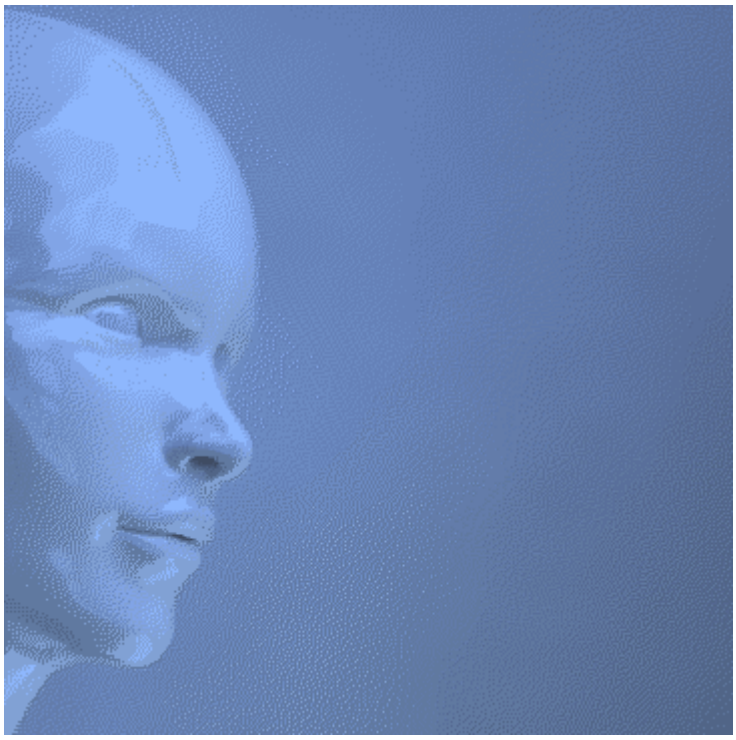
Natural Logic of Language

Automated reasoning based on the Laws of Intelligence naturally embedded in the Human Language



Whoever studies nature — studies God's creation.

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Preface

Logic and the Laws of Nature are present in nature. Christians have a simple explanation for the origin of Logic and the Laws of Nature: an intelligent designer.

Most scientists exclude the influence of an intelligent designer in the emergence of nature. Yet they cannot reproduce natural logic from either nothing or illogic. Moreover, scientists have great difficulty explaining the origin of the Laws of Nature.

Therefore, as a Christian, it is my task to uncover the science of the Laws of Logic in nature (Natural intelligence) and to implement my findings in [open source software](https://www.mafait.org/logic-of-language).

Introduction

Theories and evidence
Scientific theories cannot be proven. They can only be supported, challenged or falsified by evidence that accurately reflects the operation of nature.

Evidence is typically based on **direct** observations of the phenomenon under investigation to minimize the risk of fraud, misleading information, errors or misinterpretation. Where evidence is not based on direct observation, the term *hypothesis* is more appropriate than *theory*, reflecting the potential for observational error or misinterpretation.

Science and belief
Science is concerned with natural phenomena that can be observed, replicated, tested and potentially falsified. Belief, by contrast, deals with phenomena that are unobserved, untestable, non-replicable or unfalsifiable.

Replication (science)
Consequently, a crucial aspect of the scientific process is the independent replication of the phenomenon under investigation.

O**rigins (belief systems)**
When a phenomenon cannot be reliably reproduced under controlled conditions—and, where relevant, at the appropriate scale—it cannot be accepted as a scientific conclusion. Instead, it remains a proposition belonging to a belief system. This applies to questions of origin that inherently cannot be repeated: the origins of the Laws of Nature, energy, matter, the universe, life, taxonomic families, natural intelligence, consciousness and human language. Since such events cannot be replicated, positions taken on them—such as philosophical naturalism or creationism—fall within the domain of worldviews rather than of established science.

Natural Logic of Language
The origins of natural intelligence and human language can only be believed. However, the natural mechanisms behind intelligence and language may be accessible to replication under controlled conditions, by examining the underlying Laws of Nature. Because just as the possibility of flight is governed by the Laws of Nature, the Natural Logic of Language may likewise be governed by the Laws of Nature.

This document explores how the Natural Laws of Intelligence are related to the human language, and how natural intelligence and the human language can be replicated in software by identifying and applying the Laws of Intelligence naturally embedded in the Human Language.

1. Fundamental science

This document proposes a fundamental—scientific—approach towards a profound understanding of natural intelligence and natural language based on the Laws of Nature.

1.1. Fundamental truth

There is only one truth in fundamental science: **the way nature works**.

Nature operates in a single, definite order, governed by natural laws. Those who investigate these laws and uncover how nature truly works will find their discoveries confirmed under controlled conditions — and, in time, applied to everyday life. In this way, taxpayers will have a Return on Investment in their funding of science.

1.2. Fundamental sciences are closing the circle

We perceive nothing other than natural phenomena obeying the Laws of Nature, and proceeding according to the Laws of Nature. And we perceive nothing other than natural phenomena closing the circle, as illustrated by the following example of electromagnetism.

The field of electromagnetism is a fundamental science because it closes the circle:

- We can convert light into electricity, and convert electricity back into light;
- We can convert motion—via magnetism—into electricity, and convert electricity—via magnetism—back into motion.

If natural reasoning (or natural logic) is a fundamental property of nature, then it should be possible to translate natural language—i.e., readable sentences—into natural logic, and natural logic back into natural language, without any loss of information. Furthermore, it should be possible to integrate multiple reasoning mechanisms within a single system [1], including mechanisms that have been scientifically described as well as those that have yet to be discovered.

1.2.1. Cognitive science

The field of Artificial Intelligence (AI) and Natural Language Processing (NLP)—in a broad sense—is mainly studied from the perspective of behavioural/cognitive science, resulting in mimicry of behaviour. However, mimicking the behaviour of a hen (chicken) does not produce eggs. AI is therefore not naturally intelligent, but the result of human ingenuity.

