

Study on General Neurolinguistics and the Comprehension Ability

## **Study on General Neurolinguistics and the Comprehension Ability**

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**Abstract:** *General Neurolinguistics* is meant to correspond to the major revision of *General Semantics* that Alfred Korzybski mentioned on numerous occasions as most likely to occur within 25 years of his passing away (1950), and that naturally emerges from it when the mental barrier due to the unwarranted certainty that physical reality cannot be confirmed with certainty and cannot be objectively understood is removed. Interestingly, the analysis leading to this particular revision began to be carried out in the 1970's, that is, within the time frame that Korzybski expected, even though it could be fully documented and related to the complete set of required formal references only much later, due to the time that was required to identify, locate and correlate every major element of the solution that led to the present synthesis. Summary description of General Neurolinguistics followed by summary description of General Semantics that it is meant to enhance. Summary analysis of the influence of the motivation in individuals, driven by their feelings of insecurity and the extent of their personal general knowledge bases in the establishment of social structures throughout history. Summary analysis of the causes of the historical resistance of the academic community to the introduction of new grounding paradigms that could have been beneficial to society. Identification of the relation between the extent of the general knowledge base of individuals and the extent of their resulting level of social awareness. Summary overview of the comprehension process and of the properties of the neocortex, whose coordinated use favors the acquisition of objective knowledge.

**Keywords:** General Semantics, neocortex, brain, conceptual thinking, objective reality.

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The full text of the published chapter is now integrated in final version as **Chapter 1** of the monograph

**"General Neurolinguistics"**

**Other articles in the same project:**

**[INDEX –General Neurolinguistics - Conceptual Thinking](#)**

Here is the text of the 2021 article (**Chapter 1** of 2022):

## 1. GENERAL NEUROLINGUISTICS

### 1.1. Introduction

The object of *General Neurolinguistics* is the description of the manner in which the properties of the multilayer neural network of the verbal areas of the human neocortex, which are the seat of conceptual thinking, allow an optimal structuring and use of these areas, which can lead to an objective understanding of physical reality.

The following question now comes to mind: Do these verbal areas naturally structure optimally for each human being?

The answer is no.

Despite the fact that all human beings naturally have the potential to fully develop all of their verbal abilities, only a handful of humans can be traced to have had such luck during the known history of mankind, such as da Vinci, Newton, Einstein and a few others who are known to have made major discoveries about the laws of nature, and this only by sheer chance, because such optimal structuring always required unique and seldom encountered combinations of favorable family and social circumstances.

The reason why this combination of favorable circumstances has seldom been encountered lies in the sheer immensity of the intellectual potential of human beings. This potential is so enormous that even the most complex situations and problems of everyday life cause this potential to develop and be exercised only at relatively low levels.

Rather early in life, based on the manner in which an individual confronts most issues of everyday life according to his own experience, and according to opinions, authoritative or not, that he or she accepts from others, each individual eventually becomes convinced that his true full intellectual potential has been reached, whatever level he objectively reached, and will then close his mind to any idea that his true full potential may not have been reached yet. Strangely, the more educated an individual becomes, the deeper this certainty will tend to become. This is why so few individuals succeed in overcoming this self-induced barrier.

Such certainties became yet more deeply entrenched after the introduction of intelligence quotient (IQ) testing in 1905 by Alfred Binet and Theodore Simon [1], that were initially meant to identify children displaying learning disabilities in class. Their pioneering work was then standardized by Lewis Terman in 1915 [2] to unforgivingly categorize all children on a scale (the Stanford-Binet scale) on which a score of 100 signalled average intelligence, coinciding with the summit of the well known bell-shaped curve, about which value most people generally scored, with those scoring below 70 being considered supposedly mentally defective (about 3% of the population) and those scoring above 130 (also about 3%) supposedly being gifted).

It is observed however that when individuals are retested later in life, variations may be considerable, sometimes involving increases or decreases in the order of 50 points on the IQ scale. Then, to the extent that IQ tests are expected to measure intelligence, they appear to indicate that the intelligence level can vary widely during an individual's life, sometimes for the better, sometimes for the worse – more on this issue in **Section 1.11**. Although this is well known in the specialized community, the general population, and especially adolescents who are being tested at a time in their lives when they are particularly vulnerable to this type of information, seem hopelessly unaware of this fact.

A study carried out in 1962 by Jacob W. Getzels and Philip W. Jackson from the *University of Chicago* [3] is particularly revealing as to the objective value of IQ testing. One of their experiments involved two groups of teenagers, one involving individuals in the top

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20% in creativity but below that level on an IQ basis; the other group involving individuals in the top 20% on an IQ basis but below it in creativity. During a comparative study of both groups, the results showed a very low correlation level between creativity and high IQ. They also came up with a result that appeared startling to most: despite the fact that the creative group's average IQ was 23 points lower than that of the other group, *the scholastic performances of both groups were about equal.*

Interestingly, most individuals reading texts on this issue *know with deep certainty* that they belong to the very few who did not let such a barrier hinder their intellectual development!... But in reality, particularly in the more highly educated segment of the population, most have no idea how much more clearly they could think and understand all issues; and there seems to be no way to cause them to reconsider. Such an unhindered development of the intellectual potential of the largest possible number of individuals is however required for the wider ranging problems now confronting humanity to be correctly apprehended and resolved. See **Section 1.10.**

The question then becomes: *Is it possible for a person to reverse this certainty that his maximum intellectual potential has been reached, so that his or her progression towards optimal use of this full potential can resume?* A clear indication of the difficulties involved in achieving such a reversal is given by this quote from Alexis Carrel, once this certainty is established:

*"Pour grandir de nouveau, l'Homme est obligé de se refaire, et il ne peut se refaire sans douleur, car il est à la fois le marbre et le sculpteur."*

*Alexis Carrel, 1950 ([4], p. 163)*

*"To grow again, Man has to remake himself, and he cannot remake himself without pain, for he is both the marble and the sculptor."*

But, given that the neocortex is the most powerful multilayer neural network in existence, now that the structuring process of the verbal areas of the neocortex and that the automatic processing properties of multilayer neural networks are understood, it becomes possible to purposefully educate children in due time to prevent this feeling of certainty about any expected limit of their intellectual potential from setting in, that hinders the process towards optimal development.

It is effectively observed that the extent of the period after birth during which it is easy for the complete construction of the proper neural structures to be accomplished in the verbal areas is limited to a period of approximately 7 years:

*"Passé l'âge normal du développement des centres du langage, cet apprentissage deviendra difficile."*

*La loi fondamentale du développement cérébral, c'est-à-dire la possibilité de posséder plus tard un cerveau tout à fait normal, jouissant de toutes les aptitudes humaines, exige que la maturation cérébrale trouve toujours le milieu non seulement physique, mais culturel et affectif qui la favorise. On ne peut rien trop tôt, mais très vite, il est trop tard."*

*Paul Chauchard, 1960 ([5], p. 52)*

*"Once the normal age for the development of the verbal areas is passed, such training will become difficult."*

*The fundamental law of cerebral development, that is, the possibility of possessing later a completely normal brain, endowed with all of the human aptitudes, requires that cerebral maturation always takes place in an environment, not only physical, but cultural and affective, that will favor it. Nothing can be done too soon, but soon, it is too late."*

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Chauchard also discovered that there is a direct relation between the density of the synaptic interconnected network being established in the verbal areas of the neocortex before the age of 7 and the level of intelligence reached by children [5] – a density which is considerably increased for children who learn a second or multiple languages during childhood.

Actually, in addition to the infrastructure of interconnections put in place in the verbal areas by the mother tongue, each additional language establishes, in relation to the depth to which it will be learned, and intimately interconnected with the mother tongue, a new and autonomous network of synaptic links that allows examination of the perceptions of the senses and of the personal model of reality from the different perspective provided by this other language.

Since each language sheds its own particular light on potentially the whole range of the various aspects of reality, each of them could be the source of great discoveries in fields in which they have their strengths. Therefore, it appears interesting and constructive for every human being to learn more than one language. Indeed, it appears that more than half of the world population is at least bilingual, as revealed in a deep study carried out by Franco Fabbro, specifically on bilingual patients affected by aphasia originating from pathologies in the Broca and Wernicke areas (see **Section 3.4.3**), that increased considerably our knowledge of the manner in which the autonomous synaptic infrastructures of two different languages interconnect in the verbal areas [6].

The enrichment of the synaptic structures of the verbal areas of multilingual individuals is therefore extensive. The more languages an individual masters, the richer and denser will the composite infrastructure of interconnections become, and the more easily will this individual become able to explore reality. Alfred Korzybski, for example, who so profoundly explored the existing connections between language and objective reality, learned Polish, Russian, French and German to fluency as a child, and then English later. In fact most of the major discoverers of the past were multilingual.

However, a favorable complementary environment is mandatory for the complete intellectual awakening of all of the child's verbal skills to take place in due time. The first step of this optimal awakening involves their learning to read to the level of autonomy before the age of 7, because if this learning is not completed by that time, it will become more difficult to complete and less structuring afterwards, due to the completion of the process of myelination of the verbal areas of the brain, a process which is genetically delayed for all children until this approximate age of 7 years of age [7], leaving only the previous 7 years available for easy learning of all aspects of the language.

Field observations confirmed by numerous researchers show besides that the benefits are optimal when children learn to read at the same time as they learn to speak. It is consistently observed that children can easily start learning to read by the age of 3 and even earlier [8] [9] [10] [11].

But before delving deeper into what is now understood about the relation between the structuring of the verbal areas and the establishment of this limiting impression of certainty that Korzybski was attempting to address, let's take a closer look at the most comprehensive attempt to resolve this issue that was made in the first half of the 20th century.

