Symbols of reality are perceptual. The object of thought is an external entity that stimulates perceptual neurons. The main purpose of primal thought is to produce an ‘identity of perception’. Since the stage of primal thought processes plays an important role in examining images embedded in memory, we must distinguish between the examination of those images as part of the primal thought process and the later stage. At the later stage, the images in memory become the object of thought. The purpose of the thought process is to arrive at a

‘thought-based identity’.

Freud expanded his description of primal physical processes that are aroused en route to achieving an identity of perception. He divided these into two parts according to associative type: “while perceiving a movement, a movement is copied in its variable portion”. He explained that in order to achieve an identity, a strong energetic cathexis of the motor image is aroused, which produces a movement, and then the perception has an imitative quality. In other words, this is an imitative perception. On the other hand, if the perception is reminiscent of the sensation of pain, it produces a feeling of unpleasure and an appropriate defensive mechanism returns. In effect, Freud claims that it is the repetition and mimicry of the movement or the response to pain that have a stabilizing effect and result in identity. The repetitiveness that occurs due to the imitation mechanism is the cornerstone of the concept of imitation as expressed in the present study. Repetitiveness motivates creativity: each repetition does not mirror what preceded it; it constantly moves forward towards creating a new fact, as Freud describes above regarding the creation of a new identity. I will illustrate this further in my overview of the imitation literature below.

When Freud introduced the identification mechanism in a letter to Fleiss in December 1896, he attributed it to the manifestation of hysterical imitation and made a distinction between imitation and identification.

“Thus, identification is not simple imitation, the basis of a similar aetiological pretension: It expresses a resemblance and is derived from a common element which remains in the unconscious” (Freud1896, pp.181-182).

Freud’s observation was that identification is not the opposite of imitation, but something more complex. Later in his work on identification, he no longer refers to imitation but rather to incorporation and internalization. I will pay attention to these mechanisms later in the present study. All the great thinkers of Freud’s era and thereafter who recognized imitation (among them Fenichel [1937], Ferenczi [1932], Deutsch [1942], Greenacre [1958] and Greenson [1960]), needed to distinguish between it and what was first thought to be identification, because of a confusion in terminology, with the literature sometimes referring to imitation and sometimes to identification. It was common to think of imitation as a kind of disruption in identification processes. Eventually Jacobson, in the 1960s, spoke of early identifications in lieu of primal identifications (Jacobson, 1964). The primal identifications that she describes enable reality to be internalized. They are initially depicted as pragmatic and selective, meaning that they represent parts of an object, while later they are depicted as enabling formation of the ego through their encounter with reality. The development of identifications makes it possible to develop other functions of the ego, such as judgment of reality, and create a sense of gender identity, which is compatible with the excerpt above from Freud’s Project for a Scientific Psychology.

One psychoanalyst who made an in-depth study of the subject of imitation in psychoanalysis and infant development was Gaddini. What he calls primal identifications (Gaddini, 1992) are in fact primal imitation. The difference between primal identifications and primal imitation derives from the difference in the connection to reality. Primal imitation, according to Gaddini, is linked only to unconscious fantasy; it has a process of its own and plays a role in the development of the ego. He claims that there should be a possibility of regression from primal identification to primal imitation. Primal imitation, in his view, occupies a position of omnipotence; it does not differentiate between the sexes, so he places it within the category of identity problems, especially sexual or gender identity.

Gaddini’s writings pass from practical, structural reference through mental processes to statements that seem like diagnoses, but are undoubtedly ethical and today are probably considered flawed.

Freud’s statements are actually reinforced by Panksepp’s model, as observed above. Consolidation of an object, where there was previously no object, necessitates processes of mimicry and imitation, as described above with regard to the SEEKING system. SEEKING, as previously explained, is an energetic system that is seeking for novelty. Novelty is a structure, which is not recognized before.

As it seems to be known from one point of view, then it appears as another. The structures we meet are not perfectly objective or solid. Neuropsychoanalysis in not reductive, in no way. They are viewed by the observer, each time in a different form, providing novelty in their appearances and experiences. In this way, imitative structures are borrowed from the now imagined world to create a subjective object. The subjective object will be referred in this research project as an innovation. This kind of understanding will be discussed further in next chapters.

Could that be that in the course of this search, it creates imitative structures borrowed from the external environment? If we base our thesis only on these statements, we might believe that automatic imitation does indeed limit and conflict with creativity; I claim, however, that it is the repetition inherent in the search for structures, which leads to freedom from restrictive automatic imitation and creates the space to build a subjective, designated object. This is because the subject will also perceive the objective world; hence, there is a constant disparity between the objective world and the individual’s subjective creativity (Piaget, 1976b). This frustrating disparity produces a need to recreate the original objective creation – this is repetition, which in turn leads to a unique, original innovation, since any attempt to return to the objective results in a different creation.

## B. The Imitation Mechanism from a Neuropsychoanalytical Viewpoint

The present study will try to claim that the imitation mechanism originates in the SEEKING system, one of the emotional systems identified by Jaak Panksepp (1998). To help understand this system I provide below a brief overview along the lines of Solms and Zellner (2017), and I will focus on the importance of understanding the source of the mechanism in the SEEKING system.

## C. Emotions in the Psychoanalytical Sense in the Context of the Imitation Mechanism

In their article, Mark Solms and Maggie Zellner (2012) address the status of current affect theory in psychoanalysis. Examining different layers of emotions beyond Freudian theory, they note the Freudian model of the mechanisms that produce emotions and how they are connected to other aspects of mental life, and they find a correlation with Jaak Panksepp’s ‘affective neuroscience’ approach.

According to Freud, at the first and deepest level of the personality, we find pleasure/unpleasure as an indication of drive status. This is in line with other views – such as the attachment approach, which talks of approach/avoidance, reward/aversion. Freud links raw feelings of pleasure/unpleasure to the economy of a visceral system which strives towards homeostasis.

At the second level are feelings, which constitute an imitation of symbols of phylogenetic origin. Here Freud talks of pre-programmed physiological responses and behaviors of biological value signifying a large area of pleasurable and unpleasurable experiences (stages of emotional development: anal, oral, phallic and so forth). The next layer leads to building up of ego structure which brings us to systems of emotional regulation and inhibition.

One important and significant implication of this study to our research is the reference to a lack of object. A widespread debate in psychoanalysis concerned the question of whether an objectless drive exists, as Freud claimed. Affective neuroscience according to Panksepp as he reviews the evidence proposed to him (Solms & Zellner, 2012) clearly indicate that affects are initially objectless. It says that this means that there is a core emotion of anger with no trigger, a core emotion of sadness with no foundation in loss. We are pre-programmed to respond to some specific stimuli with specific emotions. On the one hand it seems that we do not have specific indication that we have representations before birth. On the other hand, this idea is argued by Starkey (1980) as he found out that babies 10 weeks old are able to detect change from two to three dots. Similar experiments with infants have been conducted by various researchers, even as recently as 2006 (Berger, Tzur, & Posner, 2006). They all yield the same finding: In the first few months of life, babies notice the constancy of objects and detect differences in their numerical quantities. Babies, of course, do not have a sophisticated concept of counting, but they do have a conception of quantity, or what scientists call **numerosity***.* Meaning, they detect diffences in numbers up to three. We learn to connect with the figures around us. This is where this study will direct imitation; a place where we have emotions seeking an object is a suitable place for the creation of imitation. Anything in the newborn infant’s vicinity will be imitated, It can be the room baby stays, the mobile in front of the baby the picture on the wall or caretakers.

In Panksepp’s taxonomy, the seven basic emotional systems that he identifies in the mammalian brain include one that he calls the SEEKING system, which operates much like Freud’s libidinal drive. The mesocortical/mesolimbic dopaminergic system mediates appetitive behavior 'wanting' expectancy, seeking and interest. It is responsible for anticipation (Panksepp, 2014). It raises behavioral energy levels and motivates us to go out into the world.

However, Panksepp identified another system (according to Solms & Zellner in their analysis of Panksepp), which serves emotions designated for attachment. This system likewise lacks an object and provides energy for the innate need to create social relationships, the mother-child bond.

According to Panksepp (Panksepp, 2005), there are two distinct systems: one of drive, the other of attachment. One system is more closely linked to drive, hunger, the quest for pleasure and avoidance of suffering, and is linked to feelings of anger. The other is pre-programmed for attachment, regulates the need to maintain contact, and accordingly is linked to feelings of panic, loss and anxiety (fear of losing an object).

This research considers Panksepp' understanding which can fit Bion's notion of preconception of the object as described earlier. Bion refers to a necessary antecedent to all forms ofthought (be it a conception concept, or deductive system). When a preconception is "realized," that is, comes into contact with sensory data close to it, it becomes a conception and a concept. This research project believes that the imitation mechanism is responsible to be activated in those same places is attached to some stable inner pre-conception, which later borrow some similar objects to create new concepts. It is an innately open mechanism, since it has preobject anticipating to receive whatever is in the vicinity. However, active, energetic actions and movements will clearly direct it, activate it in certain directions, and organize it towards a specific object. I claim that this place devoid of object is a transitional space, as Winnicott maintains, a place where a creative process immediately from the beginning of life occurs, from individual elements to their development into clear structures. It is a construct that is open to impression, found in a social environment, an atmosphere and experience that direct it. The structure gradually consolidates and clearer objects are created. Is that possible to think that the imitation mechanism which will be indicated along this dissertation could be the pre-objectal creation of later objectal mechanism. This research project will follow that path.

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# III. FROM CREATIVITY TO IMITATION

“Electricity is not only present in a magnificent thunderstorm and dazzling lightning, but also in a lamp; so also, creativity exists not only where it creates great historical works, but also everywhere human imagination combines, changes, and creates anything new”.

(Vygotsky, 1930/1967)

This section will examine the space between imitation and creativity. I believe that it is creativity that represents the complementary aspect of a repetitive pendulum movement, from automatic imitation to an act of creativity.

Creativity is an attractive and desirable characteristic. Understanding of it comes mostly from the adult observer. It is perceived as a capability attributable to artists and geniuses. It is not considered a personality trait, like intelligence or facial structure, in which we are all gifted. It is defined as a characteristic of certain special people, a kind of rare gift for innovation (Runco, 1996).

In this section, I will suggest that creativity is a congenital personality trait, which is discernible at the earliest stages of childhood. It does not need logic, nor any complex cognitive or mature development. But despite my claim that we are born with this quality, we must draw a distinction between its inherent potential, which is congenital, and its expression, i.e. the actual creative act, which is influenced by a reciprocal relationship with the environment (Cozolino, 2002).

In situation where one's survival is at stake one of two things will occur: either one will come to a traumatic standstill, in effect a kind of paralysis, or a creative urge will help one deal with the danger. This is why I believe there is not necessarily a link between creativity and genius. It is more accurate to look at a link between creativity and “fortitude” in survival situations and it is the presence of fortitude in such situations that indicates a creative skill.

Some people consider the creative capability to be problematic, a kind of ongoing, groundbreaking childhood. In my opinion, what is sometimes diagnosed, as a “learning disability” might in fact be a “problem” of excessive creativity, such that it precludes confinement within the usual limits of the education system.

Exceptionally creative children naturally see reality as having many different aspects. For them the accepted definitions are not definitive; by their nature they will look differently at the material, they are taught. They see the world through their own experience, from their experience in the womb to their experience of the reality they live in. They are born into a world of unique, idiosyncratic physical experiences, look around them and form a view of the world. Their ability to absorb the world is mainly passive, similar to the concept of “being led” [See chapter 1], together with the lively curiosity that characterizes them. Their creativity is inborn, leading to their own particular interpretation of the objective world. They observe the objective world from their own subjective world viewpoint and the image created in them is their own unique, creative interpretation of it (Bick 1968).

Because of the difficulty of evaluating the creative capacity, it used to be considered impossible to research. Freud (1908) discussed the concept in the context of similarities between creative writers and daydreaming children. The subject was first studied closely from the mid-20th century, following J.P. Guilford’s research (Guilford, 1950), which characterized creative people as having the ability to create a large body of ideas with a high level of innovation and flexibility of thought.

There is a convention in scientific literature that defines creativity as an ability to produce original, practical, generative work within a particular social framework (Stemberg and Luban, in press). This means that the definition of creativity encompasses not only the creative person, but also the creative product and even the reciprocal relationship between creation and society. Creativity is present in all areas of our lives (Simonton, 2000).

By Albert and Runco definition creativity necessitates a multiplicity of skills, some reflecting maturity and some, in stark contrast, requiring abilities characteristic of early childhood. This combination of maturity and childishness, continuity and lack of continuity, suggests that creativity is in fact multi-faceted. It is a kind of complex or syndrome, which is the product of many skills, different personal characteristics and a range of abilities (Albert and Runco, 1989). Such a description assumes a need for a multiple dimension in order to define creativity. This multiple dimension is expressed in a creative intent and motivation to make a transformation from the objective world to a world of original interpretation, alongside an ability to decide when the newly created invention has a practical application and when not.

Other attempts to define creativity underline the need for a connection between two distant associations (Eysenck). The ability to make a connection between two distant associations is inherent in any creative activity at any age. Transformation occurs when we interpret the objective world. Children, and even very young ones, also interpret the world through uninhibited and original play.

*“To think is to act on the object to transform it,”* Piaget, 1973a, p.90.

Piaget2 pays considerable attention to transformation. He describes adaptation as a connection between assimilation and accommodation. Assimilation is an act undertaken in order to adapt current knowledge to the knowledge found in cognitive structures. This idea corresponds with the passive experience of “being led”, [see chapter 1). Accommodation means change, transformation, which is created in structures as a response to new information, an idea that fits the repetitive imitation mechanism, which helps create the transformation.

Piaget’s subjective experience is a personal one with a unique structure and as such may be described as interpretive and idiosyncratic. The subjective and objective experiences are not identical. It must be noted that there is always a disparity between allegedly objective reality and subjective reality. This disparity and its importance has already been discussed (Chp 1) and will be further addressed below. However, to continue with transformation: this occurs when there is interpretation without inhibition (Singer and Singer, 1990), when an individual is so deeply involved in something that he “loses himself”. Creative people frequently describe an experience of “being at one with” the problem they set out to resolve. If such an experience of fusion is achieved, then a new creative idea will surface.

This is equally true in children. Anna Freud (noted, for instance, that children’s defense mechanism in the face of fear, such as fear of a dog, is to go down on all fours and “become” a dog themselves (identifying with the aggressor). In this way, they convert their fear of the dog into a feeling of control over the animal. One might say that in imitating the very dog they fear, they create a different, original behavior to cope with the reality. This type of act is relevant to imitation, as previously discussed (chapter 1, Page 7). It is an example of how, in the present study, imitation can serve the regulation of emotions and defense mechanisms in general and even direct us towards an application in therapeutic work.

In discussing fusion with reality research-based and theoretical literature, (Maslow, 1971), speaks of a need to blur self-limits and the object, enabling a creative process. Thus, the creative process requires the experience of “being led” in order to form a connection, such as imitation, with the object and make a creative act possible, in a similar way as pregnancy leads to the creation of something new.

“Lost in the present… seems to be the sine qua non for creativeness of any kind… Loss of the ego transcendence. Fusion with reality being observed… Giving up the past… giving up the future.” (Maslow, 1971)

Maslow sees creativity in childhood. He emphasizes children’s ability to become totally focused and lose themselves in a creative process (“being led”).

Piaget claims that creativity applies to all ages. It not only requires logical thinking, but is linked to the personal logic of the individual and includes personal and original criteria. Because of the tendency of psychological tradition, as described above, to attribute creativity most commonly to adult geniuses exclusively, there is also an inclination to view children as lacking in creativity, because of developmental difficulties of speech and self-expression. But it is precisely the fact that children read the world in their own special way, both active and interactive, that reinforces Piaget’s view of their having creative ability. Creative abilities are found in every area and it is the very presence in children of developmental difficulties in speech and self-expression that underlines the existence of creativity, since they find original ways of expressing themselves, other than through speech. Moreover, creativity cannot be measured with value-based criteria; it is neither good nor bad, successful nor unsuccessful.

The current modest definition of creativity, put briefly, is as follows: it is the ability to take two things and connect them (form an association) in an original way that produces a third element that differs from the two original elements (Eysenck). In fact, genius is not a prerequisite needed to define creativity; it is present at any given moment when an association is formed between any two existing ideas, resulting in a third, new idea. In practice, any interpretation of reality is by definition subjective and so does not describe the object; thus it is a new and creative response to what the object appears to be.

The question of what affects creative development or makes it possible arises frequently. Differently put, what impact does the environment have on creative ability? Does our creativity improve when it encounters a cognitive stimulus and how does intervention influence the brain? Cognitive stimuli in the context of creative cognition can appear when people come across ideas created by other people, in a similar manner to Tarde’s view of imitation as producing new ideas. One example of this theory is brainstorming sessions (Osborn, 1963). Any idea suggested by one of the participants generates an idea in someone else. The relevant literature from traditional research on behavioral and cognitive creativity shows that creative cognitive performance results from the process of sharing ideas (Paulus and Nijstad, 2003). Research findings indicate that the more focused shared ideas are – provided individuals are willing to share and are interested in them – the greater the creativity (Paulus and Yang, 2000). Thus, one might expect that children who are exposed to adult company sharing their opinions (if the children have a connection with the adults) will go on to become more creative.

## A. Imitation and Creativity – Integration

This section of my doctoral study addresses my previous claim that imitation and creativity are one and the same, as well as the way in which imitation is a *sine qua non* for the existence of creativity. I will add examples from work in practice.

Imitation by itself is, as it is defined in this study, a creative work in process. In order to make that process clearer, I will introduce its evolutionary origins. Following this chapter (chp.3) I will indicate the place the imitation mechanism, and its definition hold among the different internalizations' mechanisms, and will differentiate it from those mechanisms. I will then construct the mechanism among other neuropsychoanalytical concepts of consciousness, indicating where and how it works in learning about the world, and how it works as a transformational mechanism of bounding free energy. (chp. 5).

# IV. IMITATION AS AN EPIGENETIC CONCEPT IN HEREDITY

## A. How Well do we Understand Heredity?

Heredity is typically defined as an inter-generational transfer. This transfer requires a form of repetition – repetition of elements passed from the endower to the recipient. This interdisciplinary study defines the process and mechanisms of the imitation mechanism. Imitation is observed in humans from the moment of birth (Meltzoff & Moore 1977), and therefore it can be assumed that this mechanism exists even in fetuses, based on the continuity shown from prenatal to postnatal life (Prechtel 1984). Contemporary knowledge seems to indicate continuity in the development of instincts as well (Robinson&Robinson & Andrew 2017) and supports the concept of genetic memory. The fetus grows in the mother's womb with the congenital instincts that for purposes of this study will be referred to as the "evolutionary environment". This chapter will review contemporary research on heredity and will use this information to attempt to clarify the imitation mechanism in evolution and development. It will describe cerebral mechanisms, progressing from honey bees to animals, and finally will connect this knowledge to its significant role in the development of an infant's attachment to the world. It will describe heredity mechanisms and the evolution of thought in the various theories of evolution and will attempt to track the proposed hereditary mechanisms in order to learn about imitation from these components.

When studying heredity, we tend to search under the lamp post and think about heredity in terms of DNA sequences, since the ability to comprehend these sequences are the core of biotechnology. This does not mean that we should eliminate all aspects of heredity that involve transfer from the DNA to the RNA. So far, all existing studies have focused on organisms that are genetically operated by stable cell structures to present new genetic information to the DNA for transplantation purposes (Shapiro 2013) Thus, it has never been proven that DNA contains all the components needed for genetic transfer. As Rudolf Virchow wrote (Virchow, 1858,1902/2006), "Omnis cellula e cellula", all cells come from cells. We still do not have a full understanding of the structure and importance of the organelles[[2]](#footnote-3) in descendent heredity. We know that in human heredity, both the maternal environment and the sperm contribute non-DNA factors. Reflective observation shows that the egg is the necessary structural basis for heredity in all high-level transfers in all organisms. Based on this understanding, we can claim that there is a fixed base, to which other "additions" are made. These additions can be incorporated into a mixture or a compound, which are different types of attachments between the egg and these "additions". Different interactions can create different types of original transformations in the egg that will be replicated and processed based on the different needs of the body organs.

The definition of heredity describes one structure that is transferred to another structure, while the original entity enables the formation of another structure. The basis for this transfer is a renewed and original connection between substances. The procedure in which a structure of one kind replicates itself in order to create another structure is essentially the definition of imitation as it will be used in this study.

The question remains regarding whether cellular modifications are critical events at innovative stages of evolution. Spero (2000) notes that it seems that understanding that DNA is repetitive does not suffice to scientifically describe the entirety of hereditary renewal.

Epigenetic information, i.e. the long or short-term heredity that is now called epigenetic heredity found in both DNA and RNA, is a contemporary field of research that is of upmost importance in evolutionary studies. Imitation will therefore be incorporated into epigenetic research. The hypothesis is that there is a form of heredity that receives structures from the environment and adapts itself to those structures. The new structure then unites with the existing structure in various ways to form an inherited structure that differs from the original DNA.

**The process that leads to development and evolutionary synthesis**

Much has changed in the biological world regarding the perception of the historical evolutionary and developmental processes. Three scientists are associated with the laws of biology and evolution: Ernst Haeckel, Charles Darwin and Jean-Baptiste Lamarck. Each of the trends in evolutionary knowledge can contribute to constructing the general outline of the imitation system structure. Each of these theories came and went. Each was accepted and rejected throughout the history of their existence. Each has something to add, and later I will offer a detailed explanation of the theoretical contributions of each one.

Haeckel proposed the first biogenetic law which states that “ontogeny recapitulates phylogeny" – meaning that observation of fetal development reveals stages that appear in adult forms of other species. In other words, the fetus transforms from a single cell into what appears to be a worm, a fish, a pig and a monkey before appearing human. This can be considered a simplistic explanation of his later statement (see citation). Haeckel studied under Darwin and helped him translate Müller’s writing (1834) from German (he will later be acknowledged for developing an imitation theory). In addition, he developed a biogenetic law of his own. This description connected the fields of development and evolution. It was embraced by scientists during the second half of the 19th century and continued to influence evolutionary thought until the mid-20th century. Haeckel writes as follows: This is the Thread of Ariadne, only with its aid can we find any intelligible course through this intelligible course through the complicated labyrinth of forms (Haeckel, 1874, quoted in Gould, 1977, p.79).

When reading his words carefully, it is clear that Haeckel is referring to an inherited form. A fetus does not necessarily actually resemble a worm or a fish. This study discusses imitation of forms during development from the epigenetic perspective. It claims that there is a certain foundation for heredity, whether DNA or the fertilized egg or, at a later stage,,the newborn, to which other forms connect to create a third structure that becomes a new, advanced and creative form.

This concept of developmental repetition brings us to another law that is attributed to Jean-Baptiste Lamarck, namely the law of use and disuse. This law explains how organisms differ from one another in their distribution, social order, how they adapt to their environment, and how they endow their adaptation abilities to the next generations. Lamarck's explanations of world order were abandoned in favor of the Darwinist theory of natural selection. However, while grappling with the subject of social learning, neither Darwin nor his successors could ignore Lamarck's theory.. They searched for sources of childhood fears in inheritance of knowledge of fear that was developed in order to cope with genuine predators in ancient times. Darwin wrote:

"May we not suspect that the vague but very real fears of childhood, which are quite independent of experience are the inherited effects of real dangers and abject superstitions during ancient savage times? It is quite comfortable with what we know of the transmission of formerly well-developed characters, that they should appear [in the descendants] at an earlier period of life, and afterwards disappear". (Darwin, 1877).

This search for a single correct theory and the tendency to reject other theories has been repeated throughout the history of evolution. Thus, Haeckel's rejected theory was revived in the 20th century just to be rejected again when genome studies emerged. And now in the 21st century, the greater focus on the mechanism of regulating genetic expression has brought Lamarck's theory back to center stage and transgenerational effects make it possible to accept this theory.

Today, neuropsychoanalysis can offer an excellent explanation of the emotional system of inherited fear based on Jaak Panksepp' s theories. It can identify emotional structures of the FEAR system in the brain that stems from structural inheritance of brain structures that appear in subsequent generations due to fear of predators. Panksepp' s theory identifies one of the possible imitation functions that we will discuss later on and coincides with Muller's theory that offers an explanation for variance as a function of fear of predators. These structures are passed on in repetitive heredity, which, for purposes of this study, will refer to the imitation mechanism that essentially describes genetic, emotional, phylogenetic and epigenetic replication. This is the essence of the development and evolution of imitation structures.

August Weismann developed the study of cells (1984) and found that hereditary units had a single essence that was later called genetics. The discovery of genes promoted embryology and pushed Lamarck and Haeckel's research aside.

The paradigm of evolutionary research changed once when genetic research began to develop, and again today due to an understanding that evolution and development go hand in hand. There is now an understanding that animal and human brain structures are quite similar and are driven by the same sub-cortical emotional systems. We underestimated the different organizational levels and failed to acknowledge that the different organizational levels operate simultaneously (Panksepp, 1998) at the molecular, cellular, organic structural, cognitive/emotional and experiential levels. We are currently going in this direction and developing this understanding, which includes references to social and interpersonal organization. We are now beginning to acknowledge that the animals in our labs represent a set of biological and behavioral processes that they inherited through evolution and that these processes drive them and cause their behavioral displays. These embody the psychological processes in our patients that we strive to understand (Hofer, 2014). MacLean (1990) developed the triune brainstructure that describes the different levels of the brain structure, from the reptilian brain to the limbic system and the neo-cortex. MacLean pictured the psychoanalytic patient lying on the couch alongside a horse and a crocodile. As we clarify the clear continuity from animals to humans and incorporate the knowledge that is derived from studies that identify parallel processes and different levels, we can refer to Baldwin, a psychologist from Freud's time (Baldwin, 1894). Baldwin explained that imitation is a structural process that affects all systems, while the response of one system reverberates to another. Each system responds based on its own functional behavior, and reverberates through imitation to the next system, whether intra-personal or interpersonal (Hofer, 2014).

This understanding yields two aspects of imitation: One is the replicativerepetitious element of imitation. Imitation provides structures that can be replicated and used to adapt to a new situation in a more appropriate manner. These structures can also be perceived as shortcuts. For example, when a newborn nurses from her mother, she is not only consuming milk. She is consuming an entire complex of her mother's sensations and responses as a complete structure to which the child will ultimately develop her own structural response that will contain and reinforce her. Through repeated encounters, imitation enables the child to learn about the mother, about the world, and about other structures in the surrounding environment to which the newborn will have to adapt. The child is an independent entity ( Prechtel, 1984) that also interacts with the surrounding environment in a partially active but primarily passive manner, similarly to the way that she interacted with the environment as a fetus. Responses change when contact is made, and communicative and emotional correspondence develops later when the child's libido connects with the various objects and negotiations begin between the child and these objects. During imitation, the child is led through the world by external events. Nevertheless, the imitative response echoes through the various systems so that each system responds based on its functional capacity. This is yet another aspect of the same mechanism. Imitation drives the other systems to action.

For the three billion years of life on Earth prior to this time, the only mechanisms for creating heritable variation among the single celled organisms inhabiting the Earth during that long period had been genetic mutation, and later, with the evolution of sexual reproduction, the recombination of genetic “alleles” from each parent cell. But now, with the new forms of variation created in the Cambrian “explosion” by this life process we now call development, came the potential for a new category of heritability by which new developmental paths could be transmitted to subsequent generations, through various forms of transgenerational effects. For example, the embedding of eggs, embryos, and fetuses within the protective internal environments of female fish, birds, and mammalian mothers, not only functions to promote the survival of her immature young, but also serve as “inherited environments” that provide links between generations potentially capable of transmitting the effects of events in their own generation to the next (Danchin et Al. 2011). Similarly, in the postnatal period, developmental effects can be transmitted across generations postnatally, through the previously described “hidden regulators” operating within the mother's interactions with her infants.

Humans do not have more genes than animals, they function as a series of switches that are dictated by structures and genes that are coded by a selection of proteins. These switches are organized in circuits and in complex networks, so that fetal development is more like making new arrangements with Lego blocks than new constructions like crystal. The process involves varying paces of regulatory areas in genetic intervals. These Lego connections facilitate multiple structural modifications that form new structures and additional building blocks. These are the metaphors used to describe different theories of development (Hofer,2014), and help us understand the contexts of the connection between animals and humans that will be described below.

### 1. The Concept of Imitation in the Continuity from Animal to Human Life: From Prenatal to Postnatal Life, From Honeybees to Human Instincts

Gene Robinson, winner of Wolf Prize in agriculture for 2018, explains that the spectrum of animal life is not a blank slate. Dolphins can swim, and honey bees can dance without learning anything at all (Robinson, 2011). These abilities are unique to these animals and appear even before they are born. This is the platform on which they encounter their environment. Little is known about how these ingrained features are developed. Some were analyzed at the cellular and molecular levels ( Levis et Al, 2016). Instincts are considered to be part of the category of characteristics that are inherited from predecessors and precede acquired knowledge. There are no general principles. Based on contemporary studies, I will argue that instincts are developed through learning that is made possible by imitation, based on the same principles that facilitate general learning processes (Tierney, 1986). For example, if we consider an animal for which learning focuses on developing agility in the dark, it is likely that this group of animals will develop under circumstances in which better adaptation to their surroundings is required, and that this group will have longer survival rates.

Assume that members of ancestral populations use behavioral plasticity to respond in an adaptive way. If this adaptive behavior enables better acclimation to the environment, then anxiety hormone levels will decline, and natural selection processes will choose those that respond and adapt better during development or with ongoing practice. The natural selection that strives to improve the timing and accuracy of its plasticity will lead to development of instincts. Selection forces are dependent on the environment and on environmental demands. Plasticity is required in certain situations, and conformism, or what we will refer to as a less stereotypical approach, is required in others. This process does not require programming everyone with congenital instincts. Instead, it requires a form of behavioral tendencies that are supported by refining dependence on experiences with the environment and developing the ability to respond differently based on the event or social situation. These require certain predictable patterns of environmental reinforcement. This hypothesis, says Robinson, coincides with the definition of "plasticity-first" as an evolutionary model that describes plasticity as the initial state that enables adaptive acclimation.

The concept of plasticity includes the concept of imitation, as this study claims. Imitation that is repetitive and adaptive to the external environment on the one hand and to internal structures on the other, enables imitation to become repetitive and thus to become creative. This model is reinforced by the development of the behavioral genetics approach. We now know that genes respond dynamically to diverse relevant behavioral stimuli and they produce massive modifications to genetic reflections in the brain. The adaptation mechanism is in fact imitation. The "plasticity-first" approach has also been applied for stickleback fish, Darwin's birds, and mammals in which rapid evolutionary changes are evident (Wyles et Al. 1983).

This is also evident in the "mutations-first" evolutionary model that describes mutations as the cause of changes in the timing of development of neuronal circuits when transitioning from the prenatal to postnatal state. Data collected from neuroscientific research support the notion of a uniform model of behavior. For example, recent studies on honey bees and flies show that the two-species learned olfactory responses to smells, and they are created by the same neuronal circuits. The same neuronal circuits can be displayed in rodents as well. This applies to the courses of fear in these animals as well (Levis, 2016).

Evolutionary changes in acquired behaviors create brain structures that develop into cerebral programs that regulate and thus facilitate behavioral changes. Behavioral responses that represent fear or various levels of aggression have been identified in honey bees. These responses evolved based on the honey bees' environment and will influence the bees' behavior when they are exposed to danger. Evolutionary changes become instinctive and reduce dependence on external conditions in favor of regulation or internal adjustments and will have genetic representations that will control the aggressive or calm behavior of these honey bees.

Robinson suggested that new instincts appeared in genetic evolution, and they influence the plasticity of behavioral responses. Robinson based this claim on an expansive study that presented transgenerational changes that indicate behavioral changes in lab rats. Rats that displayed less of a tendency to respond to stress with licking behavior passed this tendency on to their offspring as well. These behavioral changes reflect epigenetic modifications and are represented in the form of changes to the hippocampus.[[3]](#footnote-4) Rats that learned to fear a certain smell passed this experience on to their offspring. This transference requires genetic modifications to the gene that is receptive to smell. The descendants of those rats were shown to display a conditioning response to the smell and to do so faster than their parents did (Dias,, 2013). It remains unclear whether this transgenerational transfer occurs in mammals as well (Nestler, 2016). If it is shown to occur, this will clarify the mechanism at hand and will provide an explanation for the speed of transfer. In addition to being transferred unconsciously and possibly without requiring any action, the imitation process is an extremely quick transformative process. If such intergenerational transfer is indeed possible, this will provide us with a possible explanation for the speed of the influence of imitation. There is also the possibility that this will provide clear proof that imitation is in fact a congenital epigenetic instinct.

Robinson proposes that the evolutionary development of instincts is based on formulations that he calculated using honey bees. He describes the epigenetic pull of the neurons to the pleasant and unpleasant aspects of the bees' sense of smell, and how this pull facilitates the development of decision-making in bees and their rejection of certain flavors. His neuronal description coincides with Freud's description from the previous century of the development of the ego and the id, as appears in the following quote:

"The id, cut off from the external world, has a world of perception of its own. It detects with extraordinary acuteness certain changes in its interior, especially oscillations in the tension of its instinctual needs, and these changes become conscious as feelings in the pleasure-unpleasure series. It is hard to say, to be sure, by what means and with the help of what sensory terminal organs these perceptions come about. But it is an established fact that self-perceptions – coenaesthesis feelings and feelings of pleasure-unpleasure – govern the passage of events in the id with despotic force. The id obeys the inexorable pleasure principle".

(Freud,1938)

Studies of the motorial behavior of the fetus show that there are fixed patterns of ontogenetic behavior that is defined by the fetal sleep and wakefulness cycles, by changes to pulse rates, and by different structures of motorial activity. Typical characteristics of motor activity, or general movement, begin to appear at eight weeks gestation, and continue into postnatal life as well. Newborns display a set of congenital instincts called evolutionary instincts. These instincts, which were defined as characteristic movements and considered to have evolutionary roots, are influenced by the newborn's environment. The frequency or absence of these movements is dependent on environmental and emotional circumstances. Therefore, evolutionary instincts do not stand alone, rather they are an indication of the connection between evolutionary movements and the social environment. They prove the existence of a nature-nurture cycle. Although a newborn child is the product of evolutionary processes and intrauterine life, the newborn's reactivity is influenced by the surrounding environment from the moment of birth (Touen, 1984). We can also conclude that the intrauterine environment is a hereditary one that exposes the fetus' genes to the evolutionary setting to which it must learn to adapt. The fetus learns how the entire world is structured and about the upcoming challenges while still in utero. If the mother is diabetic (which is called in this study a structure), the fetus must increase its insulin levels in order to cope with her diabetes. The fetus discovers whether the uterine environment is beneficial, and if not, it may stop developing and refuse to accept maternal nutrition which may result in premature delivery in order to enable continued development (Resnik, 2002).

The argument of this study is that the initial fetal response to interpersonal interaction is imitation. The newborn imitates the face of the caregiver. Studies show that when a baby is held in front of a person who sticks out his tongue, the child will immediately imitate that action. This is active, but automatic imitation. It influences the newborn in a manner that might appear active, but in fact it seems as if the response is automatic and almost involuntary. From this perspective the newborn is influenced, or "led", to use the term that we will introduce below, to the movement. Despite the newborn's helplessness and passiveness, when awake and alert (in state 4 of the Brazelton model,1995) the child is exposed to the environmental influences.

In an experiment, three-day old infants were given a pacifier to suck while their eyes were closed. The infants were then able to identify that pacifier from a selection of three pacifiers (Stern,1985).. In other words, the sensory experience is transferred to visual identification. The different sensorial modality is reverberated between the various systems as they respond to one another. This is an example of inter-system imitation that is formed between the different modalities of sensorial behavior.