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1 I have observed that many techniques in automated reasoning remain fragmented across different systems and have not yet been integrated into a unified framework.

1.2.1.1. AI / NLP is unable to close the circle

As a consequence of being investigated from the perspective of cognitive science, the field of AI / NLP is unable to close the circle on natural intelligence and natural language:

- From readable sentences,
- through natural logic (natural intelligence),
- with the result expressed in readable — word-by-word constructed — sentences again.

Illustrated by an example:

Given:

- "John has 3 apples."
- "Peter has 4 apples."

Problem description: There is no mathematical notation for the compound sentence, in such a way that it closes the circle, from readable input sentences, back to a readable output sentence:

- "John and Peter have 7 apples together."

A schoolteacher would write:

- 3 apples + 4 apples = 7 apples

But this equation lacks the references to John and Peter, and is therefore insufficient to automatically generate the compound output sentence mentioned above.

A mathematician would write:

- J = 3
- P = 4
- J + P = 7

Unfortunately, this mathematical notation lacks the reference to apples.

A neuro-symbolic AI system—a hybrid combining neural language models with symbolic reasoning—could be used to construct the compound output sentence by brute force. But that wouldn't solve the deeper problem:

There is no mathematical notation—no algebra—that holds all info—like persons, objects, numbers and verb—to represent the linguistic logic of a six-year-old child.

This is just one example of my Scientific Challenge. A generic solution to this particular example is described in Block 3. It shows that mathematicians developed their field without seriously connecting the dots with linguistics. Take for example propositional logic and Prolog, they are not developed with completing the circle "language → logic → language" in mind. It seems, only Controlled Natural Language reasoners are developed with completing this circle in mind.

1.3. Pitfalls (cows and milk)

I noticed a few instances of misunderstanding, which I will address in the following paragraphs. But first, I want to get to the root cause of the misunderstanding:

- In **science**, the term *methodological naturalism* is often used to describe the principle that scientific inquiry is restricted to phenomena that can be observed or empirically investigated;
- In **philosophy**, the term philosophical naturalism refers to the view that nothing beyond the natural or observable world should be accepted as real or explanatory.

Suppose no one has ever seen a cow, and we do not even know whether cows exist. Now suppose we examine a glass of milk [2]:

- A *methodological naturalist* would say: "I do not know where the milk comes from, but I can observe that it contains, for example, water, milk fat, proteins, lactose, minerals, vitamins and bacteria. I can also observe that the bacteria cause the milk to deteriorate";

- A philosophical naturalist, by contrast, would rule out the existence of cows as a possible explanation and will tend to defend this position by focussing on the origin of the milk without invoking a cow: "The only living organisms we can observe in the milk are bacteria, so the bacteria must have produced it".

The only way to determine whether the philosophical naturalist is right or wrong is to demonstrate, through empirical investigation, that the origins of the Laws of Nature, energy, matter, the universe, life, taxonomic families, natural intelligence, consciousness and human language can be reliably replicated—under controlled conditions and, where necessary, at an appropriate scale— in terms of purely natural processes, without any intelligent influence.

This is precisely where philosophical naturalism fails: it assumes that such phenomena can ultimately be explained without intelligent influence, while failing to demonstrate empirically that they can, in fact, arise through purely natural processes.

Moreover, if cows do exist and do produce milk, the entire philosophical framework of the philosophical naturalist may be fundamentally misguided, directing the search for the origin of milk away from the very entity that produces it and toward organisms that merely happen to be present in the milk. This may then lead to ambiguous definitions—see the following paragraphs —designed to obscure the fact that the starting hypothesis of philosophical naturalism—that purely natural processes are sufficient to explain the phenomenon—was fundamentally mistaken.

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2 I "borrowed" the basic analogy of cows and milk from Peter Scheele.

1.3.1. Self-organisation (misunderstood)

Self-organisation is often misunderstood. The following 'scientific' paper states:

> "Self-organisation refers to a broad range of pattern-formation processes in both physical and biological systems".

However, in this paper, no distinction is made between a **static** 'organisation'—which is limited to pattern formation—and a **dynamic** organisation, which requires Natural intelligence.

Distinction:

- **Natural pattern formation**—such as fractals and the formation of snowflakes—is a static process, based on rules (fractals) or the Laws of Nature (formation of snowflakes);
- **Swarming of birds** is a dynamic, temporary process, based on the bird's instinct. Instinct is an innate mechanism of survival. In case of no danger, swarming is practiced as an emergency drill, while it improves bonding;
- **Self-organisation** is a dynamic, continuous process. It is a result of natural intelligence;
- Any other **organisation**—such as a company or a pack of wolves—is a dynamic, continuous process of multiple intelligent actors.

(Self-)organisation may be a property of Natural intelligence rather than its origin.

1.3.2. Consciousness, neurons, learning, complexity and intelligence

Consciousness
To many scientists, natural intelligence and consciousness are closely intertwined. Yet consciousness is more than intelligence alone; it is the capacity of an intelligent being to function as an aware participant within complex social and relational structures. While consciousness depends on natural intelligence, it cannot be reduced to it. Systems based on Controlled Natural Language, for example, can perform logical reasoning without possessing consciousness.

Neurons
Similarly, many scientists consider neurons essential to natural intelligence. However, Controlled Natural Language reasoners also demonstrate logical reasoning without (artificial) neurons. Apparently, neurons are not essential to intelligence—just as feathers and flapping wings are not essential to aviation.

Learning
Learning requires natural intelligence. Yet scientists still do not understand what natural intelligence is. By that logic, what we call "Machine Learning" is unable to learn.

Artificial neural networks (ANNs) reflect a simple piece of advice my father once gave: "Don't become a monkey trained to perform a trick". ANNs resemble a trained monkey—capable of performing, but not of understanding.

Complexity
Philosophical naturalism confuses the term "complexity" with "order". Natural processes may indeed produce complex patterns. But complexity does not necessarily imply order, let alone a functioning system. In fact, we have never observed complexity itself giving rise to order, much less to a functioning system.