### 1.2. General Semantics

About 100 years ago, Alfred Korzybski attempted to break through the *wall of certainty* of the scientific and intellectual elite of his time, that he had identified as what was slowing down the progress of humanity towards what he perceived as its maturity [12] [13].

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In 1920, he published the first book in his General Semantics project, titled *Manhood of Humanity* [12], the first of two books in which he identified the problem and proposed an approach meant to progressively move society in a direction more conducive to the optimal development of people's understanding ability and to better comprehension of physical reality.

According to his analysis, people have a general tendency to associate to the names that they give to any object, process, event, etc, that they become aware of, a too restricted set of characteristics, which he identified as what often leads to misconceptions about physical reality, leading to detrimental ill-adapted decisions; a state that he illustrated by comparing what each individual perceives of physical reality, to a personal map of a country, that was likely to be more or less detailed depending on the care taken by the individual to observe the real country, so to speak; a map that was likely to severely mislead the individual if he was not careful to correctly apprehend what he was observing, which is at the origin of the dictum that he is remembered for: *The map is not the territory*, and was proposing a method (see **Section 3.13**) to overcome this tendency, that he perceived as a bad habit leading to decisions detrimental to the individual involved and to society itself when this condition affects decision-makers.

As mentioned in the *Preface* of the Fourth Edition of *Science & Sanity* [13], his second book, initially published in 1933 and republished in 1958, Korzybski was perfectly aware that the method that he was proposing to reach this goal was perhaps not optimal and could become the object of significant improvements within an undefined span of time, but the benefits of the problem resolution method that he was proposing can hardly be questioned (see **Section 3.13**).

It had also become clear to him that the human tendency to become certain of the validity of conclusions to the point of systematically resisting reconsideration was unduly delaying, and at times preventing, the introduction of new valuable ideas while preventing the eradication of damaging ideas ([12], p. 93). See **Section 1.10** on this issue.

He was keenly aware that this intellectual opposition to any suggestion of improvement underlied the orientation of social structures in directions in which the egocentrism of individuals and the tendency of groups to first serve their own interests becomes the norm and even end up eliciting respect! The study of anthropologist François Dumont [14] published in 1997 demonstrates unequivocally that nothing has changed in this regard.

At the beginning of the 1940's, after 20 years of futile attempts at sensitizing the specialized community to his approach, he fully realized that despite some progress, his ideas were not really spreading and his writings during the 10 year period before his sudden death in 1950, clearly show how acutely he was losing patience and becoming bitter towards the specialized community.

All the more so since he perfectly understood that the only hurdle preventing further spreading of his solution was in reality precisely the apparently unbreachable wall of certainties that he was attempting render the elite aware of, and that also was exhaustively explored in a sociological study carried out in the second half of 1990's, titled *Our Bankrupt Elite* [15], and in *Part 2* of a popularization work titled *A Future as an Heirloom* ([16], Chapter *The Major Handicap of 'Certainty'*), a wall of certainties that was all the more difficult to breach that its maintenance seemed to be what was protecting all self-serving interests from being challenged.

### 1.3. Egocentrism versus Altruism

Let us first address the issue of egocentrism, which indirectly leads members of social groups to first prioritize the interests of the group, which, unexpectedly, can be related to the genetically programmed self-protection reflex of individuals who feel insecure in relation to their social environment.

Absolute egocentrism is completely normal and healthy in children because it is this genetically programmed reflex that helps insure their survival during this initial period of their lives during which they are so vulnerable, and is critically important to the acquisition of the first rudiments of logical reasoning during the first years after birth as put in perspective in **Chapter 3** [17]. But a tendency towards altruism is also observed to develop as children gain a certain level of control over their environment, as analyzed in the same Chapter.

But it can also be observed that egocentrism does not diminish much in a large number of individuals once adulthood is achieved, that is, after individuals supposedly have become much less vulnerable in dealing with their environment, which reveals that a rather high level of personal insecurity is still felt by these individuals once adulthood has been reached.

In fact, altruism seems not to be very popular in our days:

*“L'avènement des grandes religions monothéistes a coïncidé avec l'enseignement du comportement altruiste et, malgré les nombreuses atteintes et agressions qu'il a subies, c'est toujours sur ce comportement que se fonde notre société moderne. Malheureusement, l'altruisme n'est pas très vendeur auprès des médias ! Mère Theresa, à Calcutta, reste pourtant une figure emblématique... L'orthodoxie matérialiste est profondément ancrée chez les scientifiques comme les philosophes et défend ses articles de foi avec un pharisaïsme rarement égalé, même aux jours anciens du dogmatisme religieux.”* [18].

Sir John C. Eccles, 1989

*“The coming of the great monotheistic religions coincided with the teaching of altruistic behavior and, in spite of the numerous breaches and aggressions that it suffered, it still is on this behavior that our modern society is founded. Unfortunately, altruism doesn't sell very well with the media! Mother Theresa, in Calcutta, remains however an emblematic figure ... Materialistic orthodoxy is deeply rooted in scientists and philosophers alike and defends its articles of faith with a seldom equalled phariseeism, even in the ancient days of religious dogmatism.”*

It can also be observed how extensively the media is part of the problem, which effectively confirms John Eccles' observations ([15] Chapters Code of social behavior and Children growing up in unfavourable family circles).

Egocentrism and altruism are traditionally perceived as colored by moral considerations, which give egocentrism a negative connotation, whereas altruism is perceived in a rather favorable light.

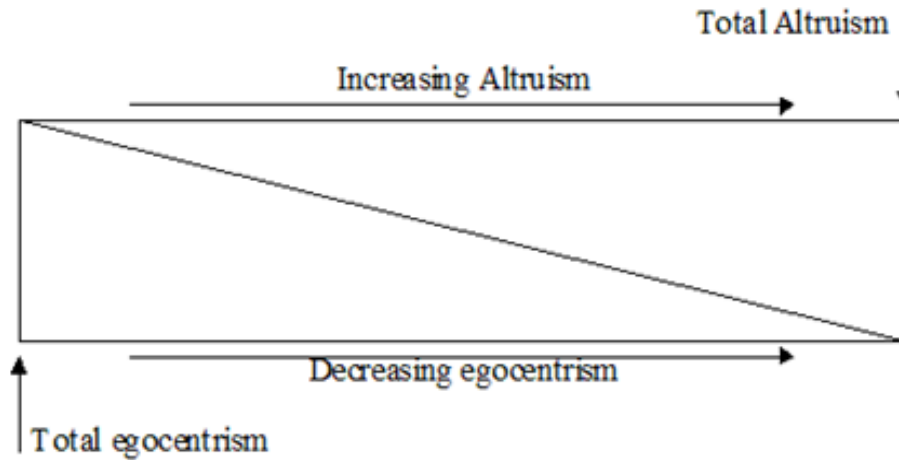
Leaving aside these moral considerations, egocentrism then resolves to a tendency of individuals to take actions meant to maintain or increase their own personal well being or feeling of security. Conversely, altruism would then resolves to a tendency of individuals to take actions meant to maintain or increase the well being or security of one or more persons other than themselves.

Ultimately, in some cases, we pose our actions exclusively for our own well being or security. Ultimately again, in other cases, we pose certain acts for the well being or security of one or more other persons without taking our own well being or security into account. In



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general, however, we include ourselves in the circle of people for whom we pose our actions. Every person is the only judge of the deep motivations of each of his or her actions.



**Figure 1.1** The egocentrism-altruism scale.

This perspective now allows considering a scale, on which each action posed by an individual can be located, the two extreme ends of which are, on one side, absolute egocentrism and on the other side, absolute altruism.

Again, egocentrism is not taken here in any negative sense but rather literally, that is, qualifying an action that one of the motives for is a contribution to the well being or security of the individual who poses the action, without reference to moral considerations. Conversely, altruism is also taken in its literal sense, that is, qualifying an action that one of the motives for is a contribution to the well being or security of individuals other than themselves, without reference to moral considerations.

Since any action can be motivated by more than one reason, it is perfectly reasonable to think that egocentric as well as altruistic considerations can be at play in justifying any given action, so that the two notions are not necessarily opposed to each other. In fact, they are complementary and contribute jointly to the survival of the species, as we shall see.

### **1.4. The Origins of Egocentrism and Altruism**

In the earliest single-celled life forms on Earth, the genetically programmed self-preservation responses of each individual was sufficient to ensure the survival of the species. Since the reproductive mode by cell division of these species generated an astronomical number of individuals when conditions were favorable, this number alone was itself a good insurance against the accidental extinction of these species.

As time went by, more complex species appeared, until came into being species whose offsprings required some maturation time before reaching the full survival potential of the adults, due to their higher levels of biological complexity. To the genetic code was then added an additional set of conditioned reflexes leading the progenitors of these species to also protect their offspring during this period of vulnerability.

For sexuated species in which one of the progenitors was vulnerable during the early stages of the offspring's life, the genetic code was modified so that the progenitor of the other sex also protected the then vulnerable co-progenitor.

During this growth period, the offsprings are naturally more vulnerable to attacks from predators. The species whose adults took up the task of protecting the young during this

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period increased the chances of survival of those young and by repercussion, increased the chances of survival of the whole species.

Eventually, species living in extended family groups, packs or herds appeared in which each member, if not personally threatened by danger, tended to show behavior that favors the survival of the whole group, such as warning yells, tight grouping around the young, etc...

The reactions stemming from pure individual self-preservation instinct without considerations for the survival of other members of gregarious species tend to take precedence in members of these species only when the individual is directly threatened by a predator or other danger.

Also, within these gregarious species, each family, pack, etc. tends to protect a certain territory against incursions from members of other families, herds, etc. of the same species when the individuals perceive that this territory that they perceive as being their vital space is threatened.