According to Stern's model (1985) which was developed following vast research, newborns are capable of sensing patterns and order in the world within their bodies. Stern presents the enthusiasm of discovery and pleasure in newborns who find compatibility between their ability to comprehend their world and the different aspects of the world to which they are exposed. Newborns live in a world that comes toward them. They feel that the world accepts them, and they most likely feel comfortable in the world because of millions of years in which their spectrums developed in a way that enables the newborns to perceive the world around them.

Imitation is intergenerational, evolutionary, and epigenetic. It is found in newborns but is also triggered and influenced by the newborn's environment. Imitation is congenital and automatic on the one hand, while on the other hand it is the manner in which newborns sense the structures in their environment and operate their various physical and emotional systems.

### 2. Leaving the Comfort Zone: Conforming Imitation vs. Imitation that Exceeds Boundaries and Yields Creativity

Based on De Waal's (2017) description of imitation as serving the transition from animal life to human infancy, this study proposes that imitation is the model that is involved in epigenetic evolution. Whether we adapt the plasticity-first or the mutation-first models, the structure of behavior and learning about the internal and external world is actually imitation of what existed beforehand and its gradual adaptation into what is currently required by internal or external realities.

To explain the imitation model to which I will refer in this study, I will use de Waal's research on imitation in animals. De Waal coined different definitions for different aspects of imitation and compared these aspects between different types of animals and human beings. The imitation model used in this study, unlike other models, clarifies, explains, and emphasizes, other aspects of the concept of imitation based on the epigenetic approach that was identified above.

According to de Waal (2017), the original definition of imitation was to do something just as someone else did. However, his research indicated that a narrower and more focused definition was needed. Therefore, he defined a new category called genuine imitation. This requires conscious and intentional imitation, as songbirds imitate one another. It necessitates insight and comprehension. Imitation is found in all types of animal life but genuine imitation according to this definition is very rare. De Waal found that monkeys, like children, are born imitators. He refers to this as conspecific imitation, meaning imitation of your own species. However, if monkeys are raised in a different environment, like in a human environment, the monkeys will imitate human behavior and will spontaneously learn to brush their teeth, ride bicycles, eat with a fork and knife, and more. Just as dogs that were born in a feline environment and were raised by cats display feline behavior such as licking their paws to clean their faces and sitting in feline positions. (De Waal, 2017, pp 152).

Scottish primatologist Victoria Horner and Andrew Whiten (2006) raised 12 orphan chimpanzees in Uganda. The chimpanzees became accustomed to their caregivers and imitated them. The chimpanzees were found to be more intelligent than children. Their imitation patterns were more purposeful than those of children. The researchers conducted an experiment in which they placed candy in a transparent container and in an opaque bag with several holes. The chimpanzees made one hole in the opaque bag while the children imitated all of the movements made by the experimenter and made holes that were actually unnecessary, indicating the difference between the children and chimpanzees' behavior. The children imitated everything that they adult experimenter did, while the chimpanzees were more purposeful and targeted the objective of their imitation. In other words, they imitate in order to solve a problem. The monkeys' imitation was selective while the children over-imitated indiscriminately. We can think of this over-imitation as an ability of our species, we transfer all our habits to our children in their entirety, and the recipient does not use his own thoughts as he sees fit. Assuming that children comprehend that adults are more knowledgeable than they are, the child imitates the adult without hesitation, according to Horner and Whiten.

In this case, imitation is a tool used to express social affiliation with a certain species. Imitation between species is beneficial because it can, for example, serve a monkey in a human environment. The desire to resemble our surroundings is therefore a survival tool. This type of conformism supports the need to belong to a family or species. The imitator learns the environmental behavioral structure, imitates it consciously or seemingly unconsciously, and the similarity enables the imitator to achieve what others have already achieved. Those that already figured out how to cope with the environment and how to adapt it to themselves, have created intellectual structures that they pass on to their successors in the form or instincts. Current coping mechanisms will be partially based on reality, but mostly based on congenital structures that are already a part of the internal system. These structures regulate and support adaptive behavior. These behaviors will be repeated until something happens to change them – whether internally or externally. Therefore adaptive, conforming behavior can be described as beneficial for survival.

### 3. Survival Aspects of Imitation

Nearly 130 years have passed since Fritz Müller proposed his evolutionary explanation for unpalatable species, known as Müllerian mimicry (Sherratt.T.H. 2005), which describes the similarities between the behaviors of different species of insects in this category. These insect species make themselves physically resemble one another in order to protect themselves from predators. Müller reinforced his claim using a mathematical model that showed the precise number of insects (n) that are killed each season until the killing stops. The mathematical model was never proven, but his claim is upheld and reinforced.

Different, diverse explanations have been given for the evolutionary system. Below I will present several proposals that have emerged from evolutionary research of imitation regarding the goals of imitation and how imitation has worked throughout animal evolution and human history.

Batesian mimicry is a natural phenomenon in which two species, one poisonous and one harmless, which live in the same natural environment and are vulnerable to similar predators, use the same warnings signs at the same time. This imitation is a form of symbiosis in which one species gains and the other loses. Batesian mimicry (Kunte, 2009) is named after naturalist Henry Walter Bates, who described the phenomenon in a study of butterflies in Brazil. His explanation for this phenomenon is that when a predator encounters two types of prey with the same warning signs, while one is harmful, the predator will avoid eating both types. However, there is an entire spectrum between Müllerian and Batesian mimicry. Müllerian mimicry is based on different warning colors and depends on the predator being able to recall that the prey is unpalatable or dangerous (Duncan, 1965).

De Wall describes the survival caution taken by monkeys in his experiment in a different way (De Wall, 2017). He served food to the monkeys in two different colored containers. He put nourishing food in one container and spoiled food in the other. The monkeys learned to eat only from the box with the edible food, but the fascinating discover was that the monkeys' offspring also only ate from the box with the edible food. Even after the researcher placed edible food in both colored containers, the monkeys continued to eat from the original container only. Their imitative actions created a process of conformism. All individual exploration was eradicated. The young monkeys even sat on the second container (the one in which there was originally spoiled food), which now had edible food, without even attempting to explore its contents. Even when new male monkeys were added to the group, they behaved like the original monkeys. The study showed that animals tend to follow their parents' examples, even if this behavior does not offer better chances of survival.

Sometimes, conformism determines what will transpire even when gratification is minimal. Monkeys were placed before three boxes of different colors, and one monkey opened all three. In some cases, all three boxes were full, and in other cases two were full and one was empty. The monkeys imitated the first monkey and opened all three boxes although some of them were empty (De Waal). This indicates that the conformism that was created through imitation did not necessarily yield gratification through learning processes, though imitation continued despite the lack of gratification.

A single starving female monkey finally changed the conformist behavior of all of the other monkeys. By removing the new monkey from its comfort zones in order for her to choose the container that historically held spoiled food, the other monkeys will follow. And indeed, when a starving monkey arrived and ate the edible food stored in the container that once held spoiled food, her offspring followed suit. The monkey paved the way for the other monkeys.

Once we understand the imitation mechanism, what new insights can we offer? As Hofer wrote (Hofer, 2014):

“The implications of these findings and ideas mark a true paradigm shift in the fields of evolution and development… From the EvoDevo perspective, development and its capacity to generate variation is seen as a major participant and even a cause of evolution … We now understand many of the ways in which early experience shapes the behavior of the adult organism as part of that variation. And our new knowledge of the nature and roles of genes, and of the many novel mechanisms for their regulation during development, has restored our understanding of biology to a position much more supportive of Freud’s formulation of psychoanalytic theory”.

This study will argue that adaptive changes occur during the development process (Kirschener, Gerhart, 2005) that are facilitated by repeated use of regulator networks and new combinations and patterns and are part of the behavioral and physiological responses of each individual to its changing environment throughout the development process. Repetition of this change over the course of several generations creates a new structure, and therefore the influence of the immediate environment will now be incorporated into the new structure that was formed and will now also be represented in the genome in this manner.

This study now presents a new understanding of the imitation system. The understanding that human heredity occurs through repetitious genetic transfer coincides with the definition of imitation used in this study. The important influence of a beneficial environment and the rapid activation of the impact of this environment on hereditary changes, and in fact on the endowed genetic structure and the fixation of physiological and brain structures, all affect human development.

Imitation becomes apparent in many systems (Baldwin, 1984/1930) as early as in the fetal stage. In prenatal life, independent motorial activity called general movement (Prechtel, 1984) is observed, in which the fetus moves independently using motions that are unique and characteristics of that fetus. Normal and pathological patterns of movement can be observed and categorized, but fetal movements are fundamentally unique. I will argue that these unique patterns are a function of imitation and its formation that is based on the genetic composition of the fetus and its reactivity to its environment. The uterine environment is an evolutionary environment, and the quality of maternal and environmental behavior influences the fetus, who imitates these functions. Therefore, there can be a wide range of movements, from regulated, repetitive movement to motions that are chaotic or of limited repertoire. I assume that there is certain correlation between fetal intrauterine movements and the mother's condition, for example fetal responses to a diabetic mother.

My argument is that imitation is a product of evolution and involves development that is suited to the specific environment, epigenetic by itself. Imitative responses are unconscious ones, they lead the individual, and they are repetitive. Repetition facilitates development and enables creativity. Imitation and repetition are the basis for how the organism learns about the world and develops within it.

Imitation is a cognitive process that involves vision, perception, memory representation and motor control. The question of how to define this mechanism and the essence of the imitation process has drawn much attention in recent years and has produced a complex conceptual glossary, ranging from neuroscience to animal behavior, from Darwinism to Haeckel's, and from Lamarck to the development of evolutionary disciplines with the discovery of the genome and organelles. The mechanism has evolved from developmental evolutionary approaches to genomic ones and has gone back and forth until the Evo-devo approach bridged them. The terminology in this field shifted with the discovery of mirror neurons, made assumptions about the connection between these neurons and empathy, and identified the link between perceptual representations and motorial function. They appeared in theories of learning and contradicted earlier theories that were based on the definition of imitation as merely coping other behavior. I will present an alternative framework to describe imitation that will identify its applicative functions for development and its role in evolutionary processes – from flying insects, to animals and finally to the human brain.

### 4. How is Imitation Related to the Analytic Approach in General and Specifically to the Neuropsychoanalysis Approach

The imitation mechanism is part of what is known as Evo-devo, a term used to describe the links between evolution and development. Psychoanalysis is rooted in evolutionary thought. During the 20th century, biology was associated with the concept of "nature" as part of the endless debate over nature vs. nurture. Psychoanalysis distanced itself from the natural sciences, from the Darwinist roots, and from biology as a whole. This new field of neuropsychoanalysis creates new links between brain functions, the inner world, and internal processes that occur in analytic situations. The concept of imitation bridges the different approaches and can clarify how epigenetic developments occur on the practical, physical, emotional, interpersonal and social levels.

In his book, Conservative and Radical Perspectives on Psychoanalytic Knowledge, Aner Govrin (2015) offers a socio-anthropological analysis of the psychoanalytic community that shows how loyalty on one hand and criticism and skepticism on the other, and the interactions between them, preserve the vitality of psychoanalysis. The debate regarding the balance between conservativism and innovation and the difficulty to avoid conservatism even when the incentives diminish, bear a certain resemblance to contemporary research on the imitation mechanism and creativity. Aner seeks the narrative that can help establishments such as the analytic profession to abandon the fixations that narrow its ability to expand and develop. He borrows a narrative of this kind from the world of technology and links it to the world of therapy. Seeking these concepts in different professional worlds is equivalent to what I refer to as borrowed structures in the context of imitation. We borrow structures from other fields as a basis for learning. Later we will question how these structures coexist with the DNA of Psychoanalysis. What is the resonance process that occurs between existing structures and the previous one, and how does imitation yield creativity? Which aspects of imitation will be infused and merged in order to ultimately develop a new theory.

Govrin describes how integration is formed using terms that are similar to the concepts of heredity that I mentioned at the beginning of this chapter. He writes that integration occurs when therapists find the weaknesses, disparities and unexplained “residuals” in a certain theory (Govrin,2015). For purposes of this study, I will define these “residuals” as epigenetic opportunities for theories to develop.

Unexplained residuals are incomplete structures in a particular approach. If they are addressed, they will provide the foundations for a new approach. This is how neuropsychoanalysis was created, as people with firm analytic foundations felt that they were missing certain elements of professional knowledge and sought other structures that would help them overcome these voids. The structure of imitation and creativity and how it develops and help us to better learn about the world of therapy is the subject of the next chapter.

# V. THE IMPORTANCE OF LEARNING MECHANISMS IN METABOLIZING FREE ENERGY: IMITATION, REPETITIONS AND BECOMING

## A. Internalization in the Psychoanalytic and Neuropsychoanalytic Theory

There are extensive psychoanalytic debates and works of research as to the curative element in psychanalytic psychotherapy. Many years ago, I spoke with the late Prof. Dov Alexandrovich about what he thought would make therapy work. In his view the most important element in a successful therapy was the therapist’s experience of any given therapy. If in his view the therapy he was providing was beneficial then the outcome of his work would succeed. it This was a conclusion he had reached after long career in psychoanalytic therapy. Prof. Alexandrovitch made it clear, that the deep inner feeling of the therapist, the sense that they were delivering was successful, would lead it to becoming the therapy offered by therapists to future generations of patients. He was talking about of his own approach to intergenerational inheritance. He didn't talk about a particular school of psychoanalytic thought, nor about a certain interpretation. What he told to me in a way exemplified the way in which imitation is intergenerational, how it works (implicitly) and its creative effect on our clinical work.

In this chapter it will be argued that there is certain structure which is a lacuna in the psychoanalytic theory. There is a mechanism which is part of the SEEKING system. It will show how the imitation mechanism and its intergenerational repetition is so important and how crucial it is to the success of psychotherapy. It is a mechanism ignored by Freud5 and one which over a long period of time acquired a poor Freud reputation. As indicated in the last chapter it is, in fact the mechanism that constitutes the healing element in psychotherapy, in an individual’s inner world, in interrelationships, in societies, and in different cultures. This mechanism is implicitly open to accepting external structures, and the repetitiveness is what makes it creative.

But first, we will review the concept of internalization, investigate how it was quantitatively researched, and the results obtained. We will be asking to what extent the patients were able to internalize relations with their therapists during therapy and once it had ended? Subsequently we will review the history of the development of the psychoanalytic movement, to understand the place of internalization in the psyche. Finally we will examine the different definitions of the concept of internalization.

The processes of therapy are bound with psychodynamic processes of the Ego (Loewald, 1960), that occur with internalization. The more intact the Ego is, the more subliminal these processes are. This is the reason why imitation and nonverbal mechanisms were not appreciated and did not receive an appropriate place in theory. It was found that definitions of the concept of internalization received many titles. At times they paralleled each other. Internalization is both implicit and explicit. This research will look at the different concepts, and will try to indicate the lacuna in the psychoanalytic theory, which has arisen from lack of focus on developmental processes and on neuroscientific findings. As the neuroscientific knowledge developed and memory systems unfolded, a new opportunity arose to refresh concepts which had variable valence, and to elaborate the new lexicon differently, making it more accurate and opening up more contemporary options.

I will now briefly illustrate a possible form of other neurobiological evidence for the construction of internalizations, which in the present study are defined as modes of learning. I shall do this prior to discussing the historical importance of the concepts and the ways in which they have developed (Tucker,, 2015).

Research on neurobiological development provides an insight into the nature and mechanisms of human neural plasticity. These mechanisms appear to support two different forms of developmental learning.

One form of learning could be described as *externalizing*, in which neural representations are highly responsive to environmental influences, as the child typically adopts a hedonic approach. A second form of learning supports *internalizing*, in which motive control separates attention and self-regulation from the immediate influences of the context, particularly when the child faces conditions of avoidance and threat.

The dorsal cortical networks of externalizing are organized around dorsal limbic (cingulate, septal, lateral hypothalamic, hippocampal, and ventral striatal circuits). In contrast, the ventral cortical networks of internalizing are organized around ventral limbic (anterior temporal and orbital cortex, extended amygdala, dorsal striatal, and mediodorsal thalamic circuits). These dual divisions of the limbic system in turn self-regulate their arousal levels through different brain stem and forebrain neuromodulator projection systems, with dorsal corticolimbic networks regulated strongly by locus coeruleus norepinephrine and brain stem raphe nucleus serotonin projection systems, and ventral corticolimbic networks regulated by ventral tegmental dopamine and forebrain acetylcholine projections. Because the arousal control systems appear to regulate specific properties of neural plasticity in development, an analysis of these systems explains differences between externalizing and internalizing at multiple levels of neural and psychological selfregulation. In neuroscience, the concept of critical periods has been applied to times when experience is essential for the maturation of sensory systems. In a more general neuropsychological analysis, certain periods of the child's development require successful self-regulation through the differential capacities for externalizing and internalizing. I will use another reading of the very same material, discussing processes of internalization in a psychoanalytic, interpersonal language.

The significant role played by the patient-therapist relationship in the psychotherapeutic process of change has been recognized for some time by psychodynamic and interpersonal theorists (Strupp 1977). However, just how important the therapeutic relationship is in fostering change, has remained somewhat obscure. Psychodynamic theory views psychotherapy as an interpersonal enterprise which can be therapeutic at an intrapsychic level because the patient tends to reenact maladaptive patterns of behavior rooted in unconscious conflicts with the therapist (Strupp& Binder,1984). If the therapist is successful in breaking free of the repetitive cycle of the patient’s problematic actions, then the patient therapist relationship may become a means of moving beyond maladaptive patterns (Strupp, 1977). Similarly, interpersonal theory predicts that patients internalized interpersonal processes in the psychotherapeutic relationship and that internalization of positive aspects of the relationship is associated with positive outcomes including the amelioration of psychological symptoms (Sullivan, 1953). This will follow the path originally predicted by Prof. Alexandrovitz whilst at the same time noting the importance of successful experience defined in what follows as structure of the therapists' approach to his work.

In light of a culture of science-based knowledge, and a familiarity with different memory structures, I will argue that the concept of imitation contains a whole physiological-biological mental cluster which can lead us to a broad answer to the lacuna in psychoanalytic theory referred to above. In relation to both the therapist and the patient imitation functions implicitly. As will be explained in chapter 5, the therapist’s imitation facilitates the discontinuation of the malignant repetitiveness and paves the way to creativity (work with the free energy of the raised by the emotional systems because of false predictions). The synchronization that takes place in these relations between therapist and patient leads the malignant repetitiveness in the non-declarative memory and advances a form of repetitiveness which frees the patient to continue their development out of creativity.

In a continuation of the biological description one can say that the therapy functions by way of hedonic externalization towards the creation of a positive and enjoyable connection with the therapist as well as towards an internalization of attentiveness and self-regulation aspects make up the imitation movement as I will discuss below. I will try to emphasize the importance of the concept of imitation and from it to the meaning of the concept for the neuropsychoanalytic clinic in general and for neuropsychoanalytic treatment in particular. As I will discuss in what follows these are the aspects that make up the imitation movement. I shall attempt to emphasize the importance of the concept of imitation and the significance of the concept to clinical neuropsychoanalysis in general and neuropsychoanalytic therapy in particular.

## B. Defining Internalization in this Research

An understanding of Internalization requires a reference to the concept of consciousness. Consciousness consists of awareness and wakefulness. In dealing with internalization we are talking about the developmental need of an organism to consider the drives with which it entered the world. In its conduct there are parts that are driven like reflexes and other parts that are sensors which are sensitive to its internal environment and the world in which the organism lives (Solms 2021). In light of this the concept of automatic behavior, which includes behavioral motifs that aim at stabilizing it at the level of homeostasis, requires elaboration. Just as any tendency toward relative stability maybe be subjected to the surprises of the unexpected external reality that same possibility also applies to sensory conscious reality. The encounter with the subjective and external inner reality creates internal structures that are constantly organized and renewed as a result of an encounter with new realities. Their emotional activation also produces an array of images. As this process evolves it leads to the formation of a range object relations. Those relations are a means of achieving a balanced, homeostatic basis on which we establish our reflexive awareness (Solms& Friston,,2018)..

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## C. Description of Concepts Relevant to Describe Different Forms of Internalization

The question arises as to what concepts are used by therapists as internalization? The findings of research on the different stages of internalization are highly significant. It provides us with a detailed picture of the patient’s memories with respect to the therapist’s clinical approach. For example: Thirteen adults in longterm individual psychotherapy were interviewed regarding their internal representations, (deemed as having brought to awareness the internalized "image" of their therapists). Results indicated that in the context of a good therapeutic relationship, clients' internal representations combined auditory, visual, and kinesthetic (i.e., felt presence) modalities; those which were triggered when clients thought about past or future sessions, or when distressed. They appear to occur in diverse locations. They vary in frequency, duration, and intensity. Clients felt positively about their representations and used them to introspect or influence therapy within sessions, beyond sessions, or both. The frequency of, comfort with, and use of clients' internal representations increased over the course of therapy, and the representations benefited the therapy and therapeutic relationship. Therapists tended not to take a deliberate role in creating clients' internal representations, and only a few clients discussed their internal representations with their therapists.

Clients' internal representations of their therapists can be defined as clients bringing to awareness the internalized “image” (occurring in visual, auditory, felt presence, or combined forms) of their therapists when not actually with them in session. In these internal representations, clients have an image of the living presence of their therapist as a person. Despite its apparent significance, the phenomenon of clients' internal representations of their therapists has not received a great deal of attention in the literature. Related concepts include incorporation, introjection, identification, internalization, attachment, transference, and object relations (Loewald, 1960) Each of these constructs, including internal representations, involves some form of an often-covert relationship that clients experience with their therapists. Thus, these related and partially overlapping constructs all refer to variations on the theme of how clients “take in” their therapists and fall under the conceptual umbrella of internalization processes.

These variations have been discussed at a theoretical level but have not yet been investigated empirically. My objective in this study is to investigate one of these internalization processes (i.e., internal representations) because *am* interested in how clients “use” their therapists between sessions. The representations of the therapist include, how the patient imitates his therapist in the special way the therapist uses the space, how he sits in his armchair, or how he repeats the verbal interpretations which calm him. What are the aspects of those representations, his vocal calibrations? What is the affect used, what does the patient sense and what is the smell of the room?

Similarly, previous researchers found that internal representations enabled clients to adopt their therapists as a kind of imaginary companion with whom they can talk privately as they assimilate and apply their therapeutic experiences between sessions. (Orlinsky & Geller, 1993; Singer & Pope, 1978; Wzontek, Geller, &Farber, 1995). Researchers have also theorized that internal representations provide clients with self-guidance, which emerged in the present study both in the introspections and in the influence of internal representations on the content of later sessions (i.e., clients' internal representations helped guide them with respect to what they wished to explore in therapy). Likewise, these clients' representations enabled them to “continue the therapeutic dialogue” with their therapists when not actually in their presence, as proposed by Geller et al. (1981). Clients' representations may indeed function as psychological connective tissue between sessions(Atwood& Stolorow 1980). Self-perceived improvement in therapy, in fact, has been positively correlated with clients' tendency to use their internal representations to continue the therapeutic dialogue (Wzontek and Al.1995).

The relationship of the therapist-patient creates an inner structure, which, in the absence of the therapist, the patient can lean on. Clients' Affective Response to Internal Representations, are sometimes positive, at other times negative. Yet as the repetitions become solid, it is possible to assess the different emotional standings of the patient, and attachment style. Some patients present a very positive affect toward their therapists, some feel critical, some reject their neediness, but all of them show they have internalized the therapist and their relations with him. It must be said that some patients have a neutral relationship with the therapist or are entirely unaware, of the internalization of the relations. This touches upon the declarative or non- declarative memory (See Chapter 6).

As the therapy develops so the patient’s ability to identify and use therapist deepens (Winnicott, 1991). As the therapist’s presence in the life of the patient the sequencing and continuity create a greater quality of the image the patient’s memory. As patients are increasingly able to trust in their therapists’ availability and responsiveness to them, they may permit themselves to develop internal representations of their therapists (Bowlby, 1969, Kobak&Shaver,1987). There is a change from a passive to an active position towards the representations as expressed in what follows.

In addition, as described above, many clients used their representations to introspect, to influence the work of therapy beyond sessions, thus continuing the analytical processes. These clients' more frequent internal representations over the course of therapy may suggest that they had begun to take on active, agentic roles, enabling them to call upon the internalized presence of their therapists when desired. There is work that can be done on the representations that makes them useful. For instance, an improvement in a patient’s situation is believed to be related to the extent to which an analysand can evoke representations of the benignly influential components of the therapeutic relationship (Rosenzweig et al., 1996) and their ability to assume the self-regulatory functions.

An additional provocative finding was that among former patients, use of the Enactive mode of representing the therapist was positively correlated with outcome. Patients with high scores on this factor experience their therapists via “certain characteristic of bodily sensations” and are aware of “ a particular emotional atmosphere” which gives them the sense that their therapist is “with them.” (Kantrowitz,1992). The release of the individual from primary narcissism to empathy as developmental achievement is a more complex process than the that defined by Vittorio Gallese as mirror neurons. The process of mirror neurons is not simply a reflexive mechanism which has an indirect link to internalization and the identification of the other. It is not enough to understand how the other becomes distinct in the interpersonal space. The process of recognizing and identifying the other requires a gradual prolonged and repetitive process of acquiring a different image and a recurring identification of its construction, at the level of body memory and consciousness. With the departure from the initial narcissism, while building the structure of the other in the interpersonal space, a gradual process takes place that is aided by repetitive imitation that creates the concept of the other as a kind of novel creation that is adopted gradually as a "core self.”.

Let me explain the definition of the core self as it has been adapted to this research study. Core self is negotiated among writers and scientists who deal with consciousness from neurological aspects. I will mention just few of them and the central mechanisms they have cited.

It was Damazio (1999) who coined the entities: proto self, core self and extended self, defining them as Proto self to be the non-conscious forerunner of core self- the faculty of the brain which receives cues from body parts. **Core self** –has a transient quality, meaning it is receiving stimuli all the time and is creating and re-creating it again and again as it appears It gives one the "feeling of knowing"(Damazio, 1999). Extended self- includes the autobiographical self- the ability to hold several images in the mind, and gives one the sense of a sequence in time.

Gallagher (2000), points to two aspects of the self. He terms them the ‘minimal self’, and the ‘Narrative self’. Minimal self is a more primitive entity, in which Gallagher includes the self-agency element of the self, the idea of ownership. It has immediacy and lacks time or space dimensions. The Narrative self on the other hand contains the self-identity and the feeling of time and sequence- which give us the feeling of personal identity. Similarly, Zahavi (2002) have coined definitions of pre-reflective self-awareness and non-conceptual self-awareness- meaning the first-person perspective which is present from birth. These ideas are most interesting yet controversial in the psychoanalytic literature- and are beyond the scope of the discussion in the present chapter.

For this sake of this paper, we adopted Panksepp's core-self hypothesis. Panksepp talks about some different, more basic forms of self, than those mediated by the cortex. He provides a very comprehensive picture of the neurological origins of emotion. Jaak Panksepp (1998) considers "the roots of the self to go back to those diencephalic-mesencephalic sensory-motor circuits in the brain, which can generate a primitive sort of intentionality (an automatized action readiness) and of psychic coherence (global affective states of the brain). The periaqueductal gray (PAG) also known as the Central Gray, which receives inputs from all the major emotional systems of the brain, is the area where the core self-resides. This core system of the self-interacts closely with other nearby components for exteroceptive consciousness such as the Extended Reticular and Thalamic Activating System (ERTAS)".

This creation requires recognition of the space that exists between the individual and his surroundings, knowledge of the structure of the other, and a gradual adjustment that considers the self and the other simultaneously, until the creation of a structured concept. All of these are accompanied by scientific research by Francisco Javier Varela (1991) The Chilean biologist, philosopher and neuroscientist.

Converging evidence indicates that phase synchrony is probably involved in brain integration. electroencephalographic analyses in cats and primates have shown that the emergence of phase synchrony over widespread cortical domain correlates with occurrence of attentive and perceptuomotor behaviors, as well as during the executive of learning task. Analogous findings have been made in humans using electro encephalic and magnetoencephalographic techniques. Therefore, Varela concludes, the emergence of a unified cognitive moment relies on the coordination of scattered mosaics of functionally specialized brain regions. This is a Developmental process.

This internalized course of the relationship within us is encountered during therapeutic meeting. It can be said, therefore, that what is brought into the treatment room are basic, autonomous instinctive impulses, the emotional activation in the attachment relationship that reaches the levels of representation. In the therapeutic meeting there is at last an openness to surprises or change that establishes new concepts. In the present study, all of these will be termed the ‘inner world’ which has records in our minds and in our bodies as well as in our brain structures. These are the internalizations. Internalizations are extensively used, the clinical claim being that in the process of healing, therapy involves reaching those internalizations that built the personality.

Repeatedly reorganizing and consolidating and re-consolidate throughout a patient’s life (Alberini, 2013) Internalizations are not only recorded and stored in memory. They successfully create predictions which, in part, predict somewhat future behavior. These structures encounter contemporary reality, are activated, change within the therapeutic process. We need to keep in mind that these structures are not just memory banks (Solms, 1997) They are processes in and of themselves. It is known that the same internalizations become our long-term memory for the structures which will make up our behavior. This memory is established and is consolidation. The additional process that emerges from neuroscience is that the memories that have been consolidated, proceed to be reconsolidated. That reconsolidation erases past memories and leaves the new memories as an active structure that maintains our balance, which facilitates the creation predictions of future behavior upon which new concepts will be created.

At the same time, there are new research finding which clarify that there are parts of memory from early stages in our lives known as non-declarative memory. This memory is an action memory. This is memory which cannot be evoked by reflection, but clearly arises by behavior. The therapists tend “read” the patient's activities and bring them to his attention, by way of confrontation and interpretation. They insert the space of meaning into the memory and allow it to remain in our minds as an experience which, during treatment, can be revived, interpreted and be used as a developmental tool.

Therapists assume that their verbal conduct is indicative of behavior that mainly involves speech. However, they are aware of the accompanying effects of the therapy they are practicing and in recent decades have been aware of the effects of nonverbal language on therapy. For example, infant observers may notice that their gaze, their observation, has an influence. A therapeutic approach has even been developed been from infant observations which reveals that non-verbal, the construction of awareness by the therapist, produces parallel processes, and a surprising experience in which the patients are sensed as if they had been in the room where the instruction was given (parallel processes), had consequently changed and that suddenly the observer who comes into their home feels that the family observed him and changed accordingly.

Thus, today, there is an understanding that speech therapy, accompanied by therapy that develops relationally is linked to the relationship that exists between the therapist and the patient, whether at the attachment level or mirroring level. Which is to say that there is not only a tendency to attach to what is said in the room verbally,, but also to what practiced from a behavioral point of view and even to what is sensed and felt. There are many levels to the therapist's influence on the patient. The patient is affected by the therapist's appearance, his behavior, his moods, the way he leads his life, including his wellbeing. The patients are very sensitive to the situation of the therapists treating them. Therapists tend not invest a great deal within the therapeutic hour in relating to how the patient really experiences their own ways such as mood. They are accustomed within a meeting to engage in their transference and countertransference to the patient. Consequently, therapists tend to pay less attention to their actual experience of the patient, to checking the patient's internalizations of them, to examining how the patient is helped between sessions, or to noticing the change in the way in which the patient is helped by the therapists during the various years of therapy.

The representations in the patients of their therapists can be defined as the awareness of the patients of the image of the therapist. The image of the therapist can be defined in any of the levels of feeling. This can begin with the felt presence, or the visual, the movement, the sound experience, or the amodal experience of the various senses. Alongside the experience that occurs in the treatment room,, and beside it, there is an experience that takes place outside the treatment room, when the patient is in a reflective state, and revives the image of his therapist. Despite the existing knowledge in the clinical field about the great importance of the patient internalizing the therapy, its quality, its various stages and the memory that is retained from it (analysis terminable and interminable) there is no extensive literature on the subject.

I will now present the various positions adopted vis a vis internalization, by way of an historical review and a review of concepts relevant to internalization. Each of these concepts contains a conscious and unconscious part of the interpersonal relationships that exist in therapy. Some of the concepts overlap and all of them are in some way a variation of how patients "internalize " their therapists, how their relationships are portrayed within them, and portray the structure of the therapistpatient relationship. The relationship is theoretically described but my research is designed to understand how patients "use" their internalizations. This practice takes place under the umbrella of the processes of internalization.

In what follows I will give an overview, of development, complexity, and parallel concepts of Internalization: An overview of the development of the concept of internalization in the history of the analytical approach; An overview of the complexity of the concept of internalization in construction from different thinkers; An overview of the development of the personality and the concepts of internalization according to the developmental stages; and, the concepts of mechanisms parallel to internalization and their meaning.

### 1. The Concept of Internalization: Its emergence and development in analytic literature, its relations with Neuropsychoanalysis

The starting point of the analytical approach is the work of medical doctors. Ernest Jones founded The British Psychoanalytic Society in 1919, he assembled a group of professional medical personnel and suggested that initially members study in schools of medicine.

Neuropsychoanalytic concepts were originally derived from the common understanding of the analytical philosophical approach of dual aspect monism. (DAM) Different phenomena are represented in different languages and have similar meanings.

Medical language as well as psychological language share common ground in their understanding of the existence of parallel physical, mental phenomena. Although at the various analytical schools speak in different languages and even the "accents" used vary it would seem that they were all working to achieve the same concept. Yet, when we examine the translation more precisely, we become aware of numerous additional aspects of the same concept something which I will attempt to discuss in the present study.

I shall first briefly describe the neuropsychoanalytic approach to dual aspect monism (DAM), from the reworking of the Project for scientific psychology (2020) as written by Prof. Mark Solms. In the discussion in Chapter eight which deals with consciousness based on explanations offered by Professor Solms in a seminar at the Neuropsychoanalytic Society.

Freud began his Project on the metaphysics of consciousness with an attitude of amateurish curiosity. Solms believes that writing the project led him to a more complex metaphysics, and that later on he no longer spoke in such simplistic terms about body-mind relations. In his 1891 book "On Aphasia" he adopts a metaphysical position regarding psychophysical parallelism, in which he relied on the work of John Hughlings Jackson. In the book Freud writes that there are two parallel processes - one is the neurological -physiological processing, and the other the conscious psychological processing. In 1891, for the meaning of ‘mental’ was "consciousness," as was commonly thought at the time. The two types of processing work in parallel, and we do not know why.

When Freud finally wrote the Project four years later, he first explained that the Project was an attempt at materialistic reduction, an effort to clarify in anatomical terms how the mind works. The Project’s opening sentences note the necessity of such an explanation if we want the study of the mind to be part the natural sciences. At that time Freud thought that in order to explain mental processes in terms of the natural sciences, their reduction should be made to anatomical and physical processes. Solms changed the opening sentences, writing that he does not think there is a need for reduction and instead he adopted a position of Dual Aspect Monism (DAM), a position which Freud had also assumed at a later stage in his career. What is important in DAM's position is that what unites the mind and brain is not a reduction of one to the other, but there is another factor that unites the two - what Freud calls meta-psychology.

In this part of the project, Freud notes that we have now succeeded to add the quantity into the system. Freud believed that the quantity was the frequency of the neuron’s movement, in other words – the temporal structure of the neuron’s firing.

In Solms’s view the subject of quantity is not linked to the neuron’s movement. In his view quantity is connected to something more basic to which he refers when discussing precision. According to Solms the modulation of the accuracy is the natural force which is at the foundation of consciousness. It also explains how the neuron functions as well as the way in which the subjective expression of the process occurs. Solms claims that both can be reduced to one functional principle.

A meta-psychological principle of processing information. The aspect of processing information which at the underlies consciousness is the modulation of the precision.

According to Freud there are two approaches to body-mind relations. In fact, there are many more than two, but Freud does not take the others into account. His two approaches on this matter are (1) That everything can be reduced to physics and chemistry, a reduction to the output/ products, and that the mind, which is to say consciousness has no role to play (2) - the mind is an integral part of the brain, and is the subjective aspect of the brain. Thus, in neuroscience anything that has a physiological feature, also has a psychological facet, i.e. an informational aspect.