Moreover, great thinkers like Albert Einstein have emphasized that:

- True intelligence seeks clarity, not complexity;
- Intelligence is not expressed in complexity, but in the ability to distil things to their essence;
- Simplicity is the highest form of sophistication, and that complexity is often a sign of incomplete understanding.

Intelligence
If Large Language Models (LLMs) exhibit any form of intelligence, it did not arise from the complexity of their neural architectures, but from the inherent logic embedded in the human-written texts on which they are trained.

The development of a reasoning system such as mine presupposes the application of principles of intelligence that are intrinsically encoded in human language, which I call: the Laws of Intelligence naturally embedded in the Human Language.

1.3.3. Boundaries of evolution

According to evolutionary hypotheses of common descent, there is no fundamental distinction between evolution observed within taxonomic families and the hypothesized emergence of functional biological organisms through unguided selection and recombination. Both are assumed as parts of a single, continuous historical process. From this perspective, fossils are interpreted as representing organisms that are related through common ancestry.

However, in the physical world, everything appears to operate within limits or boundaries. An electrical cable, for example, has a maximum current it can safely carry; a steel cable has a maximum tensile strength; and the universe has a fundamental speed limit: the speed of light.

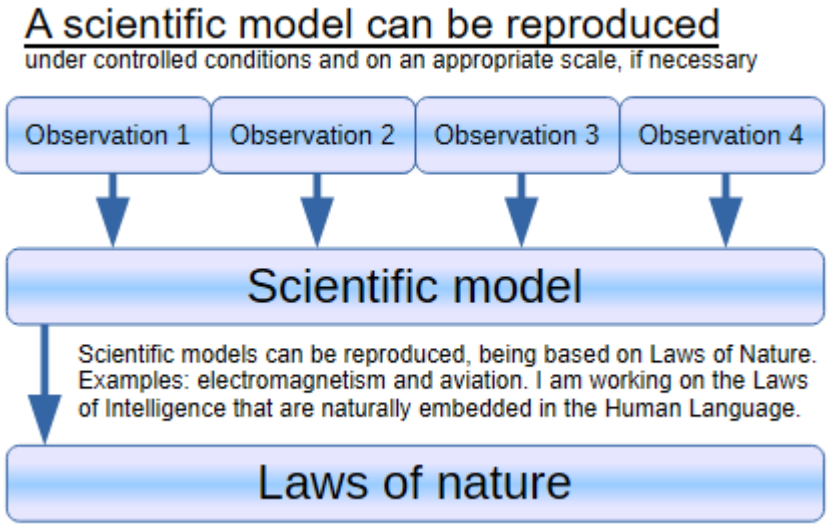
Likewise, organisms seems to evolve within the limits imposed by their biological capabilities. What we observe empirically are boundaries within which biological variation and diversification occur, corresponding broadly to established taxonomic families:

- Viruses produce viruses;
- Bacteria produce bacteria;
- Fungi produce fungi;
- Plants produce plants;
- Insects produce insects;
- Fish produce fish;
- Birds produce birds;
- Monkeys produce monkeys;
- And humans produce humans.

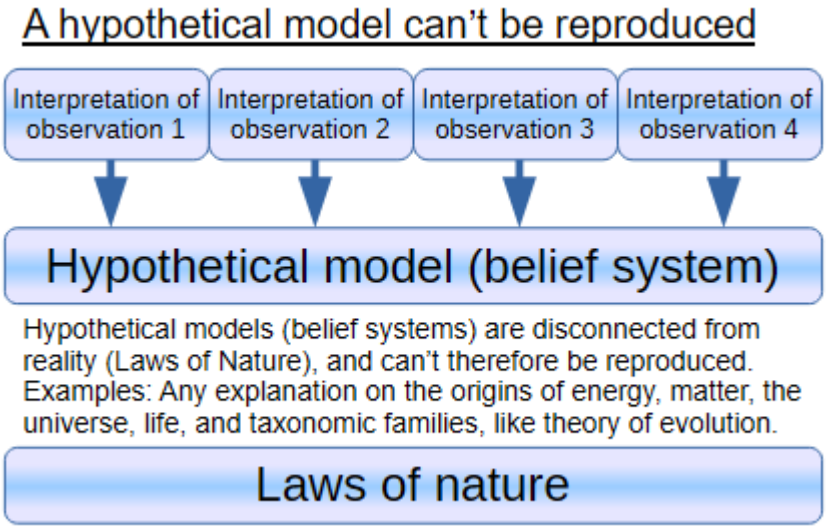
Similar limitations apply to genetic algorithms, evolutionary algorithms and Game of Life—computational models inspired by evolution. Their operation depends entirely on the parameters, representations and fitness criteria imposed by their designers. As such, they cannot serve as independent empirical evidence that undirected selection and recombination suffice to build functional biological systems, as evolutionary accounts of common descent assume.

1.3.4. Scientific models

Science is concerned with natural phenomena that can be observed, tested, replicated and potentially falsified. In that sense, scientific models should, in principle, be reproducible.



If a model cannot be reproduced, we should regard it as a hypothesis rather than an empirically established scientific model. In that case, it falls outside the domain of empirically testable science.



1.3.5. Is Christianity anti-science?

Some people believe that Christianity is anti-science or fundamentally opposed to scientific inquiry. Yet for centuries, Christian scientists made significant contributions to fundamental science. They sincerely observed the way nature—as God's creation—operates. As a result, their findings could be reproduced under controlled conditions and subsequently applied to practical, everyday life:

- in microbiology, Antonie van Leeuwenhoek,
- in chemistry, Robert Boyle and Antoine Lavoisier,
- in physics, Isaac Newton, James Prescott Joule and Arthur Compton,
- in electromagnetism, Alessandro Volta, Michael Faraday and James Clerk Maxwell,
- in mathematics, Gottfried Leibniz, Leonhard Euler, Bernhard Riemann, Blaise Pascal and Kurt Gödel,
- in health care, Joseph Lister — who is called the "father of modern surgery",
- in genetics, Ronald Fisher and Gregor Mendel — who is called the "father of modern genetics",
- Charles Babbage — who is called the "father of the computer",
- George Boole — who is called the "father of the digital age" or the "father of binary logic",
- Galileo Galilei — who is called the "father of observational astronomy, modern-era classical physics, the scientific method, and modern science",
- and Johannes Kepler — who is called "one of the founders and fathers of modern astronomy, the scientific method, natural and modern science".