Being the ultimate end product of the process of evolution of species on the Earth, there is no doubt that as a gregarious species ourselves, we have inherited these genetically programmed instinctive behavioral traits.

Always careful to clearly mark the distinction between us and the inferior species, humans gave special names to those instinctive behavioral traits when they apply to themselves, irrespective of the fact that they are genetically programmed to insure the survival of the species as well as that of the individual.

So, humans named *altruism* the instinctive manifestations of self preservation when they ultimately benefit the group and *egocentrism* the same instinctive manifestations when they ultimately tend to benefit only the individual himself without consideration for the consequences for other humans; which ended up tainting with totally undeserved negative moral characteristics the perfectly natural instinctive protective reactions of the individual due to personal insecurity feeling automatically triggered by the amygdala by any level of personal threat perceived in the social environment, now attached to the term *egocentrism*, and with positive characteristics the also perfectly natural instinctive protective reactions of the individual towards his family unit or extended group also automatically triggered by the amygdala for the same reason, now attached to the term *altruism*.

If we consider that in species biologically close to ours, when the individual does not feel a threat to himself, his protective behavior seem to naturally operate to the benefit of the group, we could expect that the same pattern will be present in humans.

What could then explain that so many manifestations of non-productive egocentrism of all sorts are to be deplored in our species? In the reference frame that we are considering, we easily draw the conclusion that it would be because the individuals concerned feel a certain level of insecurity, and perceive themselves as being threatened in some way. Conversely, there is no doubt that the same pattern also applies between families, groups of all kinds, nations, etc...

Indeed, the more a person will feel powerless to correctly insure his or her own survival and by extension, that of his or her immediate family, if any, the more it will be instinctively difficult for this person to consider actions other than those required to ensure improvement of his or her immediate conditions of living, since these self-protection reactions are genetically determined to be triggered automatically whenever the individual feels threatened in any way, or feels that his family is threatened, without being able to control its manifestation, except in retrospect, as in the case of the genetically programmed *flight-or-fight* reaction in case of mortal personal danger. See **Sections 2.2** and **2.7** on this issue.



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If this tendency persists in persons that apparently succeed in having proper living conditions, this feeling of insecurity will naturally orient them towards constituting the thickest cushion possible between themselves and what they perceive as potentially difficult personal living conditions.

It would therefore generally be sufficient to find some means to decrease the social irritants of all sorts that cause individuals to feel threatened, for their behavior to instinctively turn by default to actions beneficial to the group at large, which is the type of reaction genetically programmed in our genes to be manifested when no personal threat is perceived. Ultimately, such a reorientation should benefit humanity as a whole.

Now, as analyzed in **Chapter 3** [17], the more a child takes control of its immediate environment, the more it feels secure and self-confident, and the more it naturally turns towards others. However, given the moral considerations that are attached to the anthropocentric terms *egoism* and *altruism*, to qualify genetically programmed instinctive reactions meant to protect from harm the individual as well as the immediate family and larger groups of our species, these natural tendencies are seldom associated in people's mental processes to the fundamental conservation instincts of our species.

This could directly explain why many parents and social workers do not make the connection between the flight, violent reactions and antisocial behavior observed in many children, and also in many adults, and their genetically programmed self-protection reactions, and that these reactions can only be due to the fact that these children or adults feel threatened in some way in a family or social environment, that does not provide them with a sufficient sense of personal security, which automatically triggers these uncontrolled genetically programmed instinctive *flight-or-fight* reactions.

Now, this increase in self confidence, which is directly related to the impression of mastery of his environment that an individual may feel, is also directly related to the amount of information that he has become aware of regarding his environment. The more clearly a child understands his immediate environment, the more he will feel able of taking control of it, and finally, the more capable of surviving and prospering in it will he feel.

Better comprehension resulting in less efforts being spent to successfully insure his or her own welfare, the self confident individual will naturally tend to include other individuals or groups in the larger reference frame of all individuals the protection and well being of which he would be likely to contribute.

This impression of mastery of his or her environment is, however, totally subjective and each individual is subject to potentially gross miscalculations in his or her evaluation of his or her own level of mastery either through underestimation or overestimation.

We often witness cases in which an individual was, for example, certain that his job was secured for life and who suddenly finds himself unemployed, practically without hope of finding another job. Haven't we here a typical case of overestimation?

Or, at the complete opposite, we also see cases of extreme undervaluation in which people possess immense wealth, but feel so insecure that they continue to rake material wealth in, without regard for the potentially negative consequences of their pursuit on people who might be the instruments of their enrichment or who might be the direct or indirect victims of it.

The position that any individual thinks he occupies on the egocentrism/altruism scale (**Figure 1.1**) is strictly dependent on *his subjective perception* of his own degree of security. The quality of his actions in the reference frame of society however is completely dependent on his ability to evaluate situations with respect to *the objective position* that he really occupies on the scale.

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Everyone must, of course, attempt to match his feeling of mastery over his environment with reality, that is, with the real extent of the information base that he possesses regarding reality. Interestingly, such an adjustment tends to occur almost automatically when an individual voluntarily undertakes to increase his information base.

So, the degree to which an individual really becomes aware of his real position on the scale, paradoxically depends on the real extent of his information base, and it is here that things become complex, because if his or her information base is too restricted, the conclusions drawn, in conjunction with the illusory feeling of certainty of having drawn the *correct* conclusion, will almost guarantee that the individual will considerably overestimate the extent of that base. This is why it is imperative to keep at least a modicum of doubt regarding the accuracy of our conclusions.

In short, the subjective perception of the position that he occupies on this scale colors the decisions of the individual. But these decisions are necessarily taken according to the real information base which is available to him or her, whether this base is completely true to objective reality, or possibly only partially so, unbeknownst to the individual if he or she did not systematically proceed to the validation of all elements of this knowledge base. If this perception changes, the coloration associated to this new position will modify accordingly his or her future decisions and may even result in the person possibly reconsidering past decisions made according to the former position if their implications turn out not to be conform to the new perspective.

It was observed that a tendency to drift towards the *altruism* end of the scale is typically the telltale indication that a stronger feeling of personal security is setting in on the way to full maturity, whereas a tendency for it to remain close to the *egocentrism* end of the scale, reflects rather, insecurity or immaturity.

Altruism grounded on the assessment of an information base sufficiently widespread can be considered more objective by contrast with altruism by personal conviction or by principle which is often encountered, but which is by no means to be considered of a lesser value however, for the survival of the human species.

It can be observed that for the majority of adults, this location on the egocentrism/altruism scale progressively tends to stabilize somewhere in the central area of the scale, where an equilibrium of motivations can be found which is not conducive to generate conflicts or inconveniences for others.

The most revealing indicator of this state of fact is the enormous generosity that the general population of all peoples demonstrates when the time comes to help those who have been deprived of everything on account of natural catastrophes, almost always for perfect strangers, and often for people who live in other countries.

General populations therefore demonstrate a general and natural tendency to help other populations when one of them experiences sudden difficulties out of the ordinary. That is, *the clear manifestation of a genetically programmed instinctive reaction meant to insure the survival of the species when the survival of the individual is not threatened*. So, the tendency of motivation in adults to drift towards the central area of the scale is not likely to cause problems when the decisions of individuals affect only their immediate social environment.

The situation is quite different however, for members of the elite who are in positions of authority, because their decisions are likely to affect large segments of the population. Let us recall that we have observed that the narrowness of extent of the base of knowledge available to the members of our elite often leads to inappropriate and often damaging decisions despite an impression and a will to the contrary on the part of these decision makers [15].

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We have seen to what extent university education tends towards hyperspecialization, i.e. the transmission to individuals of extremely narrow but deep information bases, to the exclusion of broader but perhaps more general knowledge bases that are more likely to broaden the horizons of these individuals [15].

If we put in correlation the narrowness of the knowledge base that has been transmitted for decades now to the members of our elite, with the whole range of possible subjective overestimation that each individual subconsciously tends to make regarding his own degree of mastery over his environment, we come to understand much more clearly why so many damaging decisions have been made in all areas and in particular why our education system has degraded to such an extent [15] ([19], see **Chapter 5**) [20].

It becomes easy then to understand that each individual's education should optimally include a general information base as wide-ranging and generalized as possible, and this, irrespective of whether or not this individual then goes on to further specialize deeply in one or more fields that may be of interest to him or her.

Since a direct connection seems to exist between the extent of an individual's knowledge base, the degree of conformity with reality that he or she will be able to reach in his assessments and the degree of objective altruism that becomes accessible to him or her, it can be seen that the foundation of this whole process definitely is the extent of an individual's knowledge base. Consequently, it appears desirable to socially intervene at this level by insuring that as many individuals as possible acquire an as wide-ranging a general knowledge base as possible.

### 1.5. Sets of Values

*"I, as a man, exist not only as an individual creature, but I find myself a member of a great human community. I am really a man when my feelings, my thoughts and my actions have only one finality, that of the community and its progress."*

*Albert Einstein*

Numerous sets of ideal moral values have been proposed over the course of history by various philosophies and religions, and it is difficult not to perceive convergence between these various generalizing sets of principles.

Considering that evolution progressively oriented individuals of more and more advanced species towards actions that tended more and more to benefit wider and wider groups of their own species, wouldn't it appear that the ultimate accomplishment, for a species that sees itself as the ultimate end product of this evolution, should be to define and tend towards a set of moral values that would exclude none of its members?

Therefore, an orientation of social structures in directions that would be positive for all seems to depend on an adaptation of educational systems, to favor the development of social tendencies that would be in harmony with the genetically programmed reflexes of protection of the species, through the teaching of the broadest possible general knowledge base.