Freud does not adopt any one of the approaches; not the possibility that consciousness is inseparable from the brain and that and that one has to relate everything the brain does should be dealt with in relation to consciousness. Moreover, Freud does not accept that consciousness is devoid of meaning and everything is physiological. His position is between these two poles. In his view consciousness has a role to play but that a large part of the of the mind’s subjectivity is unconscious. It is in this context that Freud describes the unconscious in the way he appears in psychoanalysis. That is to say the brain is the physical expression of the brain, and that the mind is the subjective aspect of the brain. It is in this framework that Freud for the first time presents a position of Dual Aspect Monism. Consciousness, he argues, connects to the part of the brain that experienced subjectivity by which he means that it played a role and that when the processing of the brain doesn't experience subjectivity, consciousness has nothing to offer. Here he presents the idea of unconscious mental processes, the notion of unconscious subjectivity. This was Freud’s great innovation. In his view it will be appropriate to talk about psychophysical parallelism - the parallel that will constantly exist between physical processes and mental processes. According to Freud only some mental processes are conscious. Consciousness, he claimed, refers to only one aspect of the mind. So, what, he asks is awareness? For him consciousness is the frequency of the neuron firing period. As has already been said it is a position that cannot be held out of an understanding of the action of neurons. Thus, this position will be altered here by the concept of the modulation of accuracy.

In this part Solms used Freud's words, saying that we do not reduce everything to the brain, nor do we say that everything has a conscious aspect. Rather we claim that everything (in the brain) has a subjective aspect, but that only some of this subjectivity is conscious whereas all else is unconscious subjectivity. In other words, one can view the brain from the subjective point of view, but one cannot say that there will always be an experience that is linked to that subjective point of view.

In his conclusion Solms informs us that he adopts the DAM position, according to which the brain is the mind as it appears externally, the mind is the subjective aspect of brain’s activity, and only part of the mind is visible and revealed, whilst most of it is unconscious. According to Freud, awareness is related to the frequency of the neuron's firing. This is disputed by Solms who contends that consciousness is the modulation of the accuracy of the neuron's firing and that why any subjective experiences at all is a question that still awaits an explanation.

In this context Freud makes a fascinating statement “Certainly “says Freud “we have no way of explaining why the period of the neurons is experienced as conscious, it simply happens.” Which is to say that this is the expression of the parallelism discussed earlier. When Freud says that it just happens, and we don’t know how and doesn’t attempt to relate to the one in the terms of the other. This appears to be a serious lack when seen against the background of his original ambition. There can be no doubt that this is one the reason why Freud totally abandoned this approach and replaced it with the meta- psychology he developed. The meta- psychology replaced the project. I say this because when he tried to treat the mind through neurophysiology, he came to the conclusion that he could not achieve it and gave up. In the event he decided to explain the functional principles underlying consciousness, instead of trying to understand the neurophysiological processes. Freud predicted that the day would come when we would be able to return to that issue. He was forced to abandon the physiological perspective because he did not have the technologies that exist today. He did not possess the data, and he was unable to observe the brain in parallel with the mental processes that were taking place

The only empirical information he had was that gained via psychology. He tried to infer the functional organization of the system from psychological observations, thinking that one day it would be possible to make neurological observations, and create an improved version of the functional organization of the brain and the mind - an improved version of the met-psychology he had developed.

Within Dual Aspect Monism, an explanation is given for both mental and physical processes. This is the meta-psychological level of the explanation, a functional explanation of the system’s functioning. It infers how the system is organized.

The main advance here is to say that the basic structure that explains the physical and psychic aspect of the mental apparatus, is in the realm of information, the theory of information. This concept is related to entropy and probabilities.

I would also like to add why there is a subjective aspect to the mind. The subjective aspect allows the system to know how good / bad it is in relation to its basic needs, which are the drives that Freud defined. They are to be considered as categorical variables, and cannot be reduced to a single common denominator as continuous variables We have a self-organizing system enveloped in a Markov blanket, that does everything in its power to survive = maintain sustainable boundaries = preserve homeostasis, and homeostasis is classified according to different impulses, so they are qualitatively distinguished from each other. The affects are inherently subjective. What exists here is a Markov system which only knows its own states, and its states are categorical variables that are qualitatively distinguishable. The system registers its state as good / bad in relation to the various variables. This is why we have drives, which are the affects, and this is why we have qualities that are subjectively experienced. The system is intrinsically subjective, an instinctive system with values and qualities.

Thus, in order to continue the current study, and so as to deepen the understanding of the subject of internalization, I will briefly describe the position of the concept of internalization in the development of the analytical approach, the situations in which it is relevant and beneficial. I will investigate the location of the "quiet" mechanisms, which make it possible to draw attention to the subtle, invisible, concepts. After discussing the known concepts, I will try to assess the way in which mechanism of imitation assists in the understanding of what has been constructed here.

With the arrival of Melanie Klein in England, new concepts entered the analytical approach, evidence of which is found in the literature published in 1927. Melanie Klein dealt with the world of toddlers, aged between two and three. Klein’s work opened the preoccupation with the world of phantasy. Her work began with the exploration of children at play which she perceived as the equivalent of free associations. She discovered that children have a complex world of phantasy. In her view, a child's world of play was not necessarily innate which led her to assume that in the first post-natal weeks there existed an unconscious system of phantasy (Rayner,,1992).

The Kleinian concept of fantasy spelt as ‘phantasy’ rather than fantasy requires explanation. The term spelt with an F implied a whimsical capriciousness nonsense. The Kleinian word phantasy, on the other hand, is connected to the deeper dimensions of the mind, dimensions of imagination, of visionary notion which Klein linked to the death drive described by Freud and dealt with the destructive parts of the psyche. From this Klein assumed that an interpretive therapy was required that would decipher the death drives and hatred that are already evident in early childhood. This approach was contrary to Freud's view which made it clear that the therapist should use positive transference, and that interpretation should only be employed when aspects of negative transference arise. In the 1920s in Vienna and Berlin a new conceptualization of anxiety was created as a signal involving the impact of social elements on the development of the mind, Ernest Jones and the English schools of psychology were interested in the concepts of aggression and the death drive and the influence of social elements on the mind did not concern Melanie Klein.

In 1936 Anna Freud published her book on the defenses and personality structure. This led to a dramatic debate between Anna Freud and Melanie Klein. Klein attacked Anna Freud and was supported by Riviere(1936),, Ella Sharpe & Jones, although Freud remained neutral but suspicious of the developments that took place in England during this period. It was at this time that the preoccupation with aggression in matters of gender took place alongside the political struggles between the various approaches.

In the 1930’s of the last century Melanie Klein introduced the concept of the depressive state, which related the understanding of the good and bad relationships not only in front of the mother, who is an object of these opposing feelings. This is the concept that explained direction of the emotional integration that takes place in the inner world actually comes from. Klein talks about the importance of the unconscious urge to repair the defective objects. This is intrinsic to the depressive responsiveness. Melanie Klein deals with the nature of the relationship with the object, which leads us to the Object relation Theory. From that we can refer to internalized objects. During World War II analysts had hoped that the major disputes between Anna Freud and Melanie Klein would subside. But they did not. Key members of her circle left and served in the military in collaboration with other scientists. Tavistock Clinic was established after the war, Anna Freud stayed in

London’s Hampstead where she created the Hampstead War Nurseries, as a foster care home for over 80 children of single-parented families. Together with her close friend Dorothy Burlingham and other colleagues, Anna Freud worked with the nursery children, helping them to survive the stress of war. Later the nursery was joined by a group of orphans from the Theresienstadt concentration camp. When the war was over, Anna Freud and Kate Friedlander turned the foster home into a school for child psychoanalysis known as Hamstead Child-Therapy Courses and later Clinic.

Melanie Klein’s initial studies involved the publication of articles dealing with primitive development, the nature of phantasy and interaction. These articles have become milestones in the history of psychoanalysis. The question that has arisen is whether Melanie Klein’s is credible, Anna Freud of course thought it was unreliable. Many debates were held during this period, and these discussions made it possible to clarify analytical concepts. Esther Bick continued Melanie Klein's work. She systematically observed the infants,, accepting a trajectory that would allow her to draw conclusions about the inner world of babies. She observed the emotional world of babies along the lines adopted by Klein.

Anna Freud argued that emotional life begins at birth. Melanie Klein, on the other hand, contended that babies are not born TABULA RASA but have a mental and emotional organization that she observed in order to understand it, symbolize it, and construct analytical concepts to deal with it. In Anna Freud’s view, infants enter the world without an inherent organization, kind of a blank page and established her understanding of the defense systems for this assumption. However in the study of fetuses and infants, this assumption turned out to be wrong leading to a whole move of knowledge to the pathways of thought I In this study will pursue these lines of thought,, and I will try to demonstrate how the mechanisms under the heading of internalization ignore the early knowledge with which infants are born, and the abilities that drive their development.

The dramatic principle in debate at the root of the present work stems from the fact that the understanding of the newborn's inner world came from knowledge of the adult world, which led to erroneous conclusions about understanding the baby, the developing brain and other unaware theories between fetal and postnatal life (Prechtel, 19840).

The question that has dogged this debate is how, from on the verifiable evidence we possess, we can deduce the contents of an infant's inner world of babies which has not been directly reported to us by the infant himself. In brief this can be termed the problem of knowing what is actually in the mind of an-an-another person. The question of other mind, be it an infant or an adult. After all, this is a projection from our narcissistic mind. Is it not what we imagine it is. Our tendency to project our lack of understanding of infants or patients, out of ignorance, that gave rise to the claim that infants are unconscious, and that even fetuses are unconscious. It thus became acceptable to relate to substances that touch infants and even their bodies as if they were insensitive to pain. As a result of the lack of understanding and knowledge, surgeries without painkillers were performed on infants and even preterm infants. The same is true for patients who are in a coma or in vegetative states. Because of the paucity of the responsiveness of such patients and the lack of verbal evidence there was an assumption that they do not exist. They are NONEXISTENT. Quite often requests for organ harvesting were received in the wards of patients in changing states of consciousness. But recent research, and innovative instrumentation prove that despite the apparent verbal deficiencies in fetuses, infants and even gestational patients are in varying states of consciousness (Coma- vegetative patients). In fact, they hear respond and relate, and feel, something which can be tested using PET SCANS, they are in states of consciousness and maintain awareness. The new observations and understandings that emerge from current knowledge, require us to update our understanding and take a good look at the sequence of awareness and mechanisms used by it.

I will therefore review again the conduct surrounding attachment relations as knowledge evolved from Freud's period to the present day. All this to detail the existing knowledge and try to present concepts relevant to the evolving knowledge regarding the hidden languages,, which to date have not received the appropriate attention.

Freud uses the concepts of identification, incorporation and interjection, as a rule that means that there are representations of objects and relationships with the objects in MIND. These representations do not only take place in the structures of the MIND but they construct the personality. As therapists we observe human behavior and assume that it is taken from the same representations of the parents. We have no doubt that this is the identification or in fact internalization of the parent.

### 2. What is Internalization - An overview in light of the development of thinking by different theorists?

Hartman (1950) argues that there is not yet a sufficient conceptualization that can define the process by which external objects influence the structure of the internal world. The question is how structures are formed, how they are modified and what is the role and structure of the relationship with the external objects in the formation of such structures.

Geller and Orliniski (1981, 1987) argue that the concept of internalization contains all the processes which include interaction and identification through which patients and human beings in general make a transformation in emotional experiences of the events of their lives into networks of representations charged with their own feelings and those of their objects. The interactions are primarily responsible for creating emotionally charged representations of the self towards the world, whilst identification is related to the modes of creating self-representations.

Blatt and Behrends (1985), Also make it clear that for internalization, although it seems to be in intelligent use, there is no clear definition, its definitions sometimes even contradict each other. Freud used internalization, incorporation and identification alternately as if they all came from the same source. Some have argued that internalization and symbol creation are the same thing, (Klein) Schiffer (1972) went even further and wanted to abolish the concept.

The claim is that animal babies are born ready for the world while human babies are not. They need parental support. They are therefore passive as to what they receive from their parents. The findings show that the infant needs not only the satisfaction of his basic needs, but that his needs include contact with his environment. Its imitative reactivity, which responds to its impulses to be contained. They distinguish between reactivity to mother’s voices and the ability to be aware of the "other"***.***

The lack of a clear definition and the multiple uses of the term are, in part, a function of the fact that the underlying mechanisms of the internalization process have never been clearly specified. Historically, incorporation, introjection, and identification have been considered mechanisms of internalization. These terms, however, were actually derived from earlier periods in the history of Freud's development of psychoanalytic theory, and he himself at times tended to use them synonymously. Subsequently, there have been numerous attempts to separate out these modes of internalization and to define them clearly. No single position has ever been generally accepted, however, and the result has only led to even greater complexity and confusion. The existing literature on internalization is replete with instances of different terms referring to the same process, the same term referring to altogether different processes, and various combinations of them being employed interchangeably (Meissner, 1981). At present, the usage of any of these concepts tends to be idiosyncratic and arbitrary, depending upon the preference of a given author.

Still another problem, historically, has been the tendency to equate internalization with symbol formation (Klein, 1930) in which case the concept would be inapplicable as an explanatory construct for psychological development in the presymbolic infant. Although Schafer (1968) originally made important contributions in clarifying the concept of internalization, he has since gone so far as to propose that we abandon it altogether, because of its misleading spatial connotations and the danger of anthropomorphizing and reifying dynamic processes. The argument is that internalizations are the cornerstones for constructing the course of human development. Further internalizations occur as reflecting aspects of relationships with significant others.

Research of the internalizations is done through the mother-infant relationship. The basic argument here is that it is as if babies are born in need of their mothers hence their abilities develop in direct contact with the mother. A system of communication on both sides seems to be required and if it works, the child's needs develop.

What babies need, in the absence of their ability to conceptualize their mother or the ability to recognize their mother's voice, should not be confused with the ability to create a "mother" concept. These findings go hand in hand with the findings of Konrad Lorenz.

These formulations are consistent with the ethological findings of Lorenz (1937), Tinbergen (1951), and others, which indicate that the specific, instinctual capabilities of certain species are preprogrammed and inherent in the basic equipment of the organism. From this standpoint, the complex behaviors found shortly after birth can be understood as highly specific, inborn characteristics, inherent in the biological equipment of the human species. They offer no more evidence of psychological awareness or self object differentiation than reflexive responses such as eye blinking, startling reactions, or the imprinting behaviors observed in other species. Well, what do babies have if they do not have a mother concept. They have no awareness or separation between object and subject, but they do have reflexive responses.

The original claim is that infants have no Id or Ego in the first place and no distinction between what is conscious and unconscious. Furthermore, it is argued that infants are unable to make significant symbolic differentiations in the environment or between themselves and their surroundings. Therefore, the baby's first role is to do separation-individuation. This is accomplished gradually within the matrix of infant-mother relations. And if so then it is necessary to examine the role of the mother in this process. One has to examine the kind of connection between them and the desirable intensity. There is an understanding that the baby produces cues to which the mother responds.

There is here a mediating concept of dual unity, a kind of blurring of boundaries between mother and infant which facilitates the passage of information from her to the baby. Thisconcept is also similar to the Winnicottian concept which describes the mother as experiencing a kind of loss of boundaries with the baby in her "excessive" attention to the newborn. Thus, Winnicott also suggests a concept of reducing the boundary between mother and baby.

"Dual unity" is a term given, meaning that the infant has not yet developed boundaries which differentiate self, the mother must temporarily blur her own boundaries to intuit her infant's needs. Such an appreciation of the origins of psychological life leads both Mahler (1963) and Winnicott (1953) to conclude that the good enough mother infant relationship is essential to subsequent psychological growth and development.

We propose that the establishment of this mother infant unity represents the first developmental prerequisite for internalization and that it in fact contains in rudimentary form the essential operative components for all subsequent internalizations throughout the life cycle. The creation of unity in the mother-infant relationship is what forms the basis for the creation of the components of internalization.

If the basis is unity then the further development should be separation. How is this separation created? Separation occurs during a recurrence that takes place in the mother-infant relationship, a move which on the one hand repeats itself and is renewed at the same time. With the daily renewal the child develops his ability to predict that the mother will return and notices her presence and absence.

Mahler contends that on the way to separation the child is equipped with innate given and hence in taking small steps as per Winnicott’s suggestion the mother gradually moves towards to separation and the child gradually moves to internalization.

Loewald (1962) describes identification as a process "whereby the child reaches out to take back from the environment what has been removed from him in an everincreasing degree since his birth" In a similar vein, Tolpin (1971) specifically links each step in the separation individuation process to internalization: "When a 'tolerable' phase appropriate loss of some discrete function that the object carried out for the child is experienced …, the psyche does not resign itself to the loss; instead, it preserves the function of the object by internalization"

It is crucial to note that the infant's early internalizations are represented on a sensorimotor level. According to Piaget (1945), from birth to about 18 months, action sequences evolve into increasingly complex sensorimotor schema through "interiorization," a process analogous to internalization. For that matter Piaget adds which he calls interiorization, a concept analogous to internalization based on sensor motors.

In the mother's absence, the infant forms sensorimotor patterns which eventually enable recognition and later recall of the sensory qualities of the mother's activity and her appearance associatively linked with gratification, comfort, and stimulation. The mother repeatedly reestablishes these activities in response to the infant's distress signals, and these repeated experiences result in the establishment of schemas of certain crucial aspects of the mother infant relationship. The schemas for first recognizing and later enactively recalling the sensory experiences with the mother reflect the beginnings of psychological organization and individuation, as brought about through the process of internalization. In this manner, the original biological functions of the infant are modified and augmented (Hartmann, 1939). This rudimentary psychological organization, which begins at a sensorimotor level, then proceeds to preoperational and operational levels (Piaget, 1937), as the child continues to internalize aspects of significant relationships.

The argument is that the process of building the mental structures and the process of internalization go hand in hand. Thus, the need to define internalization clearly arises. Roy Schafer (1968) offers a useful definition:

“Internalization refers to all those processes by which the subject transforms real or imagined regulatory interactions with his environment, and real or imagined characteristics of his environment, into inner regulations and characteristics”

### *3.* Internalizations and the stages of personality development

Balint goes on to define internalizations in the context of object relations: part of the examination is between what is external and what is internal and what the connection between them is. There is serious ambiguity and confusion in the theoretical world when it comes to the discussion of object relations. While we are dealing with the distinction between what is external and what is internal, it is very important to understand what is linked to the external world and what the connection is between the self and what has become its representation of the object.

If we are dealing with a mother-infant relationship, there is the "real" relationship that can be viewed, photographed and interpreted. There are real mother-to-infant relationships, about which it can be said that each of them is the object of the other. But this differs from the intrapsychic difference in the mind of the infant representing his self, and the representation of the object of the mother only after the distinction between the self and the object of her. And this concerns the subject of recognizing the self-object.

The external observer has no way of knowing what the baby’s experience of his mother (the problem of other mind) or the level of distinction he has between himself and his mother. The lack of clarity stems from the fact that it is impossible to say when the baby's relationship with his mother begins, can one say that it is from the womb? Or can one only talk about object relations only after the distinction between self and object has been achieved. These are two different things..The question of whether there is a distinction in the representation of the object is completely different from the question of whether a real relationship has been established with the object much earlier.

To keep on with this discussion I will attempt to distinguish between real relationships and relationships with representations: Following, I would like to use the term object relatedness to express the real interaction with objects, and reserve the term object relations to refer more specifically to the intrapsychic dimension of the subject's experience of objects, that is, of his sensed and experienced relation with objects which calls into play the definition of a sense of self as differentiated from, as well as related to such objects.

The question arises, whether a relationship of separation is required prior to internalizations. The question sounds strange because of our serial thinking. After all, how do we talk about the inside and the outside if we do not separate the inside and the outside. But if the order between the inner and the outer is different from separation, and what if indeed there are processes of assimilation and accommodation, and the boundary line that the self-understood towards the other is unclear, whether it exists in some world with an inseparable oceanic experience between the self and the other forever.

If so, one can talk about the internalizations that take place in the space of assimilation, near and close to the border between the self and the other, in which the self and the other merge and are created by a process of self-organization a unified integrated representation which at a later stage will develop interfaces between the self and the other in which the structure of the other and the selfbecome clarified by means of the same exploration and an intermediate space comes into existence. Thus, self-organization is experienced in a sense that it has a different form than any other structural subsystem. It contains qualities and functions that must not be reduced to functions and system components, and serves as the focus of organization and integration of these functions and subsystems where the whole is larger than the sum of its parts. In other words, self-representation reflects the organization and its components but does not constitute them.

Balint drew attention to the formation of the transference from primary object relations related to the environment, emphasizing the need to transfer them to internalized object relations and transferring the psychic economy from the internal back to the influences of reality.

The connection between object relatedness and object relations is in internalizations. There is a gradual move from the presentation of reality to the internalizations, to the permanence of the object, and to the self-cohesion, the unity of the self. It is a process of the stabilization of the self-organization, its construction and representations of the object. The integration of the self-image is an outcome of increasing separation. Consolidation, organization of the self- the system in a progressive process, of excessive organization and stability in internalizations.

3.1 The mechanism of Attachment and protection of the Object

Basch (1978) suggests that "In the mother's absence, the infant forms sensorimotor patterns which eventually enable recognition and later recall of the sensory qualities of the mother's activity and her appearance associatively linked with gratification, comfort, and stimulation. The mother repeatedly reestablishes these activities in response to the infant's distress signals, and these repeated experiencesresult in the establishment of schemas of certain crucial aspects of the mother infant relationship. The schemas for first recognizing and later inactively recalling the sensory experiences with the mother reflect the beginnings of psychological organization and individuation, as brought about through the process of internalization".

In this manner, the original biological functions of the infant are modified and augmented (Hartmann, 1939**)**. This rudimentary psychological organization, which begins at a sensorimotor level, then proceeds to preoperational and operational levels (Piaget, 1937), as the child continues to internalize aspects of significant relationships. This is how Internalization in infancy and early childhood happen. Numerous theorists, using terminology somewhat different from our own, have drawn similar conclusions about the steps leading to separation individuation in the early phase of life.

Basch (1975) Presents a critique of this simplistic and substantive approach and notes that mother-baby relationships produce order and organization in the infant’s life. This understanding from the fetal life in which the mother's rhythm produces organization in the fetus. The absence of the infant mother creates sensorimotor patterns that allow for the recognition and recall of sensory qualities of activity associated with needs, satisfaction, contentment, relaxation, and stimulation. At the same time the mother responds to the patterns that have been internalized by the fetus.

Klein argued that the first developmental need of the fetus and infant is to create a schema that has coherent unity, and integration to create a schema of the self. There is no doubt that schemas formed at the beginning of life exist in the same way later (Feldman, 2007).

Freud, in his reference to the construction of the super ego, when discussing internalizations, makes it clear that those internalizations touch upon the different levels of mental organization, starting with relationships with the world and later on family relationships and the organization of developmental conflicts. Still later this also applies to relationships with the environment.

Freud (1938) noted that: "A portion of the external world has, at least partially, been abandoned as an object and has instead, by identification, been taken into the ego and thus become an integral part of the internal world. This new psychical agency continues to carry on the functions which have hitherto been performed by the people [the abandoned objects] in the external world". This conceptualization of internalization has been extended beyond superego formation to include all processes in which interactions in the environment are transformed into inner regulators and are taken on as characteristic. The internalization of aspects of object relations provides a primary basis for the development of these internalizations which are not merely symbolic but are also sensorimotor. They appear in various linguistic and imaginary modalities.

In his article “Mourning and Melancholia” Freud relates to two levels of internalization. The initial internalization is considered as being a direct attempt to heal a lost cathexis (in the death of a close person) Loewald termed “primary identifications as being immediate and direct rather than the result of attempts to recover relinquished object cathexes Loewald (1962)views these primary internalizations not as defenses, because in defense against object loss through internalization the secondary internalization is only created after the boundaries between the self and the object come into existence. Loewald separates between initial identifications that come prior to clear separation between the self and the object and those that appear after the oedipal conflict.

In this paper, we think it is correct to say that the early ('ego-') identifications take place during stages of development when inside and outsideego and objects-are not clearly differentiated, which is to say that the stage where 'objects' can be 'cathected' is not yet reached or that a temporary regression from this stage has taken place. The later type of identifications, the superego identifications, on the other hand, are identifications with differentiated objects of libidinal and aggressive cathexis, objects which themselves cathect in such ways. The later identifications thus can be based on the relinquishment of these objects.

In actuality, of course, there is a continuum of stages between these two types and much overlapping and intermingling of them.

The process of changing the internalizations involves parting and mourning. The difficulty in parting is the abandonment of the initial identification and the desire to avoid, or deny the pain. Our natural tendency during parting is to stay and prolong it, especially since we expect to stay with whoever was with us and the desire to avoid the pain that will come after it. All this of course concerns the transition, the relinquishment of previous identifications. This is where new structures are built during the treatment that will replace the old ones. The therapist by his presence softens the pain of parting from the existing structures and softens the acceptance of the current structures. The immense difficulty in parting leads patients either to stay with the previous structures, or the fear of the pains that have been experienced in the past as threatening and dismantling the integrity of the structures that have already been created.

3.2 The Practical Role of Internalization in Therapy

In his article Geller (1987) it is found that there are stages of the development of transformations in the structure of the internal representations in the patients. The first stage is a replication of the transactions between the therapist and the patient in the patient's internalized fantasies about the therapist.

The second stage is the transformation involved in the gradual development of the functions of the ego and the super ego through selective identification with the representations of the object of the therapist.

It would appear that patients are able to get their therapists to behave like the characters they have been in their lives. According to this, the question of who imitates whom is one that remains unanswered. Patients can not relate to their therapists if therapists are unable to find a way to imitate the characters around the them.

A post-treatment analysis found that patients used representations from the treatment to further their mental development. On the importance of post-treatment internalizations, Geller (1987)suggested that internalization of the therapeutic process “not only helps to preserve the gains derived from therapy but insures the survival of the process after termination”. What are the different types of meaningful internalizations? What is the sensory motor and emotional modality in which the therapists' internalizations are located?

Geller and Farber found that self-perceived improvement in former patients was positively correlated with the tendency to evoke therapist representations that serve to “continue the therapeutic dialogue” with representations that reflect a “mourning” of the loss of the therapeutic relationship. In addition, they found that whereas self-perceived improvement in current psychotherapy patients were positively correlated with the tendency to evoke visual representations of the therapist in between sessions, former patients' feelings of satisfaction with their therapists and the belief that they had benefited from treatment was more strongly associated with the kinesthetic mode of representation “feeling” the therapist's presence.

Bernard and Drob's (1989)study of patients who had terminated treatment, although limited in scope (i.e., their sample size prevented systematic quantitative comparisons between subjects), indicated that patients who believed that their therapists had ended therapy during the middle of treatment typically visualized or had imaginary conversations with their therapists after termination. In contrast, patients who had longer treatment experiences” (undefined) and who had terminated treatment by agreement reported that they had not experienced such fantasies since termination; instead, these patients spoke of feeling that the helpful aspects of their therapists were now a part of themselves.

The data did show that the frequency with which certain representational themes are evoked is significantly correlated with afterwork and self-perceived improvement. As noted earlier, the factor “Continuing the Therapeutic Dialogue” was positively correlated with both self-perceived, afterwork and improvement—a finding that supports the theoretical position emphasizing the importance of internalization (specifically, introjection) in attaining and maintaining the beneficial effects of psychotherapy. In addition, patients whose representations tend to reflect the theme of “mourning” are more likely to feel they have benefited from therapy. According to Loewald (1962), one of the most important aspects of termination is the work of mourning, a process that includes not only the gradual relinquishment of a cherished relationship but the internalization of the relationship as well. Finally, the factor “Failures of Benign Internalization” was negatively correlated with both afterwork and improvement. As this factor can be considered a negative outcome measure—with items such as “I feel as though I was never in therapy”—significant negative correlations with self-perceived improvement and self-perceived afterwork are not surprising. This factor can also be viewed as one that reflects the absence of a “benignly influential” representation of the patient/ therapist relationship, the existence of which many theorists **(**Schafer, 1968**)** view as necessary for positive therapeutic outcomes.

It should be noted that the generalizability of the results of this study is limited by several factors: subjects were self-selected and treated only by student therapists, most of whom were psychoanalytically oriented. Poor outcome cases were underrepresented, both by the 6-month minimum inclusionary criterion and because it is likely that patients who were more involved in their treatments and who felt more positive about them were more inclined to choose to participate; These factors are further compounded by the low (21%) participation rate of potential subjects who were contacted. In addition, the study is limited by the absence of data regarding subjects' diagnoses and current stress levels. It is clearly possible that these variables influence the nature and use of therapist representations following termination.

In summary, the findings of the present study confirm that former patients have an enduring relationship with their therapists in the form of internalized representations. When these representations are evoked, they tend to be images of the therapist sitting in his or her office and tend to be used in the service of trying to solve problems in the ways in which they were worked on during treatment.

What should be encouraging to the field is that self-perceived improvement and afterwork seem not to dissipate over time; Moreover, those former patients who feel they have benefited from treatment are especially likely to continue replaying mutative aspects of the therapeutic dialogue long past the actual date of termination. Finally, it should be noted that the data collected in this study reflect only a small part of a long-term therapeutic process that, under optimal conditions, likely involves ongoing, mutually influential sequences of successful therapeutic collaborations; internalization of the therapist and the therapeutic process; mutually agreed upon termination; and continuation of representational activity following termination.

Most significant for the patients is the feeling that they have internalized an inner experience of success that they themselves have noticed, and continued self-work in connection with the internalizations of their therapists after the treatment was over.

### 4. Parallel concepts / mechanisms contained in the concept of internalization and their meaning

Internalization is a mental process whereby a person “imports” another person into himself. This occurs as an unconscious process; over time the subject becomes aware that he is behaving, thinking and sharing similar values and positions to his mentor. There are three further sub-groups in psychoanalysis:

Incorporation is derived from the Latin *incorporare,* meaning ‘to form into a body'. It is perhaps the most basic form of taking the outside world into the inner world, being focused on bodily sensation and ingestion.

Although this need not mean *actual* bodily ingestion, this term is used to explain the way that incorporation is experienced and conceived. By bringing something into the body, I make it undeniably a part of the physical, solid and real me. Once incorporated, it cannot be separated from me, but I can choose what to do with it, including destroying or expelling it.

The mechanism is borrowed according to its definition from the Greek word corpus meaning body. Thus, its meaning is understood based on the concrete level, close to the body itself. "A Kind of Fantasy of ingesting or engulfing another person" is the way in which David Olds believes it should be defined. Some contend that this mechanism is the most primitive, earliest mechanism and therefore occurs at the level of oral functions.

The history of the development of the concept of incorporation points to the multiplicity of emotions that are apparently present in the infant. This array of attributions to the infant, the aggression attributed to the murderous dialogue of bringing the other "saint" into the inner world, requires from a cerebral and developmental point of view, a much more complex system. There seems to be a weight of implications here for the mental life from its very beginnings. It cannot be ignored and has to be considered in terms of the global emotional conduct that characterizes the infant.

The reference to global emotions considers the emotion in its indistinguishable power. It is powerful and without differentiation, global and intense, without the possibility of regulation. From the understanding that the emotion will gradually become more refined, it can be assumed that its initial amalgamated form is intense, and the accompanying assumption is that unregulated intensity will be cruel and destructive in nature, like that which is attributed to the incorporation mechanism. That is, since the center of attention, is the oral or swallowing, there is a tendency here to argue that the incorporation is the relation to the world from the point of view of the sensory sensation activated with swallowing. The treatment of the baby as a cannibalistic creature, swallowing its mother relies on a cultural reading that sees initial development, primitive development. This development is interpreted concretely and not in the sense of its primacy but in the sense of what is created as a result of the Oedipal conflict that also contains the aggression and hunger, in an attempt to subdue the objects.

Collecting the world of objects or in fact the main object commonly referred to in literature is the maternal object, hence here the tendency to say that incorporation is a function of the desire to swallow the mother emotionally. The incorporation as being primary is also considered as an indistinguishable global swallowing, of all that the mother represents for the newborn.

The past 40 years of booming infancy research certainly debunked a great deal of strongly held common assumptions: that babies were born cognitively helpless and passive, their behavior disorganized. Prior to this research, it was not uncommon to construe infants as born blind and oblivious of the world surrounding them, a blank slate in need of fundamental growth and learning, often thought to be born in a vegetative state that kept them alive and tentatively able to receive indispensable care and protection from others.

These views have certainly changed but the fact that human children are helpless at birth should certainly not be overlooked6, particularly when comparing them with the infants of other species. These ancient views were not that counterintuitive after all. Compared with other species, humans are indeed born too soon, greatly immature, and markedly dependent on others to survive. This is due to the combination of the proportionally larger brains we evolved as a species, together with the narrowing of the female’s birth canal associated with bi-pedal locomotion, a posture uniquely evolved by our species and linked to protracted ‘external gestation’, namely the fact that we are born much sooner compared with other primate species. We start standing and roaming the world on our own only by 12 months and it takes many, many long childhood years to separate from one’s own original niche and to become autonomous to reproduce this cycle of development with new progenies.

The premature human birth leads to a state of protracted dependence during approximately one fifth of our life. This remarkable dependence shapes our psychology from the outset. It is a simple, straightforward fact, yet probably the major determinant of what makes us psychologically unique in the animal kingdom. What the new wave of infancy research shows is not that infants are born much more mature than previously thought, but that infants are born much better equipped to tap into and exploit the prolonged state of dependence they are born in. As Bruner (1972) wrote years ago, there are ‘uses of immaturity’ by the young child. Numerous research tapping into preferential looking, sucking, visual familiarization, violation of expectations, and other clever habituation and dishabituation paradigms show that infants from birth are remarkably quick to learn.

The most solid and reliable finding is indeed that healthy young infants get easily bored and are particularly inclined to seek novel information. From birth on, infants expect outcomes to occur based on past experiences and show a natural inclination to build up on new expectations. Two-month-old babies are attuned to complex probabilistic algorithms or conditional probability that one particular event will be followed by another, for example in their ability to discriminate among strings of speech sounds they hear successively, or the frequency of lights flashing at different locations in the environment (Haith et al., 1988; Saffran et al., 1996 ).. Infants show all this remarkable learning ability while not having to worry about being fed, getting enough cuddling, or living in wet diapers. Their protests are typically heard while able to explore and encounter the world around in playful ways. Childhood is indeed, for the most part, a prolonged immaturity that translates into a prolonged, socially secured and assisted opportunity for a free licence to learn and to explore, to fantasize, and to realize these fantasies in the unbridled works of children’s imagination. But children’s free license to explore and to play is not just free and self-organized. It is highly constrained as demonstrated by recent findings in cognitive and affective neuroscience.

I will focus on sets of concepts of the kind of projections which seems relevant to the imitation mechanism and on the recent findings in the so-called mirror neuron systems.

Introjection – taking in the other as a kind of parent, entering a dialog with the advisory, critical or congratulatory self. In psychoanalysis, introjection (German: *Introjektion*) is generally regarded as the process where the subject replicates in himself behaviors, attributes or other fragments of the surrounding world, especially of other subjects. Cognate concepts are identification, incorporation and internalization.

Projection has been described as an early phase of introjection. However, this meaning has been challenged by Maria Torok (1994) as she favors using the term as it is employed by Sándor Ferenczi in his essay "The Meaning of Introjection" (1912). In this context, introjection is an extension of autoerotic interests that broadens the ego by a lifting of repression so that it includes external objects in its make-up. Torok defends this meaning in her 1968 essay "The Illness of Mourning and the Fantasy of the Exquisite Corpse", where she argues that Sigmund Freud and Melanie Klein confuse introjection with incorporation and that Ferenczi's definition remains crucial to analysis. She emphasized that in failed mourning 'the impotence of the process of introjection (gradual, slow, laborious, mediated, effective) means that 'incorporation is the only choice: fantasmatic, unmediated, instantaneous, magical, sometimes hallucinatory...*crypt* effects (of incorporation).