By replicating and applying their findings, these Christian scientists provided a Return on Investment to taxpayers, which we still benefit from today. Their approach of using fundamental science (Basic Research) might be useful to investigate the fundamentals of natural intelligence and natural language too.

1.3.6. Fundamental choice: apes or Adam and Eve?

Evolutionary hypotheses of common descent are fundamentally at odds with Christian beliefs. And theistic evolutionism is just a variant of the theory of evolution, topped with a religious sauce. So, only one of both belief systems can be true:

- If man shares a common ancestor with the ape, Adam and Eve never existed;
- If Adam and Eve never existed, the Fall of man—high treason against God—never happened;
- If the Fall of man never happened, the redemption through Jesus is meaningless;
- If redemption through Jesus is meaningless, Christianity is nothing but an empty religion.

So everyone has to make a choice: a common ancestor with the ape, or creation by God.

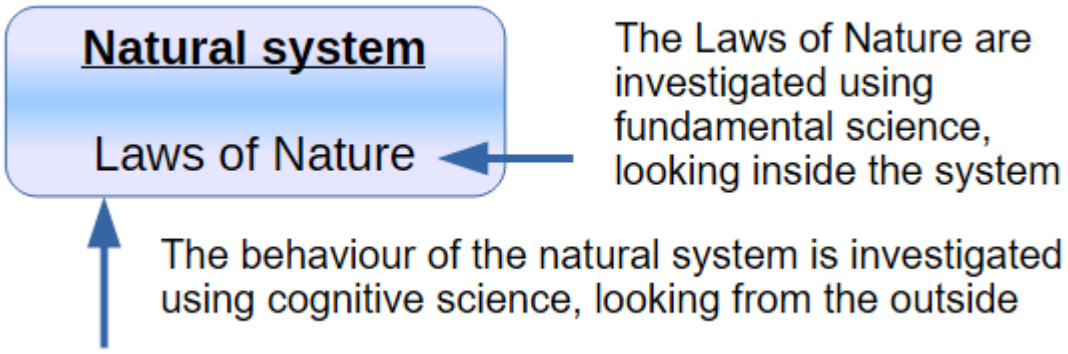
2. The fundamental approach of Thinknowlogy

We perceive nothing other than an ordered universe that is subject to unified, exact, structured, deterministic [3], and consistent the Laws of Nature. And we perceive nothing other than natural phenomena obeying the Laws of Nature, and proceeding according to the Laws of Nature [4].

As such, logic must be a fundamental and permanent structure of nature. It is not a chemical or geological structure, but a logical / organisational one.

Chemical and geological structures arise under the influence of physical laws of nature. Logical structures arise under the influence of **logical / organisational laws of nature**.

- Without harnessing the natural laws governing intelligence, one can only simulate intelligent behaviour using cognitive science;
- By contrast, by harnessing these laws, it becomes possible to replicate the logical structures of nature within a controlled environment, using fundamental science (Basic Research).



Because they are deterministic, these Natural Laws of Intelligence may be implementable in artificial systems through reverse engineering. They may also provide an answer to a deeper question: How can logic be universally true? The answer is that natural logic is enshrined in the Laws of Nature.

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3 deterministic: "the doctrine that all facts and events exemplify natural laws";

4 I presume that God has created the Laws of Nature to make his creation run like clockwork in a unified, exact, structured, deterministic and consistent way.

2.1. Sources of natural intelligence

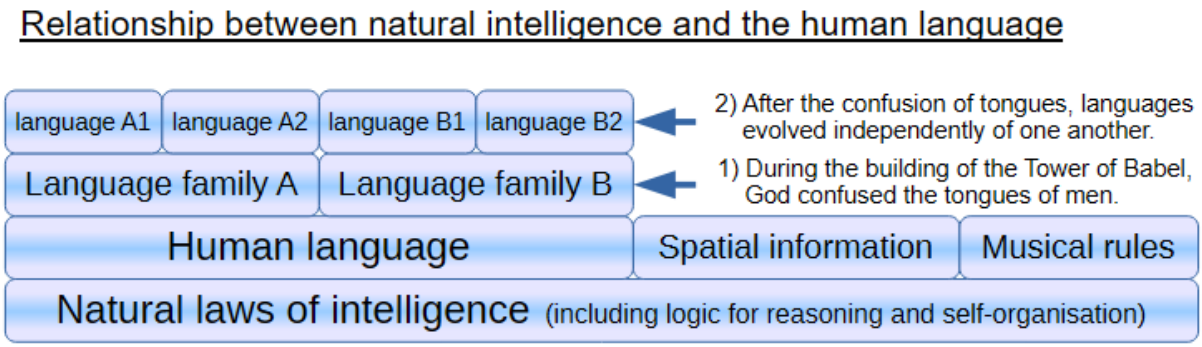
I have identified three sources of Natural intelligence: the human language, spatial information and musical rules:

- The human language provides logic for reasoning as well as for organising knowledge objects;
- Spatial information provides logic for organising spatial objects (used in, for example, self-driving cars);
- Musical rules provide logic for organising harmonious musical arrangements.

I focus on the human language.

Because all natural phenomena are designed in a unified way, Natural intelligence and the human language might be related. If so, it must be possible to identify the natural laws obeyed by language. After identification, it must be possible to reverse-engineer the way nature works regarding knowledge. In other words: how the human brain is organising its knowledge.

According to the biblical worldview, life and the universe were all designed once, while no improvements were made afterward. So—if intelligence and language are related—current languages must still obey the same Laws of Intelligence as were designed in the beginning, regardless of all their differences [5]. Then, current languages still must share the same foundation.