### 1.6. Korzybski's Approach

Korzybski's approach [13] was grounded on the idea that it is possible to train any human being to think optimally on account of the manner in which the brain records information.

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Contrary to what many seem to think in contemporary scientific circles, the functioning of the brain was already rather well understood in Europe in the 1920's and 1930's. Indeed, it is during this period of the 20<sup>th</sup> century that Pavlov understood that it was the use of articulated language that creates physical imprints that interconnect the various aspects of our sensory re-collections, each engram corresponding to a word, that interconnects as a single synaptic arborescence, all of the connections previously established between the synaptic imprints of the various engrams of the non-verbal memories associated to this word, and that constitute the coherent thought related to this word ([21], see **Chapter 2**).

In 1892 already, William James proposed a rather exact model of the manner in which the various aspects of our recollections could be mutually associated ([22], p. 149). On his part, not only was Korzybski convinced of the boundless intellectual potential of every human being, he was profoundly convinced of the boundless potential of the entire human race.

To explain this concept, he was metaphorically making a parallel between the growth of an individual and that of the human species. Just like a child goes through a stage of walking *on all four*, so to speak, prior to succeeding in standing up to walk upright, he considered that the human species currently was at the stage of *walking on all four*, and was proposing to educators an approach according to which an increase in the level of clarity with which individuals perceived reality, would eventually lead to the betterment of social structures, as the number of properly trained individuals reached some critical threshold.

*"All through history, Man has groped to find his place in the hierarchy of life, to discover, so to say, his role in the 'nature of things'. To this end, he must first discover himself and his 'essential nature' before he can fully realize himself – then perhaps our civilizations will pass, by peaceful evolution, from their childhood to the manhood of humanity."*

Alfred Korzybski, 1921 ([12], p. lv)

Korzybski was quite familiar with the work of Pavlov. In fact, he dedicated many chapters of his second book ([13], pp. 315-357) to correlate his own conclusions with Pavlov's discoveries. It seems however that he only had access to Anrep and Gantt's translations that were published in 1927 and 1928 in the United States [23] [24].

These translations however could not possibly mention discoveries that were made by Pavlov after they were published. So, it appears certain that Korzybski was not informed of the discoveries that Pavlov made during the last 7 years of his life ([25], pp. 391-392), that is, from 1929 to 1936, a period during which Pavlov understood and clearly described *the second signalization system*, that he related to the structures that learning an articulated language establishes in the neocortex, because he makes no reference to it in his second book despite his obvious interest for Pavlov's work and despite the fact that this discovery by Pavlov constitutes a glaring confirmation of his own conclusions:

*"Dem Tier wird die Wirklichkeit in den Großhirn-hemisphären fast ausnahmslos nur durch Reize und deren Spuren, die unmittelbar auf die speziellen Zellen der optischen, akustischen und anderen Rezeptoren des Organismus einwirken, signalisiert. Das ist das, was auch wir als Eindrücke, Empfindungen und Vorstellungen von unserer Umwelt vor uns haben, von der allgemeinen natürlichen wie von unserer sozialen Umwelt, ausgenommen nur das gesprochene und geschriebene Wort. Es ist das erste Signalsystem der Wirklichkeit, das wir mit den Tieren gemeinsam haben. Aber das Wort bildet ein zweites, speziell uns eigenes Signalsystem der Wirklichkeit; es ist das Signal der ersten Signale. Zahlreiche Wortreize haben uns einerseits von der Wirklichkeit entfernt, und wir müssen uns ständig dessen erinnern, um unser Verhältnis zur Wirklichkeit nicht zu verfälschen."*

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Ivan Pavlov, 1934 ([25], p. 183)

*"To the animal, reality is signalled in the cerebral hemispheres almost without exception only by stimuli and their traces, which act directly on the special cells of the optical, acoustic and other receptors of the organism. This is what we also have brought to us as impressions, sensations and perceptions of our environment, of the general natural environment as well as of our social environment, excluding only the spoken and written word. It is the first signalization system of reality that we have in common with animals. But the word forms a second signalization system of reality, specific to us; it is the signal of the first signal. Numerous word stimuli have distanced us from reality on the one hand, and we must constantly remember this in order not to distort our relationship to reality on the other hand."*

This last remark from Pavlov being exactly what Korzybski was attempting to make the elite of his time aware of. So, it turns out that Korzybski intuitively understood the understanding process as will be observed from the actualized description of the current understanding of the comprehension process presented in **Section 1.11**, which is related to the automatic correlation properties of multilayer neural networks, that Donald Hebb discovered only a few decades later, as he was analyzing the manner in which the neocortex processes sensory information by successive correlations [26]. See **Section 3.13**.

*"Human intellect, be it that of an individual or that of the race, forms conclusions which have to be often revised before they correspond approximately to facts. What we call progress consists in coordinating ideas with realities."*

Alfred Korzybski, 1921 ([12], p. 28)

### 1.7. Alfred Korzybski, 1921

Had he been aware of such a later confirmation, this might have allowed him to take another step forward in his understanding of the understanding process, this time by understanding how the engrams of the conclusions most often *visited* during the thinking processes end up being biologically reinforced to the point that individuals become unable to question them unless they are aware of this property of the conceptual thinking mechanics (see **Section 3.7**), which would have allowed him to understand why his attempts at convincing the contemporary specialized community were futile, and would have been more fruitful had he oriented his outreach efforts to the upcoming generation, which like all new generations throughout history, was still hungry for new knowledge, not yet having made up their minds as to what they would consider fundamental in the range of choices then available to them.

The same hurdle can also be observed to have been faced by Chauchard in his attempts at spreading Pavlov's discovery about the function of articulated language in conceptual thinking, due to his lack of knowledge of Korzybski's work and most importantly, of Donald Hebb's discovery of the manner in which multi-layer neural networks establish automatic correlations from simultaneously supplied input data sets, because it is precisely the simultaneous correlation of the conclusions of these four discoverers in light of the way that memories are stored in the neocortex that effectively allows this comprehension to be established [5] [13] [25] [26].

The most revealing clue that the discoveries of these four scientists have not been correlated in the scientific community is the fact that as late as the 1990's, Lothar Pickenhein, the only contemporary scientist who deemed Pavlov's research of the last 7 years of his life sufficiently important to be the object of a book, came to the conclusion that when Pavlov was using the expression *second signalization system*, he was using it as a mere synonym for

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the word *language*, without making the slightest allusion to the relationship between *articulated language* and *conceptual thinking* that Pavlov had established:

*"Doch der Begriff 'zweites Signalsystem', diese zweimalige Element-zu-Element-Projektion, wird in keiner Weise dem Wesen der Sprache als einer spezifischen, sozial bedingten Form der Umweltbeziehungen und der spezifischen Informationsverarbeitung im menschlichen Gehirn gerecht. N. A. Bernstein (1975) hat diese Formulierung Pawlows mit vollem Recht kritisiert. Diese falsche Begriffsbildung entwertet jedoch keineswegs die richtige Beobachtung Pawlows, daß die höhere Nerventätigkeit des Menschen eine neue Qualität besitzt und daß die psychischen Erscheinungen der Menschen über ein biotisches Substrat im Gehirn realisiert werden.*

*Pavlov hat den Begriff 'zweites Signalsystem' erst im Alter von über 80 Jahren geprägt und angewandt. Für ihn war dieser Begriff lediglich eine andere Bezeichnung für das Phänomen der Sprache. Hingehen wurde dieser Begriff von zahlreichen seiner Nachfolger über Jahrzehnte und z. T. noch bis heute verwendet, obwohl er dem Wesen der Sprache in keiner Weise gerecht wird."*

*Lothar Pickenhein, 1998 ([25], p. 392)*

*"But the term 'second signal system', this twice element-to-element projection, in no way does justice to the nature of language as a specific, socially conditioned form of environmental relations and specific information processing in the human brain. N. A. Bernstein (1975) has rightly criticized this formulation of Pavlov. This wrong conceptualization, however, in no way devalues the correct observation of Pavlov that the higher nervous activity of Man possesses a new quality and that the mental phenomena of Man are realized via a biotic substrate in the brain.*

*Pavlov coined and applied the term 'second signal system' only at the age of more than 80 years. For him this term was only another name for the phenomenon of language. However, this term was used by many of his successors for decades and partly still today, although it does not do justice to the essence of language in any way."*

The fact that Pavlov was a physiologist and seemed accustomed to expressing himself in simple terms does not seem to have drawn his attention to the fact that he must have been referring to the biological functioning of the brain, and that he would not have used such a complex expression as a synonym for the simple word *language*.

It is quite obvious for this author, as it also was for Chauchard, that Pavlov was speaking of the whole set of biological modifications that structures the brain *as a consequence of the use of the speech organs* ([25], p. 169, p. 265), and that he was not using this verbal locution as a simple synonym for the word *language*, that Pickenhein, and obviously also Bernstein, considered as such, but to clearly establish the conclusion that after a lifetime of studying the human brain, he had come to clearly understand that it was the use of the speech organs that physiologically structures the brain in such a way as to allow conceptual thinking, which has nothing to do with his age in any respect.

## 1.8. Collective Egocentrism/Altruism

*"The only feature common to all corporations is that the loyalty of their members goes first and foremost to the corporation and not to society as a whole." [27]*

*John Saul, 1996*

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We have seen that the orientation of social structures in positive directions seems to be dependent on an evolution towards objective altruism by individuals, an evolution that depends on each individual broadening the scope of his general knowledge base.

This is however only part of the solution, because society is not made of only individuals, as we might be tempted to assume. It is in reality made of *individuals* and of *groups of individuals* whose members have common interests for certain aspects of their relationship with society.