According to Freud, the ego and the superego are constructed by introjecting external behavioral patterns into the subject's own person. In Freudian terms, introjection is the aspect of the ego's system of relational mechanisms which handles checks and balances from a perspective external to what one normally considers 'oneself', in folding these inputs into the internal world of the self-definitions, where they can be weighed and balanced against one's various senses of externality. For example: According to D. W. Winnicott, "projection and introjection mechanisms... let the other person be the manager sometimes, and to hand over omnipotence.”

Introjection is the journey of the inward entry of the other's conduct into the self. Freud assumed that structures of the ego and the superego are constructed from this journey. Internalization is the taking of the object (Roy Schaefer from Olds) into an intermediate space. In this sense the insertion of the object is one of the relational mechanisms that connects while in examination and balance from a different perspective that which the individual calls himself within himself. Internalized aspects are examined against the sense of self, adapted or foreign to the self. (Roni Solan)7. At the relational level, that is, the object is taken inward with the relationship it has with the subject. A kind of virtual dyadic relationship. The introjected remains as "other" it can be critical, or admired, advising or threatening, usually experienced as an inner parent. The characters with whom we consult when we need advice or assistance or support.

When we treat the internalized characters as enemies and assemble in front of them, we experience a kind of depression because of the lack of energy of their support for us. That is, we can hide or shut ourselves off from our internalizations. Internalization is a modification of moral values that represent our social conduct and thus becomes a structure that Freud calls the super ego.

The imitation mechanism is not a kind of fantasy but a kind of naturally existing reality. The process of engulfing is a qualitative description of the status, but not a description of the act. The imitation mechanism does not borrow representation. The representations imposed on it are not clear, but are created and amalgamated out of being.

Identification – a modification of the self to resemble the other, usually a significant other or a person perceived as “strong”. In focusing on the identification process, we may speculate that it occurs as the result of the co-evolution of a number of biological adaptations. These include:

1. The evolution of a variety of memory systems, in particular procedural memory.
2. Imitation, which is more prevalent in higher mammals.
3. Mirror cells, which are developed in mammals and birds.
4. The growth of the pre-frontal cortex, enabling greater complexity of executive functions, inhibition of impulse, a sense of time, and more complex interpersonal patterns.
5. An extension of human plasticity in childhood enables imitation and attunement.
6. The progress of mentalization and theory of mind, which is exclusive to humans.

Another concept is emulation, whereby the subject sets out to achieve a goal and is willing to do so by behavior either like or different from the other.

Novel aspects of the internalization mechanisms are emerging from the newest findings of the Mirror Neurons system (MNS). This research will try and indicate how the mirror neurons stemming from neuroscience facilitate the process of internalization and where they are maintaining the lacuna which remains in psychoanalytic clinical theory. While explaining about the MNS this research will add some more definitions which are part of the internalization process. Embodied simulation, and contagion.

Mirror neurons (MNS) – these are a set of neurons in different areas of the brain, which are activated both when engaging in action and when observing another agent engage in the same action.

The work ofGiacomo Rizzolatti and others has demonstrated this entity in monkeys (Gallese & Goldman, 1998; Rizzolatti et al.,1996). They found that in the experience of viewing a motor event of another, there seems to be a virtual premotor cortical event in the viewer. The same cells that would fire had the observer performed the same action. During action observation there is a strong activation of premotor and posterior parietal areas, those neurons were found in monkeys and in parallel at the human brain. Those neurons appear as well in action observation, in imitation of simple movements, in mimicry of observer postures, expressions behavior of social partner.

The perception of communicative actions, and the detection of basic actions intentions, activate the mirror neurons as well. The MNS system enables social identification as well as mutual recognition. To that purpose we can say it is capable of mapping actions and intentions. This is the system that enables mimicking facial expression, and even the experience that comes with those expressions. All those impressive findings are debated in a very impressive way by David Olds.

Olds indicates that this finding should not arrive as a surprise as we must have some way to recognize actions as we recognize objects. The pre-motor cortex has been known for years to be where coordinated actions are generated, in contrast to the motor cortex which controls individual muscle contractions. The phenomena of the mirror neurons should be less surprising then it was at first appeared. After all, we must have a way to recognize objects. When we recognize an object, we use our primary sensory cortex to form an image, an iconic representation of the sense datum. The activity of the mirror neurons is part of perception. The only way we can observe an action is to play it out in the brain.

It takes us back to Piaget for whom the sensorimotor realm is the basis of perception and representation (Piaget and Barbell Inhelder 1971) It also reminds us of Pullvermuller (1999) who suggested that neurological activation that required to produce a verb, an action word, in language, includes premotor cortex. In other words, the concept of motor acts needs to include a premotor activation. It means that to perceive an action, to symbolize or to speak of an action, we draw in the frontal, motor part of the brain. An action is a holistic or integrated concept of a piece of behavior, this may be at the same level of complexity as the concept of an object.

Gallese (2009) when referring to the MNS tries to explain why we need mirror neurons. He believes it is what makes us understand the other person easily. He speaks about the I-Thou relations as providing the basic ground for cognitive and affective development. The representational mind reading as he puts it is intercorporeity which he defines as the mutual resonance of intentionally meaningful sensory-motor behaviors which is the main source of knowledge we directly gather about others (Gallese, 207,2009). intercorporeity is a crucial aspect of intersubjectivity because humans share the same intentional objects, and their situated motor systems are similarly wired to accomplish similar basic goals. Gallese argues that human beings are primarily wired to identify with each other and that such process is neutrally grounded, since the discovery of the MNS. Gallese thinks (2011), that desire before its fulfillment is an oxymoron. He says that "nothing but the presence of an absence of reality".

This is not agreed with Jaak Panksepp who described the SEEKING SYSTEM as the energy, excitation without an object. This crucial difference will further open a possibility that this research will point out to be very important for further understanding of the imitation system. Gallese based his understanding on the theory of imitation of Girard mentioned in chapter 1. It speaks about the identification which parallels identification with the other's object of desire. Meaning, we imitate the object who has some desire, we want what he wants. In Kleinian terminology it will be the concept of envy. Going with this path, he speaks of a shared manifold of intersubjectivity which is described in three levels: the phenomenal, The functional and the sub personal. Thereby he describes the phenomenal as the sense of social identification. It generates the feeling of familiarity with other individual's intentional attunement coming from the observer and meeting the feeling of the observed.

The functional is the *embodies simulation* of the actions we see or of the emotions and sensations whose expression we observe with others. The Simulation as he describes it is a functional process that possess certain content, typically focusing on possible states of its target object.

In Philosophy of mind, the notion of simulation has been used by proponents of the simulation theory of mind reading to characterize the pretend state adopted by the attributer to understand another person's behavior.

Simulation – replication of an object, a map of behavior resembling imitation, but almost anything can be copied and this is not limited only to behavior. In cognitive sciences, simulation is used to describe a mental representation, as distinct from a computer simulation. The depicted image uses apparently virtual brain “images”, which in fact resemble or replicate the original object, whereas the computer model uses a code, like a computer code, to represent objects or activities.

In opposition to standard accounts of simulation theory (Short, 2015) Gallese views emulation as embodied to characterize it as, pre-rational, non interospectionist. Emulation is pre-linguistic, pre- theoretical but nevertheless attributed to conceptual contents.

The sub personal level of shared manifold is instantiated as activity of a series of mirroring neural circuits. It is a we-centric state in which we enable ourselves to understand the other, what and why he is doing what he is doing.

The emulation**-**theoryof representation postulates that there are multiple internal modeling circuitries in the brain referred to as emulators. These emulators mimic the input-output patterns of many cognitive operations including action, perception, and imagery. Often running in parallel, these emulators provide resultant feedback in the form of mock sensory signals of a motor command with less delay than sensors. These forward models receive efference copies of input motor commands being sent to the body and the resulting output sensory signals. Emulators are continually updating so as to give the most accurate anticipatory signal following motor inputs.

Another way to describe the concept of emulation, whereby the subject sets out to achieve a goal and is willing to do so by behavior either similar to or different from the other. This is different mode of taking in, it includes internalizing while having an intention to do something which is elicited by the goal which is desired (Decety & Chaminade, 2003).

Olds maintains that analysts have developed several concepts that relate to one another, all of which can effectively be included under the umbrella term: internalization. He seeks to add knowledge from evolutionary sources about the roots of such phenomena. According to him, the evolution of higher mammals has reached an advanced level of imitative capacity, in line with their cortical expansion, enabling new forms of memory.

### *5. Conclusion*

I claim that our evolutionary and developmental knowledge allow us to identify a deeper phenomenon through brain research, namely the creation of the self, objects and personality resulting from imitative reactiveness, unconsciously and automatically. The existence of an energetic, emotional system such as the SEEKING system, makes it possible to encompass a whole range of information in which the individual finds himself. As he is in the mother’s womb, so he is in the womb of the world. The world and this system open to imitation enables the gradual formation of new structures that did not hitherto exist, which are gradually assimilated through repetitive seeking and take shape within a system that becomes clearer and forms new, previously non-existent definitions.

Here too it is pointless to talk of an act of changing oneself, since the reality of someone experiencing imitation is enforced and there is no other. It can be produced by choice during development, but at its core it is a kind of experience in the womb, which constitutes the world of the fetus until after birth.

With the help of Olds (2012), We reviewed the concepts and highlighted what is lacking in them which the imitation system can supply. We will thus demonstrate the clinical “stations” that arise and are clarified through therapeutic work, whose origins are in that same creative system that enables new material to be processes – a system of conscious and unconscious present experiences, which is sensitive to everything taking place in the environment, including the smallest details. It perceives information in an overall, comprehensive way and has no boundaries. As such, it is allocentric and without any predictable order. It discovers the order of the world as it simulates it, forms an image that recreates reality and processes the sum of the information.

Olds refers to the discovery of neurobiology and mirror neurons – the discovery of a brain quality that perceives the other, distinguishes it, and enacts its actions. In child development, dyadic negotiation involves imitation and attunement, so that as part of his behavioral internalization process the child adopts his parent’s characteristics, affects and communicative skills, including language. However, Olds’ definition of imitation refers to learning processes and the behavioral intentionality to imitate another. It is not, then, coincidental that he examines learning processes in higher mammals and their contribution to imitation processes.

According to Olds, imitation is an exact duplication by one agent of the behavior of the other, a definition which talks of a sequence of behaviors which do not depend a goal. Goal-oriented behavior is aimed at reproducing a behavior and not at the goal itself. Olds’ current definition comes close to the experience of using the imitation mechanism. The claim is that goal-oriented behavior is irrelevant, since it is an automatic behavior based on evolution and ontogeny.

It is true that the imitation mechanism is a replication, but it is not directed like two skin cells created side by side or two electrical currents passing through one another, the second existing as a replication but not goal-oriented, or intentionally reproducing the existence of the other. They are simply there.

Following all different kinds of taking in what is outside which becomes part of what is inside, as the different modes of internalization was described in this chapters we will need to add that primary learning mechanism to that group of concepts. We will be able to understand what are the influences of the womb, chemical influence the structural influences of the primal life and the special contribution brought up by the fetus, infant toddler child adolescent and the young person, to our societal life, the two sides of the coin.

# VI. IMITATION AS A NEUROPSYCHOANALYTIC CONCEPT: HOW DO WE LEARN ABOUT THE WORLD? FROM IMITATION TOWARDS CREATION, A WAY OF BOUNDING FREE ENERGY

## A. Minimizing Uncertainty, the Place Where Speech Begins

### 1. Imitation, prediction, and language’s place

The present research intends to clarify the process of imitation and its mechanisms, as the thing and manner that facilitate new creations. It required several steps: First, we had to define the imitation mechanism, as an automatic mechanism that learns about the world, as it unfolds, and we had to offer an evolutionary epigenetic perspective on it. As this mechanism had been overlooked by psychoanalysis, I went on to show where it would be important to integrate this mechanism in the theory of the clinical practice, as part of the theory of neuropsychoanalytic clinic, while offering an overall review of all other mechanisms that compete in the very same way, with different implications. This is the place that lies between the mind and the world, and I had to explain how this relationship is built, the workings of the world’s internalization as performed by the imitation mechanism, the underpinnings of this system, how it is revealed, how it functions, and for which processes it proves important. I ran through different mechanisms of internalization, which is an umbrella concept for many different mechanisms that I present here. In general, the term explains how the conscious patient learns about their inner subjective world, as they internalize developments at the clinic, and above all, about the process of the patient’s psychotherapy - their psychoanalysis. This research will argue that imitation is having memory traces looking for structures outside reaching precision. This shall be proven by clarifying the hard problem of consciousness, informed by the new definition of consciousness as affects and feeling that form the bridge between the subject and the world (Solms & Friston 2018). Feelings are not mere stimuli. Affect is unlike perception. The most elementary forms of feelings are urges.

This is a multidisciplinary concept, and I shall therefore start by explaining free energy and minimization of uncertainty, with the predictive error, which will form the basis of the free energy theory of the mind. I will then try to explain the bottomup phenomenon of hierarchical brain structure and the free energy approach to pattern regulation. This theory will streamline the explanation about imitation as creation theory, which concerns this research.

At this point I wish to take this idea forward and show how the new concept of imitation is a neuropsychoanalytic concept, dovetailing with the new theory that has been taking hold in neuroscience, and in the research of the mind as a whole, as noted by Hohwy.

"It is the theory that the brain is a sophisticated hypothesis-testing mechanism, which is constantly involved in minimalizing the error of its predictions of the sensory input it receives from the world. This mechanism is meant to explain perception and action and everything mental in between.

Our senses are bombarded with input from things in the world (Hohwy, 2013). Based on this input, we perceive what is out there. The brain is an inference machine, says Hohwy (2013). Our brain is an inferential machine made of perceptions, which has the resources to help capture and categorize states of affairs in the world, as well as to capture the phenomenological richness of the perceptual experience. The tool that supports it is imitation and the perceptual hierarchy. This tool is built of replications of predictions of error minimization mechanism and the message conveyed is part of how this mechanism works.

We now know from modern neuroscience that Freudian concepts may have neurobiological substrates. Freud's description of primary and secondary processes is consistent with self-organized activity in hierarchical cortical systems, while his description of the ego is consistent with the finding defined as the default mode system/network (DMS/N), including its reciprocal exchanges with subordinate brain systems. This neurological account draws on the view of the brain as a hierarchical inference machine, to cite Helmholtz (1925/1962). According to this view, large-scale intrinsic networks regulate supraordinate levels of the hierarchical brain systems that try to optimize their representation of the sensorium. The optimization has been formulated as a minimization of free energy. This process resembles Freud’s own view of energy in his formulations. Carhart-Harris & Friston (2010) substantiated this synthesis by showing Freud's descriptions of the primary processes to be consistent with the phenomenology and neurophysiology of REM sleep, as with early acute psychotic state, the aura of temporal lobe epilepsy, and hallucinogenic drug state. This research will posit that these processes work in the same way with the seeking system, as imitation reflexive phenomenon is part of the mechanisms of that system, which works through sleep, particularly REM sleep.

In short, all these new understandings are part of the work done on the hard problem of the consciousness (Solms, 2020a). We must understand how findings made over the last few years have shifted our understanding of where and what is consciousness. It is there that imitation as creation will assume its due place. This research work will therefore explore the relationship between Freudian ideas and classical concepts, and try to determine how close they are to the neurobiological construct found by brain scientists.

My neurobiological account of Freudian ideas will consider some Helmholtzian notions that draw on mathematics and theoretical physics. Helmholtz et al. laid many of the foundations of theoretical neurobiology. These advances allow us to recast some Freudian theoretical ideas in a mechanistic and biologically informed fashion.

### 2. Consciousness and the changes experienced by its definition

In his classical theory of the “talking cure”, Freud argues that the purpose of therapy is connecting consciousness to perceptual representations and cognitive representations that largely comprise words (in what has become known as the declarative memory systems), so as to draw words into the mind and connect them with the id’s contents; so that the unconscious can become conscious, thinkable.

Freud’s mistake, as exposed by recent scientific revelations, lies in his view of the consciousness as an intrinsic property of the cortex. This mistake was revealed in the 1940s, after Freud’s death. Moruzzi and Magoun’s study (1949) showed that in cats, consciousness was not found in the cortex, but in the upper brainstem, in the extended reticulo-thalamic activating system (ERTAS) region. These findings were later extended to humans by Jasper and Penfield (1954) with observations performed on epileptic patients. Consciousness was therefore declared an endogenous property of the brain that did not stream through the senses. In order to sustain older theories, a distinction was introduced between the contents of consciousness found in the cortex and the level of consciousness found in the ERTAS. The level of consciousness was determined between sleep and wakefulness and its contents were processed by qualia. All the contents of consciousness are not made of sensorial qualia; rather, ERTAS has an introspective qualia of its own, i.e., the affects. Affects are the basic aspect of consciousness, contrary to classical perceptions of perceptual modality. The relationship between the two is hierarchical. Cortical consciousness relies on ERTAS arousal. Damage to the ERTAS leads to coma (Parvisi & Damasio, 2012; Fischer et al, 2016). On the other hand, cortical damage results in the loss of some information (Merker, 2007), and memory, thought, and imagination loss in extreme cases. The region in the brain where damage results in loss of consciousness is the ERTAS and PAG. Stimulation in this region generates extreme states of affective overstimulation (pleasant or otherwise). Therefore, animals or humans with no cortex show a range of powerful feelings, and it is misguided to believe that feelings become conscious if their impression is etched in the cortex. On the contrary: animals or people with no cortex are very emotional, having no way to regulate their feelings. We become conscious through our needs; our needs are our feelings. Affect is a system that signals our survival needs to the body, while successful reproduction and unpleasant feelings signal the opposite.

The emotion mechanisms are found in the upper brainstem and diencephalon. There are homeostatic emotions (in the hypothalamus), emotional affects (e.g., fear and bonding), and sensory affects (e.g., surprise and disgust). These feelings are intrinsic to the brain itself. All these, according to Freud, operate from the id. But present findings show that they belong to the subject, which is first and foremost affective, and only then perceptual, with cognitive representations.

The id functions are innate. These are hardwired drives, instincts, and reflexes of the upper brainstem and limbic system. The instincts and reflexes regulate the different biological needs of the human organism. Every need has to do with one or another feeling, while the ego learns from experience, by shaping representations. Ego has to do with memory, while the memory’s most important recollection, of which we know much more today, is not the generation of any fixed impression of anything it experiences; it is no passive registering; it is about learning how to gratify needs in the world out there, how to comply with vital needs, the sexual reproductive needs. The ego registers the questions: what do I need to do? How do I gratify my needs? Its target is to eliminate needs (Nirvana principle), or in contemporary computational neuroscience terms: How do I make successful predictions (action plans)? It must update this plans, following the reality principle. Ego is regulated through measurement error. It updates predictions when they fail to work. Animals cannot regulate the id’s needs.

When the ego’s predictions are adequate, they undergo consolidation, while unsuccessful predictions undergo updating. The cortical process requires cognitive consciousness and is known as reconsolidation. In fact, what we know as ‘working memory’ was referred to by Freud as “thinking” (frontal patients are flooded with emotions, as they cannot think right). Through working memory, through the problems created, the individual feels the need. Through reconsolidation, the ego rethinks its own predictions. This is what Freud’s refers to when he says that “consciousness arises instead of a memory trace” in his *Beyond the Pleasure Principle* (Solms, 2015).

Working memory is a small, limited resource, which hinders reconsolidation 95% of our activities are performed unconsciously, and are therefore found in the preconscious - in the corticothalamus - and operate automatically. Predictive error releases free energy, i.e. an entropy increase. In information theory’ terms, free energy rise means rising uncertainty. In terms of arousal, it means salience (Pfaff, 2005). Therefore, predictive error produces preconscious predictions. A need that is left ungratified triggers (hypertactic) distinct salience, while inducing some memory signs designed to gratify it. Only the stimulation of the ERTAS can generate a state of activation, which is essential for reconsolidation. Therefore, predictions (prior wishes) have no choice but to undergo reality check, and subsequently become updated. All this occurs at the cortical level. Only cortical memory systems can produce representable images (thinkable-declarative consciousness). This process involves the recurrence of the prediction signs between three systems that maintain a hierarchy:

1. Short-term memory
2. Declarative long-term memory – episodic and semantic memory
3. The deepest, most automatic, non-declarative long-term memory

The ultimate target of learning is problem-solving. The closer you get to achieving this target, needs are resolved automatically. The consolidation of automatic predictions involves their transference from the cortex to the subcortical memory (located in the basal ganglia or cerebellum). The best memory systems are the emotional or procedural systems; these are not represented in images, nor are they thinkable. They are nondeclarative. They are not subjected to updates by the working memory. It is what Freud refers to as “primary process”: X activates Y without thinking - this is invariably the case. Neither delay nor thought, it is no secondary processes.

This is where automatic mechanisms come into play; they can be found in animals and humans alike. Imitation is an automatic learning process (Triesch,2013) which for the purpose of the present research, will be referred to as imitation as creativity**.** The imitation mechanism lays the foundation for what shall be considered as internalization – automatic internalization. It comes as an innate mechanism that can be found in utero, part-reflexive and automatic (about the reflex as bridging in and out, later). However, this is also a generative mechanism, which acts by generating something new.

Today, current knowledge points that the so-called evolutionary reflexive mechanisms are epigenetic mechanisms that work like seeking systems and are activated in the context of their environmental conditions (Touen, 1984). They can be traced in the uterus and are responsive to the uterine environment. Postpartum, they also occur in brain-damaged patients (Raveh-2008) and manifest their response to their surroundings, even at their automatic level. If these were mere mirror mechanisms, they would show no predictive errors. But being part of the seeking system, they survey their surroundings. Their attention extends beyond what they are attending; they also glean from their stuff that falls outside their immediate attention range. There is much more to them than meets the eye and consciousness. Each may take something else from their environment. They sample their vicinity. We tend to take stuff that we find interesting, but also stuff we do not intend to take or even things that we did not know would serve us later.

## B. What are the Possible Processes of Imitation’s Construction? Some Different Aspects of the Imitative Theory

### 1. Consolidation and reconsolidation: What are they, how do they work, and why do they require to use the imitation mechanism?

We posit that the seeking system studies the world, radar-like. It gathers information relentlessly and must put it into order. It is described as the brain’s ‘default’ emotional system. It saves this information in the memory, which in turn has processes in place to through this information. Recent years have seen meticulous work done in memory research, and we shall therefore draw on two key concepts in this research in order to understand what happens to materials gathered in the imitative learning system.

Consolidation and reconsolidation are vital for normal function and for memory generation and memory use. Memory is significant when performing a behavior that serves as a target, like thinking. The resolution of all these issues is at the heart of developmental disorders, anxiety, mood changes, addictive behavior, and other aspects of cognitive thinking. Memory also plays an important role in shaping the personality structure, character, and social interpersonal behavior. Therefore, it is vital to understand how memory is created, saved, stored and retrieved; how its changes impact different events of human and mental life. The present research posits that the ontogenetic, epigenetic, implicit, evolutionary process, found in animals and humans alike and known as imitation, is central to memory structuring and even to memory’s modification over time. In order to get an idea of imitation’s structure, we must understand the memory mechanism and how the imitation mechanism serves its function.

Traditional approach assumed that we remember historical experiences, while the historical vestige is retrieved from the memory storage. Current knowledge clarifies that the retrieval of memory items involves the item’s transformation. This process is known as reconsolidation. The classical approach assumed that memory experiences a fragile state for a certain period, before becoming structured, and then, once stable, it becomes a stable essence – memory consolidation, as they referred to it. This understanding seems to have been informed by the notion of amnesia, under the assumption that memory in its labile state takes a long time to become solid. However, research over the last century has shown that despite memory formation being a long process that occurs over several stages, memory undergoes one type of stabilization, and once it has completed it, it is no longer sensitive to changes (Squire et al.2015).

This understanding too has undergone revision in current research (over the past 15 years), which has shown that memories experience revision when memory traces are retrieved – memory reconsolidation. Reconsolidation is not the preserve of a single memory on a single occasion; it is an ongoing process, and we can see that memories are stabilized and re-stabilized. As part of this process, memories wane or wax. This proves pertinent in selecting more effective, efficient, and adaptive strategies of learning and memorizing. This knowledge can also inform therapeutic implications tailored for patients and their different grievances.

### 2. Where do the objects that we notice come from?

Assuming the imitation system, as part of the seeking system, gathers minutiae from its surrounding environment, how are the objects retained in our memory created?

They are not created objectively, top-down, nor are they the product of bottom-up sensory signals. Rather, they are subjectively inferred top-down and seem to appear ex nihilo. In fact, it is from within us that they come. They come from our expectations, from our generative model, from the memory systems, from our understanding of the context that they inhabit. In other words, they are actually the products of computational work. What do we mean by ‘computational work’? Our memory system is an abstract thing. Representations are not generated by our cortex in the literal sense of the word.

“What causes perceptual images and cortical activities *both* (they are in fact one and the same thing, realized from different perspectives) is the operation of functional laws of the kind described by Zeki for colour vision. The images that cognitive scientists call ‘representations’ are, at bottom, really *products of algorithms*” (Solms, 2021).

Cognitive representations are distinct from affects, as shall emerge later, because they are the product of captured or free energy. In other words, they are the product of computational work. Affects are the demand for this work. Work means generating stability for their prediction – how they are retained in our mind is determined by their stability. This in turn lends our basic mental structures the semblance of stability. The cortex in turn adds an image, mental representation, to perception, rather than consciousness (as consciousness comes from the location of lower affects, near the brainstem). These images are predictions, the product of algorithms from different brain hierarchies, from the center to the periphery, with every level trying to push the predictive errors of the level below.

### 3. The hierarchy of the brain

The deepest level of long-term memory has the largest spatio-temporal receptive fields. They contain everything transmitted from the peripheral level.

The inversion of the hierarchy - i.e., with the transition from learning to perceiving.

Each perceptual scene encompasses “a fully articulated, panoramic, threedimensional world composed of shaped solid objects: the world of our familiar phenomenal experience.” The ultra-STM granular details are nestedwithin the objects you perceive, which are nested within STM sequences of events, which are nested within LTM episodic narratives, which are nested within deeper LTM semantic facts about the world, which are nested within nondeclarative rules and procedures, and so on, all of which are ultimately nested within conditioned instincts, reflexes and drives.

The following quote, from Clark asserts this statement by Solms:

“A certain pattern of retinal stimulation, encountered in a given context, might be best accounted for using a generative model that […] combines top-level representations of interacting agents, objects, motives, and motions with multiple intermediate layers capturing the way colors, shapes, textures, and edges combine and temporally evolve. When the combination of such hidden causes (which span many spatial and temporal scales) settles into a coherent whole, the system has selfgenerated the sensory data using stored knowledge and perceives a meaningful, structured scene.” (Clark, 2015).

Accordingly, referring to paragraphs 1, 2 and 3, we may recap: The inner world comprises memory traces. Memory traces come from our past encounters with the world, from which we build a prediction model about the world orders, as we must meet our needs.

We are not created as a blank slate. For numerous biological reasons, we come into this world complete with many innate predictions. These are dictated by our phenotype and in this sense, our anatomy is our fate. It is determined in our early embryonic period, as summed up by Mark Solms: “I shall withdraw from stimuli that injure me’ and ‘I shall stay close to mummy’.”

As early as intrauterine life, when the amniocentesis needle enters the womb, the fetus recoils from the frightening needle and leans against the mother’s womb. This constitutes evidence for fear as early as intrauterine life. (On infantile instincts and their significance as early as intrauterine life, later.)

Imitation at the different hierarchy levels of the system comes from an integral spatial place, with a breadth of margins. It arises from corrected predictive errors and becomes, through repetitiveness and the containment of uncertainty, more finetuned, unique, and appropriate for the individual’s unique needs. From memory traces to the highest level of consciousness, from experiences perceived clearly and compatible with existing structures, to accidental experiences that exist within us over different associative levels; and all the way to the concept and symbolization level. I shall later elaborate on the pathway to the highest levels of consciousness and to cognitive consciousness.

How do our needs manifest and what is the target of perception? Perception is not an end in itself, it is meant to serve our biological needs. It is a biological end, moderated by biology. The sensory input comes from within us, and the way to meet its needs that come from within us is through our action. Perception is generated due to the interest of free energy minimization. When a need arises that cannot be gratified, having no inherent answer in the system, a state we shall refer to as ‘uncertainty’ emerges, which contains free energy. It is in fact an alarm system that guides behavior when we need to manage situations that exceed the system’s existing specifications.

We therefore represent the world, because we must do something. Perception guides action. We only notice stuff to which we have paid attention. Every society and race have stuff that earns their attention and is salient for them: We only see what we sample.

We are equipped with motor functions that include reflexes, instincts, and drives, which is why we have perceptions. Perception guides activity. It automatically guides it towards the world. This occurs frequently, as the instinctual (as well as autonomic) repertoire is limited.

## C. What is the Target of Learning and Imitation?

According Friston’s law, as our needs cannot change, they generate a new fixed and continuous demand for work, because something else must change. This leads to perception-guided, and it this target that learning serves. Learning and memory are tasked with representing the causal structure of the world – the world wherein our needs are to be gratified – and particularly the part of the structure that does not make immediate sense through our existing predictions. In other words, the creation of models of the outside world serves the function of explaining the origins of our predictions, our predictive errors, errors that stem from our actions - so that we can minimize them. Our perception scans the world based on the division of activity model of the salience network, while identifying the origin of the errors so as to allow us to assign them a better, more compatible action.

Perception, therefore, means revealing an inexplicable context of our errors, so that they can at least come as a surprise, and thereby open up the beneficial repertoire. For this reason, perception grows from within, like phantasy and hallucination, and is meant to provide us with a model of the world that can guide us towards the thing that we observe. It will guarantee that our representations are bound as close as possible with external parameters, so that we can truly gratify our needs. Albeit very subjective, perception is also very arbitrary (De Saussure, 1911/ 2018).

How does the connection form between the world as we perceive it and the world out there? This is explained later in the context of the of reflexes’ development and function, with assumptions raised about the workings of the imitation mechanism.

Varela (1991), in his enactive approach, suggests that we seek that which we need, but take care to be enactive. We wish to discover things that we do not know as well, i.e., to find conventional binding principles between the motor and sensory systems that may explain how activity can be led by perception and received by a perception-dependent world. Perception has to do with problem-solving, and therefore requires a problem-solving mechanism.

It is this problem-solving mechanism that the present research endeavors to address. I shall point to the imitation mechanism, which offers a path to find what we wish to find and do not know; I shall discuss collection which also applies to things we do not seek intentionally - and allows to identify new, unintentionally generated things in the world; things that were not present in the cerebral system prior to the imitative seeking. I shall point out the relevant evolutionary and epigenetic survival mechanism.

But before we turn to this mechanism, let me go back to what Mark Solms, with the help of Friston, devised as the foundation for the neuropsychoanalytic approach to consciousness research. Once we understands the roles played by perception, we can put together our knowledge about hereditary automatic mechanisms and how they integrate into human development, how they shorten processes – i.e. fast, and how, and on which emotional pathway, they run from the outset.

Why do we perceive consciously? Perception is action-oriented, while the conscious action guides the voluntary activity. (It guides activity in times of uncertainty). Solms puts all activities from the cycle of action selected by the decision-making triangle of the midbrain into three phases:

1. Parameters – the sensory outcomes expected for any activity
2. Precisions – the level of certainty or uncertainty associated with these predictions 3. States – the sensory outcomes of the sequence of actions as they took place

The first and third phases have to do with the top-down and bottom-up systems that transmit messages. The outcomes obtained are calculated versus the outcomes in practice, prediction versus predictive errors. This is neurotransmission, an intrinsic, unconscious process. The question then follows: Why and how do we perceive consciously?

The answer lies in the post-synaptic modulation, which pertains to the second of the three phases listed above, the expected context dimensions that attend the action. It pertains to the ERTAS - more of which soon.

The brain is an organ that strives for homeostasis; the ERTAS (reticular activating system) is the region in the brain that judges our relative distance from processes. It is the mechanism involved in all conscious actions and experiences. All consciousness, including (cognitive) conscious perception, is activated by endogenic sources. The need for consciousness arises from predictive errors that transpire in the above-discussed process. Information enters consciousness, with predictive errors, and undergoes prioritization, which takes place around the PAG by the end of every round of action and or, perception.

The main role of the midbrain’s control is to find the desirable solution to help achieve maximal free energy minimization and to enhance precision. Rather than going away, problems left unresolved turn into (automatic solutions) automatic sequences; if left unresolved, their residue – their predictive errors, will be returned to the PAG and re-introduced into the consciousness, so as to receive compatible solutions. There is a hierarchic line of receptive fields of motor and perceptual representations, embedded in one another. We shall refer to them here as the different levels of the imitative hierarchy. We can find the implicit level of imitation - which includes everything that occurs. This level is activated by the radar-like seeking system, which receives surrounding information - from the context, if you will. The radar-like activity receives necessary as well as superfluous information, ambiguous and unambiguous information. Everything is computed and available, while a small part is processed in different ways. Wakeful states maintain one type of processing, while sleeping states see other types of information processed in this system. The processed and unprocessed material transfers amodally through different mental and physical systems, and resonates in the different systems that seek to convert the free energy into bound energy - in Friston’s terms, or bound cathexis, in Freud’s terms. The context-gathering by the brain level helps to maximize certainty and minimize surprise. The gathering contributes to certainty, in the clinical sense of organizing reflections. In other words: The feeling we get when several pieces of information come together and can point to cues in the inner environment, which can in turn support the knowledge that we have been gathering. It is conducive to creativity as well as to communication, to openness and to interaction with others, who offer information that is differently structured in them, while we, in our mental space, can organize and understand them.

Perception is a deviation from this hierarchy. It is what we experience, shapes of colors, tones or smells, which include deviations from the anticipated. Not all deviations that are experienced in the body, or registered by the consciousness, can be found in our predictions. Their prediction always includes forecast deviations. The confidence in their prediction is represented by omega precision – represented by Freud as transformation from quantity to quality in the 1895 Project. Changes between our homeostatic prediction and surprises are the felt uncertainty. Conscious perceptioncomes from any level of hierarchy and disproportionally, from the bottom-up, where the entire action sequence takes place. Precision in confidence grows when the things we do turn out as expected, and decreases when uncertainty rises (i.e., feeling bad because it did not turn out as expected). Under uncertainty condition, precise predictions must be made compatible with the amplitude of measuring error. The basis of precision lies in the RAS, which activates and performs selection in the LTM (long-term memory) parameters, according to the hierarchic levels of the generative model found in the core brain, which leaves uncertainty. All this is done based on the priors, while predicting uncertainty. First we select the action sequence; one feeling is selected to fit the specific context during the coming cycle (selecting a feeling means selecting an action). The progression of the feeling is assessed - nothing happens in the dark. The hierarchic cascade of predictions ensues from a homeostatic core – from predictable, immutable behavior, and according to Friston’s law, the following conduct will stem from a lower level, below or around the core.

In other words, the rise of the free energy at the core of the hierarchy necessitates further work, which must occur at the periphery. Thus, a selected affect is resolved by binding the energy of the precision optimization in every action (perception cycle). That is the target of consciousness in the cognition. It shall be referred to here as ‘predictive work in progress’. Cognitive work slows down the automatic work of action in the world, and here lies the difference between voluntary and involuntary work, conscious and unconscious, felt drive and automatic reflex, between the automatic imitation and its repetitiveness, which facilitates creativity. The new creation allows to minimize measurement error and uncertainty. A new conception is formed. Within all these lies the mechanism that improves work and presents the brain with possible ready structures, which are latent. Some are the imitative shapes unintentionally internalized, which were not really conscious, or in use. These are imitation models of possible solutions that have already been generated in the surrounding environment and can serve as shortcuts, in order to bind energy. The imitative action is involuntary and implicit, and therefore swift. It is the same action that marks, as Freud noted, the impact of charismatic leadership on the masses; they are activated unwittingly, by some imitative responsiveness that forces itself on the individual, being unconscious.