5 The existence of entirely different languages today is explained in the bible: "At one time all the people of the world spoke the same language and used the same words" (Genesis 11:1). During the building of the tower of Babel, God confused the tongues: "Come, let's go down and confuse the people with different languages. Then they won't be able to understand each other" (Genesis 11:7).

2.1.1. World-view

The Laws of Nature are the fundamental laws underlying all natural phenomena.

Take, for example, the ability to fly. It is inherent in the Laws of Nature and is therefore, in principle, accessible to any organism. Some plants produce seeds that, driven by the wind, can glide or drift to other locations. And some animals have wings. However, not every organism is equipped to make use of those laws. Humans have developed artificial solutions to make use of these Laws of Nature, such as air-planes and hot-air balloons.

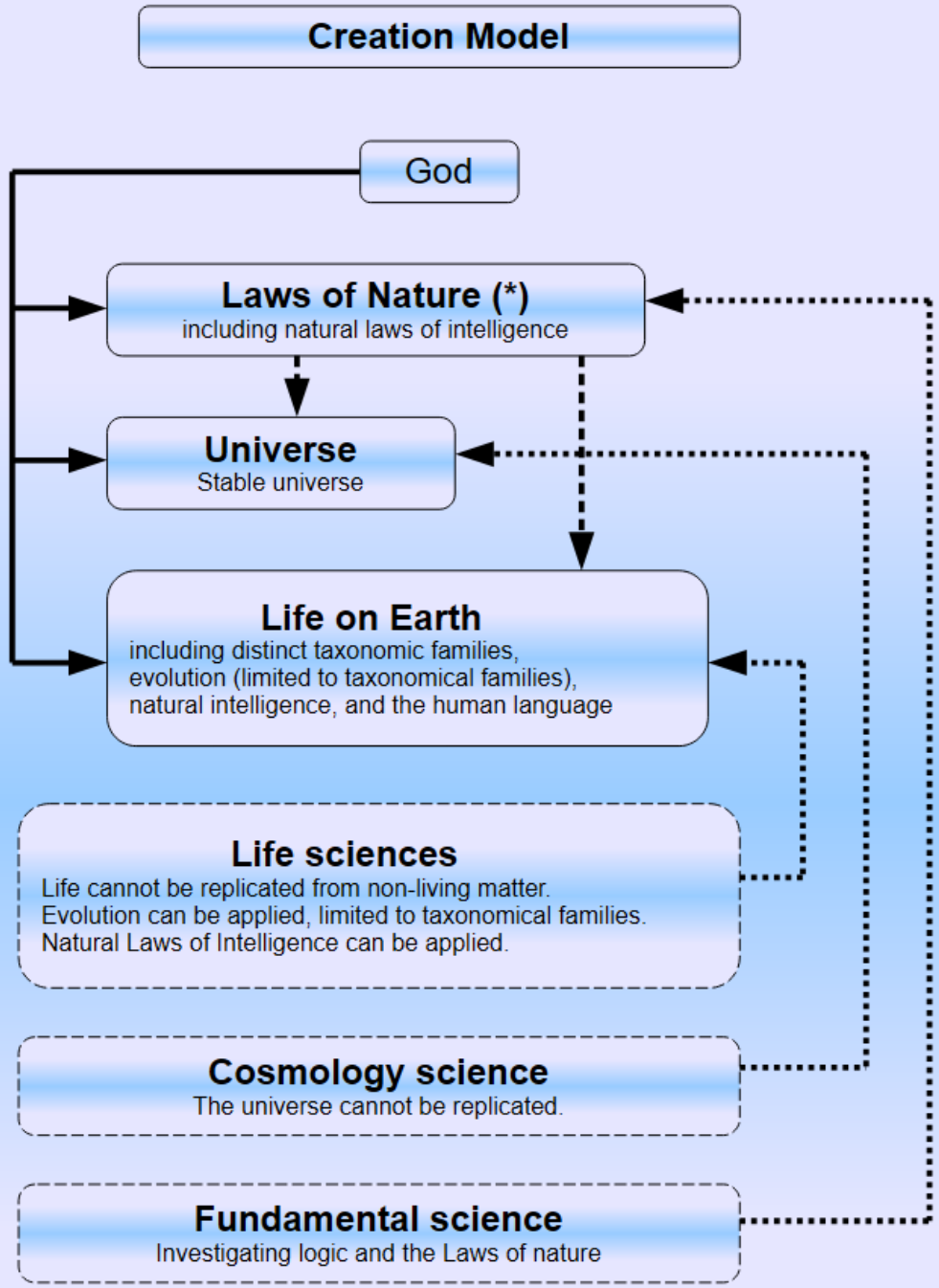
In the same way, the Natural Laws of Intelligence are available to every organism. Yet not every organism has the capacity to make full use of those laws. Moreover, not every individual possesses the ability to fully utilise them. One person may be able to write a text through the use of reason and understanding, while that same text may be far too complex for another person to comprehend.

Likewise, not every world-view is adequate for grasping the Natural Laws of Intelligence. A world-view that presents a distorted picture of how nature operates will have greater difficulty understanding the Natural Laws of Intelligence than a world-view that provides an accurate representation of the workings of nature.

Therefore, I am optimistic that it will eventually become clear which world-view—evolution or creation—more accurately describes the origin of nature. If this leads to a fundamental revision of prevailing scientific assumptions, it would represent the kind of paradigm shift described by Thomas Kuhn—potentially one of the most significant in the history of science.

My take on this discussion:

- **World-view**: God has created nature, including the Laws of Nature;
- **Hypothesis on natural logic**: The Laws of Nature may include Natural Laws of Intelligence, which is a logical kind rather than a physical kind. This may help to explain why logic is universally valid;
- **Hypothesis on self-organisation**: The Natural Laws of Intelligence may provide self-organising properties. This may help to explain why our brains are able to organise their knowledge independently;
- **Hypothesis on language acquisition and multilingualism**: The Natural Laws of Intelligence may include Laws of Intelligence naturally embedded in the Human Language. This may help to explain questions concerning language acquisition and multilingualism;
- **Science**: If the Laws of Intelligence naturally embedded in the Human Language do exist, they can be defined in a logical and linguistic way, after which they can be replicated—implemented in software—tested, and potentially falsified.