The fathers of the *Universal Declaration of Human Rights* were perfectly aware of this state of fact as the formulation of *Article 30* bears witness to:

*Article 30: Nothing in this Declaration may be interpreted as implying for any state, group or person any right to engage in any activity or to perform any act aimed at the destruction of any of the rights and freedoms set forth herein.*

Groups can be infinitely varied. They can be legally or informally constituted, temporary or permanent, positively oriented or totally antisocial.

Any society is an infinitely complex hierarchical assembly of groups mutually interconnected by overlapping or inclusion. The smallest element in such a structure is of course the individual, the smallest group is the family unit, and the most extensive group is society itself taken as a whole. The individual speaks for himself. Parents speak for the family. Representatives of intermediate size groups speak for their members. The government speaks for the whole society.

If we expand the concept to its limit, we find that the largest group possible is Humanity as a whole, which includes all human societies whose top of the line representative could currently be seen as the *United Nations General Assembly*.

At all levels of this gigantic structure, groups are in more or less harmonious relation, often in open conflict, often in difficult relation, but always involving human beings, most of whom do their best to bring their contribution, all the while attempting to insure their personal survival and that of their loved ones, having for only tools the extent of their personal knowledge base and the subjective perception of their own position on the egocentrism/altruism scale, which is the unique source of motivation for each action of individuals in their social environment, which in turn emerges from the genetically programmed protective reflexes of each individual, in harmony with the subjective feelings of security or insecurity that each one may feel in relation to his or her social environment.

Just as Korzybski drew a parallel between the level of maturity of humanity and that of a child, it is possible to draw a parallel between the degree of collective egocentrism/altruism of groups and that of the individuals that are part of these groups.

Just like for children, the feeling of security that the members of these groups have regarding the aspects of their relationship with society that adhesion of such groups represents for them is subjective and dependent on the degree of mastery over these aspects that belonging to these groups let them feel.

As for the degree of individual egocentrism/altruism that we have previously examined, the degree of collective egocentrism/altruism that will be manifested by the members of a group regarding the relationships of the group with the rest of society is entirely dependent on this subjective perception.

Let us first clearly define our terms.

*Collective Egocentrism/altruism:* Behavior of the members of any group whose actions tend to favor the interests of the group or of members of the group without consideration for the consequences of these actions on the rest of society.



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Without going to the other extreme of the scale of possible cases, where we would find extreme cases of collective altruism, it is now possible to define a position not conducive to conflicts between groups and the rest of society and that can be located in the middle part of the scale:

*Enlightened Collective Egocentrism/Altruism:* Behavior of the members of any group whose actions tend to favor the interests of the group or of members of the group insofar as these actions are not detrimental to the rest of society.

This does not necessarily mean that all members of a group fundamentally adhere to the same level of *collective egocentrism/altruism* that generally characterizes the actions of its members on behalf of the group.

It is obvious that the reasons for belonging to a group are to be put in correlation with the various degrees of individual egocentrism/altruism of the individual members. However, in our modern societies, people often do not have much choice but to belong to some groups, like workers unions for instance, if their well being or that of their loved ones depends on it. They may even completely disagree in some instances with the general philosophies of a group to which they belong, either because they feel forced to belong to it due to social pressure, or are forced by law to belong to it.

The general philosophies of groups that can be identified in our societies often have roots reaching far into the past, and these philosophies may have been developed at a time when the decisions taken were required for the survival of the group regardless of repercussions on the rest of society.

The fact that some societies have evolved and perhaps no longer require that these philosophies be centered so exclusively on the survival of the group may not automatically have caused these philosophies to be adapted to the possibly less threatening current state of these societies.

Some drift with respect to the underlying philosophy of a group, could also have occurred under the influence of very articulate charismatic individuals whose level of egocentrism/altruism was at odds with that of the group's philosophy, and whose extent of personal knowledge base may have been too restricted to serve well the interests of the group.

It is precisely in this manner that would-be gurus and dictators took control of large groups of people, and even entire nations by convincing the group that the restricted set of elements that should underlie the group philosophy should be limited to his own. The way in which the neural arborescences of often-visited memories are thus progressively reinforced, eventually leads to their eventually irrevocably permeating every thought pattern of a sufficient number of group members to finally consolidate a paradigm shift. See **Section 1.10** about the certainties that are likely to then be established.

It seems then desirable that the members of the various groups be invited to globally reassess this aspect of the question regarding their own group from time to time to determine whether the position of the group on the collective egocentrism/ altruism scale remains conforms to the real needs of the group.

We now can see how correlating the personal motivations of each individual with the extent of each his personal knowledge base complicates the analysis. But in the same breath, it finally allows us to better encompass the whole question. In particular, it allows every individual who so desires to better understand how to proceed to identify their personal position the egocentrism/altruism scale through a more objective analysis of the extent of their personal knowledge base.

The fact that we all generally tend to stabilize in the central portion of the scale, and that the extent of our individual knowledge base is almost universally less far reaching than

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we personally think we had acquired, should induce prudence in our conclusions. How many times have we heard, at times of personal failures: *I thought I was doing the right thing!* or *I was certain that I made the right decision!*

The lack of a general non-specialized knowledge base, the tendency to hyperspecialization and the certainty of each individual that he or she possesses sufficient knowledge, can now be correlated with the scale of all possible cases of egocentrism/altruism, in order to better understand the reasons for the inability of a majority of our elite to reach a level of social awareness that would allow them to properly analyze contemporary social issues and to become aware of the long-term consequences of their decisions.

Let us now examine the consequences of drifts towards collective group egocentrism in society because this considerably worsens the consequences of the first three factors.

In the frame of social structures influenced by these factors, in the non-optimized state that we observe, any influential individual or powerful group, legally constituted or not, practically ends up feeling endowed by default of an apparently inalienable and absolute right to take advantage of situations, so to speak, no matter what the consequences are for the rest of society.

The situation becomes particularly difficult for the vulnerable elements of the population when the government itself of a country or one of its agencies is the guilty party. But governments are not always as respectful of the laws that they themselves have decreed or of the rulings of their own courts of justice, as the British government was, in the case of the *Padfield ruling*, available in Reference ([15], Appendix C).

In these countries, the destitute and the vulnerable are roughly shoved aside. Ordinary citizens, individually or in groups, who are the victims of glaring injustices are often ignored and left to their fate if they do not have the financial means to legally force the abusers to back off, and this, of course, if legal recourses are even possible, under the indifferent eye and in the total silence of the local intellectual and scientific elite, very often after having waited in vain for an answer from the authorities to which they were appealing to as a last resort.

Such a lack of response from authorities does not really reflect deep contempt for the vulnerable on whose fate children's well being often depends. In reality, it reflects profound incomprehension, which is the direct cause of this inaction on the part of the solicited individuals in authority.

The study of periods in History when great intellectual and scientific progress was made shows that this progress was the outcome of elements belonging to a more enlightened elite having developed long term vision. Let us consider particularly Newton's era and the *Royal Society* at this moment in History. Such progress would have been impossible if some of the leaders themselves of these societies had not been enlightened and had not also developed a long term vision emerging from a sufficient level of *social awareness*.

In democratic countries, we often hear the expression *We have the leaders that we deserve!* But do we really! No elected leader comes out of the general population. Without exception, all leaders belong to the elite. In real life then, this saying presently applies uniquely to the restricted frame of the elite in any democratic society.

As for the general population, the expression *We have the leaders that the elite allows us to choose!* appears to more closely fit reality. The quality of these leaders cannot logically stand below what is considered as the *lowest level acceptable* by the majority of the members of this elite from which they emerge, *neither above a level above which their initiatives would become 'bothersome' for the group.*

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Even when a socially aware and enlightened decision maker or advisor is chosen for a key position, his positive action is mandatorily limited by this *insurmountable upper limit* imposed on him by the elite. The surprise resignation of some decision makers or advisors whose long term vision and social awareness were well known and appreciated by the general population can hardly be explained otherwise by them having been discouraged at realizing that any overstepping of this upper limit was intolerable for the elite.

For example, a decision-maker who has always had access to the services of a physician by subscription is unlikely to fully understand the anxiety that so many members of the general population feel when they try unsuccessfully to find a physician willing to see them, or that such a situation could even be real, unless he or she has developed a sufficiently high level of social awareness by having acquired a sufficient general knowledge base to motivate him or her to try to remedy such a situation.

But, if the majority of the elite to which he belongs is satisfied with the present state of affairs as far as they are concerned, the impacts that this elite may perceive as negative on these presently satisfactory living conditions will *de facto* establish this *upper limit of acceptability*, which it will not allow this decision-maker to exceed. This is why it is imperative to increase the number of members of such an elite who would develop a heightened level of social awareness, which is the only way that such a problem can be solved.

The same pattern is observed in the field of education. The totality of the members of the elite of a society having benefited from a level of education sufficient to ensure their well-being and interacting in a social environment where they never meet anyone who does not have a roughly equivalent level of education, will be hardly responsive to *claims* that more than 50% of their population is functionally illiterate, if they even believe it. Here again, only the implementation of extensive general knowledge acquisition programs in the educational system will succeed in eventually raising the level of social awareness of this elite, thus raising the level of this *upper limit of acceptability*.

This intolerance for the actions of those who overstep the upper boundary that the elite of the moment considers should not to be overstepped can work both ways. Decision-makers or even ordinary members are outright ostracized when their initiatives deliberately overstep this invisible upper boundary.

A telling case in the formal physics community is that of Paul Marmet, a leading edge physicist and experimentalist whose motivation simply was the further advancement of science and who was unceremoniously deprived of his tenure at the *University of Ottawa* for carrying out very valuable fundamental research, the very nature of which was beyond the comprehension ability of his colleagues due to their knowledge base being too restricted relative to his own, which always was the hallmark of all pushes in new directions throughout history. [28] [29].