Which begs the question: Do feelings attend the conscious representations, or do they become representations in their own right? The answer is that raw feelings both attend conscious representations and become the generators of conscious representations. Feelings generate the whole cycle of perceptive actions, so that every progress is monitored according to what preceded it and to the original target. But prediction in working progress resolves the affect by becoming free energy bound. The affect becomes cognition and binding is set in working progress; for example, when people speak out their unprocessed feelings, they often take on the diction of whoever they have been communicated with. The delivery acquires the emotional style. As we listen to the speech characteristic, typical mental and emotional structures emerge.

The verbal representation of feelings is achieved through imitation, and it also serves as a monitor. The different reflexes, including the automatic imitation, lend the characteristics the qualia and vividness of the emotion. They are also sensorimotor activated, producing an energy bound state of the new situation that faces the baby. For example: A two-year-old girl toddler was observed in a kindergarten. Her history featured a CVA suffered by her father. She had witnessed him evacuated from their home by an ambulance. The father had returned, confined to a wheelchair, while the entire household revolved around him.

The toddler was sitting cross-legged on her kindergarten’s floor, leaning forward and looking down. She seemed engaged in something, and every so often children and adults would approach her and try to interact, only to retreat back. Every couple of minutes she would dart a quick, startled glance at the entrance door, and once realizing it was shut, turn her gaze back down, resuming her forward-leaning position.

The methodology I used to employ involved asking students in the preschool development course I taught at the medical school to describe what they were seeing. Several students were observers and their joint observations created the full picture of the girl’s situation, at home and elsewhere. Students were in the dark about her situation at home. The kindergarten teacher who sat with the students would provide this information after the description and construal were completed. Time and again, we would see students describe major situations in the lives of the toddlers they had been observing.

You could see the swift, startled gaze of the toddler as she was reconstructing her trauma, the way she carried herself, imitating her father’s navigation of the house, that dominant figure who was going about his life in a wheelchair, and the girl’s ability to activate the surrounding children and teachers in a manner that simulated her situation at home.

This process has to do with the hierarchic nature of the predictive model. As the process expands from its homeostatic core, affect becomes perception. The experience grows inside-out - from the agent’s perspective. And so, the affect is inferred and implemented prior to the experience and continues to be the sequence quality of the action/perception. But then, when the predictive process unfolds in detail, not only does affect disappear (when everything goes right), but the qualia of the extrospective perception are inferred and implemented, in as much as they bind the changing uncertainty to the contextual origins of the activated feeling.

It demonstrates what Merker said about feelings being the common currency of consciousness. The world acquires valence only if it offers options to fulfill our needs and in so doing, it minimizes free energy. That is, the common currency is sustained by minimizing existing energy, therefore no experience can exist without affect.

Imitation means casting free energy, the feeling that rises and seeks its relevant context, in a formal container. The context is the form, and free energy is then captured. For example: Suppose I feel a need for certainty in the notion of zombiedom. I walk into a room, ready for the encounter, but something about the room is different (free energy), starting from the shape, but mainly the emotional quality. The place has just hosted a heated argument. It may be experienced through the parties’ facial expression, but it could be that their expressions are no different, while the emotional experience is different and unclear. Automatic mode is off, it is not the intended obvious conversation about one thing or another. Our seeking system has registered a change to the verbal flow, something different about the whole experience, and perception must now withdraw inside (as a creative imitation process) in order to clarify the matter. The subtle emotional experience is registered in a low hierarchic level of the brainstem, by the imitation mechanism (it is just there, palpable and therefore not experienced on a conscious level). It identifies the free energy and now carefully deciphers, through thinking or conscious observation, all that happens in the room, besides the planned encounter. Soon, based on consciousness, a match can be made, the situation can be conceived in words and later even allow a conscious, intentional response. Then we can determine the presence of certainty and the absence of free energy at the moment.

Importantly, there are other conscious qualia beyond affectiveness in the experience, which may clarify the meaning of feeling beyond affect. In fact, there are five additional categories of qualia associated with the sensory modality (which comprises sub-modalities of touch, posterior location, temperature, pain in the context of somatic sensation, color and motion, orientation and sight-related context). The concept of sensory affect serves as a bridge between the perceptual types of consciousness and affects. Affects are not associated with introspection. Feelings are the bridge between the introspective and extrospective fulfillment, which is a non-self-world. Smell, taste, and repulsion are external and hold external valence, and so are pain and different types of affective touch in the somatic sensation. Presumably, along these bridges, we can find the power to discern the ripe fruit, the warmness of the color red. This way they acquire their valence.

Panksepp discusses the issue as follows:

“Were primary affective and sensory-

phenomenal experiences initially intimately linked during early mind/brain evolution, or were they two fundamentally distinct forms of primordial consciousness of the brain from the outset? We don’t know. But new theoretical perspectives could be crafted from the supposition that the *experience* of conscious sight and sound were initially largely affective (Panksepp, 1998). *The immediacy with which sudden visual and auditory stimuli can startle and frighten us, especially when such stimuli originate very close to our bodies, suggests a deep primal integration of these sensory systems with some of our most essential affective survival mechanisms. Consider also how we are prone to associate certain colors with feelings*systems

Panksepp, in his conclusions about the origins of affects, the proximity of the auditory and visual reflexes’ responses, points to this proximity as a primal integration of the sensory systems, in what is commonly known as sensory amodality. The present research employs the concept of simultaneous imitative responsiveness of the senses (Stern, 1985). Panksepp points to the reflexive responsiveness, which is commonly perceived as infantile reflexes, evolutionary vestiges commonly believed to disappear with development. However, they can also be understood as an origin of the feeling’s valence and as evidence of cerebral pathways and sensory emotional qualia. It is these amodal qualities that mark the color red as warm and blue as cold and can tell ripe and unripe fruit by their quality. Heat and cold are simultaneous, clear visual-sensory qualities, typical of affective touch (Fotopoulou, 2017) In other sense, they are the hedonic side of the sensory qualities, an embodiment of the biological valence. For example, someone’s physical proximity acquires the significance of heat, sex is hot, fire is hot. The colors of ice and snow are blue and cold. These definitions of the sensory qualia point to the lifelong amodality; they transcend race and apply to humanity at large.

However, the valence conferred on perceptual qualia is unlike the valence conferred on (sensory) affects. The difference is simple – the perceptual are acquired, while the sensory are innate. These are associations in the empiricist sense, and therefore, even though some affect or precept-type associations may appear later than others, they are absolutely arbitrary (de Saussure 1911/2018). Therefore, unlike the primal affects, their causal force is very low. They only acquire their force by receiving affective power from the context, i.e. they are percepts that have a contextualized affect.

Tracing the consciousness development, we can easily make the leap to understanding the imitation mechanism. This mechanism is innate, while in its deeper part it is automatic, associative and serving in other levels of consciousness as well. It exists in the association of constructing cognitive concepts. This automatic mechanism responds well in the affective level, while generating fast unconscious/Implicit associations. The very same mechanism associatively serves consciousness even in the context of the concepts that flow alongside the contextual affects. The presence in a specific context supplies the associative process that generates precision in the free energy; it gradually transforms it, through a reflexive spectrum, into bound energy.

Our approach to reality is invariably dependent on the affect that sets the context to our concept. The dominant feeling paints the picture of reality. Painting reality with the relevant color is the imitative affect of perception. Imitation is the context. It is the creation of the structure from the dominant affect. If the feeling is that of fear and horror, then our entire physical responses and reality will be interpreted accordingly, while if the main feeling is lust, then our entire approach to the physical and realistic responsiveness will be altogether different. This is how the concept of contextualized affect unfolds.

Originally an implicit mechanism, and later perceptual cognitive, imitation, through its associative nature, helps the cognitive consciousness minimize its free energy. This research has its emphasis on the automatic, implicit mechanism, which reads the environment according to emotional needs.

## D. The Imitative Pathway as a Neuropsychoanalytic Concept: A Quest for Consciousness as Organized in Current Scientific Thought, Adapted by professor Mark Solms – What is the purpose of imitation? Assumptions as to how imitation serves us, its contribution and its benefits

How does consciousness grow of memory traces? Or rather, at this point, the question is: What is the relationship between memory traces, imitation and consciousness? The answer is: it generates memory traces, which only become consious when there is preditction error. How does imitation help to minimize free energy, generate certainty, or create concepts instead of memory traces?

So far we say that affects produce demands for the mind, while cognition generates the work demanded by affect. The measurement error transforms memory traces into consciousness. Memory becomes salient, as it fails to predict what it should predict, and therefore requires an update. As of the 21st century, there has been a renewed understanding of the mechanisms behind the memory update, known as memory consolidation. A specific chemical structure, which shall not be specified here, allows the regeneration of memory, while deleting previous memories. Current findings in memory research show that cortical processes are basically unconscious, while consciousness grows from the brainstem.

The basic predictions in general, and imitation in particular, are supplied by innate reflexes and instincts, which are our survival tools. These survival tools serve us efficiently, but prove unhelpful in more complex situations in our environment. Therefore, the innate predictions employ the same basic tools and develop by learning from the experience. Experience is an operative thing. The innate action programs are activated automatically, in situation of certainty. Environmental complex situations call for consciousness.

"As I said: the terms ‘reflex’ and ‘instinct’ are ambiguous in this context, and this is also why

‘drive’ denotes *felt* volition. We must feel our drives, reflexes and instincts because the innate predictions they embody do not (and cannot) predict all the variance in complex and changing environments. What we feel, in short, is the residual prediction error and associated uncertainty as we try to stay ‘ahead of the wave’ of the biological consequences of our actions: To deal rapidly and fluently with an uncertain and noisy world, brains like ours have become masters of prediction – surfing the waves of noisy and ambiguous sensory stimulation by, in effect, trying to stay just ahead of the place where the wave is breaking.” (Clark, 2015).

The seeking system, radar-like, constantly seeks, quickly scanning the environment, while sensing and feeling goings-on, the necessary and unnecessary. The system is updated with new developments by day, and processes them by night. New stuff is organized into concepts and the remaining stuff returns to the PAG. Memory is selective and has to do with filtering of all the material learnt during the day. This is how I check my predictions. There is a hierarchy of predictions, as noted earlier, with a core and periphery:

"The same principle which guides the conditioning of drives, reflexes and instincts – namely learning from experience – also underwrites conscious perception and every other form of cognitive consciousness. I have identified the mechanism by which this happens as ‘reconsolidation’. Reconsolidation is the effect that arousal (gain, precision) has upon memory traces."(Solms, 2021).

But the ideal of all learning is to *automatize* reliable acquired predictions. Understandably, we aspire to forge new predictions that are at least as reliable as the innate ones (remember: reliability = inverse variance). Therefore, to the extent that we achieve this (i.e., to the extent that predictive errors wane), to that extent our acquired predictions become automatized through consolidation – which is, in this sense, the opposite of reconsolidation. (Consolidation is the mechanism whereby the traces become automatized; by ‘opposite’ I mean that reconsolidation dissolves the traces – rendering them labile once more -- it literally dissolves the proteins that ‘wired’ them.)

The entire move described here takes place in the nondeclarative part of the memory. The main target of memory systems is to automatize whatever can be automatized into automatic systems, very quickly. To the extent that it is possible, information should be transformed into consolidation – this state is ideal for cognition. It is the quickest state, involving the least amount of uncertainty. It is therefore no surprise that most innate memories are nondeclarative.

Nor is it surprising that the innate mechanism of imitation is the mechanism that best describes the unfolding reality. Imitation is a system found in the nondeclarative memory. Efficient and fast, it plays out even before cognitive consciousness arises. It tracks innovation and variance in the world, and being automatic, it facilitates stability, with no cognitive consciousness. Imitation allows acquaintance with the different forms of the experience. It is amodal, gathering the different aspect of experience through the different physical modalities, while providing support against uncertainty.

Solms notes that many of the LTM (long-term memory) memories undergo constant consolidation. Most of these memories, though not all, are directly transmitted to the nondeclarative memory, while many types of learning simultaneously transfer through multiple systems. However, nondeclarative memory comes in many forms, which do not necessarily follow the same manner. For example, procedural learning happens through repetitiveness, and therefore we tend to say that skills and habits are hard to learn and hard to forget. Different types of emotional experiences are learned quickly and prove hard to forget. (The conditioning of fear, bonding). Furthermore, nondeclarative memory is only unconscious in the cognitive sense. When an emotional response is activated, we no doubt know and feel it, but at times you may feel you do not know where it came from. Indeed, often we do not know where it came from as it comes from imitation - automatic by nature - which happens before we can tell, until consciousness is directed there, whereupon it becomes conscious and conceptual.

## E. Brain Hierarchy and Imitation

Predictions of a broader spatiotemporal scale are found deeper in the LTM hierarchy of the predictions that create a generative model. It offers the best description of the nondeclarative memory situation relative to the momentary experience. Subcortical memory traces are more stable and reliable than their cortical counterparts. The cortex specializes in context. It restores the model’s precision during unpredicted situations that have an element of surprise. Therefore, the higher the consciousness, the lesser the memory traces. (More neuroplasticity required, and more work). The lesser the uncertainty, the less the consciousness required. Consciousness means felt uncertainty.

What better way to minimize uncertainty than borrow ready, mathematically organized structures, in order to streamline and shorten consciousness structuring processes? We therefore borrow these structures in different situations in order to minimize surprise and shorten the brain’s plastic work. These structures are appealing, as they are constructed into preexisting successful structures that shorten processes. They require precision work in order to minimize free energy. This work is repetitive and original, which means imitation constitutes a new creation. In a parallel process, you may say how the present physical theory offers a basis for an affective and cognitive theory of consciousness and the unconscious. The analytic theory devised by Freud allowed, in its basic level, to describe a generative model of the inner world, while Solms in turn takes the physical model suggested by Karl Friston and creates a generative model designed to minimize free energy and clarify cognitive consciousness.

Feelings grow and appear instead of memory traces. The uncertainty/feelings appear when automatic prediction fails to work and gratify the need it addresses. This is the source of all psychological, normal and pathological suffering. To cite Freud: “Hysterics suffer mainly from reminiscences.”(Freud, 1895).

Psychopathology stems from memories of which the patient is unconscious but are nevertheless influential. Psychopathology stems from automatic predictions. Life in a pathological, domestic mental space gives rise to pathology in the next generation, thanks to automatic imitation.

Next, we may say that repression occurs during the consolidation process. During early development, when our generative models are not as stable yet, we are overcome with needs that require response and adaptation. We are born with different innate behavioral structures, including different defense mechanism, starting from freeze or flight, genetic behavioral models, and epigenetic models adapted to the environment of origin. Learning by experimentation is our solution to human distresses. We are born tabula rasa, and one of our striking, most primary skills is the imitative response. Babies imitate everything around them. This is how they understand how they feel in this world. They exist in an environment that is comfortable or otherwise, and this environment is imprinted in the deepest level of their nondeclarative memory. Imitative responses are observed as soon as the first postnatal hour, in babies and animals alike. These are reflex-type responses, which eventually respond to the human environment of the baby. Babies often end up in overwhelming situations, as far as their abilities on one hand and their needs on the other. What can they do? Their imitation mechanism manages to represent the impossible situation in their body and behavior, and we can see the typical behavior, which can be found in their nondeclarative memory.

This conduct among children is also typical of their approach to fears. When a two years-old is afraid of a dog, he will stand on all fours and ‘bark’. This will give him a sense of control over the feelings of fear. In other words, for the child, the imitative mechanism serves to minimize uncertainty. It takes the structure of the behavior and by using it, minimizes the free energy. The same holds for the aforementioned two-year-old girl toddler observed in the kindergarten, who seemed to run the place; the children and teachers approached her, but rather than looking up, she responded by looking down. In fact she was observed imitating her father, who had recently suffered brain damage and was running the entire household from his wheelchair. This manner is typical of the solutions children devise to the need to face different feelings, in order to minimize the uncertainty of their situation, when their needs are not gratified. This behavioral model does not end by age two or three, it is lifelong and helps to minimize free energy and uncertainty. However, residues of this need linger. The nondeclarative memory, manifested in behavioral markers, acts out these imitations, which leave the free energy that seeks to complete the gratification of needs, based on the automatic primal imitation. Our deep homeostatic certainties (our needs) cannot change.

Therefore, repressed predictions are unlike automatic predictions (the former are the nondeclarative imitation products). These allow room for predictive errors in deep consolidation levels of the generative model. Feelings are measurement errors. They are the byproduct of anything left ungratified. The difference between repressed memories and nondeclarative memories is that the error marker hinders the child’s solution from regaining salience, and thereby facilitate consolidation. It does not allow to learn by experimenting, but rather begets symptomology, from which we then suffer. The psychiatric symptomology is an activation of the nondeclarative memory enactment. We turn to therapy due to unwelcome feelings. It is the quality of the feeling that determines which need fails to receive proper gratification. These feelings, or rather, what we do with these feelings, are known in psychoanalysis as defenses. Defenses are the ways to resolve measurement errors, without updating their underlying prediction. In fact, they are ways to avoid reality. There are different types of defenses, some better and more efficient than others, which are energy-consuming.

Early imitation is one of the priors built into the system and later, as the emotional difficulties arise, it can be a solution of sorts and a shortcut to minimize free energy. However, as it does not fulfil all needs, it actually serves as a defense mechanism for all intents and purposes, and as consciousness rises through a repetitive process, it assists in structuring the defense mechanisms.

## F. Thought and Language

Most of our thinking actions are performed in the automatic level that activates actions, and require no entry to the consciousness (Barge & Chartrand, 1999). This work is energy-efficient and even quick. Autonomous reflexive behavior and automatic behaviors fail to resolve complex issues of measurement errors. Animals too struggle to find their way through new situations and are required to perform trial and error actions. Errors can be fatal. As we assess the situations unfolding based on past experience, we are required to minimize measurement errors and uncertainty in the new situations. Therefore, the reflexive, radar-like instinctive behavior that assesses the quality of the environment serves as a direction in the new pathway and helps minimize uncertainty. Imitation therefore is efficient and quick. Like a radar in the open sea that indicates the presence of the next submarine, it locates what happens out there so as to check and complement through repetitiveness. The phantasies (or in Solms’s words, best guesses) can be seen as an implicit guide to the world and will become clearer, particularly with measurement errors. In the event of an error, they shall be brought to our attention. Phantasy guides our psychological life from one moment to the next and becomes conscious when it is in contradiction with reality. The thing that makes it into our consciousness is not the phantasy itself, but its incompatibility with the anticipated scenario. There are top-down generative models, precepts. On the other hand, there are concepts like phantasy, hallucination, dreaming, or imagination. These are concepts that denote mental processes that do not factor in the limitations of reality.

Hohwy distinguishes between two types of thinking, precepts and concepts. One is experiential while the other involves thinking and observing. Birdsong is an experience, while the effort to define who the bird is or its name constitutes conceptual thinking. This in turn also leads to the distinction between two different mental states, between sensory states endogenously activated and active imagination actions. In the space between “predicting the present” and “intended imagination” lies a mental state of mind wandering. It is a state of no consciousness. The mental activity does not stop when the sensory measurement error is

minimized. There is reverie, a state of “being there”, the same state that features as one of the baby’s five states of wakefulness-sleep states: wakefulness with no particular need, observing the world and seguing into the intermediary state that Winnicott pointed out in the transitional object space – a state of being. The state of the system is a state of minimizing measurement errors. It is an energy-efficient model that serves to sample the world that is compatible with the prioritized needs.

The mind wandering state is the preliminary state of what Winnicott was later to call ‘the transitional space’. This is an optimal state, where the creature experiences the world, free of physical needs such as hunger, or the need for physical contact, like bonding. It is a state that lies between wakefulness and sleep, a working state of the DMN seeking system. It demonstrates the reflexive and automatic state of the seeking system. It is an optimal state to minimize uncertainty if generated previously or intrinsically. It is the state of metamorphosis from the emotional need for action and the emotional need for insight, between the precept-generating site and the generation of concepts, where the imitative system is at its best.

# VII. PRACTICAL IMPLICATION OF IMITATION FOR THE CLINIC: IMITATION AS A FORM OF ACTIVATION AT WORK IN THE CLINIC

## A. The Neuropsychoanalytic Approach to Observing the Behavior of the Mind

The theory dealt with in this chapter is the most advanced theory being used for the interpretation of experimental and theoretical studies of drives and is guided by various facets used in studying the mind (Hohwy, 2013). The central claim of this theory is that the brain is a sophisticated hypothesis-testing mechanism, which is constantly involved in minimizing the error in its predictions of the sensory input it receives from the world ..The objective of this mechanism is to explain the perceptions and the working of everything that can be described as ‘mental’ activity’. The present theory is attractive because it encompasses a powerful theoretical argument to support it. It is also attractive because more and more empirical evidence is being accumulated as to its correctness. It has a unifying power and it is capable of dealing with the minutest details.

Hohwy is interested in the mind and its ability to perceive the world. He is interested in knowing how we manage to make sense of the manifold of sensory inputs that encounter our senses, and what happens when it goes wrong. Hohwy wants to know what shapes our phenomenology, and what this tells us about the nature of the mind. He attempts to respond to the question as to how the mind minimizes the error of its prediction created in the encounter with new/ surprising sensory input, which had not yet been formed in the in-built structures but which had been created within us in the course of human history and in the course of the history of the individual himself. The ability to perceive the world touches directly upon the subject of our research which argues that imitation is the primary process of learning and that as such it is the answer to our ability to learn about the world quickly and in a highly efficient way.

This idea is attractive because it links theoretical functioning with a simple mechanical implementation. The basic combination is of the utmost simplicity yet has potential to be applied in a very nuanced way. Moreover, this theory makes it possible to learn something new from applying this idea to the maters of the mind: we learn something new about the mechanics of perception and about how different aspects of perception belong to each other. In addition, we learn something new about our place in nature and in the world as perceiving and active creatures.

## B. Affective Neuroscience

In the present chapter I will try to clarify the implications of the imitation mechanism in the course of therapy. This will be accomplished by observing clinical neuropsychoanalysis using the approach that facilitates the application of mind neural research to clinical practice.

Observing clinical neuropsychoanalysis requires the linking of various schools of thought, between cultures of thinking that have led to neuropsychoanalysis most advanced information. The contemporary clinical approach adopted by neuropsychoanalysis is based on the investigation of emotional systems pioneered by Professor Jaak Panksepp (2012). The clinical implementation of Panksepp’s theory in the analytic clinic was accomplished by Professor Mark Solms (Solms, 2018). In the previous chapter we described what was required to work through emotional changes via internalized personality structures that had reached early automation. In other words, certain memories are not subjected to appropriate processing pathways. They go through a process of problematic automation, following which they repeatedly create experiences of intrusive and invasive memories described in trauma theories. These memories result in a life of repetitive patterns which time after time lead to destructive outcomes. This research is based on the integration suggested by Professor Mark Solms, the intention of which is to provide an updated concept for the purpose of putting the emotional pathways into practice, reducing the level of free energy as described chapter 5 of this research.

### 1. A Brief Description of the neuropsychoanalytic emotional pathways

Panksepp (2006) summarizes recent advances in endophenotypic thinking in biological psychiatry and suggests that various core emotional–affective processes may be among the most important endophenotypes that need to be clarified at both neurobiological and genetic levels of analysis. To this end, he discusses strategies to link basic emotional processes that are commonly imbalanced in psychiatric disorders to neuroanatomical, neurochemical, neurophysiology, and molecular genetic levels of analysis. Conjoint animal behavioral-genetic and gene expression, microarray analyses can clarify a variety of key emotional endophenotypes and thereby provide a coherent infrastructure for psychiatric systematics. To further clarify the neurobiological dimensions of psychiatric disorders, we must also focus on psychosocial and environmental stress vectors that converge to create imbalanced emotional and motivational brain activities of psychiatric significance.

A detailed analysis of Panksepp’s writings is beyond the scope of this research. However, to understand how imitation fits into clinical practice we shall assume that core affective processes are especially relevant to the conceptualization of psychiatrically and psychologically significant emotional problem (Panksepp,1998). Core emotional tendencies may emerge from ancient brain processes (referred to in chapter 3) shared by all mammals. Mammalian brains contain circuits that are critically involved in anger, fear, sexual lust, maternal care, separation distress and social bonding, as well as playfulness and a general resource acquisition system for SEEKING/ wanting. In one word ‘desires.Each generates instinctual action-oriented tendencies that are easy to monitor in animal models and each generates a dual aspect monism approach positing that affective consciousness may have been built upon inherited instinctual response tendencies. The possibility that core emotional feelings are firmly anchored in instinctual action systems of the brain, raises the interesting possibility that the foundations of consciousness are rooted in core affective processes the fact that basic emotional tendencies may have distinct neuro-peptidergic codes also allows us to search for new psychiatric medicines that target specific types of emotional dysregulations.

I will begin by expanding our understanding of the seven emotional systems of the brain referred to previously. This will broaden our theoretical comprehension of the fountainhead from which the view of imitation as a primary evolutionary, implicit system of learning - the tool that binds free energy (as explained in chapter 5) - sprang from. I will therefore start with a brief description of the seven systems of the brain and the integration between them. I will then explain howthey are integrated and the way in which the phenomena is to be analyzed. Once we have understood the main emotional systems, and their characteristics we will move closer to an understanding of the feeling - the feeling that should be binded – and the way in which imitation is accomplished:

1. LUST system- How would we procreate in the absence of a brain system capable of feeling erotic desire? The neural seeds of male and female sexual systems are set in early development, while infants are still gestating. However, the seeds do not fully develop until puberty, when the maturing gonadal hormones begin to nurture male and female sexual arousal. (heavily centered around vasopressinergic and oxytocinergic brain systems.) And yet, because of the way the brain and body are organized, female-type desires can also exist in male brains, and -typical male desires gain an existence in female brains. Of course, learning and cultural influences constantly add layers of control and complexity to each emotional system that cannot be unraveled by animal brain research (Pffaf, 2005).

1. CARE system: How would we mammals survive if we did not possess brain systems capable of supporting and nurturing one another? The maternal instinct, so rich in every species of mammal (as well as of birds), enables us to propagate effectively (Numan& Insel, 2003). To have left this to chance, or just the vagaries of individual learning, would have guaranteed the end of all social species. These hormonally primed urges, still present in humans, govern the way we respond to newly born babies. The ebb and flow of peripheral estrogen, progesterone, prolactin, and brain oxytocin figure greatly, through actions on extensive sub-neocortical systems, in transforming a first-time mother into becoming fully maternal. Because males have inherently weaker CARE systems, they require more emotional education to become fully engaged caretakers.

1. PANIC system: A lost child exhibits intense separation distress. The child implores to be cared for, and its feelings of sudden aloneness, verging on panic, may reflect the triggered and inherited pain codes on which adult sadness and grief are built. Brain systems in mammals and birds generating cries of distress due to separation have been identified using electrical stimulation of the brain (ESB) techniques. They resemble each other so closely as to suggest a shared heritage. Brain chemistries that exacerbate feelings of distress (e.g., Corticotrophin Releasing Factor) and those that can powerfully alleviate distress (e.g., brain opioids, oxytocin, and prolactin) figure largely in the genesis of social attachments (as well as sexuality and support) and may ameliorate depression (Nelson, Panksepp, 1998). These chemistries help create those intersubjective spaces with others that allow organisms to learn the emotional ways of their type, paving the way for empathy and love. An understanding of such social chemistries may eventually yield new psychiatric medicines to help patients whose social/ emotional “energies” are greater or lesser than they want them to be. This knowledge may also link up with a better understanding of childhood disorders such as autism. A subset of such children may appear to be socially aloof because they are addicted to their own self-released socialreward chemistries, as opposed to activation by significant others.

1. PLAY system: Young animals play with one another in order to navigate social possibilities in joyous ways that can be easily monitored behaviorally. The urge to play was also not left to chance by evolution but is built into the instinctual action apparatus of the mammalian brain. Indeed, such systems can even promote a joyous “laughter” in other species (Panksepp and Burgdorf, 2003). These are “experience expectant” systems that bring young animals to the brink of their social knowledge, to psychic states in which they must pause to cognitively consider what they can or cannot do to others. Such social activities help program brain circuits essential for wellmodulated social abilities. This is possibly partly due to the activation of genes that promote neuronal growth and emotional homeostasis. Children not allowed sufficient time to play may express such ancient urges in situations where they should not, and so exhibit symptoms of Attention Deficit Hyperactivity Disorders (ADHD). Psychostimulants, which can help everyone to better attend to cognitive demands, also act as strong anti-play drugs. Perhaps many of these children manifesting symptoms of ADHD would benefit from enhanced daily periods of rough-and tumble activities.

1. FEAR system: a multitude of dangers exist in the world, some of which can arouse the central FEAR system of the brain. The system causes freezing at low levels of arousal and fleeing at higher levels (it is possible that the fleeing is precipitated by recruitment of the SEEKING system). Although stimuli that intrinsically provoke fear may differ among species, the evolved core structure of aroused FEAR is similar in all mammalian species. Many other external stimuli gain access to this circuitry through learning — via cognitive–perceptual “high-roads” and more rapid, unconscious thalamic “low-roads.”( Ledoux1996) However, it is the “Royal Road” stemming from evolution, namely, the unconditional FEAR circuitry that courses between the central amygdala to the periaqueductal gray of the midbrain – that concurrently controls the instinctual action apparatus and those deeply aversive feelings that basically help animals avoid danger (Ledoux,1996). It is more helpful to feel anticipatory fear than to be attacked and harmed RAGE system: Anger can be evoked by any of a variety of situations where there is significant competition for resources. The RAGE system can be aroused by restraint, frustration, and various other irritations, as well as directly by brain stimulation. Anger is provoked when organisms do not get what they want. Just like every sub-neocortical emotional system, higher cortico-cognitive ones are able to provide inhibition, guidance, and other forms of emotional regulation. Adults can regulate their anger in ways that children and animals cannot. Individuals with frontal lobe damage exhibit more anger than those with brains that are intact (Berlin,2004). We presently have no psychotropic medications that can specifically control pathological anger. But the neuroscientific analysis of RAGE circuitry has revealed neuropeptide controls, such as opioids and Substance P,[[4]](#footnote-5) which may eventually yield new pharmacological tools to facilitate such emotional selfregulation.

1. SEEKING system: This remarkable system mediates all appetitive sensual desires to find and gather the produce of the world. This dopamine facilitated SEEKING system energizes all our goal directed urges and positive expectancies about the world. Animals vigorously self-stimulate this system in addictive ways, and the neural substrates are critical for humans and other animals to obsessively self-administer every variety of addictive drugs and to increasingly crave more. The underlying system is the one that mediates our intense appetitive motivation to obtain resources from the environment, and highlights how a basic state control system that mediates the primary process phenomenology of appetitive actions can readily link up with cognitive systems that mediate thoughtful awareness and appraisals (Ikemoto& Panksepp, 1999).

Bearing these seven emotional systems in mind, the SEEKING system is the mind’s primary system. It is at work every minute of the day using its radar like skills, implicitly collecting information, being either aware or unaware of what is being collected. Hohwy notes that perception is characterized by curious passivity. He analyzes this phenomenon in the very same way that this research describes the Imitation mechanism that functions via the SEEKING system and does so implicitly ( see page…). Meaning that as we test hypotheses we perceive the world as it is. When we slightly err in our critique and perception of reality, we are transferred to a psychiatric department, hospitalized in a psychiatric ward. The mind is a kind of dance hall. It tests mistaken hypotheses and corrects them. The mind’s repairing process is defined in the present research as constituting a part of identifying the structures and repetitive examination which constantly repeats itself whilst at the same time gradually imitating and changing. This creates a new conception that will join a host of concepts and become an “internalized” or in-built part of the system and will alter it in a substantive way.

### 2. An illustration of the dynamic of emotional activation

The emotional pathways are, in fact, the drives that arise the cortex. They are the sources of energy that stimulate the cortex into action (Solms, 2022). The emotional pathways which were established in our childhood lead to predictions. The mind develops and is shaped by these anticipated predictions. For example, if I use the emotional pathway of attachment, I want to relate to someone who can supply my relational needs. My prediction is that I will behave in a certain way and will succeed in linking up with the person. I am interested in. To link up with this person, I must match the image that exists within me with the figure out there. (termed in this research as structure]. To create the connection, I must learn about the person facing me and that figure must learn about me. The process of learning takes place though mutual imitation. I imitate and through the repetitiveness of our contact a new figure is created within me that is more in accord with the sum of my inner structures and the structure of the external figure. We know that the world is full of surprises. Our predictions do not include the unexpected and the external figures are not what we thought them to be as we first saw them. Therefore, my attachment needs are not fulfilled as expected. Free energy resides which we are required to harness by a repetitive return to the already existing structure of systems. These surprises constitute part of the imitation system, create new concepts or, in the context of the present discussion, new and complex figures, that will become part of our priors. Our priors are the in-built assumptions that have become automatic and are already to be found in our structures. We assume attributes and behaviors related to the new concepts and automatically make them our priors, that henceforth will be part of the future predictions we create.

To gain a clinical understanding of what follows, I will say already here that our emotional systems are our predictions as to our options to, for example, make contact, as I have illustrated till now. In the course of our clinical discussion we will subsequently check our predictions. At first, we will examine their qualities, we will ask, what is the dominant feeling. Then we will investigate these predictions, to determine whether they are correct or false predictions. The false predictions will constitute the basis of a professional analysis of the patient, his emotional state and of the way in which we will work in the clinic.

In a similar way, Hohwy (2013), stated that "It is commonly believed that consciousness is a higher brain function. Here we consider the likelihood, based on abundant Neuroevolutionary data from lower brain. Affective phenomenal experiences provide the “energy” for the developmental construction of higher forms of cognitive consciousness. This view is concordant with many of the theoretical formulations of Sigmund Freud. In this reconceptualization, all of consciousness may be dependent on the original evolution of affective phenomenal experiences that coded survival values. These subcortical energies provided a foundation that could be used for the epigenetic construction of perceptual and other higher forms of consciousness.

From this perspective, perceptual experiences were initially affective at the primary-process brainstem level, but capable of being elaborated by secondary learning and memory processes into tertiary-cognitive forms of consciousness. Within this view, although all individual neural activities are unconscious, perhaps along with secondary-process learning and memory mechanisms, the primal subneocortical networks of emotions and other primal affects may have served as the sentient scaffolding for the construction of resolved perceptual and higher mental activities within the neocortex. The data supporting this neuro-psycho-evolutionary vision of the emergence of mind is discussed in relation to classical psychoanalytical models (Sherington,1906).

The claim made in this work of research as referenced in the previous chapter, is that imitation is the mechanism that lessens the errors of computation. This is an evolutionary, inter- generational mechanism that is the foundation of the intergenerational drive. The mechanism is already evident prenatally and is located in the SEEKING system. The SEEKING system is located in the upper brain stem. In the past it was defined as part of the line of reflexes because it is an evolutionary mechanism in the womb and appears immediately after birth. The tendency to view the newborn as having a system of reflexes and the definition of the reflex mechanisms as entities undergoing suppression, derives from a comparison between the brain in childhood which is understood from the perspective of a brain of underdeveloped adult brain. The definition offered by the "reflexive approach" not only influenced the interpretation of manifestations in the newborn and the child, but also on manifestations that one could have searched for and learned about which do appear in early childhood and keep appearing along adult life. This, apparently, is the reason why the activity of the fetus and the newborn were interpreted based on reflexivity, and why only a small number of writers refused to accept the reflexive paradigm.