(*) Except for physical Laws of Nature, the Creation Model also predicts logical / organisational Laws of Nature as a foundation for natural intelligence, reasoning and the self-organisation of knowledge:

Natural intelligence is the harnessing of natural logic, and our brains use that natural logic to organise their knowledge autonomously. This inherent capacity for self-organisation distinguishes natural intelligence from Artificial Intelligence. For example, language models cannot integrate new knowledge with existing knowledge once they have been trained.

2.2. Natural intelligence

To contribute to science, intelligence needs to be defined in a unifying, fundamental (=natural) and deterministic [6] (=implementable) way:

Natural intelligence is rooted in the Laws of Nature — it is the art of harnessing natural logic.

Natural intelligence allows us to independently:

- Avoid chaos,
- Create order,
- Restore order.

Natural logic provides mechanisms for self-organisation, allowing us to independently:

- Group objects that belong together;
- Separate objects that don't belong together;
- Archive objects that have become less important;
- Plan future actions;
- Foresee the consequences that the planned actions will have;
- Learn from mistakes.

More into detail:

- Grouping (combining) of individual or separate objects, to achieve a goal that can not be achieved by either of those objects separately;
- Separating (differentiating) compound or intertwined objects, to clarify the situation, by putting them in their context;
- Archiving of obsolete information, separating current from obsolete information;
- Planning future actions, setting goals, and anticipation of changes;
- Foreseeing possible consequences: Using knowledge and experience to predict possible consequences of planned actions (own plans and planned actions of others);
- Learning from mistakes: Using knowledge and experience to determine the course of a mistake, and to avoid making this kind of mistake in the future.

These capabilities of intelligence can be applied to basic concepts like knowledge objects, spatial objects and musical rules. Grouping of, for example, numbers, we call: adding. Separating of numbers, we call: subtracting.

6 deterministic: “the doctrine that all facts and events exemplify natural laws”

Deepening:
- Creation starts with grouping;
- Understanding starts with separating;
- Omitting starts with archiving;
- Governing starts with planning;
- Anticipation starts with foreseeing;
- Improvement starts with learning from mistakes.

2.2.1. Natural language as an intelligent system

Assuming that natural language is an intelligent system, predictions can be made about the intelligence that will be found in language:
1. Natural language will have self-organising properties;
2. The sender's brain will add logical clues to the knowledge that is expressed;
3. The receiver's brain will use the logical clues added to the knowledge, enabling it to organise the received knowledge.

In all languages, there will be specific words and sentence constructions for:
- Grouping knowledge that belongs together;
- Separating knowledge that doesn't belong together;
- Archiving knowledge that is no longer relevant;
- Planning future actions;
- Foreseeing the consequences that the planned actions will have;
- Learning from mistakes.

2.2.2. Self-organisation as a property of natural intelligence

Self-organisation is a property that separates natural intelligence from Artificial Intelligence.

Artificial neural networks excel in pattern recognition and pattern generation but fails in logic and self-organisation. Take for example Large Language Models: They are unable to seamlessly integrate new knowledge with existing knowledge, after being trained.

Self-organisation is a property of natural intelligence — rather than the origin:

- Natural intelligence is the harnessing of natural logic;
- Logic is essential for applying set theory;
- Set theory is fundamental to every form of organisation—grouping what belongs together, separating what does not, and so on;
- Prefix “self” of self-organisation means in this case: done automatically.

Now the other way around:

- Self-organisation requires set theory to be automated;
- Set theory requires logic to be implemented;
- This logic needs to be natural in order to be automated;
- Natural logic requires a natural source of intelligence;
- The human language, spacial information and musical rules are natural sources of intelligence;
- Their inherent logic can only be uncovered by unravelling their underlying design;
- Applying this inherent, natural logic enables self-organisation.

So, the purposiveness (teleology) of human language can be used to replicate its inherent, natural logic — including self-organisation — whereas scientists tend to avoid researching purposiveness (teleology) in nature, instead referring to it as “apparent purposiveness” (teleonomy).

Whoever studies nature — studies God’s creation. Perhaps that’s why scientists in certain fields are reluctant to study how nature truly works.

2.2.3. Natural reasoning in natural language

Almost 2,400 years ago, Aristotle already described a few cases of natural reasoning in natural language — combining natural logic (natural intelligence) with natural language, like:

- Given: “All philosophers are mortal.”
- Given: “Socrates is a philosopher.”
- Logical conclusion: “Socrates is mortal.”

This case of natural reasoning in natural language will be the start of our investigation of finding, unraveling and replicating God’s intelligent design regarding to natural intelligence and natural language.

2.3. Laws of Intelligence naturally embedded in the Human Language

Clues of logic—naturally embedded in the human language—provide information to our brain on how to organise the gained knowledge. The clues of logic include specific words for grouping, separating and archiving (see definition of Natural intelligence). By using these logical clues—which I call the Laws of Intelligence naturally embedded in the Human Language—we can implement a naturally intelligent, self-organising knowledge technology similar to the way the language centre of our brain works:

- The basic verb "is/are" defines present tense basic logic, which has been described scientifically;
- An indefinite article (in English: "a") defines a structure, which has been described scientifically;
- Conjunction "and" has the intelligent function in language to group knowledge, with and without relations (Block 3 and Block 4 of my Scientific Challenge);
- Conjunction "or" has the intelligent (Exclusive OR) function in language to separate knowledge (Block 6);
- A definite article (in English: "the") has the intelligent function in language to archive knowledge (Block 7);
- The basic verb "was/were" defines past tense basic logic (Block 5);
- The possessive verb "has/have" defines present tense direct and indirect possessive logic (Block 1 and Block 2);
- The possessive verb "had" defines past tense—direct and indirect—possessive logic (Block 1 and Block 2 and Block 5).