The lower limit is seldom problematic, and is the cause of *resignations* that could be diplomatically qualified as *more or less voluntary*. Not to be confused with the previously quoted case. It is often difficult to properly analyze from afar some apparently borderline cases that occurred in the past, but some others are clear as spring water, so to speak, no matter what the involved parties might have said.

So, the decision makers of a society presently constitute only the tip of this metaphorical iceberg that we call the elite, and as we have seen, it is rather easy for an attentive observer to develop a clear opinion about the quality of this elite by observing their reactions to the decisions of the decision makers stemming from it.

Decision makers who are exclusively tuned to the needs of the elite, will make decisions to their own benefit or to that of the elite, without regard for the needs of the general population or for possible negative consequences on social assets available to all.

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whereas decision makers with a sufficiently broad-based education would rather tend to address these needs and to reinforce social assets, being fully aware that everyone will benefit, including themselves and the elite, which is the hallmark, so to speak, of decision-makers who have developed a sufficient level of *social awareness*, stemming from an elite of which a sufficient number of members have also developed sufficient level of *social awareness*.

### 1.9. Social Awareness

Definition:

*Social awareness*: awareness of the problems that ill adapted social structures inflict upon individuals who suffer from them.

The victims of these ill adapted structures are obviously very aware of them, but they quickly learn that any improvement is totally out of their reach to address. But who then would be in a position to force an improvement of society's structures? All being considered, the answer obviously is: *The elite of this society*, from which the actual decision makers of this society systematically emerge in democratic societies.

Who then belongs to this elite?

*The elite of a society*: Unstructured group of individuals mainly made up of a core of university graduates possessing doctor's or master's degrees in the various domains of intellectual and scientific knowledge and/or wealthy individuals, and whose actions or inactions, coordinated or not, determine the structures of this society.

But most members of this elite are generally quite well off, and never had to suffer much from the social structures that sometimes force large segments of the general population to suffer intolerable situations that would have caused them to develop a significant level of social awareness. So having no direct personal experience of these structural deficiencies, social awareness must be developed in the elite by other means.

It may well be that the only way forward would be for a sufficient number of elite members to acquire a solid general knowledge base, the breadth of which would make them sufficiently aware of the role played by social structures in determining people's subjective sense of security, and thus to develop a long-term vision, mainly by becoming aware that any improvement in ill-adapted social structures would be beneficial not only for the general population, but also for the elite, and consequently for themselves and their relatives.

In the absence of a direct personal experience, the feeling of personal responsibility that individuals develop with respect to social issues can only be linked to the extent of knowledge that this individual will acquire regarding humanity. Much progress and many important discoveries have been made in this regard in the first half of the 20<sup>th</sup> century, but despite their importance for the progress of humanity, these discoveries seem to have generally escaped the attention of our university elite, due to inappropriate referencing.

For a long time, specialists have wondered at what would be the long term consequences of the general trend to hyper-specialization in all branches of university education that has been increasing since the beginning of the 20<sup>th</sup> century.

Paradoxically, the first victim of this trend was the only specialty that could have allowed analysis of these consequences, that is, sociology. Although he seldom was regarded as such, the last genuine universally knowledgeable sociologist was, in this author's opinion, Alfred Korzybski. After him, no university graduate ever seemed to have had access again to a sufficiently vast pool of knowledge to allow an as deeply integrated analysis of universal social trends.

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A major contributor to this state of affairs was the absence throughout the 20th century of a formal protocol for translating cutting-edge work into a common communication language for scientific results originally published in various other languages, which led to some cutting-edge research results never to be referenced by researchers who could not read them, and eventually never to be referenced at all in subsequent formal publications.

Indeed, it is this specific reason that explains the enormous delay in the correlation of the works of Pavlov, Flechsig, Korzybski, Hebb, and Chauchard in the neurosciences domain [5] [7] [13] [25] [26], naming only the main contributors to this synthesis, and of Maxwell, Lorentz, Einstein, de Broglie and Marmet this other synthesis in the fundamental physics domain [45] [46] [125], to give another example. This issue will be elaborated more thoroughly in the Afterword of this book.

This neglect on the part of the formal community to make available to all researchers all of the formal scientific publications of the past has, however, begun to be addressed by private organizations whose leaders are clearly imbued with the same level of social awareness that animated the first leaders of the *Royal Society* of London, such as the *Minkowski Institute* of Montreal, for example, whose founder and current head Vesselin Petkov just published a study [30] that puts in very clear perspective the state of research in fundamental physics on two levels; that of the problem of certainty that will be examined in **Section 1.10**, and that causes the promoters of the various schools of thought in this domain to confront each other without any possibility of reconciliation since the beginning of the 20th century, and the absence of references in formal publications of numerous leading-edge works not translated into a common language that would have helped to reconcile the various perspectives.

In our societies, no one analyzes any more in an integrated manner the impact of the excessive behavior of some workers unions, or of the dramatically degraded quality of the education provided in some university faculties, of the quality of teaching methods, the consequences of the indifference of the elite of some societies on the state of their social structures, of the qualification of graduates, teachers, physicians, economists, etc. Public discussion on these issues has become taboo.

Progress in fundamental physics research gradually came to a standstill as a direct result of hyper-specialization in this domain for example, funding having begun in the 1940's to be allocated almost exclusively to research projects promising quick results, typically applied research projects, because it had become critical for the reputation of more and more numerous physicists to have *something* to publish, whatever the objective value of the contents of the articles. This trend only grew over time, to the point that we are now witnessing an all out rat race to publish *something* at any cost ([15], Chapter *Scientific Literature Not Very Reliable*).

*"It is pathetic, if not tragic, that society should invest millions of dollars to support such specialists who train future generations in maladjustment, just because they disregard the unavoidable neurolinguistic and neurosemantic effects of their teaching on the lives of their pupils. Most scientists and educators are either entirely innocent of these problems, or indifferent and passive, or even in denial."*

*Alfred Korzybski, 1933 ([13], p. xxix)*

One of the consequences was for example the lack of consistent referencing to important decisions taken by leading researchers in fundamental physics in the early 20th century, such as the decision taken in 1907 by the elite of the time in this discipline to ignore the known behavior of electrons in the study of the gravitation problem ([133], p.159).

This problem was greatly accentuated by the discontinuation of use of well-documented reference works about the confirmed discoveries of the past, such as References [75] and [134], now considered *out of fashion*, in the teaching of the confirmed foundations

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of fundamental physics, which contributed greatly to the slowdown of progress in this field that characterized the 20th century [125], by generation after generation of ill-informed physicists, who were thus forced to spend their time trying to reconfirm with great effort long confirmed discoveries, of which they should have been informed during their training, for those who did not end up concluding by discouragement that it is impossible to understand physical reality any further than the vague image that the current reference works designed for education provide them with.

### 1.10. The Issue of Certainty

Let us now address the underlying causes of the *wall of certainty* that so frustrated all attempts by Korzybski to break through this wall in his attempts to cause the scientific and intellectual elite of his time to pay attention to his potential solution, that was meant to favor and accelerate the progression of humanity as a whole towards maturity, as presented in **Section 1.2**, whose reference frame is presented in **Section 1.11** and whose solution is proposed in **Sections 3.10** to **3.14**.

As put in perspective in the Introduction of this chapter, it can be observed that the more highly educated individuals become, the more certain they tend to become of having reached their maximum intellectual potential. The research that was carried out by Hebb in the 1940's [26] and that Korzybski could not have had any knowledge about as he was carrying out his analysis in the 1920's [12] [13] reveals that the causes of the setting in of such a depth of certainty on any issue whatsoever are of biological origin, as we will see, and that once such a state is established, if an individual is not aware of this physiological characteristic of engram imprinting in his neocortex, whose establishment is out of his voluntary control, no logical argument can reverse it, which is why any attempt to then induce reconsideration of a certainty established in this manner can only increase the level of frustration on both sides without any possibility of information to be exchanged, as is frequently observed.

A key property that Hebb discovered about the manner in which the synaptic links that store memories in the neural network of the neocortex are established, whose arborescences store the engrams of each memory in the inner layers of the neocortex (a 6-layer neural network), is that *they are strengthened a little more each time they are visited*, and that they weaken progressively with time when they are not visited ([21], see **Chapter 2**) [26], and that *the arborescences thus strengthened are always visited in priority in preference to arborescences whose synapses are less strongly solicited*. It is precisely this characteristic of multilayer neural networks that allows artificial neural networks to be trained so efficiently to systematically select a particular solution from all other possible cases via the *deep learning* method in the field of artificial intelligence [63].

One aspect of logical reasoning that leads us to favor one conclusion above any other when considering any issue to be resolved or understood is that we always prefer the solution that appears the most coherent or logical to us according to what information we have in mind at this moment, and this, even before we can even think of verifying the objective validity of all elements that contributed to this specific conclusion ([21], see **Chapter 2**) [26], for the reason that the correlation operation proper which is carried out by the neural network of the neocortex, that leads to any conclusion, *is entirely automatic and out of our direct control*, and may also have inadvertently and unsuspectingly related unintended elements to the voluntarily chosen set that led to the conclusion, which only a post-conclusion review can reveal.

*"Le travail cérébral primaire d'interprétation est inconscient."*

*Paul Chauchard, 1963 ([49], p. 59).*

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*"The primary brain work of interpretation is unconscious."*

Because conclusions that appear completely logical to us on the spur of the moment are so pleasing to us, unless we previously developed the habit of methodically identifying and verifying all premises that might have been automatically taken into account by the neural network in reaching a conclusion, even without our being aware of it at this moment, we often accept them as valid without suspecting that some of the correlated elements may not have been verified as really valid, either by ourselves previously or by whoever provided the information to us, in the latter case, trusting that these elements were confirmed by others as valid.