Sherrington (1906) cast doubt on reflex activity being a key neurological explanation of the nervous system. He believed that the healthy reactivity of the nervous system was too complex a question for it to be the subject of a simplistic response. Today, the reflexive paradigm is losing its hold due to an ever-increasing recognition that the known nervous system meaning the part of the nervous system we know about, is too complex to be interpreted on the basis of reactivity and reflexivity even though that approach is very convenient for the purpose of a neurological examination. An infant’s brain is, first and foremost, an active organic system except for its ability to respond to stimulation in the reflexive sense of the word Today, child assessment is mainly a functional assessment that investigates what our brain system is and is not capable of executing. This assessment goes hand in hand with the notion that emotions activate the cortex and our task is to investigate how they accomplish this. Are they successful in binding the activity or are they unable to accumulate the free energy and what the emotional path activity that can be seen actually is. Which is to say that the neuropsychoanalytic system’s updated diagnostic assessment goes hand in hand with the current, the most advanced, functional assessment of the brain. Contemporary thought no longer views the nervous system as functioning in drawers located one on top of the other, and which very slowly link up with one another. During ontogenesis the entire nervous system is fully operational and development or a hindrance to development influence the entire system. The variance and complexity of children’s’ execution of tasks represent the involvement of numerous parts of the nervous system despite the fact that the child’s implementations themselves appear to be simplistic compared to those performed by adults (Prechtel,1984).

Development signifies a change in the organic structure of the brain’s functionality and morphology. In the course of development, the changes in motor development can turn into various responses to reality, and changes in complex responses be a functional display of the organization. That is to say that there are reactions that can be formed in the developing healthy infant, which cannot be solely termed as reflexive.

In summary, the concept ‘reflex’ can be used to point to every functional aspect that exists in a young nervous system. It has no other significance apart from indicating responses to stimulation which is the basic property of the nervous system. Thus, when we are ostensibly discussing the reflex we would expect to see its influence as ‘action potential’ which will be expressed in patterns of behaviour. Thus, the imitation system, previously viewed as reflexive and which is detectable immediately after birth, as said in the previous chapter, does not simply ‘disappear’ in adulthood. Rather, it remains during the entire course of a lifetime, lending structures to their sensory qualities. Therefore, in this chapter we will follow the concept of imitation and the system that activates it, as well as its influence on relationships with objects and with the immediate surroundings. In addition, we will follow the way in which this concept appears in the assessment of our patients. Finally, we will attempt to assess how it will appear in the clinic, which systems it will influence and consider how the recognition of its existence can improve our clinical work.

Subsequently, I will present a lexicon of neuropsychoanalytic concepts of clinical theory and we will attempt to indicate the location of the concept of imitation in the array of clinical concepts and the therapeutic and pathogenic possibilities offered by concept in the contemporary clinic.

## C. The Aspects of the Concept of the Imitation Mechanism in Clinical Practice

The imitation mechanism is multi- dimensional. Gaining an understanding of the functional aspects of this mechanism can resolve numerous puzzles in the assessment of the personalities of the patients observed. It can lead to discovering the false prediction that is repeated in many different forms, the creations of patients in therapy. This research project, seeks to explain how such an understanding may be achieved and how it may be used in a clinical setting. It will be presented from a developmental perspective, with the help of observation a young child, and it will be developed through the presentation of cases involving two different patients where its structure will be presented.

As said imitation is a multi- dimensional phenomenon. In part, these phenomena are understandably viewed in overly simplistic ways. Yet I will argue that an appreciation of the depth and range of this phenomenon requires complex investigation before we can grasp its full extent. Saying that it originates in the SEEKING system implies that all external phenomena are implicitly recorded in the brain.

The SEEKING system is the primary emotional path that excites and stimulates the whole system of the brain. It therefore appears in relation to numerous aspects of a person’s personality: their physical appearance, their behavior, their cognition, speech, and in their entire bodily reactions, relations with himself, interrelational. It is part of our subjective world, of our relations with the surrounding environment, and with our culture. All of this leads to the conclusion that the imitation mechanism is fundamental to our being.

The imitation system is a basic system which constitutes a primary learning process. It learns about the world in line with the definition of the system described in previous chapters. We can assume that it notes the infant’s initial impressions about the surroundings in which he grew up. It notes the cultural and sensory environment, identifies the way in which its initial drives can be satisfied, and leaves within it this information in a non-declarative way (Alberini, 2017).

In therapy using the neuropsychoanalytic approach, we investigate the basic emotion upon which the patient’s psych structure relies. We discover what the emotional pathway is and what the existing false predictions are.

The false prediction is, in fact, the form which was built to resolve the drive's need. This form of resolution is found in the non-declarative unconscious memory the nature of the imitation system we are discussing which constantly repeats itself in behavior. This system, which we formulate during our childhood, in adulthood is revealed in repetitions in various dimensions of life. It will appear in imitations in the structure of our conduct and behavior during our lifetime. It appears in interpersonal relationships, in meeting needs in a person’s professional activity. The false prediction is in control of the patient’s contacts with the world. It repeats itself and appears at various levels of the patient’s conduct with his close surroundings, his work, family, parenthood and relations to his children, and the culture within which he lives. In what follows I offer three examples taken from three courses of therapy which will illustrate the false prediction and the way in which it is reproduced in the various systems.

I will provide three case presentations through which I shall try to explain how the mechanism works and why understanding it is of such importance to the clinical practice. I begin with my observation of a toddler and follow this up with the cases of two adult patients. I will try to indicate the nature of the mechanism. Observation in this research was carried out in line with the Tavistock clinic’s methodology as applied to kindergartens(Miller, 1989). The Tavistock’s methodology was chosen because of its accuracy. It offers a detailed description of the encounter. In case presentations it follows the trajectory of all the meetings thus enabling the professional observer who has had experience of this methodology, to identify the inner, and the external reflective, objective, and subjective detailed aspects of the meetings, all of which have been scrutinized and analyzed, thus providing a comprehensive assessment of the patients’ basic mechanisms.

Alongside the presentation of patients’ cases, I will also be discussing the system developed by Professor Solms to interpret clinical cases which he presented in a seminar he teaches around the world. This will give me the opportunity to clarify some of the differences between Solms’s interpretation of psychic information and the neuropsychoanalytic approach, whilst at the same time explaining the way in which the imitation system works. Each presentation will start with a description of the case followed by a discussion.

I will begin with the observation of a toddler in a kindergarten.

### 1. Observation First

Allow me to say a few words about the methodology worked during this observation. I used to take my students in the "Normalcy at Infancy" course conducted in Tel Aviv University’s Sackler School of medicine, to observe different aspects of development of kindergarten children. The procedure adopted was to observe different developmental functions in each lesson attended by the children. That day

I asked my students to pay attention to issues related to the children’s eating habits. The kindergarten teacher was aware of our arrival and expected us to join her at breakfast. She had been briefed that our observation would be following the Tavistock Clinic’s methodology, which allows observers to observe but does not permit them to intervene. The families of the children knew that we would be coming, they knew about the methodology we would be employing, and they found the procedure very valuable. Permission from the parents to observe the infants had been requested at the beginning of the year.

After an hour of observation, the observers would go to a separate room and discuss what they had witnessed. The kindergarten’s head teacher would subsequently join us and listen to our interpretation of what we had observed. As we ended describing our observations, The Head Teacher would react by giving us a detailed information of each child presented background.

I will now describe the observation as it happened, and the group’s reaction. I will then outline our interpretation of the situation and will continue by describing the results of the group’s observation.

#### Observation

It is a Friday morning. We arrive at a kindergarten for infants of different ages. We had decided to observe a class of toddlers between the ages of two and three and a half. The class is housed in a very large room. There is a garden with a sandpit where the children can play while being observed by the teachers through a glass window. There are 15 infants in the class supervised by three teachers. As said, our approach was to devote each visit to observing a different function. The task of my students was to observe without interfering. On this Friday, the students were told to observe the infants’ eating behaviors habits. Once the period of observation ended, we all went to another room to discuss what we had observed and to meet up with the Head Teacher. We informed her of what we had observed in focusing on the infants’ eating habits and gaining an understanding of the detailed picture behind their behavior. We set about describing moving into interpreting what we had learned from observing the children’s behavior and, in particular what we believed was going on in the mind of one specific toddler, and what we were able to understand on the basis of the cues we had picked up on.

The scene that greeted us upon our arrival that day was of a pale, almost yellowish, three -year-old toddler sitting at a table. She was sitting somewhat erectly as the teacher attempted to feed her. In a swift movement the toddler raises the palms of her hands close to her ears conveying to us a sense of terror. The teacher had had enough and gave up trying, allowing the toddler to leave the table and walk to a different area of the kindergarten. She ended up in the sand pit accompanied by my students who had been observing her. I was able to watch my students and that little girl, as she went to the sand pit behind the glass window between that room and that space inside the kindergarten.

In the sandpit the infant was being supervised by another teacher. She gathered up some sand in the palm of her hand lifting her heaped palm towards the teacher while watching me observing her behind the glass window. She looked straight into my eyes as she gathered the sand with the palm of her hand and letting it flow through her fingers, her gaze directed towards me. A side view made it look as if she was standing in front of the teacher who was in close proximity. Her eyes, however, drifted towards me as I sat behind the window. During this whole time, the teacher paid no attention to the toddler. If she looked at her at all it was as if she was looking at someone who is transparent. The toddler remained in the sandpit for a long time. I noticed that her hands were disfigured by small scars which she scratched repeatedly as if trying to peel them away.

#### Discussion of the Observation

This brief observation was then the subject of discussion, first of all among the group of observers (the students and I) and subsequently between my group the Head Kindergarten teacher.

The students began by expressing their anger at the way in which the teachers had handled the situation. They were particularly unimpressed by the teacher who did not persist in her efforts to feed the toddler, and the second teacher by the sandpit who paid no attention to the child’s clear sense of loneliness and made no attempt to connect with her.

I chose to contain the anger, arguing that in my view something was happening in the relationship between the teachers and the toddler under their supervision. I knew the teachers were expecting us to arrive and I knew them to be very attentive to the details of the planned observation. It seemed to me that some unconscious reaction was triggered by our presence in the kindergarten. I asked the students to pay more attention to the detail of what was taking place. I told my students that if they followed that route they would gradually uncover what was actually happening.

In their detailed description of what they had observed my students reported observing the toddler’s fear of eating turning into panic as the teacher tried to feed her. This seemed to suggest that for the toddler situations of eating evoked something much more profound (McDougall, 1989). The students then went on to discuss the teacher’s lack of reaction to the toddler. This suggested that something was happening to the toddler’s free energy. That energy -her painful feelings were not reaching the teacher. Instead, as the whole group noticed, that energy was directed at me sitting in a different area of the school, removed from the area the teachers were in. At this stage, all we could say was that in our observation the toddler experienced no sense of containment from those physically close to her. She was unable to attach herself to the people around her.. To be in any kind of contact she resorted to acts of self-harm scarring her hands. Rather than turning her energy towards others who might help, the energy is turned destructively towards her own body.

As this discussion between us continued the Head Teacher sitting with us was crying. At That point she revealed what was the history of that girl. Her mother was killed in a terrorist attack in a coffee shop while they were eating.. At the time the infant was just a year and a half old. she survived the attack and was raised by a relative while still mourning her mother's death. The infant was looking for help from those around her who didn’t know what to do as the child resorted to extensive self-harm.

I tried to educate the teachers to adopt a different mode of behavior. I informed them of the ways in which they could be more attentive to this avoidant child needs, and the necessity, if possible of getting the family members now raising the infant to try and engage with her. I explained the gaze the child gave me across that room as her relation to her mother who is in another space then herself, and he avoidant behavior as the girl's false prediction that she was rejected by her mother and now unable to relate to figures alive. That it is kind of repetition she did with her own trauma. We attempted to explain to the teachers’ ways in which they could more effectively relate to the infant, be attentive to her although she witdrawed. We suggested they perhaps could explain to family members to be more in touch with the child. We then left and returned three months later.

Three months later we returned to find an entirely different situation in which the toddler we had focused on 12 weeks earlier, was engaged in play and was behaving in much the same way as the other infants were behaving.

Now let return to the imitation mechanism. The toddler’s resort to self-harm and even her eating regimen sprang from the trauma she had endured when her mother was killed in the terrorist attack. The toddler’s behavior towards her own body and her eating habits disorder were the outcome of that trauma. The panic she felt sitting at a table being fed by her mother when the terrorist struck and murdered her. This terrible loss meant that her SEEKING system was immobilized and that the separation distress system was at work triggering the panic. The attack on her primary support in life – her mother- left the child fearful and very nervous. In fact, it became our view that the child was still grieving her loss, that she had not been able to separate from her mother and was still searching for her. I had been playing for her the figure in her inner other world that she was trying to find. She does this by not interacting with the teachers around her since she lacks the resources to engage in the reality of her new situation. Instead she remains alone.

All the EMOTIONAL systems which were activated, were the illustration of the exact reality she traumatically lived. The infant’s behavior accurately reflects the way in which the IMITATION system works. This makes it possible to identify in the toddler's behavior what had happened to her. Understanding that this system functions across the entire internal system and is replicated and reflected in the toddler’s behavior provides therapists straightforward clues, a clear and accurate path, that can help them unravel the puzzle of the behavior recorded by the system.

The Toddler was looking into the abyss into which her mother had vanished. In her body and mind she is imitating and creating a situation whereby the teachers unconsciously react by imitation and repetition, imitating the same state of mind. They too do not see her. She is not gaining their attention. She has become her late mother. It is as if she is not actually present. She remains the little girl looking for her mother who is not there. She is overlooked. By being there and being overlooked she has, by imitation, created the situation in which she lives. Although she is surrounded by people who love and care for her, she is repeating what she feels. In this way she creates again and again the same situation she was hurt by.

Imitation is a brain mechanism. As we saw in the observation, it is not just that she is there but the terrible thing is that she is not seen by the people around her. She does not see them. She does not see her body. She does not feel it. It is scarred. She scratches it again and again to make it seen, to make it felt. She harms herself until there are scars all over her body and the scars bleed. she sees the blood and the scars but that does not stop her from repeating her act of self-harm and she keeps creating more scars. It is her inadequate but ‘creative' solution to that feeling of absence, of non-being. She is in panic and continues, two years after her mother was murdered, to mourn her loss. She lives with her grandmother who also grieved the loss of her daughter and was unable to help her granddaughter.

Our task as therapists is to be able to release ourselves from this kind of imitation, by withdrawing gradually from the transference that is offered to us. As our understanding of the imitation mechanism grows, we will be able to better interpret what had actually happened and the direction we need to follow.

In this situation we can see how the toddler imitated the situation and created the structure in which she lives. She has created something new, transformed herself into an absent member of the society in which her mother had lived. As paradoxical as it may seem, the child has created a new concept. The new concept, arriving from her free energy-from the surprise that met her old structures (being in good relations with her mother), is to be a toddler without a mother, and a non-being in the world. She was looking for someone to whom she could attach herself. By chance, as I stood there, standing there watching her, as she gathered the sand and then let it trickle through her fingers. Her world was disappearing like the sand between her fingers.

### 2. Imitation in the Clinic second

#### The analytic therapist who imitates, observes and reflects

The therapeutic work begins with the therapist interacting with the patient, adopting the stance of a diagnostician and using all the means available to him to ‘read’ the patient. These means replace the stethoscope and the analytical thinking of the doctor. Scrutiny and observation are the required tools to reach a diagnosis of the patient’s disorder. Later on, the analyst is required to decide what the most appropriate and relevant therapeutic approach should be to deal with the diagnosis he had reached. The growing knowledge in the fields of both the analytic and the neuropsychoanalytic theory, has led to flexibility and change in the role of the analyst and his stance vis a vis the patient.

As the therapy developed the analyst ,,his ranking as a “doctor”, occupying an “honourable” position in the hierarchy of those who are titled ‘doctors’, is lowered in the eyes of the patient who is even lower down in the hierarchical rankings. This grew out of the medical school of thought to which analytic therapy owed its origins. According to the analytic approach, in the initial stage the place task of the ‘doctor’ / therapist was defined as someone who diagnoses and his role in the therapeutic theory is one of abstinence. The analyst became a blank screen onto which the patient’s projections, his essence, his private life, emotions were displayed. The analyst’s feelings are hidden from the patients, the assumption being that the analyst’s presence has no influence on the therapeutic process. Moreover, if these feelings were to be revealed they could well damage the projective process taking place in the room. The therapy is a ‘one person’ therapy and the therapeutic thinking was conducted around the diagnosis of the patient himself. This diagnosis that includes assumptions vis *a vis* psychic structures, a definition of the patient’s symptomology, a referral to DSM within the therapeutic framework. The blank screen analyst was linked to the important role of him in being an absentee, a non- presence in the room, a kind of monitor on which the patient’s projections would be screened. Who the analyst was and his role were significant, but not in terms of his personality and his influence on the life of the patient and patient and on the work being done in the therapeutic room (Kantrowitz, 1996).

The world of psychanalytic therapy in its various approaches has changed, broadened its scope, and is today in a completely different place. We no longer relate to the analyst as merely an object for the patient’s projections. Therapy no longer just deals with symptomology. Today, the presence of the therapist/analyst in the patient’s world of objects is regarded as significant (Govrin,2016). The central therapeutic assumption is that the patient’s internalizations undergo a transformation and are the main curative factors in the therapy. (chapter 4) Thus the therapist is not only the object of projection but also the object of imitation. The developing relationship between the therapist and the patient, the attentiveness that develops between them, and the personality and abilities of the therapist are considered as part of the development and healing process in the therapy. The therapist is used to listening to the patient’s transference-countertransference relationship, analyzing it and understanding what the relationship that the patient is transferring to him is. With the evaluation of the relationship while neutralizing the therapist's transference relationship to the patient – countertransference – the therapist gains a more accurate understanding and is more able to evaluate the patient’s early relationships in life. The therapist gives transference mutative interpretation (Caper, 1995), and the patient's internalizations change, which helps him to find a new path into his lived experiences.

Today, having recognized the importance of transference relationships, we are advancing to a more precise and a more contemporary understanding of these relationships.

As part of the transference relationship, there are those who compare the transference, establishing the empathic understanding between therapist and patient, to the relationship built on the mirror cells. The concept of mirror cells occupied central stage, based on the assumption that the therapist's empathic ability is derived from these cells. (Gallese and Rizzolatti,1996) However, countering this claim, David Olds argues that the admiration accorded to mirror cells is misleading and irrelevant because, in fact, the entire role of mirror cells resembles the role of other cells in the brain which deal with the identification of objects. Thus, the mirror cells are busy identifying the emotional world of the onlooker, or someone who is in the company of significant others and, in a more general sense, in relationships with the environment and the world. Hence mirror cells have a role in helping identifying structures as defined by imitation in this study.

The basic relationship with the world originates in the SEEKING system which functions like a radar, scanning the environment copying, and imitating the environment in order to decipher it. In the same way it repeatedly works on copying the structures and repairing them until it collects and organizes a perfect concept that matches the patient’s historical genetic system, thus assembling a picture of the world as it will be seen by a replica of the environment. It borrows the environmental structure in order to repeat and refine it over and over again until a personal structure is finally built. In this framework, it identifies the more significant objects and those that are of no significance. The repetitiveness of its actions helps to decipher the objects, until it achieves an all-inclusive and clear picture.. What is not deciphered during the day, is repeated when this system scans again at night what had been scanned and accomplished during the day.

The claim that the therapist is ‘an absent presence", while being in abstinence is not relevant today, although it is found in therapists' basic knowledge and analytical training. Analytical therapists today are freer in the relational interpersonal encounter with their patients. Theory-based and practice-based concepts are required that can assist the therapist whose presence in the analytical clinic today is a kind of co-creation with the patient's inner world. Imitation is not only an historical, evolutionary and primary developmental mechanism It is evident at every moment in the treatment room.

How was the concept of imitation and its complex mechanism built? This study attempts to clarify the mechanism by further describing cases from the analytical clinic.

1. Focusing on the Neuropsychoanalytic Therapist's Observation - What does neuropsychoanalysis offer?

Neuropsychoanalysis allows for greater accuracy from the point of the study of affective neuroscience. At this stage of the development of brain research, one can discern the existence of basic emotions, emotional pathways, that can occur at any given moment, and operate in our brain.

The segmentation and effectiveness of one emotional pathway or another, the dominance of each of the pathways, is important to the overall structure of the therapeutic work that takes place. The different structures and the interaction between the systems should be the center of attention of the contemporary therapists in neuropsychoanalytic research, and clinical practice. The dominant emotional pathways are the ones that activate the cortex. When one of the pathways does not reach the appropriate level of activation, the remnants of the emotions that are not properly activated remain in the system at the level of free energy. To be activated they must be processed. We shall term this as the therapeutic work that is aimed at helping change the action strategies of our patients so that they can embark on a journey of mental recovery.

We understand that the current experience is what will change the patient's quality of life. From now on, that experience is the one we will analyze and within it we expect new experiences to take place. It is no longer a question of pointing out the locations of experiences that have taken place in the past, but of an immediate and contemporary experience that is happening in the here and now. The current research work becomes highly relevant to the development of therapeutic work. This work addresses the most basic initial learning processes of any given patient. It examines the way in which the patient learns about the therapist working with him and the creative therapeutic solution that is found which will finally help in treating the patient. The assumption is that the patients make "historical" changes in their own evolution against the background of their family’s history, and that the internal brain structures on which they rely, undergo transformation rather than change. The difference between transformation and change is fundamental. Change is an event that alters a behavioral state, but by the very nature of the concept of

‘change’ it returns after a short period to the previous state. The structure has not changed. Whereas when we talk about transformation, we think of dismantling and construction, structural changes (Guttman, 2003). These changes are changes in structures that have been built over the generations, inherited in evolution and in the culture within which the social human brain is lives and functions. They have interacted with the world (Northoff, 2013) the immediate environment, the culture and family heritage. These influences take place around us in the world and we imitate them and are built accordingly.

When we talk about structural changes in the present study, we will understand that as well as in the analytical approach, the initial relationships with the environment and culture in which we live shape brain structures. That for all of humanity there are brain structures that are built in the processes of evolution and cultural and global epigenesis. Today the children of each generation are frequently examined. Second generation post holocaust, Generation X, Generation Y, Generation Z, who are built in different ways (Kaplan, not published ) and their structures are linked to the changing contemporary culture. Culture produces structural changes (Govrin, 2019) in the structure of the brain and the behavior that stems from these changes in the various generations.

As our understanding of the research into various generations increases, so too does the openness of psychoanalytic systems change. That which in the past was deemed to be unacceptable, has, in recent years become more admissible (Govrin,2019).

This work of research will not be able to deal with all the complex processes of change that have taken place over the years in the analytical schools and in analytic thinking during the last 80 years since Freud's death. Nor will this study be able to deal with the image of the therapist in line with different the approaches, and the various analytical schools. This study places an emphasis on the existing lacuna in the analytical approach with respect to the imitation mechanism that takes place in the treatment room, starting from the first diagnostic meeting of the therapist and the patient, and into the therapeutic process. This work will be conducted using two case descriptions, which will be detailed below, and will demonstrate the development of the mechanism of imitation within the therapeutic setting, its use and the transformation it can rightly lead to in the therapist-patient relationship, and in the world of therapy in general.

#### The level of action and the therapeutic experience

Imitation has always been part of between the therapist and patient but wasn’t termed as such. From the outset therapists learn and practice how to do an intake.

Their teachers repeatedly emphasize that intake, be it a child, an adult or a family, means taking in the patient. What is the meaning of the therapeutic act in which the therapist agrees to take in the patient? For a practical understanding of the therapist's work, the therapist should question the patient and be able to understand why he or she have come for therapy and to reach a diagnosis, diagnose according to a scale that was built in the course of the therapist’s development of his practice during the therapist's development. It stems from his relationship with his instructors, his therapists, the repeated experiences during treating patients that led to his ability to reach a diagnosis of a newly accepted patient. Having “matured” in his therapeutic approach the therapist can evaluate the "real" reasons why the patient has come to him for therapy. It is assumed that there is a difference between the stated reasons and the real reasons, a difference which the therapist understands. What then does the intake mean? What does the therapist take in? Therapists frequently say that the patient offers his ‘visiting card' at the first meeting. This is a famous statement that is repeated over the years of work. In the first meetings therapists even tend to record in writing what the patient is saying based on this assumption. They point to the fact that the patient comes to the meeting with the totality of his personality, and his completed mental structures. For his part the therapist enters the meeting with an approach he has formulated during his years of work. The therapist developed his skills in a professional hothouse with a culture of discourse and attentiveness of its own. Which is to say that within him there exist educational, mental and cultural structures derived from both his personal and professional place of birth. The first meeting encompasses the structures of both patient and therapist. Gradually a closeness and an understanding between them will come into being. Therefore, the first meeting can be compared to the presentation of their respective ‘visiting cards’ What is said at the first meeting, will become understandable as the therapy progresses. From the first meeting the therapist and the patient come together whilst their SEEKING system functions like a radar, pinpointing what is taking place between them, their experiences, and their bodily, physical, Somatic, sensations are translated into cognitive understandings. The understandable and the incomprehensible are bound together to enable a diagnosis to be reached and to decide this meeting will turn into a prolonged course of therapy. It is important to note that the SEEKING system’s radar like activity gathers diverse, complex, comprehensive and undiagnosed information. In this study this comprehensive information is termed as- structure. The mental system detects other systems, some of which are familiar and in most instances are incomprehensible. The seeking system learns them gradually, night and day, during the analytic meeting, but also outside of it. The system works non-stop and its processing procedures are complex. During the day it imitates what is in front of it, and at night it organizes the information into that which can be understood and “ assimilated”. At night it checks the systems that have been imitated within it against the existing deep knowledge and understandings. The therapist and the patient are exposed to this information. They both imitate one another and conduct conscious and unconscious internal processes of enquiry, at different stages of the day and night. These processes take place within the meetings and their processing takes place in different ways between the sessions, 24 hours a day.

At the end of their first meeting, and possibly after a number of meetings, a decision will be made. During the meetings the therapist learns the structures that exist in the patient. He learns these structures, some of which are understandable and familiar, but many others are unique to the patient, so that for them to become comprehensible a process of assimilation is required. The therapist takes the patient in, he imitates the patient and works with this imitation. The image of the patient's personality remains with the therapist, just as all the images of the therapist remain with the patient. Over time those images of the patient and the therapist undergo changes. Simultaneously they connect to different aspects that exist in the therapist and patient and in a gradual process they change until they become assimilated. At that point in time, they and create an new image that hadn’t existed before, new concepts that hadn’t previously existed within him. These creations are the outcome of the process of therapeutic assimilation.

In this work of research the processes of imitation will be read; the extent to which they change, the extent to which they are assimilated,, and the final outcome of this process, will determine whether or not the proposed therapy can take place. The structures that exist in the therapist and those that have been found to exist in the patient, are supposed to create some kind of possible meeting point which can become a bridge between therapist and patient, between past and present, between past emotional systems and the new proposal of a different system the therapist offers. This, continues throughout the course of repeated sessions, until it is clear to the therapist and the patient (in principle after about 5 meetings ) whether the current treatment can take place.. Sometimes it is very easy, and sometimes the gap between the therapist and patient’s structures is unbridgeable. In popular language it can be said that there is no ‘chemistry’ between them.

My contention is that the situation is much more complex, and that very quickly the imitation system becomes active, and repetitive adjustments are made, so that the therapists and the patients will be able to respond to the imitation process of building the structures that assist the therapeutic process. Different therapists from different schools of thought adapt themselves according to their internal structure to what can or cannot be bridged between the analyst and the patient. But the central issue is not spoken about is not appropriately defined. Recently, various statements regarding imitation have begun to emerge. The current research attempts to pinpoint the mechanism and explain the kind of work that is required to do so.

Nebbiosi (2008) speaks of imitation as the co-creation of meaning. The joint creation makes it possible to understand the body languages,, the bodily movements and the facial expressions. Nebbiosi deals with the compatibility of one’s personal rhythm in the interpersonal space, and places the emphasis sequencing. He places the atmosphere in therapy into a sequence, a musical sequence, along with breaks in the musical sequence and the continuation of sequences. He links the interpersonal meeting to a musical encounter, through which he opens an understanding of the interpersonal creation introduced by the patient, and the therapist, who listens to the creation’s structure located within him.

Nebbiosi description is consistent with the definition of the present study regarding imitation in the therapeutic meeting. Understanding that imitation is an intergenerational, intrauterine mechanism, and is, in fact originally the source of the drive. The therapist's experience derives from the womb, the fetus being in the mother’s womb and knows her feelings. The uterine world is a kind of noisy city, but the materials of the mother's body and mind are present and form part of the fetus’s world.

The cortisol level in the mother is secreted and the fetus responds. The mother's insulin levels produce a reaction by the fetus. It "knows" its mother from that. It experiences itself and the mother. The fetus has no cognitive separation ability, but is physiologically reactive. This knowledge is the same deep knowledge that is created from the beginning of life. It is no coincidence that we repeatedly see babies imitating their parents. In order to produce the imitation they must first have their own DNA. Babies imitate their parents and each baby imitates his parents differently. Thus there is also variability in the process of imitation and its source is in the variance that exists in the individual. Imitation is basically the first creative action of the fetus and the infant.

The link between the infant’s genetic makeup, his neurology, his biology and that of his mother, father or family, has, by definition, created a new creature that is composed of the connection between one genetic make-up and other external structures. Now that the imitation is already taking place, there is a new creation here. Therefore, the patient, when arriving in the treatment room, uses this initial learning mechanism (Chalamish, 2020), the most basic mechanism in his personality, and he responds to the therapist with an act of imitation. The therapist acts in the same way..Both patient and therapist create an imitative response towards each other. And they adapt themselves to one another When the therapist becomes aware of the imitation process, he can be assisted by it and not interfere with its development.

The therapist is required to be reflective, open to change, calm about his ability to be emotionally intimate with the patient, and to allow himself to change in line with the patient. These are not major behavioral changes but a gentle and adapted emotional openness. To be able to "be together with" and later on not to interfere with the evolving interpersonal process. To follow him and not lead him. To Identify him and let repetitiveness be constructed so that the patient can reach the place he wishes to reach and achieves his own creation of his unique identity.

At the same time, the neuropsychoanalytic understanding of the emotional structures created in the various emotional pathways can help the therapist observe accurately what the patient has created within himself. The same emotional pathways, being transformed by the various bodily systems, produce structures that, if identified, are easy to observe and our interpretations can be directed towards them. For example, when we discover that there is a decrease in the in the SEEKING system’s activity, there will be a decrease in enthusiasm, there will also be a decrease in attachment, and a decrease in communication. The different systems imitate each other and the manifestation of the phenomena will be in all the systems in a similar way, with a predefined characterization of each system.

Imitation can be understood when we look at a child imitating his parents. He imitates their movements, he imitates their manner of walking, he imitates their response to their immediate he responds to the culture in which he lives,, he responds physiologically and sensorially in line with the characteristic typical structure of the system. He also imitates with his inner, mental and physiological responses. For that reason, it has been said the imitation mechanism is multidimensional.

#### Patients

In what follows I will be offering examples of the way in which imitation works in the course of therapy. I will discuss the implications of differing personality structures and different behavioral modes as well as the implications of the sense of self, of the inner sense of integration. These examples are based on the therapeutic journey of three patients attending my clinic.

##### Miss L

L. is a very good looking, well-built woman, who looks a good deal younger than her age. She is thin, tall, and has blond hair. Her appearance does not reflect her high professional status and nor is it an indication of her understanding of mathematics and the senior international managerial position she holds. She comes to my clinic in a state of depression. She lives an empty life, devoid of feelings. She has a well based family with two amazing children. She has no feelings about her children’s beauty or their abilities. She is married to a wealthy man who she chose to marry after much reflection. He is a very impressive man, but that is not how she feels about him nor had she ever enjoyed their sexual relationship. That was the situation until at work she met a married man who had been unfaithful to his wife. They had recently divorced. After meeting this man and forming an emotional relationship with him she, for the first time in her married life enjoyed a sexual relationship and realized that she could, in fact, have enjoyable sex in her life. Since her lover was a man who was known to be unfaithful, she was certain that there was no possibility of forming a family with him and so had no intention of parting from her husband, her home and her family. The trust between her and her husband had been violated, and she feels threatened by the destruction she was bringing upon herself.

Her experience of family life was not enjoyable but in the house there was at least a family. She found it pleasant to spend time with her cousins and the wider family and enjoyed the fact that she appeared to have a ‘perfect’ family.

As the therapy progressed the difficulty she had in being a mother and wife in light of the relationships that she was experiencing in her original family became more understandable. Her mother was a woman who had given up her career, leaving her husband (father) to pursue a not particularly brilliant career. She had moved her family to a relatively affluent area but had a miserable and poor personal life in the new neighborhood. The house that was built was never completed because of a lack of finance, the car being driven by her father was mechanically defective. As a child she had felt ashamed and valueless despite having been an excellent student and was particularly gifted in the fields of mathematics and physics – more successful than all the boys in the class.

Today, she is a role model, makes huge international deals but inside she is dead. She is a highly intelligent woman and says that she has come to see me because of her inner death. Recognizing the difficulty inherent in the relationship, she decides to leave her lover.

She loves animals and plays a significant role in organizations dedicate to saving animal life. There are dealers in animals who abuse beautiful bitches. She goes to court to obtain a restraining order against the dealers thus freeing all the bitches from the suffering they experienced at the hands of the dealers. This included ceaseless insemination and caesarean section operations to increase the number of a breed of bitches that is particularly beautiful, purebred, and worth a great deal of money. She adopts a small puppy and the two of them be customers in pictures published in a journal devoted to animals' life.

The puppy accompanies Miss L all the time, day and night; when she goes to her office, and when making international phone calls the puppy is there with her. She constantly shows her love for the puppy, stroking her and bursting into laughter. One can see that Miss L is returning to life. The puppy is devoted to her and she is devoted to the puppy. There is an intimacy of devotion and attachment between them of a sort she had never previously experienced in her life including the treatment room.

She has given up her lover and is now devoted to her puppy. When she returns to her home she no longer lies to her husband. She senses a great easement. In due course she tells me that despite everything she had participated in a family meeting and experienced everything she was lacking. Very quickly she is again in touch with her lover, is once more engaged in endless phone conversations. His disappearance from her life and his entering back, that, she apparently finds attractive. She is angry with herself for being trapped again. The lover, hard days, financially and emotionally, and she again finds a way to end the relationship. This time it is easier for her, but once more the company of the bitch is not enough. She talks about what he the ‘other’- the lover- seems to arouse in her, and what is lacking when he is not with her. The barren bitch, who has been through so many pregnancies, is somewhat resembles my patient's emotional barrenness.

I, following the traumatic death of a partner with whom I had formed an emotional connection over the past year, experience the return to life. I remember the experience of death, the loss, the sense of emptiness after the sudden death which is impossible to assimilate. The return to loving oneself, the renewed sense of vitality, following the feeling of emptiness which the loss had created within me and the physiological and emotional difference within me, experiencing physical life that had been recreated in me due to the new intimacy in my life - the affection for myself and who, and what I am.

We talk about the feelings she misses when she is not with her lover. She says that she has been with friends, in events in the past that were pleasant. She remembers them, and that is what makes her fearful because when she recalls those events. She once again feels the lack in her current life. I try to be at her side in our discussion of this feeling of lack. She attempts to describe what she feels when she is with her lover, and what she misses when he is not there. As she searches for the exact words I realize that I can tell about my own experience of such an absence. I was able to verbalize for her how I had been helped by defining for myself what was missing and what subsequently reappeared in my life. We clearly understood each other. After hearing me, she said that that was exactly what she meant and that she could not have described the experience more accurately than I had done.

So, what precisely had I done? I have lived my life in a way not so differently from the way she has lived her life. I have done a great deal in own my life. I have succeeded in everything I have done. I have lived a full life but one that was lacking from an emotional point of view. At work I was overloaded. I had huge ambitions. I was overly sensitive, not something that was evident when I was very young. I had found a solution to the way in which I had been conducting my emotional life. This solution was formulated over many years of therapy, psychoanalysis and my experience of life. I was willing to stand at her side and listen to her in a noncognitive way. I paid attention to the tempo of her speech, to the contact between her and her barren and injured bitch that allowed her to connect to the injured "bitch" she was experiencing inside her. We were now turning an exchange of experiences into meaningful words.

There was a kind of similarity between her personal development and mine. Which raises the question of whether we can only treat patients who are like us? It raises the question how deep and how close emotionally do we allow ourselves to be present in our life and attach to the inner world of our patients.