I am implementing grouping, separating and archiving as much as possible while leaving the implementation of the remaining capabilities to future generations. These Laws of Intelligence naturally embedded in the Human Language drive a set of structuring algorithms [7] in my system to independently group, separate and archive knowledge in its knowledge base.

So, natural language provides knowledge—expressed in a certain language—as well as a logical structure of how that knowledge should be organised. This logical structure is (almost) language-independent.

7 algorithm: "any set of detailed instructions which results in a predictable end-state from a known beginning"

2.3.1. Example of reasoning: Autonomous generation of questions

Let's put the Laws of Intelligence to work. Or at least, one law:

- Given: "Every person is a man **or** a woman."
- Given: "Addison is a person."
- Automatically generated question: "Is Addison a man **or** a woman?"

How to automatically generate the question mentioned above, using Laws of Intelligence:

- A law of intelligence: Conjunction "or" has the intelligent (Exclusive OR) function in language to separate knowledge;
- Given "Every person is a man **or** a woman" and "Addison is a person";
- Substitution of both sentences: "Addison is a man **or** a woman";
- Conversion to a question: "Is Addison a man **or** a woman?".

2.3.2. The function of lexical categories

Nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, interjections, numerals, articles and determiners are word classes / Parts of Speech (PoS) / lexical categories.

Lexical categories are essential for reasoning. Consider, for example: "All philosophers are mortal" and "All blue are mortal". Only one of both sentences is grammatically correct, while the other doesn't make sense. So, knowledge technology must always keep track of the lexical category of each word.

Each word of a list of words is usually of the same lexical category. Consider, for example: "Red, white and blue" and "Red, a sister and four". Again, only one of both phrases is grammatically correct, while the other doesn't make sense.

2.3.3. Autonomy / independently

In the definition of natural intelligence, the word "independently" is used. So, we need to define that word, which is similar to the word "autonomy":

An autonomous system relies on the **consistency** of a natural source, or a **consistent** artificial source such as GPS (Global Positioning System). So, an autonomously intelligent system relies on the consistency of a natural source of intelligence.

AI does not rely on the consistency of a natural source of intelligence. Instead, a lot of human labor is required—such as the fine-tuning of LLMs—and **inconsistent** artificial sources or engineered techniques are used in the background, like, for example, some reasoning or semantic techniques.

2.4. Self-organisation (implementation)

A self-organising knowledge system requires explicit operations, which are outlined below:

- **Statistics** are static, whereas self-organisation is dynamic. Language models create a statistical structure, which many people mistake for self-organisation. Hence, language models, after having been trained, are unable to seamlessly integrate new knowledge with existing knowledge;

- **Creating**: Natural reasoning constructs — see my Scientific Challenge — are the foundation of my reasoner. Together, they provide the accountability for each self-generated conclusion, assumption and multiple-choice question;

- **Keeping up to date**: When a change relates to self-generated knowledge — a self-generated conclusion, assumption or multiple-choice question — the natural reasoning constructs underlying that knowledge are amended. If the uncertainty of the amended knowledge changes, all natural reasoning constructs with a level of uncertainty higher than that of the amended knowledge are removed. So, all underlying natural reasoning constructs have the same level of uncertainty;

- **Set theory**: Natural intelligence involves grouping what belongs together and separating what does not. This is implemented using set theory.

  In the sentence "Paul is a son of John and Anna", I call "Paul" the subject, "son" the object, and "John" and "Anna" the relation words. Subject words are collected with other subject words, object words with other object words, and relation words with other relation words.

  In this example, "John" and "Anna" are collected into a union as **relations**. In the phrase "coffee or tea", however, both object words appear to be mutually exclusive. Together they form an exclusive disjunction of **objects**, representing an XOR (eXclusive OR) function. And when the sentence "Joe is a son of John and Anna" is entered, subject words "Paul" and "Joe" are collected into a union as **subjects**;

- **Possessive logic**: In most cases, logic is limited to express infinitive "to be" (am/is/are/was/were) in the present tense (am/is/are). However, in particular cases, infinitive "to have" (has/have/had) is the complementary function of infinitive "to be": The sentences "Paul **is** a son of John" and "John **has** a son called Paul" express the same knowledge, only their subject is different. So, we need possessive logic too;

- **Dynamic structure**: The sentence "John is a father" is a static structure. We also need a dynamic structure on top of the static structure, an **assignment**: "John is **the** father of Paul". When "John" dies, this particular assignment changes into "John **was** the father of Paul". If the structure "Paul has a father called John" was true, the assignment "Paul **had** a father called John" is added on top of the static structure, while the structure "Paul is a son of John and Anna" remains valid;

- **Indicators**: My reasoner stores a lot of indicators for each sentence. I already mentioned three types of collection: subject, object and relation. And in the phrase "coffee or tea", the objects appear to be mutually exclusive. In the following example, the subjects are mutually exclusive: In 2021, "Joe Biden is **the** president of the United States" became true. Following four years later by: "Donald Trump is **the** president of the United States". To be able to 'archive' "Joe Biden" as a president, the system has to know that the subject is mutually exclusive; that there can only be one president at the time;

- **Searching**: Maintaining a parent structure, i.e. the subjects of the objects. This allows you to quickly navigate upwards through the knowledge structure towards similar knowledge;

- **Optional**: My system creates quick-lists of, for example, nouns or proper names. That makes searching the knowledge structure more efficient if the parent structure does not suffice;

- **Important**: You have to design everything yourself, based on the Laws of Intelligence naturally embedded in the Human Language: a logical, intelligent, self-organising framework grounded in the Laws of Nature, enabling our brains to self-organise their knowledge and to reason logically. Nothing will emergence automatically. Philosophical naturalism tries to make us believe that self-organisation or emergence arises in complex structures. I wish them every success in turning this hypothesis into a reliable implementation.