When such conclusions are of major importance to us, they then begin to automatically be taken into account as valid when considering all other related issues, and their engrams are constantly strengthened by being revisited so often. For issues that we find so important that they become intertwined with all aspects of our worldview, they usually become so important to us that we come to strongly deny the very possibility of questioning them, whether or not they were initially based on fully verified facts. No amount of explanation or argumentation will then cause us to change our minds on these matters.

If such conclusions that we have become certain of and that became so fundamental to us happened to have been correct, the benefit of them having been so strengthened at the biological level is that no amount of arguing will then succeed in causing us to stray from *the right path*, so to speak, although we remain open to any information that might confirm them. ***But this is a double-edged sword***, because if perchance they were ill grounded without our having become aware of it before we became so certain of them, we will resist with the same energy any reconsideration of these possibly bad conclusions, while remaining of course open to any information that seems to confirm them.

This behavior is of course also at play for conclusions drawn from incomplete knowledge on certain topics, as research may not yet have reached a sufficient level to ensure a correct understanding at this particular point in the progress of knowledge throughout history. This is indeed what caused so much resistance to the introduction of Korzybski's so promising solution since he was trying to convince an elite already deeply convinced otherwise, instead of offering his solution to the upcoming generation who had not yet become so deeply convinced of the formal state of knowledge. It is a historical fact that Max Planck was earlier confronted with the same hurdle that he stigmatized with this memorable phrase:

*"A scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up that is familiar with it."*

*Max Planck*

This is how some damaging educational philosophies became progressively established, that did not favor the establishment of a systematic process of validation of the whole set of premises leading to any given conclusion about physical reality, which was precisely what Korzybski was fruitlessly trying to sensitize the community to.

It turns out however that when people are made aware early on of this constant tendency that we all have to become so easily certain of our conclusions even when all premises have not been confirmed as valid, they do remain prudent about the validity of all of their conclusions and remain ready to reconsider any tentatively accepted conclusion in light of any new information that might eventually come to their attention that could cause a more appropriate conclusion to be drawn.

Let us now proceed to a brief overview the mechanics of the comprehension process, grounded on the discoveries of Korzybski, Pavlov, Chauchard and Hebb, and how its clear



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understanding can allow progressively overcoming the so limiting wall of certainty that Korzybski considered the main handicap faced by humanity on its way towards maturity.

### 1.11. Brief overview of the Comprehension Process

Before *intelligence*, or should we rather say *the comprehension ability*, can be defined, it is mandatory to describe the thinking process. After lengthy experimentation, Pavlov determined at the beginning of the 1930's that we think according two different modes [5] ([21], see **Chapter 2**) [25] [31].

- 1- The thinking mode by images association.
- 2- The thinking mode by words association.

In 2016, Amalric and Dehaene experimentally determined that high level mathematicians can directly think via non-verbal idealized symbolic or geometric representations and association of mathematical descriptions of these idealized representations [32] first described in Reference ([21], see **Chapter 2**), thus clearly defining our third thinking mode:

- 3- The thinking mode by idealized concepts association.

The thinking mode by images association is a reflection of the circulation of what we name *our awareness* in the set of sequences of memories corresponding to the perceptions of our senses: visual images, tactile sensations, sounds, etc., the complete set being stored in recoverable order of occurrence in various areas of the neocortex [33], each area corresponding to one of our senses. These sequences of events, that are stored as synaptic arborescences, that is, engrams, in the various neocortex areas, are also mutually interconnected in such a way that we can easily access what we can remember of these sensory perceptions for any specific past even.

The thinking mode by words association is a manifestation of the circulation of *our awareness* in an infrastructure of synaptic links that have been established in our neocortex between the various aspects of our memories as a consequence of the use of the articulated language or languages that we use to think, write and speak about them [33], French, German, Spanish, English, Russian, etc.

The set of all idealized symbolic images and of all idealized mathematical relations that we elaborate and that we can also have come to mind at will, also is non-verbal and is similar to the thinking mode by association of images from our sensory perceptions, except that it is the outcome of the generalization process that emerges from the thinking mode by words association ([21], see **Chapter 2**).

We all observe the external world as well as our emotions by means of the thinking mode by images association, and we all describe and understand it by means of the thinking mode by words association ([21], see **Chapter 2**), and in addition, we can also observe, describe, understand and measure it by means of the thinking mode by association of idealized concepts, for those among us who learn to master this third thinking mode to a sufficient level ([21], see **Chapter 2**).

An important aspect of each object, event, process, concept, chain of events, or emotion that we may think about by means of the thinking mode by images association is that it potentially possesses *an infinite number of characteristics* [13] ([21], see **Chapter 2**) [34], pp. 171-187). See **Figure 3.2**.

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Another important aspect of the images thinking mode is that we never need to have perceived the totality of this infinite number of characteristics of an object, event, concept or emotion before we can objectively understand its nature [13] [31].

Consequently, for any object, event, concept, process or emotion that we may think about, there exists *a restricted subset of characteristics* that allows objective understanding of its nature and that results in the establishment of a corresponding idealized mental representation.

An important aspect of each resulting idealized symbolic representation of objects or processes, geometric shape and mathematical description of these idealized representations that we can have come to mind by means of the thinking mode by images is that it possesses a restricted set of characteristics that are generalizations of shapes and processes that we associate to whole groups of images abstracted from our sensory perceptions ([17], see **Chapter 3**) ([21], see **Chapter 2**) [31].

The main feature of the verbal thinking mode is the generalization ability that emerges from our ability to name each characteristic of the objects or processes that we think about ([21], see **Chapter 2**) [33]. This generalization ability is the process by which a set of images can be associated in our mind by at least one of the characteristics that we have named. Every word is potentially a generalization.

The word *dog*, for example, can cause a person to think about a specific dog, about all dogs that he or she has known, about all he or she knows about dogs, about the owner of a particular dog he or she is afraid of, etc. The degree of generalization carried by a word, in any language whatsoever is always determined by the immediate global context in which it is being used, that is, by reference to the reference frame in which it is used.

We can now discuss intelligence, that is, the comprehension ability. The comprehension mechanics involves the use of two distinct processes.

- 1- The correlation process [33].
- 2- The comprehension process [33].

A verbal correlation being a relationship perceived between two or more verbal elements, the process of verbal correlation, allowed uniquely by our generalization ability, which is an exclusive outcome of the use of an articulated language, takes place by means of an automatic process of memory retrieval in the neocortex by successive sequences of correlations between elements that are closely or remotely related to the issue under examination, a process that always is initiated by a question about this issue that we ask ourselves, which generally leads to the perception of a coherence in the set of associated elements ([21], see **Chapter 2**).

However, the perception of a specific coherence [35], which is another neocortex automatic process, that is, *the impression of having understood something* following some cogitation on this issue, does not, as such, guarantee that the subject of our cogitation has been objectively understood. Therefore, another process must be at play in order to orient our thinking towards true objective comprehension, which is obviously the ultimate objective.

The comprehension process is a method used by the human brain, consisting in exploring and re-exploring a concept until objective understanding of the concept as a whole has been achieved, which is the critically important process that Korzybski was trying to sensitize his contemporaries to, in the first half of the 20<sup>th</sup> century [12] [13].

Each new exploration of the same concept, initiated by questions raised by aspects of the concept that still remain unclear, will induce the individual to reconsider, taking into account more newly acquired or newly considered characteristics that these additional questions have come to mind, which will lead to the perception of new and sharper global

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coherences about the main issue being investigated. The final coherence ideally enclosing only the restricted set of objective characteristics that objectively describes the concept being explored, and adds this idealized conclusion to the set of idealized symbolic representations, geometric shapes and/or mathematical descriptions already established.

This presumably final coherence can tentatively be confirmed as objectively valid by the fact that a series of repeated further re-questioning causing more and more data to be considered does not cause the concept to become clearer. However, an unmistakable telltale that final objective comprehension of any concept has not been reached is the fact that any of its aspects remains unclear or unexplained.

The only means at our disposal to let the comprehension process operate efficiently is to consciously force ourselves never to be totally certain that we have objectively understood any given event, object, concept, process, etc. [31], which maintains the individual receptive to reconsidering the whole issue in light of any new information of which he or she might become aware of and which would be likely to render the concept yet clearer.

Given that the generalization ability, which is the very foundation of the whole comprehension mechanics, is an exclusive property of articulated languages, it follows that the more finely an articulated language is mastered, the more efficiently the comprehension process can operate.

Consequently, the level of awakening of intelligence, that is, of the comprehension ability, is therefore directly linked to the level of articulated language mastery [5] [16].

At birth, the neocortex areas that will support the verbal thinking mode are not yet physically interconnected with the areas that already support the thinking mode by images. The required synaptic connections will be established as the child learns to speak, read and write.

The establishment of the myelin sheets about the dendrites interconnecting the neurons of the verbal areas is genetically delayed in humans, contrary to the rest of the neocortex, so that their physical presence would not hinder the rapid construction of the network of interconnections that will be established during infancy [7]. This is why children so easily learn any language or even many languages during infancy.

In humans, the final myelination of the verbal areas of the neocortex is genetically triggered at the age of about 7 [5], age after which further construction becomes more difficult (requires greater efforts) on account of the physical presence of the newly established myelin sheaths about the existing dendrites in the verbal areas.