The answer is that we have similar constructs with our patients. Her SEEKING emotional path and mine were working, with our inbuilt experiences which are restored in our memory systems. Some of them are implicit others are explicit. Much of our inner work was done with our own psychoanalysis, as we were the analysands, and became aware to unconscious, implicit false assumptions. We are working from a 'real' inner state of mind. We should allow ourselves be conscious that this is what we do. The sooner we will accept it the better we will be able to work with those structures we imitate or are being imitated by our patients. Those are deep structures coming from the basis of our feelings. It needs better care to allow us to be replicated, imitated and develop the ability to be spoken in an intimate way with our patients without the danger of disclosure.

Therefore, I realized that there was a structural resemblance between us. We share the same structure of life, I in mine and she in hers However, it is structure of a life devoid of an inner experience of life, the loss of a spouse, lacking an emotional partnership that could help to create a relationship of attachment.

The experiences of living creatures be they animals or humans. These are structures on which we base our personality, structures built into our lives, from which we work, from which we grow. Our encounter with our patients, their encounter with us, allows us to imitate the same structures and repeatedly broaden them until a new creature comes into being. We are supposed to allow our patients to copy us, to imitate us. Whether we are exposed or are defending ourselves and are protected, they recognize our most profound presence. They ‘read’ us according to the way we dress, they identify us by the quality of our breath and our expression, in fact by everything that is in us that encounters them. They are helped by us, while we study them in the most profound way.

All of this requires us as therapists to deepen our knowledge about ourselves, about our bodies, our sense of ‘self’ and how we are viewed externally. We need to expand our knowledge about our non-declarative memory. It is from there that all these issues will unfurl in our work with our patients, into the ethics of the treatment room, into the initial and essential deep connection that exists between us and our patients.

##### Hiding your wealth: Secrets and Lies – Ms. S; How imitation of secrecy affects different systems of the Mind. False predictions

In this presentation I will try to show how the imitation mechanism influences the integration of the self, how it influences our behavior, our inner world structures, our external activities, our thoughts, and our ability to reflect upon ourselves. I will show that the core problem repeats itself in the different systems of the structure of an individual’s personality.

The most striking feature in the presentation of this case is the influence on an individual who lives with a secret. In a normal personality structure, doing so can lead to a catastrophic outcome. The patient in this case is a woman born to a wealthy family who is in constant fear of being attacked due to her wealth and the good life she leads.

I am not suggesting here that all lies, secrets, or wealthy families hiding their fortune are alike. There are clearly differences in the way in which such families handle these issues. What I do intend to show is the way in which living in such a state of fear undermines different personality structures at a cognitive, communicational inter-relational and inner relational level.

The woman in this case presentation, is 45 and beautiful in a rare sort of way She first came to me with her husband for advice on how to manage the relations with her 4 young children while she and her husband were getting divorced. Three month later having been divorced, she came to me for therapy. Her ex-husband told me for the first time who she really was, what her family background was, all of which I would never have guessed. All this information is concealed and never spoken about.

When she came for the first time for therapy in her own space and time, after her exotic origin had already been disclosed to me. She talked to me about her tyrannical mother who was of eastern origin. She, the only daughter and her four brothers, help to run the family business. In addition to that she is a mediator and the owner of a highly successful start-up company – information I found hard to take in as I observed her, sitting in front of me looking both beautiful and highly energetic, her eyes sparkling, her mouth slightly open, she swallows my every word. She listens eagerly to what I was saying, swallowing every word I uttered with a look of admiration as if she was falling in love with me. Only much later did I understand that though she listens, she is unable to recall or assimilate anything that had been said in the room. She told me that from a young age she had become used to being in hiding. The family was worried she would be kidnapped. A child in their neighborhood had been raped and murdered. They believed that the kidnapper had made a mistake and that she or her brothers were the real targets. Therefore, from the time when they were very young they were accompanied by guards, arrived at school with a driver who parked a block away, and couldn't invite any children to their house. There were rumors about who she was, but her identity was never made public.

As the discussion regarding the financial settlement with her ex-husband and an agreement between them about future arrangements regarding their children progressed, it looked as if she would be supporting her husband whose earnings were far less than hers. She was unaware of his high status and sound finances position believing that she had to help him and take on most of the family’s obligations. He used to get angry when she asked him to look after the children when she was ill. In the end she finally understood how mistaken she had been. He, immediately entered new relationship. She wasn’t envious. Knowing him as she did, she was sure that he would not stay at home with his new partner, in the same way that he hadn’t been in the home they were meant to share. She was also sure that there would be no intimacy between him and his new partner in the same way as there hadn’t been any closeness whilst he was married to her. He was at work 24 hours a day.

The longer we talked, the more I understood her role in the family and her role in life. How she was not there. The way in which she would often ‘disappear’ Gradually, I understood how little of my interpretations she was actually able to grasp. She never makes plans, is never able to reflect upon her the situation. As had happened in our very first meeting, she was swallowing every word I said but was incapable of thinking about or recalling what I told her. Then she had to go and meet her lawyer. She wanted to change the agreement she was negotiating with her husband.

In the meeting with the lawyer who was drafting the agreement with her husband, she spoke to him in an altogether different way She was assertive, told him exactly what she wanted and what she didn’t want. Her manner of presenting herself entirely differed from the way she had spoken to him in their previous meetings. When her mind was clear she was capable of conducting a forceful conversation,, not allowing herself to stray from what she wanted to say. Her delivery was clear and precise. However, her imitation of me was not applied to all the other fields of communication in her life. The power of her hiding herself from people, hiding herself from herself, was stronger than her wish to express her real thoughts. Now we were able to see the false prediction. The prediction made by a young, frightened child.

She believed that to survive in this world and be attached to something\someone, she had to hide her real self from everyone. Hiding herself necessitated concealing her actual thoughts.” But how can I go on hiding what I really think?” she asked. “I will be exposed. I conceal my secrets from myself, from my mind and in the end, I do not assimilate what I hear, to the extent that I am totally invisible? So, to live, I have to hide my feelings from everyone even from myself. My thoughts can only be deleted if I delete my feelings. Having deleted all those functions, I am now without any experience of integration. So Instead of achieving a better integration, I will attempt to think in the same way as you,, my therapist, thinks, and then I will be as assertive as you are. I will imitate the kind of structure you provide, and later I will check it again, by repetitions I will find myself.

Now that she was divorced and was looking for a new partner, she turned to someone from the media. He didn’t respond to her approach. She said she does not know how to present herself, given all that humbleness that was forced upon her, and the manner of behavior imposed on her as she was growing up.

Having hidden herself for so many years she discovered that she didn’t know who she was or what it was that she really wanted to do in life.. Though she had had her clinic, and her startup company which had invented a special form of insurance, she sold it and wanted to move on. However what she really wanted to do in her life was so deeply concealed [ within her] that she was unable to discover it.

She ran the family properties; she still felt nobody took any notice of her.. She wanted to do something which was appropriate given her talents and skills. She didn’t want to just run the family businesses. Though she helped her parents, her mother had full control of the company’s money.. Nobody was allowed to touch it without her consent.

She feels she does not know what will satisfy her in life - since her real wishes are hidden even from herself. She is used to be in hiding. Therefore, men don’t react to her approaches. This repeats her tendency not to allow others to notice her, not even in her place of work. She met a member of Parliament and a minister in the Israeli

Government in the parking lot, he looked at her but she didn’t know what she wanted to say to him. I talk to her about her history of hiding that finally forced her to hide from herself. I tell her that she knows how beautiful, charismatic and passionate she is. She accepts that she knows some of these things. But she does not make use these aspects of her personality. Then she recalls her meeting in the offices of the lawyer earlier in the week. Before the meeting she had had decided to tell the lawyer what she knows and to be an assertive presence at the meeting. She put on her lipstick, the red brown one knowing that this was the one that suited her most. On the way to the meeting she got confused about some of the questions she would have to answer, such how much of the land shown on the map belonged to her family.. She thought she would not be able to answer this question and yet, as the meeting progressed she recovered [ her self-confidence?] and dealt with the question successfully. This time the false prediction did not win.

She tells me that these days feels that everything in her life is a mess, that she does not have a plan. Every week she has to plan her life. What she wants is that whoever she meets will know who she really is. She does not want to hide herself any longer.

It would seem that this act of hiding herself and her humility prevented her from knowing what [ and who?] she really is and even stopped her from setting goals in life other than her desire to find a partner or a brief love affair. She wanted to be involved with charities to and play a part in politics. I responded by telling that she should absorb those words and concepts. Noone could know in advance what the result would be, but that she should take the first step by assimilating these words and concepts and then we could try to see what really lies behind them and how the puzzle [ that had hounded her life could [ perhaps?] be resolved.

She sent me a message on WhatsApp up asking what we were actually doing in our meetings. Were we engaged in charting a new course in her life or were we merely temporarily solving problems? Her question arose because she was unable to remember anything of what I had told her. In checking with her what we were talking about, her the answer was so lifeless,, that I was overwhelmed. At the next meeting she understood that her incessant chatting both in our meetings and in other places, was preventing her from hearing what people were saying. Though she was talking a great deal she was at the same time continuing to hide her [ real? True?] self. And failing to state what she really wants. Her talking consisted of saying the same thing over and over again rather than actually communicating with others.

The result is that nobody is going to be at her side. Nobody will give her the recognition she needs. She is angry at her father and brothers who does not let her touch the family’s capital. Her mother who never listens, who is such a powerful, and extremely strong woman, who inherited all her capabilities from her father, whilst she herself feels as if she is living in cocoon. Her mother had not spoken to her own mother (my patient’s grandmother) for 35 years. Once when she met her abroad she told my patient that her husband (my patient’s father) had been unfaithful to her and that he had a son with his mistress. My patient said that this meant she had had a brother in addition to her two brothers. Her mother had a heart attack and refused to understand that if she doesn’t give my patient signatory rights to the account her efforts in helping to run the business will become worthless. Though my patient is imitating her mother she is not conscious of doing so. She does not hear a thing that is said to her. Whenever I talk to her, the information I try to convey to her is too much for her to take in. Her inner world is closed. Her ability to understand what is being said evaporates. She becomes more conscious of how difficult it is for her to communicate and of how scared she is to be out of her cocoon. She is aware of how difficult it is for her to let go of the imitative structure and replace it, with my assistance, by taking an in depth look at the way in which she communicates with others in her life.

Some concluding remarks: By allowing ourselves to view phenomena of imitation in its entirety, we can see how the whole myriad of imitations of the basic dialogue between mother, family, culture, and the complexities of life’s events, influences the mental structure of all the patients’ behavioral, relational, and communicative functions. As the development of the therapy unfolds, the different structures are revealed as having the same structural appearances in all phenomena. It will appear in time and space of the patients' behavior, body, reflections. Therapy’s role is to reveal the basics of the non-declarative memory which is the foundation of the formation of an individual’s inner world perceptions and their behavior in the external world. Allowing ourselves to dwell on the different modes of the phenomena is the best way of revealing the mechanism which in and of itself is modal, repetitive, and creative.

As therapy advances, my patient’s inability to engage in a dialogue with others is exposed. The therapy reveals the way in which her communication with others is inappropriately intimate, whilst at the same time she fails as to hear or understand the meaning of what she is doing and saying. Either she hides by not opening at all, or she conceals her real self by being too open. We can say that she is "all over the place" at times not communicating at all, whilst at other times words simply pour out of her. She unable to think about what she is saying, what her motives are. There is no reflection, no PLAY.

The very structure of no PLAY relations is the structure which will appear in any negotiation she is engaged in, whether it is in her communication with herself, her inner or external relationships, her family relations or her business relationships. The quality of the repetition of the same structure is the basic assumption of imitation, evolutionary, intergenerational (her parents do not have any valuable communication between themselves or social relationships) inner (no reflection capabilities), outer (no dialogue).

I will present the last case, in which I will try to indicate the way we could have treated the patient in psychoanalysis, and the way in which we conduct an analysis in neuropsychoanalysis using the imitation mechanism.

First let me restate the theoretical basis of Neuropsychoanalysis. It is on this integrated, neurological and psychoanalytical foundation that this material will be interpreted, taking the imitation mechanism to the place where it belongs in the clinical case.

Below a summary of the basic theoretical components of Neuropsychoanalysis.

Here we are citing Prof. Solms who built the system with which we work:

1. Panksepp's taxonomy, failure to meet 'emotional' drive needs is what most frequently gives rise to psychopathology. Bodily ('homeostatic' and 'sensory') drives are easier to master. The requisite predictions are largely reflexive and instinctual. The mastering of emotional needs- which frequently conflict with each other- requires a great deal learning from experience. At this point enters the learning imitation which helps mater emotional unfulfilled needs, frustrations and looks for an innovative way to mater what is troubling, false prediction, which is by itself free energy until bounded.
2. I believe that our clinical work is greatly enhanced if we use the unregulated feelings which our patients suffer from as the starting point of our analytic work. From the conscious feelings, we can infer which underlying emotional needs are not being met. This in turn facilitates identification of the repressed prediction that the patient is (unsuccessfully)using to meet the needs.
3. The repressed predictions are inferred from the "transference". Transferences, please note, are automatized actions programs. They cannot be remembered (see above) but they are repeated they are automatically reenacted.
4. Transference interpretations unfold over four steps:
   1. 'Can you see that you are constantly repeating this behavior?'
   2. 'Can you see that it is meant to meet this need?'
   3. 'Can you see that it does not work?'
   4. 'Can you see that is why you are suffering from this feeling?

1. Transference insights enable patients to generate new and better predictions, but these do not reconsolidate and thereby extinguish the old ones.For that reason, despite the insights patients attain from transference interpretations, they still continue to enact the old action programs. Transference interpretations therefore need to be repeated until patients can make them for themselves. Ideally while the enactment is happening rather than afterwards, (so they can change course utilize a new and better prediction. This is called 'working through'.
2. It takes a long time to automatize a new prediction. In cognitive neuroscience we say that non-declarative memories are ' hard to learn and hard to forget'. That is why psychoanalysis requires many and frequent sessions (those who want quicker treatments must learn how learning works.)
3. The new predictions are gradually preferred over the old ones because they work; They actually meet the underlying need. But the old ones are never extinguished. That is why our patients can always return to their own ways, especially under pressure.
4. The few points I have just made:
   1. Bring our basic theory into line with current neuroscientific knowledge;
   2. Enable us to explain the scientific rational of our therapy to collegues in allied fields in a way they can understand;
   3. Open our theory and therapy to ongoing scientific scrutiny and improvement.
5. I am mindful of the fact that Neuropsychoanalysis focuses almost exclusively on elementary Freudian ideas, but we have to start somewhere. These ideas are our common ground. I am also aware of that many of the points I have made here already from central tenets of some post- Freudian approaches. This is not surprising; We do what works; but now we know more about why it works.

As professor Solms points out, the infant is in a world which he came into with his cultural multi—generational heritage. From the time of his birth he is in the intermediate space between him and the world in which there are structures which he is required to learn. Imitation is the basic process by which he connects himself to the world. He learns all there is to know about the structures within which he is located. There are critical periods in the course of his development as these structures are built and become automatic and are unconsciously located in his nondeclarative memory. Without him being aware of it these automatic structures become actions upon which he will base his knowledge about the world. He will repeatedly return to these structures he created if he remains unaware of them.

As therapists we must identify the basic emotion that our patient has been unable to respond to appropriately in the world in which he now finds himself. In him we will encounter several diverse variations, repeated imitations during his development. Thus, we will be able to easily identify the structure of the activity. The role of the therapist is to help the patient become conscious of the existing structures. We term this a false prediction. The child may think that what he is receiving relates to the activity he is engaged in. It is up to us as therapist to transfer the patient to a position in which he has conscious control and from that point in a slow process of learning and a renewed examination to enable our patients to recognize and to create new structures.

# VIII. A RENEWED DEFINITION OF NEONATAL IMITATION

## A. Summary and Results

It is now possible to re-trace the path we took in constructing the concept of the imitation mechanism and what has been built in the course of this research. In order to summarize the current research, I turned to Freud’s writings so see how he concludes his own research and was aid by his unpopular book ‘On Aphasia' (Freud, 1891).

The starting point of this research relates to events that occurred in my personal history. I grew up with a sister three and a half years older than me. I loved and admired her. She was the grown-up,, the one who knows,, the one who ran more quickly, and did everything better.. And I,, the little one followed in her footsteps.

Sometimes I heard my mother saying “Irith, don’t imitate her, the more you imitate her so you will turn out to be only half of what she is. My mother roused my attention to what was happening naturally and unconsciously, out of love and of love and esteem.. It was she who marked out for me the way to develop, who advised me when I was unsure, who occasionally disappointed me when she didn’t behave in the way in which my mother wanted us to behave. The attention that my mother aroused in me was, on the one hand, critical in its essence and, on the other hand educational. Her comments left me in a place that enabled me to decide to distance myself from imitation of my sister and others and attempt to choose an alternative way. My mother drew my attention to this important phenomenon of imitation and at the same time to the conflict that results from it. My sister who was more skilled than I in social relations, and used to guide me in her way as to how I should behave in such situations, remained close to me. When I spoke I used to hear the echo of her laughter accompanying me in my imagination. For many years she remained one of the voices that followed me in a positive and, sometimes, negative way.

Of course, there were important events in my life that preceded this knowledge I gained of imitation. I was born as a healthy, pleasant, adaptive baby, with a sense of humor. The resonance of my laughter was a subject of conversation from early on in my early childhood. My behavior caused jealousy and the affection I aroused in others on the one hand and facilitated relations of love whilst on the other hand, as will become clear in what follows, it created considerable envy. In her memory My mother held on to her life in Austria and the loss of her home in Vienna in WW2, which was associated in her mind with the death of one of two of her twin sister, Idith, from an epidemic of Scarlatina. She had been taking care of Idith, one of her twin sisters until one day she “disappeared with her mother into a room in the house where she was isolated and died a week later". This happened towards the end of 1933, when "Jews and dogs were prohibited from entering shops" my mother used to say. My mother’s ‘friends’ were abusive towards her and her father too was not especially kind in his criticism of her. Idith was buried in Vienna in 1933 under her Jewish name when she was just 27 months old. The entire family emigrated to pre- state Israel with the help of my grandmother’s brothers who were some of the leaders of the Jewish community’s defense organization Haganah and sent them immigration certificates issue by the British Mandatory authorities who at that time governed the country. My mother was then 13 years old.

When I was 18 months old, and because I was very healthy, my mother, a professional a nurse, became worried about me and decided to infect me with various childhood diseases such as measles, whooping-cough, and in the end also pericarditis an inflammation of the heart’s tissue.I becameunconscious and was as a result of which I was hospitalized. “Why is Irith so ill” my sister wanted to know and asked my mother to take me to the hospital. Apparently, I was taken there in a taxi and I spent seven days in a coma vegetative state and a further period after I regained consciousness. My sister subsequently told me that on the fourth day of my hospitalization, when I was being ventilated in an oxygen tent, she was brought to see me. A gramophone and records of songs that I especially loved were brought to the hospital. Everyone said that even though I lay there with my eyes closed, when my sister was close to me I responded with a smile. This story was told and retold for as long as my mother lived. She herself recounted it time and again with tears in her eyes. This legend is accompanied by tales of miracles and other superstitions, like a broken mirror on the way to the hospital which promised to her anxiety, bad luck and reinforced my mother's sense of terror. In addition there is a story according to which my grandfather went to the Lubavitcher Rebbe who was fasting on that day. He sent his assistant to tell my grandfather that this girl, thanks to what was happening to her now, would in future be the source of great comfort to him.

The fact that this infant which was me reacted to her sister in the way she did not surprise me when – many years later I read Dr Merker’s (Merker 2006) article about the girl who responded to her brother despite her being anencephalic. The behavior of someone who has endured such experiences influences the psychic development of babies and children and can enable rare revelations about unconscious intergenerational psychic abilities, and the role of imitation in intergeneration implicit transmission.. One can exaggerate and give various interpretations about the role and the possibilities it required in this life story. At the same time, it seems to me that my retrospective was what enabled me to conduct the pilot study in patients in unconscious situations, and to initiate further research in the observation of anaphylactic infants (Raveh 2008 unpublished article).

The seminar on ‘infant observation’ is a course given at the Tavistock Institute in London. There was no such course in Israel when I was a young trainee. I remember a conversation with Dr Rina Bar Lev in which I said that the subject of infants' observation interested me. Following this conversation, I understood that I had no option other than to study this subject in London. However, by the time I had completed my internship and was ready to resume the furtherance of my professional career, I was already a young mother to two babies. A good friend, Dr Tamara Sternberg who had done her analysis in London under Professor Joseph Sandler, suggested that I go to London and visit the Anna Freud Centre and the Tavistock Institute. I took up her suggestion and after visiting both places decided to continue my work with the Tavistock.

A few years later in 1988 I began to give a course in infant observation in Israel for professionals dealing with infants and psychotherapists. I emulated the structure of study at the Tavistock, while I enlisted a wide-ranging group of leading professionals from the various organizations dealing with infant observation so that the course included neuropediatricians, speech therapists, physiotherapists, clinical psychologists, developmental psychologists, professionals engaged in teaching, in philosophy and more. As I handed the course over to these professionals, one of the participants – a major figure in the world of physiotherapy, said that one could see the imitation by babies from the moment of their birth, that they imitated anything and everything that moved including their cradle. This comment still rang a strong bell in my ears when ten years later in 1998 I joined Professor Heinz Pretchtel ‘s course on foetuses in Graz where I was able to see the structure of the movements of both the foetus and the baby, I could observe the significant presence of the embryos and their dissimilar behaviour. I became familiar with the ‘preterms’ and their characteristic movement in the absence of significant figures in their surroundings. The imitation that was identified very early on after birth and occurred in the same way as we related to other surprising phenomenon after birth was understood in Graz not as a reflex that would disappear, or as an evolutionary phenomenon like the rest of the reflexes. In Graz it was already understood as a condition related to the brain. There can be no doubt that the knowledge I acquired in Graz was ahead of its and our time, It took many year and much research in order to locate imitation and place it appropriately. The imitation mechanism as it appears in the current interdisciplinary study bridges between the analytic Freudian concepts and the knowledge that is derived from neuroscience..

From the analytical approach following the revision of the drive theory it becomes clear that to understand the advance of learning and the context we have no option other than to bring concepts from other worlds of knowledge. Prof. Mark Solms, President of the International Neuropsychoanalytic Society, who is responsible for the creation of the integration and leads a global movement revising Freud’s psychoanalytic writing, has written clarifying the need for renewal and up-to-date elaboration of Freud's drive theory. I identify with this mover in my current doctoral dissertation as I suggest that imitation is the basis of learning. That the imitation of structures is what we do from the very beginning of life. That we become familiar with these structures unconsciously, feel and understand them in all their complexity. Their digestion and working through is accomplished in the course of collecting the energy they bring to our systems. According to this definition, the systems with which we came into the world and therefore every structure that is imitated is the structure that is additional to the existing system and when its energy is bound it creates a new and original concept which by its nature is a new creation. We produce these concepts emotionally and experientially and even physically and biologically.

As Professor Solms explained:

"Since this paper imports assumptions derived from other branches of knowledge into psychoanalysis I must, briefly, before proceeding, address the often-expressed objection that it is unpsychoanalytic or even anti-psychoanalytic to do so (Blass& Carmeli 2007). When it comes to drive theory, this objection is more easily dismissed than is usually the case because Freud always acknowledged that in the case of the trail blazing concept of drive, that we are obliged to rely upon knowledge from other fields: I am altogether doubtful whether any decisive pointers for the differentiation and classification of the drives can be arrived at on the basis of working over the psychological material. This working-over seems rather itself to call for the application to the material of definite assumptions concerning the life of the drives, and it would be a desirable thing if those assumptions could be taken from some other branch of knowledge and carried over to psychology (Freud, 1915) Many other such statements could be cited. It is abundantly clear from Freud’s writings on this topic that he drew heavily upon the biology and psychophysics of his day. That is why he felt so uncertain about his conclusions -- “it should be made quite clear that the uncertainty of our speculation has been greatly increased by the necessity for borrowing from the science of biology” -- and why he readily conceded that future biological findings “may be of a kind that will blow away the whole of our artificial structure of hypotheses” (Freud, 1920).

In short, in the case of drive theory, there can be no doubt that we may, indeed must, carry over into psychoanalysis findings derived from other branches of knowledge. dualistic languages of psychology and physiology, both, and to replace them with the deeper (non- phenomenal) abstractions of statistical physics. As

Galileo said: “The book of Nature is written in the language of mathematics” (Galileo, 1610).

## B. The Object of the Drives is Connected to Learning

Freud’s drive theory distinguished between the “pressure”, “aim”, “object” and “source” of a drive. The “pressure” refers to its quantitative aspect, that could be “measured” in degrees the “aim” referred to its basic mechanism, discussed above, which was to discharge, that is, to get rid of the demand. The human infant, like all animals, is equipped with reflexes and instincts which serve this purpose, but since these innate mechanisms cannot by themselves satisfy the exigencies of life, at least not in every context, they must be supplemented by learning through “experiences” In Freud’s second drive theory, the fundamental entropic tendency of drive is represented in the life drives, too, by way of their “conservative” nature; that is, through their compulsive tendency to revert to a previous state of things (previous to the impingement of an excitation.) Cf. the “compulsion to repeat”. “In my opinion this distinction [between free and bound drive energy] represents the deepest insight we have gained up to the present into the nature of nervous energy, and I do not see how we can avoid making it” The fact that instincts satisfy drive demands demonstrates just how unfortunate it is that Strachey translated Trieb as

“instinct”. The German word for instinct is “Instinkt of satisfaction” (Freud,1915). This applies all the more to the “object” of a drive, which, as Freud pointed out, is its most variable aspect; the object of a drive is almost always specified through learning.

The definition of imitation breaches traditional conventions in contemporary psychoanalytic thought. Imitation is actually a different way of expressing the idea of being together with someone. That is its essence. As was said in the first chapter, it has its beginnings in the womb and the generations that preceded it. It defies boundaries and in being the primary learning mechanism in the world, reads structures, simulates and become at one with them Thus we turn to moments without boundaries in a single unity with the structures we discover and from them create the meaning of togetherness and difference. Out of repetitiveness we finally create the understanding of what there is between us and who was together with us, so creating a new definition of ourselves.

The presence of the infant in the world, its imitation of the structures that exist in the world points to something that is not only an individual connection also an historical, intergenerational connection that takes place from the moment of creation until the moment of separation while in its creation new possible concepts are formed. It can be said that in the spiritual word there is a clear mutual blending. Who I am, what my thoughts are, my memories, my ideas and my views are all absorbed within us through the imitation of others out of social solidarity (Durkheim/ Gofman, 2014). A person lives in the language, a language that he actually did not create by himself (Wittgenstein/ Malcolm,2009). Every idea that is considered, every sentence that is thought about is permeated with the spirit- the essence of what we have read and people we have talked to, movies and meetings in which we were present. Everything that is ‘me’ is dependent on others and therefore I, my nature, my appearance, my thoughts, are dependent on and influenced by others. In this research I term this encounter between me and an – other the question of structures from the surrounding area, in other words, from the environment. In her book ‘The Enigma of Childhood " Roni Solan (2015 )explains that the fetus is influenced by its mother’s emotional situations. She contends that the infant is simultaneously in a situation of connectedness and separation while still in the mother’s womb. The birth pangs represent the mother’s separation in the course of the fetus the exiting the womb. When the baby that had been previously recognized in the womb and had been imagined prior to its birth appears in the world, it is new and unfamiliar. The infant now meets up with its mother from. on the one hand, a new and unfamiliar point of view, although he is awake and felt her prior to his exit, he now learns to recognize her from the outside. Ostensibly, what is being talked about here is separation. However, we are familiar with the research carried out by Andrew Meltzoff and have knowledge of sensory a-modality, where infants and mothers alike know those they have previously sensed from a different facet of feeling. Meltzoff’s research demonstrates that infants who with open eyes recognize the pacifier they previously sucked with their eyes closed. With their eyes open they are able to point to that particular pacifier from among three other pacifiers shown to them In other words the various senses are connected. They recognize what they felt before. They identify their mothers who carried them in their womb, in different ways.

I was able to think when I observed my first-born baby how he moved in the space as I pondered how he was able to cry and turn to me and the way in which he was able to cope with his immediate surroundings in my womb that was for him a more or less protected place while he was inside it. I thought about how he moved around in the womb’s surroundings supported and held when I don’t know what his condition was,, unaware of his distress or the comfort he felt. And now, after the birth, when he cries I can take him in my arms and give him a soothing hug which he sometimes enjoys whilst at other times he needs to distance himself from my smell, from my touch and to be with himself. I learned to recognize his rhythm and his generosity, and his devotion. I learned to discern his deep voice, the qualities of his crying, and he learned about me. We played considering this accountantship. His humorous father, whose profession is humor, was laughing with him and our baby was filled with funniness. My hypersensitivity also characterized him and he learned very quickly to mimic the qualities of speech and I with a subtle listening heard him crying and talking. And later laughing full of imagination. I had a hard time believing what I was hearing. How at the age of four months I heard the sounds of crying in which there was a shout of f-a-t-h-e-r or more accurately an emphatic call to m-o-t-h-e-r and how subsequently, while standing in the coop, he played nonsensical games with his father.

The imitation of the first hour after birth in which a tongue protruded appeared throughout his development, as expressed by Thich Nhat Hanh.

“When my mother died…” by Thich Nhat Hanh (1992)

“The day my mother died I wrote in my journal, “A serious misfortune of my life has arrived.” I suffered for more than one year after the passing away of my mother. But one night, in the highlands of Vietnam, I was sleeping in the hut in my hermitage. I dreamed of my mother. I saw myself sitting with her, and we were having a wonderful talk. She looked young and beautiful, her hair flowing down. It was so pleasant to sit there and talk to her as if she had never died. When I woke up it was about two in the morning, and I felt very strongly that I had never lost my mother. The impression that my mother was still with me was very clear. I understood then that the idea of having lost my mother was just an idea. It was obvious in that moment that my mother is always alive in me. I opened the door and went outside. The entire hillside was bathed in moonlight. It was a hill covered with tea plants, and my hut was set behind the temple halfway up. Walking slowly in the moonlight through the rows of tea plants, *I noticed my mother was still with me. She was the moonlight caressing me as she had done so often, very tender, very sweet… wonderful! Each time my feet touched the earth I knew my mother was there with me. I knew this body was not mine but a living continuation of my mother and my father and my grandparents and great-grandparents. Of all my ancestors.*

*Those feet that I saw as “my” feet were actually “our” feet. Together my mother and I were leaving footprints in the damp soil.*

From that moment on, the idea that I had lost my mother no longer existed. All I had to do was look at the palm of my hand, feel the breeze on my face or the earth under my feet to remember that my mother is always with me, available at any time.”

Later, I studied and taught child development in different setting, where I was able to discern the imitation mechanism. I learned from Heinz Prechtl that reflex is a form of brain organization, and in Touen (1984) I read that there is a tendency to look at the brain of an infant as a not fully developed organ when compared to the brain of an adult which is not the case. These are different structures and the position that places the infantile brain as a less developed brain is a semantic distinction which leads to a lowering of the complex, structure of an infant’s brain.

The perspective which scans a child’s brain as a primitive brain does not facilitate a fitting reference to existing mechanisms in infants and imitation mechanisms in particular. Mechanisms that go through various stages of development.

### *C.* 1. Operational definitions of the imitation offered by Vincini

There is a presumed phenomenon, well circumscribed but particularly intriguing, over which the science of embodied intersubjectivity has to take a position. This phenomenon concerns the first 2 months of post-natal life and is labeled “neonatal imitation” (NI), giving the term “neonatal” an unusually wide sense. The questions of whether and in what sense infants in that early stage imitate facial gestures have considerable implications. For example, if NI actually occurs, resistance toward the idea that the newborn’s brain may regulate responses that match different visual models (Keven and Akins, 2016) will have to be revised. If NI is real, the hypothesis that imitation develops through associations via contiguity and contingency is seriously undermined if not altogether falsified. And if imitation is real but the findings do not justify postulating a foundational socio-cognitive role for the “recognition” of self-other similarities, then Meltzoff and Moore’s (1997) influential theory should be called into question on this point. Thus, although it is unlikely that a widespread agreement will be reached soon, it is worth striving toward a solution to the questions surrounding NI as they have significant repercussions for neuroscience, developmental psychology, and social cognition.

Whatever the ideas concerning Neonatal Imitation are, the phenomenon whether understood or not, exists. The thorough research by Meltzoff and Moore speaks for itself. There is research work which is done to indicate that this phenomenon that appears in early childhood has some implication for adults and society. It is a primary mechanism that people know recognize and would immediately appreciate in life, societal belonging, and everywhere around them.

The definition which is brought up in here includes the many facets which appear and give a coherent grasp of what is the need for this mechanism, what it offers, and how it behaves. There needs to be a Neuropsychoanalytic research which will cover the entirety of this phenomenon and facilitate an understanding of the mechanism.

Such a study would include several stages which have been constructed in this research work and developed from the themes expressed here. We will organize the different theories upon which research was done, and we will argue the research material presented here exemplifies the way in which the further research should be carried out. The wealth of knowledge this kind of understanding built from research presented here, can further support the following conceptualizations.

That the appearance of TP/R is a primary way to indicate imitation is there from the first hour after birth.

In order to operationalize imitation, Meltzoff and Moore (1977) postulated the following: infants imitate a particular behavior if there is a statistically significant increase of that behavior in the presence of the modeling of that behavior as compared to the modeling of alternative behavior(s). For instance, they tested whether “infants produce more tongue protrusions (TPs) after an adult demonstrates TP than after the same adult demonstrates mouth opening (MO), and vice versa.” (Meltzoff and Moore, 1977). Thus, NI was defined from the start as

“differential imitation” and that definition has been employed in the great majority of empirical studies concerning NI.

Hereafter we call the increase that a gesture exhibits when the corresponding model is presented compared to when other models are presented Comparative Increase for the Corresponding Model (CICM). In this first section, we focus on TP and MO as examples, because they are the actions for which CICM is most frequently reported. In particular, the CICM for TP is reliably documented (Heimann, 1989).

Why is imitation operationalized as differential imitation? The reason—already specified by Meltzoff and Moore (1977), is that imitation has to be distinguished from a global arousal response. Observing that TP increases in response to the TP model as compared to when the infant is presented with a still face, does not in itself indicate imitation. In such cases it would be more prudent to think that the baby is aroused by the presentation of TP and increases its TP production as a consequence of its state of arousal. Indeed, we could point to the now well-known data reported by Jones (1996, 2006), that perceiving flashing lights, dangling toys, and classical music increases TP in infants. In the absence of more compelling evidence for imitation, one could think that what causes the TP response in the case of TP presentation is merely the arousal state, which is provoked just as well by other arbitrary stimuli. The perception of characteristic features of TP would not play a determinant role in generating the matching response and so the matching response could not count as imitation. The operational definition of imitation must neutralize the arousal explanation in advance; otherwise there is no guarantee that minimal conditions for imitation are met.

Meltzoff and Moore’s (1977, 1997; Meltzoff, 2002, 2005) insistence on the claim that a plurality of gestures exhibits CICM indicates that the operational definition of imitation should be understood as entailing reference to such plurality of gestures. There is differential imitation only if more than one gesture exhibits a statistically significant increase when the same gesture is presented compared to when other gestures are presented, i.e., only if more than one gesture exhibits CICM. In this regard, it is noteworthy that advocates of the arousal explanation ground their hypothesis on the claim that only one gesture presents CICM. Hence these theorists seem to accept that if more than one gesture were to exhibit CICM the arousal hypothesis would be falsified or seriously undermined (Anisfeld, 2005;; Jones, 2009).