2.5. Universal Grammar theory

In his Universal Grammar theory, Noam Chomsky proposes that the ability to learn a language is hard-wired in the brain, which differs from my fundamental approach:

There is no Universal Grammar, but there are Universal Laws of Intelligence naturally embedded in the Human Language, while logic / algebra / universal reasoning rules on themselves are (almost) language-independent.

When children learn a language, this universal logic in the language centre of their brain is 'configured' for a language, which will be their native language / mother tongue. My Controlled Natural Language reasoner works similarly: It implements an (almost) language-independent logic, which is configured for five languages: English, Spanish, French, Dutch and Chinese.

Just as each living cell contains all the information needed to replicate itself, natural language—the language centre in our brain—contains all information to organise its knowledge independently (self-organising properties).

Communication with other natural language systems—other people—requires that all language systems operate in the same way. That is easiest when those language systems are configured for a common language, but it is not necessary. Broken English and communicating through gestures are powerful workarounds.

2.6. Free will and morality

First of all, morality and free will originate from the bible.

According to the bible, humans separate from animals by having a spirit, which provides humans a free will and a set of morals. Spirits — being supernatural — are, by definition, not bound by the Laws of Nature. Therefore, spirits can't be captured in machines, which are, by definition, bound by the Laws of Nature. So, a machine will never have a spirit, free will and an autonomously controlled set of morals like humans have.

I agree with John Searle on his Chinese room thought experiment, that computers will never have a mind and consciousness:

> "if there is a computer program that allows a computer to carry on an intelligent conversation in a written language, the computer executing the program would not understand the conversation either".

2.7. Prediction

On the assumption that nature has a relational and intelligent origin, I expect to uncover even more relational and logical structures within the human language that have not yet been described by scientists. And I expect to uncover even more languages obeying these relational and logical structures.

So, I expect to implement more relational and logical structures, and more languages, to be implemented in my Controlled Natural Language reasoner.

Testimony: I don't have this wisdom of myself

During my young childhood, God asked me if I wanted to become rich or wise. I chose wisdom [8] because I like the stories about the wisdom of King Solomon.

A few years later, I offered my life to God, as I gave up my own life and desires, and fully dedicated my life to Him. Initially, nothing special happened. I studied electrical engineering, electronics, and computer science (Bachelor, specialisation: telematics). I also tried a master study, which I didn't finish.

During my study computer science, I joined elective course Artificial Intelligence. However, after a few lessons I left the course disappointed, because LISP and Prolog are no replications of natural intelligence. On May 15, 1990, I attended a seminar on Artificial Neural Networks at TU Delft. However, after a few years, I realised that artificial neural networks do not possess the capabilities of natural intelligence either.

I became just another Software Tester. I am skilled in software testing, but I recognise my limitations. I am not a genius.

In the first decade of this century, God asked me if I accepted an assignment—a mission of life—to prove philosophical naturalism / evolutionism wrong. If I would accept this assignment, God would provide unique knowledge about His creation of intelligence and language. I accepted. And as promised, God gives me wisdom—insights beyond my knowledge and intelligence—as long as I work on this project. However, if I use the given wisdom for my own good, it will be taken from me. I was explicitly ordered: "Give everything away. Keep nothing behind".

While I was criticising the current approach to AI and NLP on LinkedIn for not having a (natural) foundation, nor a (natural) definition of intelligence, someone asked me what definition I used. Then I had to admit to myself that I didn't have a definition of intelligence either. So, I prayed and asked for an answer. Ten minutes later, I was able to write down a unifying, fundamental (=natural) and deterministic (=implementable) definition of intelligence, provided by God. Later I also discovered how this definition is related to language through Laws of Intelligence naturally embedded in the Human Language.

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8 It wasn't a trick question, because trick questions are not consistent with the character of God. If I had chosen wealth, I had to give this wealth away like I give away the results of my wisdom now. But I guess, God already knew what my answer would be. When God gives such a gift, it doesn't mean you can keep that gift for yourself. It means, you should use it to the glory of God.

Appendix: Genesis hidden in the Chinese language

The Chinese language is the oldest, continuously written language in the world. It was first written over 4,500 years ago. And some Chinese characters seem to refer to first book of the bible (Genesis). A few examples:

The Chinese character for "to create" consists of four components, and seems to refer to the creation of "Man" – later called: Adam:

- Dust or mud: God has created Adam from dust;
- Mouth or breath: God breathed into the nostrils of Adam;
- Movement or life: Adam became alive;
- Able to walk: Adam was directly able to walk (and to speak).

"*Then the LORD God formed the man from the dust of the ground. He breathed the breath of life into the man's nostrils, and the man became a living person.*" (Genesis 2 verse 7)

(See on YouTube: "Genesis hidden in the Chinese language? Part 2")

The Chinese character for "to covet, to desire" consists of two components, and seems to refer to the Fall:

- Two trees: the tree of life, and the tree of the knowledge of good and evil;
- A woman: "Woman" – later called: Eve – desired the fruit of the only forbidden tree.

(See on YouTube: "Genesis hidden in the Chinese language? Part 3")

On YouTube: "Genesis Code Hidden Within The Ancient Chinese Language", among all:

- The Chinese character for "first" consists of three components: alive, dust and man. (Adam – created from dust – was the first man to become alive);
- The Chinese character for "to talk" consists of three components: dust, breath/mouth and alive. (Adam – created from dust – was able to talk);
- The Chinese character for "naked" consists of two components: man and fruit. (After Adam and Eve had eaten the fruit from the forbidden tree, they felt naked);
- The Chinese character for "pain" consists of two components: a piece and two trees. (Pain was a punishment from God for Adam and Eve after they had eaten a piece of fruit from the forbidden tree).

On YouTube: "How Chinese Characters confirm Genesis & Bible stories", among all:

- The Chinese character for "flood" consists of four components: eight, united, earth and water. (Noah, his wife and their three sons with their wives, all eight were united in their boat, while the surface of the Earth was flooded with water).