Thus, only the first seven years of life are available for *easy and rapid establishment* of a dense synaptic interconnected network between the areas that underlie verbal thinking and the areas that underlie thinking by images association [5]. It is therefore imperative that children become sufficiently verbally articulate in early childhood so that they become adept at easily expressing their thoughts and at readily describing what they perceive and understand.

Such early mastery will cause further learning after final myelination to remain easy due to children having now become more interested in what reading gives them access to, rather than having to concentrate at the task having now become more difficult of finishing mastering an imperfect reading skill.

The density of the network of synaptic interconnections that will be physically established within the verbal areas and between these areas and the areas of thought by images, and that will serve for the rest of the individual's life, depends directly on the quality of this early development of all verbal abilities [5].

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It must be said, however, for those whose verbal development conditions may not have been as optimal, that the situation is repairable to a large extent, and even completely, only dependent on the level that the person concerned becomes interested in investing the time and efforts required.

On their part, IQ tests quite obviously measure the speed with which a person can perceive specific coherences. This speed seems to be related to the level of language mastery acquired during infancy, but also seems to constantly vary during the lifetime of an individual as a function of the intensity of use of the language areas [31]. See **Section 1.1**.

A heavy reader, for example, intensely uses the areas supporting verbal thought and will probably see an increase in his or her coherence perception speed. Conversely, if this person stops reading for a period of time, he or she will probably see a decrease in his or her coherence perception speed. Many other factors certainly also have to be taken into account [33].

Given that the comprehension process mandatorily involves a permanent questioning process that leads, with time, to the perception of a series of increasingly precise coherences for each object, event, process, concept or emotion of real life that an individual may think about, tests measuring only the speed with which specific coherences can be perceived by an individual, can in no way give any idea of the degree to which that individual uses the comprehension process [33].

By its very nature, the closeness of a perceived coherence with respect to objective reality can be verified only in relation with the perceived coherences of other persons considering the same object, event, process, concept or emotion, because there is only one objective reality [13] [16] [33].

### 1.12. Conclusion

As mentioned in the Foreword of this book, although work began in the 1970's to correlate Korzybski's findings with what more had been discovered since the 1920's on related issues, initially only meant to reach personal understanding, then, given the importance of what was coming to light, to purposefully communicate it to the community, decades of research were required to succeed in fully identifying and synthesizing all of the formal sources that could finally bring to light an as complete as possible explanation to the existence of this *wall of certainty*, that Planck also stigmatized, and that resisted so much the introduction by Korzybski of his so promising solution.

The reason why these research results were not made available to the international community earlier is that except for Hebb's discoveries, the related discoveries of Pavlov, Flechsig and Chauchard that shed the required light on this issue were never translated into English, that has been the international language of scientific communication since the 1950s, and that all this time was required to progressively trace, identify, analyze and correlate these sources.

It initially seemed more than probable that the cause of this resistance to change that Korzybski was confronted with had something to do with the thinking process itself, so this already narrowed the field of research to neurophysiology, neurolinguistics, and neural networks operation, given that in the 1970, it was already understood that the human neocortex is a 6-layer neural network.

In fact, Donald Hebb's analysis of the properties of the neural network of the human neocortex, published in 1949 [26], provided the first clues as to why people can reach such levels of certainty about certain obviously wrong conclusions that they apparently end up

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finding it impossible to reconsider them, even when provided with obviously correct information.

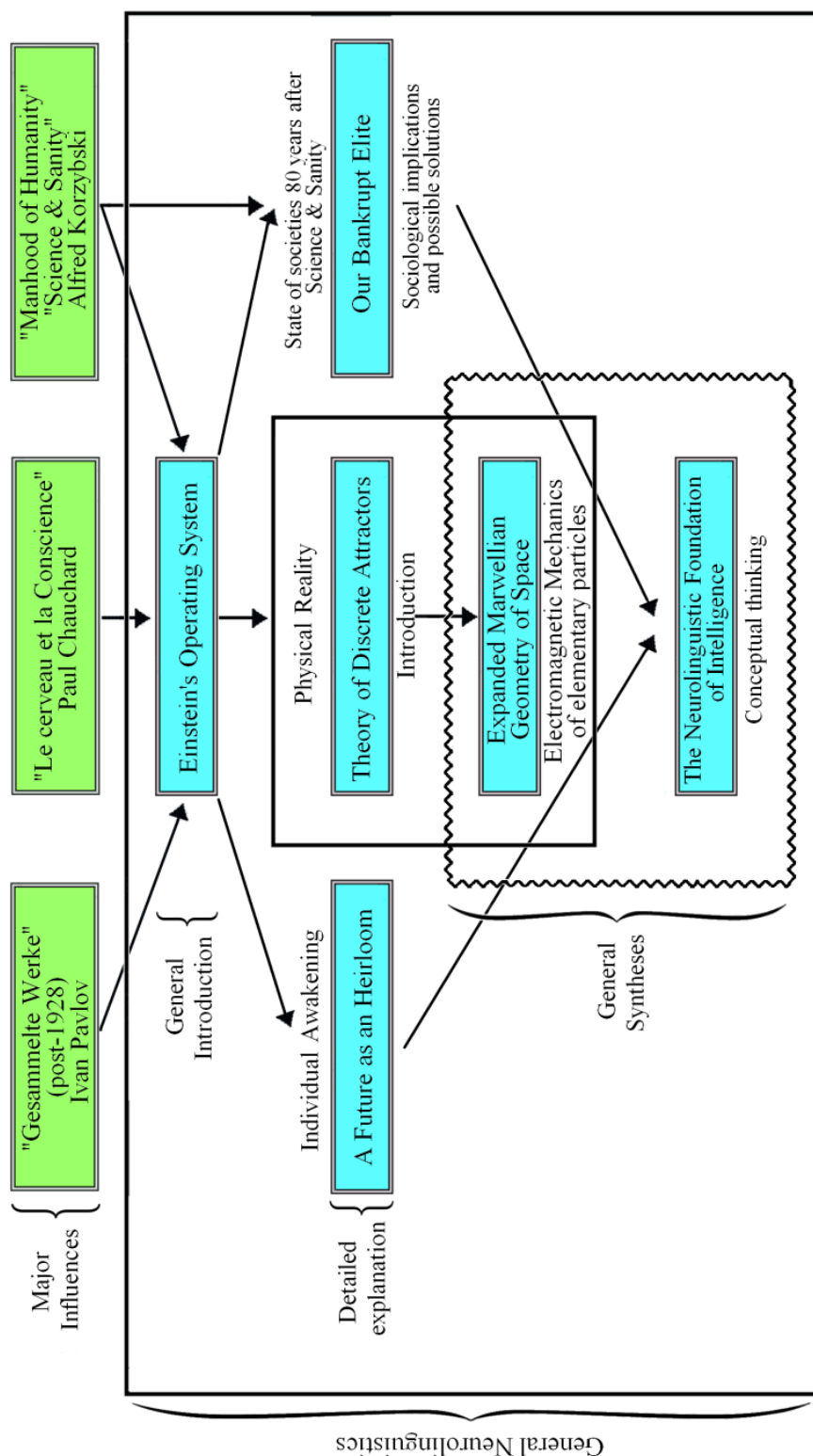


Figure 1.2 The General Neurolinguistic popularization project.

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Then came in cascade, Chauchard's discovery published in 1960 that there was a direct relation between the density of the synaptic interconnected network established in the verbal areas of the neocortex before the age of 7 and the level of intelligence reached by children [5], grounded on the understanding established by Pavlov dating back to the 1930's of the relation between articulated languages generalization properties and conceptual thinking, but that became available in German only in 1998 [25], coupled with the only reference that could be found to Flechsig's research [7], in Eccles' wonderfully referenced work [18] without which this research could not have been successful, that explains why children so easily learn all aspect of their mother tongue and even of many languages if taught in due time, that is, before the age of 7.

Finally, came in 2016 the experimental confirmation by Amalric and Dehaene that high-level mathematicians can think directly by means of the idealized symbolic, geometric, and mathematical representations that articulated language allows to generalize ([21], see **Chapter 2**) [32].

A first wave of popularization works were published in paperback format from 1997 to 2004 to make available the first results of this synthesis project [15] [16] [31] [33] [35], of which **Figure 1.2** presents the structure, a set of books that was converted to eBook formats in 2012, followed by a series of formal articles that were then published to put these research results at the disposal of the education community ([17], see **Chapter 3**) ([19], see **Chapter 5**) ([21], see **Chapter 2**) ([36], see **Chapter 4**) ([37], see **Section 1.11**) [38].

The popularization project layout presented in **Figure 1.2** sets in relation the 6 books that were meant to progressively bring an interested reader to clear understanding of the subject. Such a progression was deemed necessary given the effort required for an individual to become able to question his own deep beliefs, as well as to increase his own awareness of objective physical reality, that only complete understanding of the mechanics of conceptual thinking allows to correctly apprehend.

The first three books put in perspective the various aspects of the extended reference frame which is required at the level of elementary popularization to allow readers to have come to mind a sufficiently wide knowledge base for them to become able to properly assess the content of the last three books. The subject is so vast and abstract that there seemed to be no other way to completely describe it at this level.

To demonstrate the validity of the reasoning method that he proposed, Korzybski analyzed the state of accumulated knowledge about mathematics and fundamental physics that was available in the 1930s, so the same exercise seemed to be appropriate regarding the state of knowledge currently accumulated on these issues, taking into account the conclusions drawn by Hebb, Pavlov and Chauchard.

The result was a series of articles that synthesize the current state of knowledge about the electromagnetic nature of physical reality [28] [39] [40] [41] [42] [43] [44] and a final monograph in two parts published in paperback format that synthesizes all these articles [45] [46], completed by a final article relating the new paradigm that resulted from this synthesis project to the current paradigm of fundamental physics [125].

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