The arousal hypothesis is untenable in the presence of differential imitation. This hypothesis can explain CICM for one gesture if that gesture’s modeling is more arousing than other models. In particular, the TP model may elicit more TPs than other models in a set because it is the most arousing stimulus in that set. Yet, if another model (e.g., MO) also elicits the corresponding gesture more than the other models (including TP), the arousal explanation encounters a problem. Indeed, Meltzoff and Moore (1977; Meltzoff, 2002, 2005) understood arousal as a global state that increases overall action production, not just a particular action. Thus, if TP has been assumed to be the most arousing model to explain the CICM of TP, TP should solicit more MO than the MO model because it provokes a greater state of arousal and, among other responses, more MO. The same holds for the other gestures in the set under consideration. Therefore, according to the arousal hypothesis, TP would cause a comparative increase in other gestures as well, excluding the possibility that comparative increase for these other gestures is caused by their corresponding models. So understood, the arousal hypothesis predicts the absence of differential imitation for a plurality of gestures.

This definition works well with the model presented here. It is expected to have many different modes of expression since imitation is of a structure and is not limited to one cueing of the presenter of TP. TP is presented by a person standing there who is a whole structure made of certain rhythm, gentleness, a history previously known to the infant. Therefore, baby will be expected to react in many different ways until he creates his own version of understanding of what he learnt about the world.

### 2. Explanations for the neonatal imitation Findings

One of the first, and foremost aspects of research in imitation is checking the reality of the movements of imitation in mammals and babies

The debate about the movement of the tongue and its fragmentation into parts of the movement, opens the door to a specific exploration of the movement of imitation. Although imitation as a mechanism is symbolized by this initial movement which, whether or not it is accompanied by other movements, undoubtedly exists. This does not reduce or increase the necessity of referring to the imitation system as stated in the present study. The imitation system consists of many different entities. The practice of tongue extraction, which also occurs in animals, is not the most significant feature of the mechanism. In fact, in this chapter I wanted to illustrate the preoccupation with different theories dealing with imitation and the ongoing debate as to whether imitation occurs for a particular reason, whether there is a multiplicity or a paucity of movements, and what the modes of movement are. The purpose of getting to know the mechanism of imitation as it emerges in theoretical research is approached in this chapter analytically i.e. the study of the mechanism, its history, its social, personal and interpersonal status, the connection that this mechanism creates in the link between man and his environment.

Eventually, the study of this mechanism is aimed at its occurrence in the analytic clinic. (See Chapter 6). I will further introduce the practice of the various theories that emerge from this research and emphasize the contribution of part of the discussion to enriching our scientific knowledge about the imitation mechanism.

Below I will outline the proposed theoretical trends regarding imitative tongue protrusion and the indication as to its origin. Finally, I will present my proposal for continuing research, to support the research definition currently offered here.

There are two main types of explanations for the Neonatal Imitation findings, depending on what goal they set out to achieve.

There are theories for which the only thing that has to be explained is the CICM for TP (and, perhaps, the accidental appearance of CICM in other rare cases). Other theories aim at explaining differential imitation. So, on one hand, there are theories that assume that findings do not and will not prove the existence of differential imitation. On the other hand, there are theories that rely on the opposite assumption. In this section, I shall review the principal theories on both sides of the debate and investigate which of them have the most explanatory power. This involves the examination of the following theories.

Theories based on the empirical claim that *only* TP exhibits CICM (i.e., differential imitation does not exist). Anisfeld (1991) presents two theories of this kind: the Innate Releasing Mechanism (IRM) and the “attention, response release” hypotheses. IRM( Jacobson,1979) posits that TP is a fixed action pattern released under a relatively specific set of stimulus conditions (e.g., stimuli, including the TP model, resembling an approaching nipple). An IRM is more flexible than a standard reflex (e.g., More reflex); hence the notion seemed to account for the documented variability of the TP behavior.

The second theory, the “attention, response release” hypothesis simply supposes that infants inhibit spontaneous TP when their attention is captured by the TP model and then discharge a higher rate of TP when the model disappears, as a function of the energy that has built up internally during inhibition. This latter proposal can be considered an arousal explanation. Indeed, one can assume that arousal is precisely what builds up during model presentation and is expressed as higher rates of TP in the model-free response period.

The third theory, the Arousal theory- Since Jones (1996, 2006) demonstrated TP increases in response to a wider set of stimuli than predicted by the IRM hypothesis, recent skeptics of differential imitation converged on the arousal explanation for the CICM of TP. In what follows I summarize five main reasons for why this is a viable explanation:

1. Differential imitation is disputable because findings are highly variable and often negative (Meltzoff, 2017. [Oostenbroek et al, 2016)](https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01323/full#B68).
2. A variety of arousing stimuli in different modalities elicit TP (Jones, 2009). (iii) Jones (1996) found that 4-week-olds looked longer at a TP display than an MO display, confirming the assumption that TP is more arousing to infants than other modeled actions. This assumption allows the arousal hypothesis to account for reliable CICM for TP.
3. Tongue protrusion behaves like other spontaneous stereotype characterizing development which increase as a result of non-specific stimuli connected to arousal

(Keven and Akins, 2016).

1. Jones (1996, 2006) found that arousing stimuli other than modeled actions (lights, toys, music) cause a specific increase of TP, but not a diffused increase of other actions as well. Thus, the arousal hypothesis can explain the fact that the TP model does not produce a comparative increase (Simpson et al., 2014) Simpson does not accept the notion that the existence of differential imitation is disputable. In any case, the other four points are so compelling that even defenders of differential imitation should accommodate arousal as a factor contributing to the CICM for TP. Arousing stimuli of disparate kinds elicit TP and the TP model is an arousing stimulus. At a minimum, imitation defenders should accept that in addition to being imitative, TP is *also* an arousal response.

We now move to accounts that aim at explaining differential imitation.

### 3. Genetically Programmed Direct Matching (GPDM)

Genetically programmed direct matching is the name assigned to the psychological model of differential imitation that is most naturally associated with the classical genetic account of mirror neurons ([Cook et al., 2014)](https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01323/full#B12). [Jones (2009)](https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01323/full#B39) introduce this type of model as requiring infants to have significantly fewer cognitive abilities than is assumed by AIM. In fact, GPDM relies heavily on an evolutionary story: populations in which newborn brains were able to automatically connect the perception of specific actions with their corresponding action plans were selected. This is why we qualify this matching of action perceptions with action plans as

“genetically programmed.”

The fact that action plan activation is automatic means that the infant does not need to know why it has an impulse to act in a certain way rather than another. *The infant perceives a specific action and then has a tendency to act in a specific way.* According to GPDM, this is a complete description of the psychological states underlying imitation. Regulating which action tendency follows which perception is the work of neural mechanisms selected through evolution, but no psychological operation of the infant is directed at these mechanisms. In other words, it is not necessary for infants to recognize equivalences between modeled and executed actions. NI may still serve a social function in that it affects caregivers and positive infant-caregiver interaction is promoted.

We note that GPDM as a model of differential imitation has not been developed to account for the details of the empirical literature. Moreover, it has not been defended in opposition to the most well-known model of differential imitation (AIM). Here, we consider it only in so far as alternative explanations cannot be understood if it is not clear how they differ from GPDM. Hence, in this subsection, we anticipate its differences from other theories, i.e., AIM and AST.

We qualify perception-action matching in GPDM as “direct” precisely because it does not require infants to *recognize self-other similarities*. This is a critical difference from Meltzoff and Moore’s (1997) AIM model. Meltzoff and Decety (2003), distinguish the mirror neuron-based model from AIM because the latter posits “an active comparison and lack of confusion between self and other.” Indeed, Meltzoff and Decety propose that mirror neurons may not be sufficient to implement the psychological operations necessary for imitation. Something more

(the inferior parietal lobe) is likely to be required to implement the recognition of “both the similarity and the distinction between actions of the self and other”. The point is repeated in Meltzoff (2009) where it is suggested that mirror neurons are not well suited to account for the psychological phenomena AIM seeks to explain, notably “response correction” and “the imitation of novel acts.”

In order to anticipate its difference from AST, we need to emphasize that GPDM does not assign any functional role to the domain-general process of association by similarity. Perception-action connections are essentially different from the ordinary process by which a current visual stimulus is interpreted in light of a similar perceptual experience (*generalization*). Rather, in GPDM, perceptual representations are connected with corresponding action representations through genetic links that were specifically selected for social or socio-cognitive functions

### 4. Fetal development of the respiratory-digestive system

Development of the aerodigestive system in the fetus and infant before and after birth. During repetitive maturation, maturation of the system in the womb does not go against or complement the imitation system. The system has innate capabilities, a view that no one opposes. Various repetitive motion systems exist in the womb and are activated later during the first months after birth. In general in order for them to become operational what is required is a resistance to gravity and initial learning processes of the imitation type that correspond to the definition of imitation in the present study.

In short, the development of aero digestion occurs through constant prenatal

“practice.” The lips and jaws open and close as do the aerodigestive valves; the tongue protrudes and retracts; the chest expands and contracts, and the moving waves of contraction that define peristalsis flow down the length of the tongue, the pharynx, and the esophagus. Through rhythmic repetition, the proto-components of aerodigestive behaviors emerge and transform into primitive motor sequences that then evolve into smooth, tightly coupled motor runs. In other words, rhythmic behavior seems to be an essential part of aerodigestive development for both the acquisition of repetitive movements and their coordination by sensorimotor controllers. Tongue protrusion and retraction is just one element of this gestational process.

### 5. Rhythmic stereotypies

Thelen (1979) published a landmark, longitudinal study of the “*rhythmic stereotypies*” (or general movements) of infants. Twenty infants were filmed every 2 weeks, from4 weeks after birth to age 52 weeks. Over one year, she recorded more than 16,000 instances of repetitive stereotypical body movements classified into 47 different kinds, among them hitting, kicking, banging, thumping, and flapping. She found, first, that the peak, postnatal frequency of each stereotypy was determined by anatomy – for example, all stereotypies involving the leg such as kicking with alternate legs, or synchronous heel-thumping peak at 20 weeks postpartum.

Second, 84% of the stereotypies recorded (16,000 events) had identifiable releasers such as the appearance of the caregiver, presentation of a toy, or an interruption to feeding. Yet these stimuli were remarkably nonspecific and unrelated to the rhythmic behaviors elicited. “It is as if the eliciting context demands of the infant, ‘Do something!’ – Greet the caregiver, express delight in the mobile, manipulate the toy – but the immature central nervous system (CNS) responds in a manner that is not goal directed” (Thelen 1981) Thelen did not record the facial expressions of the infants studied (for methodological reasons) nor did she have access to highresolution 4-D ultrasound images of pre-natal behaviors (including images of internal rhythmic motor events). It would have been evident that although all infant stereotypies develop prior to birth, after birth they divide into two rough groups based on the timing of peak frequency. Aerodigestive stereotypies peak in frequency at birth whereas general stereotypies of the head, trunk, and limbs (that Thelen herself studied) peak months later. (The single exceptions to this division are finger movements, present at a low frequency from birth onwards.) One physiological explanation for this difference is simply that, in mammals, the myogenesis and synaptogenesis of the tongue and pharynx occurs much earlier than the development of the limbs and trunk, and even the jaw.

Another such explanation is that the corticobulbar tract, which mediates the cortical control of the trigeminal, facial, and hypoglossal cranial nerves, develops both earlier and faster than the corticospinal tract that controls limb movement. As to why this should be so, our answer at the outset seems the most plausible: Aerodigestive sensorimotor development takes precedence over the acquisition of

“non-essential” general motor tasks at least until the second stage of aerodigestive development when trunk control is acquired and solid feeding can begin.

The experimental results of Thelen's (1979) combined with the early ultrasound studies of neonatal neurologists (Pretchtel, 1984) show that infant stereotypies form a class on the basis of seven factors as follows. Stereotypies (1) are simple, rhythmic movements; (2) begin and end within a set window during the first year of the infant’s life; (3) are invoked or undergo a change in rate as a result of nonspecific stimuli often related to arousal; and (4) re-emerge in later life as a result of cortical injury or generalized cortical degeneration. When an infant fails to exhibit a stereotypy or the stereotypy shows a markedly abnormal pattern, it is often the case that (5) there is a cortical abnormality or injury in the infant; and (6) this abnormality will lead to a cascade of further developmental problems. Finally, (7) stereotypies are easily distinguished from primitive reflexes that occur as a result of specific stimuli and promote infant survival.TP/R, as our model gesture, clearly meets these criteria.

First, TP/R is a rhythmic behavior, one rarely seen in full-term infants after the fourth month of life. Abnormal or continued TP/R beyond the neonatal period is often the result of developmental abnormalities. For example, children and adults with Down syndrome continue to exhibit spontaneous TP/R, often into adulthood. The problem here is hypotonicity, a lack of muscle tone in the tongue lips, and jaw. Without proper internal control, the tongue flattens, assuming a broad, flaccid shape, and as a result, the tongue does not exert normal pressure on the hard palette during suckling. Without suckling pressure, the high arched shape of hard palate fails to change into the broad, rounded shape conducive to solid feeding. In turn, the jaw (masseter) muscles develop abnormally, and the misalignment of the jaw results in a cross- or overbite.

Eventually this hypotonicity will affect speech and even the child’s ability to make emotional facial expressions. TP/R often reappears later in life as a result of degenerative cortical disease or cortical trauma. Dystonic TP/R occurs with advanced cortical degeneration.

Vincini believes that TP/R differs from what have been called the“primitive reflexes” of the neonate, with which it has often been confused. The primitive reflexes such as the rooting, suckling, and the Babinski and Moro reflexes are complex, automatic behaviors evoked by specific triggering stimuli (e.g., stroking the cheek, drawing a pencil along the sole of the foot, briefly – and safely – dropping the infant). Although some primitive reflexes are rhythmic (stepping and sucking), others involve a single motor sequence (e.g., the Moro reflex). They develop around weeks 25 ofgestation, and although they generally disappear within the first year of life, it is not uncommon to see certain primitive reflexes in healthy, young adults (Brown, 1998).

In contrast, TP/R develops earlier in gestation, does not have a single trigger, and is fully absent in healthy adults. However, both TP/R and the primitive reflexes can reappear after neural loss in cortex, as the result of normal aging or with degenerative neural disease. Therefore, both neonatal stereotypies and primitive reflexes appear to be sub-cortical motor functions but of two distinct kinds. In sum, TP/R fits the profile of rhythmic neurodevelopmental behavior. It emerges as a result of subcortical function in utero, is inhibited and/or integrated with the advent of cortical control, is sensitive to nonspecific external stimuli, and often reappears in cases of cortical trauma or degenerative disease. Abnormal neonatal tongue protrusion can also lead to a cascade of developmental disorders.

### 6. Tongue protrusion and activity-dependent development

In the previous section, it was argued that TP/R is a stereotypy, one of the many rhythmic movements that appear before and after birth, which are neither goal oriented nor triggered by specific stimuli. Yet despite their apparent “aimlessness,” the ubiquity of stereotypies in mammalian development suggests that they constitute a functional stage in sensorimotor development. (Thelen 1979; 1981b).

Thelen hypothesized that rhythmic stereotypies *“bridge the gap” between disorganized and goal-directed behaviors,* that they form a “substrate” for the directed behaviors to follow. Recent work on activity-dependent development suggests an answer that aligns with Thelen’s view: Rhythmic movements, such as TP/R, drive a series of activity-dependent neurodevelopmental events. Pioneered by the classic work of Hubel and Wiesel on mammalian visual cortex development, abundant evidence now strongly suggests that neural activity modulates the development of the central nervous system. Once neurons are born, spontaneous, isolated activity begins in individual cells, which is characterized by a slow depolarization crested by a burst of activity. Soon this random activity coalesces into the synchronous activation of neighboring cells, with waves of activation flowing outwards from the locus. Notably, spontaneous activation is not confined to one area of the developing brain, say to motor or sensory areas alone. It has been recorded in the spine, as well as in the cerebellum, retina. and visual cortex. Immature neurons throughout the brain – even neural progenitor cells yet to migrate to their permanent locations – are capable of spontaneous activation and signal propagation. Spontaneous activity of the kind just described drives early developmental processes both directly and through epigenetic mechanisms.

The upshot of this body of research is that activity dependence is a general developmental phenomenon. On one end of the continuum, sensory experience acts through the standard mechanisms of sensory transduction and transmission, and properties of stimuli affect neural organization. At the other end, neural organization arises out of variations in the standard pattern of long silences punctuated by short bursts of activity. But there are also a number of “in between” variations. Spontaneous activation can spread to mature neurons, thus propagating the signal to distal locations. Indeed, Khazipov (2004) reported that visual signals, produced through photoreceptor transduction and transmission via retinal ganglion cells can lead to waves of spontaneous activity at the axon terminus, in the lateral geniculate nucleus (LGN), prior to maturation. Finally, activity-dependent development can be driven by self-induced sensory feedback. Spontaneous activity in motoneurons, within the spine, midbrain, or cortical motor areas produces muscle twitches. In turn, muscle twitches activate stretch and load receptors in the muscles, sensory feedback that initiates activity-dependent changes in sensory areas (Colonnese & Khazipov 2010). So, the self-production of sensory signals, caused by motor events with the classic burst-silence pattern, is yet another variant of activitydependent development.

On the picture of development now emerging, neural development uses a rich form of neural scaffolding. Spontaneous activity can create temporary pathways between two regions and then eliminate or alter them once the scaffolding is no longer needed – for example, once a direct link between the two termini has formed Epigenetic processes can lead to neurotransmitter specification and then their respecification at a later time (Spitzer & Borodinsky 2004). Similarly, an existent excitatory neurotransmitter may become inhibitory (or vice versa) as a result of the activity-dependent expression of different membrane channel receptors (Wolfram &

Baines 2013). Thus, the “storyline” of neural development looks much less like a pure cascade of events, each stage building on the last, and more like an economical solution to the Tower of Hanoi puzzle, a back and forth of developmental events that eventually results in the standard organizational patterns of the normal adult brain. Against this general framework, there is the suggestion that rhythmic stereotypies participate in activity-dependent processes is more plausible.

First, if motor events can bring about neural development through self-induced, rhythmic activation, then TP/R, along with other rhythmic stereotypies, is a potential cause of activity-dependent development. For another, it is less mysterious why there is a mismatch between the time periods of human gestational events typically measured in days or weeks (or occasionally months) and the lengthy lifespan of rhythmic stereotypies (~9 months). If mammalian neural development adheres to a “use, dispose, and replace” principle, and/or to the dictum of “write rough and refine later,” then TP/R might well drive a sequence of distinct developmental events: for example, pathfinding from B to A, followed by pathfinding from B to C.

In what was presented, it occurred that having an abstract description, in chapter one by Gabriel Tarde of group of smart people working together imitating each other ameliorating their concepts and rising to a new concept will fit in with what was written above, and will help fit the definition of imitation as it is described in our research project here. I will not be able to end the description of the research of imitation which was done up until today without describing the most extensive work done by Meltzoff along the years with the concepts he and his team produced.

### 7. Active Intermodal Matching (AIM)

The “crux” of the AIM hypothesis is that imitation is “intentional” or “goaldirected;” the goal is to achieve a “match” between perceived and executed actions. Goal-directedness is what allows Meltzoff (2010) to define NI as “genuine imitation.” Indeed, true imitation is traditionally described as having an active, intentional character (Piaget, 1951/1962). Evidence for goal-directedness is a presumed process of response correction in which infants use the target/goal as their criterion for correction (Meltzoff and Moore, 1997). Imitation is achieved through a “comparison” computation described in Meltzoff and Moore (1997) The comparison has two inputs: one is visually perceived action features and the other is proprioceptive experienced action features. Specifically, the computation compares the “configurable relation between organs” and/or the “speed, duration, and manner” of the modeled action with the configurable organ relations and/or dynamic properties of the infants’ own actions. If the two inputs are dissimilar, the output is a “mismatch,” and then the infant executes a new attempt. If the two inputs are similar, the output is a “match” and the infant has recognized the similarity between her own and the other’s actions. For this reason, imitation entails the recognition experience or the basic perception: “That seen event is like this felt event” or “Here is something like me”. Note that it is essential to AIM that the two inputs entering the computation are clearly separate, as shown in Meltzoff and

Moore’s (1997) schematic of AIM. If there are not two distinct inputs, the idea of a comparison for the detection of similarities and dissimilarities falls apart. Hence, Meltzoff and Moore (1997) insist that the visual representations of the modeled actions must be “independent” or “separate” from the corresponding proprioceptive representations. In order to make the “action system” commensurable with the “perceptual system,” evolution provided infants with a “supramodal representational system.” This system provides “the lingua franca, the abstract code, for connecting self and other.” Nature designed infants with an “imitative brain” through “Darwinian means.” This “special neural-cognitive machine” evolved to ground social cognition, including theory of mind and testing others’ identity. One of the main reasons for being skeptical of AIM is the following: if infants have a developmentally crucial “innate propensity to imitate” for which nature evolved a specialized comparison mechanism, (Meltzoff, 2002, 2007), then the empirical literature on differential imitation would be more robust than it currently is (point ii. below). An extensive critique of AIM can be found in Vincini and Jhang (unpublished). Here we list some of our objections.

### 8. Association by Similarity Theory (AST)

Although anticipated by Kinsbourne (2002), AST was recently introduced as a detailed alternative model to AIM by Vincini and Jhang (unpublished). AST relies on domain-general processes of association by similarity and can be considered as a consistent application of Prinz’s (2005) ideomotor theory to NI. AST interprets NI as differential induction of spontaneous behavior through similarity. Association by similarity is one of the main principles in traditional associationism (Hume, 2000), has been recognized as fundamental to a number of psychological phenomena (Larky, 2005), and studied in sophisticated ways (Shepard, 1987). Considering that practically any organism capable of learning must be able to generalize its behavior to stimuli similar to those already encountered, it can be supposed that similarity was functional very early in evolution. From a phenomenological perspective, association by similarity is a form of “operative intentionality.” (Merleau-Ponty, 2010), indicating regulated ways in which experiences are connected so as to make our coherent experience of the world, and any further higher-order cognition possible. In general, association by similarity designates the process by which a present experience or cognitive event is connected to a similar past experience, reactivating or re-enacting the content of the past experience. For example, I am used to responding to specific stimuli in a specific way; thus, when I encounter a new similar stimulus, a specific motor response is facilitated (Dreyfus, 1999). From a cognitivist perspective, similarity can be defined as the process by which bits of information tend to activate wholes in which they are normally integrated. For instance, in Hebbian learning models of perception, bits of information that are activated together become associated to constitute a complex object representation. Hence, a novel activation of an information bit due to sensory input facilitates the activation of the associated bits that complete the representation of the object, making object recognition possible. In developmental studies, the habituation procedure relies precisely on the relation of similarity between present and past (harmless) stimuli(Van Heteren et al., 2000). Neonates show preference for familiar stimuli, i.e., stimuli similar to experiences had before birth, Indeed, theories of perception in philosophy and cognitive science acknowledge that present stimuli are apprehended in light of past perceptual experiences that presented commonalities with the current stimuli(Sommerville and Woodward, 2005), in the domains of audition, taste, and smell (Hepper, 2015). Importantly, similarity is context-dependent and, in each case, it must be specified what features of the stimulus are relevant to the (action-oriented) experience of the subject (Decock and Douven, 2011). In the case of modeled actions in NI studies, the features of the stimulus that may be relevant to the functioning of similarity are action features that are habitually instantiated in the infant’s own behavior. Specifically, each model will present features that are routinely experienced in one of the infant’s behavioral stereotypies. The contrast between AST and AIM can be discussed by examining four crucial differences between AIM and Prinz’s (2005) ideomotor theory, of which AST is an application. First, as seen in Meltzoff and

Moore’s (1997), p. 180 and p. 186) diagrams, AIM posits no overlap between the perception and action systems; rather, it posits a “supramodal” system specifically evolved to make perception and action commensurable. In contrast, Prinz’s more parsimonious scheme (1997, p. 130) shows intrinsic overlap between perception and action. There is no perception of an action without the representation of its dynamic spatiotemporal features or of the final state achieved through it; in the same way, there is no action planning without representation of the action’s dynamic features and final state. Prinz’s (1997, 2005, p. 144) hypothesis is that the very same resources employed in perception to represent specific action features are employed in action planning to represent the same action features. The strength by which a specific perception induces a specific action depends “on the degree of similarity, or [representational] overlap” between them. Second, in AIM, the imitative response is actively determined by the infant, who modifies its responses in light of its goal. In contrast, in the ideomotor theory of imitation, action facilitation is determined passively by perceptual experience. In Prinz’s texts, perceptions “induce,” “modulate,” “suggest,” “facilitate,” “awaken,” “elicit,” or “prime,” corresponding actions. The perceptual system may even be said to “seduce” the action system. All these expressions denote passivity. Indeed, according to the ideomotor principle, if the “idea” of an action comes to mind it will tend to bring about the action (actually bringing it about if antagonistic tendencies are inhibited). Now, the “idea” of an action, i.e., its “representation” or “action plan,” can be awakened by perceiving the action. Thus, insofar as perception evokes the representation of an action, perception tends to induce that action. For this reason, Prinz (2002) states: “action imitation is therefore a natural by-product of action perception.” Certainly, passive induction presupposes activity, both in general ideomotor theory (which assumes a motor repertoire sufficiently exercised) and AST (according to which NI experiments take advantage of infant spontaneous and habitual action execution). Nonetheless, which action is facilitated over others is a passive effect of perception. In short, while the crux of the AIM hypothesis is “the active nature of the matching process”( Meltzoff and Moore, 1997), ideomotor theory and AST propose passive similarity-based induction. Third, as noted above, it is essential to AIM that representations of visually specified and proprioceptively specified action features be two “separate” inputs of the comparison computation. In contrast, Prinz’s claim is that “identical representational structures are involved in the perceiving and the performing of actions.” (Prinz 2002) and that, when these structures are activated in perception, they tend to awaken the action plans in which they are habitually integrated. No comparison computation is required for imitation. As a consequence, there is no psychological act having similarity or dissimilarity as its content (“that seen event is like this felt event”). For ideomotor theory, “recognition of similarity” is not necessary for imitation. If it were, action imitation would not be “the natural byproduct of action perception,” but rather the achievement of a mechanism to be added to perception, i.e., the mechanism for comparison/similarity recognition.

Obviously, ideomotor theory assumes a “functional role” of similarity (Prinz, 2002), but this does not imply positing that similarity is the object of a mental act. Similarity merely regulates how specific perceptions facilitate specific actions. Fourth, for AIM, imitation is underlain by a specialized mechanism specifically evolved for social and socio-cognitive functions. (In contrast, Prinz (1997) provides evidence for) In addition to the textual evidence provided in Section “Active Intermodal Matching,” we should mention that this is how AIM is usually understood (Heyes and Ray, 2004) the functioning of similarity in simple perceptionaction tasks outside the social domain. Hence, Massen and Prinz, insist that “imitation is not based upon special purpose mechanisms, but, rather, relies on the general organization of learning and action control.” (Massen and Prinz,2009).

## D. Conclusion

Among the proposed theories one can assemble fragments of theories and bits of information which together can produce the big picture of the imitation system as we note in the initial definition of the system found in the present study.

It is possible to gather particles of knowledge from other fields of research and follow the results at the interpersonal level and in particular at the research level of social psychology. In addition, the aim of this study was to deepen the understanding of the initial learning created in early childhood which is goalorientated. The idea is that if we do have an implicit imitation ability then we will be able to recognize it from an early age. We will be able to identify such an imitation system through the knowledge we possess of the search system and its sources in the depths of the brain. This system operates at the lowest level of consciousness known to us (Merker, 2007) will then be found in infant studies. We will expect to discover it in places of consciousness formation. As said in chapter five of the present research work, we will try to produce observational scientific research in infants. We'll be looking for brain-damaged, anencephalic babies. As we progress, we will discover ways of measurement, through which we will try to prove the location of the search system and its inquisitive exploratory role, and that which allows us to carry out the initial, implicit, impulsive, assimilative and physiological imitation.

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**תקציר**

מחקר רב ומקיף נערך במאה הקודמת בנושא החיקוי. חלק גדול מהמחקר הזה התמקד בתפיסת החיקוי כרפלקס פרימיטיבי, המופיע מיידית לאחר הלידה ונעלם מעט זמן מאוחר יותר. המחקר הנוכחי יתמקד במכניזם ובתהליך החיקוי, אשר יוגדר כאן כמנגנון ראשוני בהתפתחות. משמעותו של הבדל סמנטי זה הוא משמעותו שהמכניזם הזה – אשר מופיע מוקדם עם הלידה – יופיע בהמשך החיים למטרות, ולתפקודים שונים שיפורטו בעבודת המחקר הנוכחית.

מחקר זה יעסוק במכניזם של החיקוי, המופיע בגיל הינקות ובחיי העובר. יש המשכיות של התפקודים הנוירונאליים בהתפתחות האינסטינקטים בין החיים העובריים לחיים לאחר הלידה, ואלה תומכים במה שייקרא זיכרון גנטי. רפלקסים ראשוניים מצויים ב-shut up במהלך ההיריון ומתגלים מיידית אצל פגים. העובר גדל ברחם אימו עם האינסטינקטים הקוגניטליים, ובמחקר זה אנחנו נקרא לרחם סביבה אבולוציונית. התיזה המולטי דיציפלינארית הנוכחית תבדוק מספר אספקטים תיאורטיים של המכניזם של החיקוי. היא תדבר על אספקטים פילוסופיים, אבולוציוניים, אפיגנטיים, על תופעות פיזיקאליות ופיזיות. היא תחקור את האספקטים הקליניים ולבסוף היא תדון במחקרים נוספים המתווכחים עם עמדתה ואף יוצע מחקר עתידי.

"עקבות זיכרון" פותחות את הדרך לאסוף ולהשאיל מבנים מהעולם שמשמשים לבניה של מודלים פנימיים. שבע מערכות הרגש שהתגלו ע"י יאק פאנקספפ, מייצרות ניבויים במטרה להשיג את מטרותיהן. המוח הוא מערכת ניבואיית, מטרתה להגיע להומיאוסטאזיס. אך, החיים מלאים הפתעות, כך שמה שאנחנו מנבאים לא תמיד ישיג את מטרתו. כאשר איננו משיגים את מטרתנו, אנחנו עלולים להרגיש את הכאב הרגשי הנובע מחוסר סיפוק הצרכים הרגשיים שלנו, כאב רגשי זה נקרא בשפה הפיזיקאלית שעליה נתמך מחקר זה, אנרגיה חופשית. טעויות מדידה, כלומר אנרגיה חופשית חייבות להיקשר על מנת להגיע ל"דיוק"precision) ) למודעות. במטרה להגיע ל"דיוק", אנחנו נדרשים לעשות"working through" זהו התיאור הפיזיקאלי (פריסטון) לתיאור המתרחש בקליניקה הפסיכולוגית/הפסיכואנליטית. המחקר הנוכחי יצביע על היווצרות מבנים המושאלים, מבנים אלו נעים באופן חזרתי אל מהלך הדיוק. מהלך זה מתרחש מתוך חיקוי המבנים המצויים בעולם. מבנים אלה נקלטים באופן לא דקלרטיבי (לא מודע), והם מתנהלים באופן חזרתי, עד שנאספים אל ההומיאוסטאזיס.

מערכת הרגש המוחית הקשורה לחיקוי, קרויה SEEKING. זוהי מערכת המחפשת חדשנות. מערכת זו מתבוננת במבנים המוכרים, וחוזרת ובודקת אותם שוב ושוב עד שהיא מצליחה לייצר קונספט חדש ויצירתי, אשר יהווה בהמשך את המצב ההומיאוסטאטי הבא. המכניזם של החיקוי מצוי בתחילת ההתפתחות הוא אבולוציוני ואוטומטי. המכניזם הזה לא קיבל את תשומת הלב המתאימה. הוא הבסיס של הדחף, ההתפתחות, הלמידה והיצירה של החיים המנטאליים. המכניזם הזה מופיע אצל היונקים, ובבני אדם החל מהשעות הראשונות לאחר הלידה. הוא אבולוציוני, אימפליציטי וחזרתי. היחס כלפיו היה קשור בדהואלואציה בעת שהתייחסו אליו כמו אל העתקה, ועבר אל הערכת יתר ע"י פרויד כשהתייחס אליו כמנגנון מסוכן המשמש רק בידי מנהיגים כריזמטיים (תרבות ללא נחת). הוא עובד מהר, כך טען, ובמובן זה, הוא סוגסטיבי. פרויד ראה את מנגנון החיקוי כמסוכן לאנושות, בגלל הנטייה של ההמונים ללכת באופן עיוור אחרי המנהיגים הכריזמטיים שלהם. בולדווין, בן זמנו, טען שהמנגנון הזה משפיע על החושים ובין החושים, ואילו יאק פאנקספפ אמר, שהעובדה שמנגנון החיקוי מופעל כתגובה לגרייה מאד קרובה לגוף שלנו, מצביע על סוג של אינטגרציה פנימית של מערכות החושים שלנו. זאץ באמצעות המכניזמים הרגשיים החשובים ביותר להישרדות.

המחקר הנוכחי יצביע על האספקטים האבולוציוניים של המנגנון; יראה מהו השפעתו על ההתפתחות הנוירולוגית של הדחפים, הוא יבהיר כיצד הוא חלק ממערכת הרגש המוחית הקרויה "חיפוש", מערכת רגשית ראשונית החשובה להישרדות מחפשת חדשנות כפי שהוגדרה ע"י יאק פאנקספפ; הוא יצביע על ה-sine qua non של היצירתיות מכיוון שהכל נוצר יש מיש, ולא מתקיים יש מאין. קבלה והיכרות עם המוח העוברי והינקותי פותחת אפשרות להבין את הרפלקסים הראשוניים אשר בטעות הוגדרו ע"י שרינגטון כפרימיטיביים. זו הייתה טעות סמנטית שהותירה את החשיבות והמשמעות של מכניזם זה אשר מהווה מנגנון ראשוני ללמידה, המאפשר לפתוח מסלולי ם לאימוץ מבנים מהעולם, ומנעה את האפשרות לתת לו משמעות וחשיבות.

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עבודה זו הונחתה בהדרכתו של **פרופ' ענר גוברין** מהיחידה ללימודים בין תחומיים, התכנית ללימודי פרשנות ותרבות באוניברסיטת בר-אילן. מנחה נוסף של העבודה הנוכחית הוא **פרופ' מארק סולמס** מהאוניברסיטה בקייפטאון, ומבית החולים גרוטשור, במחלקה לפסיכולוגיה ולנוירולוגיה.

**מכניזם החיקוי, מכניזם טרנספורמטיבי**

**מהכאוס אל המבנה, אל חופש הבחירה והיצירתיות**

**נקודת מבט נוירופסיכואנליטית**

**אירית רווה-ברזל**

**היחידה ללימודים בין תחומיים**

**התכנית ללימודי פרשנות ותרבות**

**עבודה לשם קבלת תואר דוקטור בפילוסופיה**

**מוגשת לסנאט של האוניברסיטה בבר אילן**

**רמת- גן טבת, התשפ"ג**

1. Thought and Reality: “While one is perceiving W, one copies the movements oneself; that is to say, one innervates one’s own motor image (which has been aroused to coincide with the perception) so strongly that one actually performs the movement. Thus, one can speak of a perception as having an “imitative value”.pp395 [↑](#footnote-ref-2)
2. Definition of ORGANELLE: a specialized cellular part (such as a mitochondrion, chloroplast, or nucleus) that has a specific function and is considered analogous to an [org](https://www.merriam-webster.com/dictionary/organ)an [↑](#footnote-ref-3)
3. These behavioral changes are associated with epigenetic changes in the hippocampus (methylation of genes involved with hormone signaling and changes in the chromatin structure around neuronal growth factor genes). Pharmacological manipulations show a causal relationship

   [↑](#footnote-ref-4)
4. **Substance P** (SP) is an undecapeptide (a peptide composed of a chain of 11 amino acid residues) member of the tachykinin neuropeptide family. It is a neuropeptide, acting as a neurotransmitter and as a neuromodulator. [↑](#footnote-ref-5)