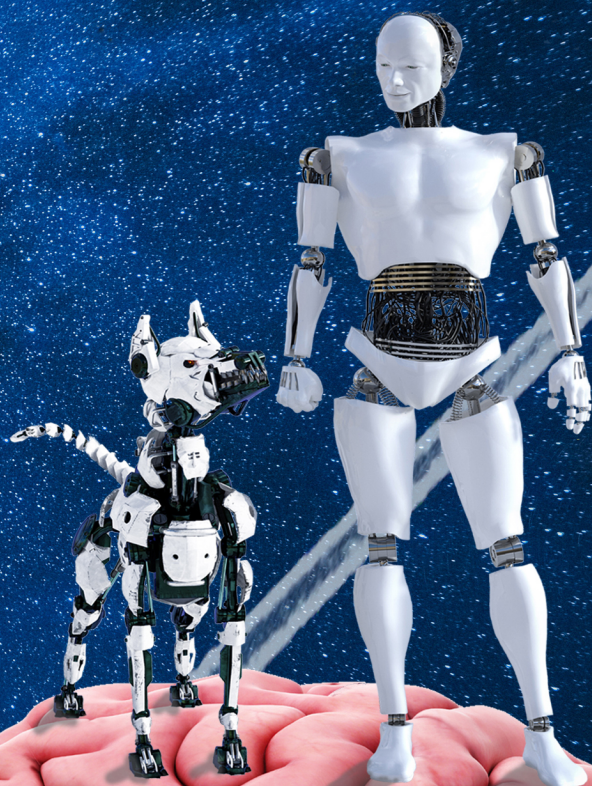


SURVIVAL AND HAPPINESS IN A
COLLAPSING SOCIETY WITH
Advancing Technology

INTELLOPY



JJ KELLY

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DEDICATION

To my grandchildren—Blake, Bay Lou, Joe, and Remi:

You were born a blank slate and must learn the knowledge discovered and accumulated in society. Much of what today's society will try to teach you is false—not based in reality—and can cripple your mind.

I share my knowledge of how the world works—principles based on reality—so that you can distinguish truth from falsehood and navigate turbulent change toward your heroic vision.

With love,

Daddo

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THEORY OF MIND

Based on Brain Pattern-Recognizer Functions

The following *Theory of Mind* was an exercise I needed to do to clarify my understanding of what consciousness *is*, the levels of consciousness, self-awareness, and goal-directed action. This exercise is quite tedious to follow, and therefore I did not include it in the book's main body. I have included it in the Resources section as food-for-thought material for those who, like me, wish to dig deeper into this subject.

Ultimately, I wanted to understand how *consciousness* could be a material-less phenomenon arising from the brain's evolved physical functioning? I developed the following only as an example of the type of pattern-recognizer-based brain operations that could plausibly result in our conscious mental capabilities. I am not a neuroscientist. I did not intend for the following exercise to be a scientifically accurate description of a brain's functioning or the only possible explanation for consciousness. I only needed to satisfy myself that it *is* possible to describe at least one theoretical chain of pattern-recognizer functions that could result in consciousness.

Shorthand used: Three levels of consciousness: *Subc*-onscious (not conscious); *Perc*-eptual; *Conc*-eptual.

Note: Some animals with simple neural networks or brains respond to environmental stimuli with instinctive responses but cannot modify or override their preprogrammed instinct to any significant degree or create any newly learned behaviors. I consider these as not possessing consciousness for this exercise.

BASIC SENSORY OPERATION (MAMMALIAN BRAINS)

Simple organisms that do not possess the faculty of consciousness simply respond to range-of-the-moment stimuli from the external world without retaining or learning anything from experience. The essential ability of the

perceptual level of consciousness that higher animals possess but simple organisms do not is the ability to retain sensory stimuli over time until they: can detect—become “conscious” of—an “entity” in the external world; can learn to differentiate between entities by recognizing each entity’s “identity”; and can automate learned successful behavioral responses to such entities.

The brain is essentially a large pattern recognizer made up of an integrated system of an exceptionally large number of Pattern Recognizer Units (PRUs) and Connection Networks (CNs). The neocortex alone contains approximately 300 million PRUs in total.³⁰⁰ In a human, a single PRU consists of approximately 100 individual neurons, densely interconnected within the PRU in what is called a cortical column. The synaptic connections between the 100 individual neurons within a single PRU are genetically determined and used only for momentary pattern recognition by that PRU and do not connect to other PRUs.

The CNs consist of interconnecting neurons between PRUs. Each of these neurons has many axons (transmitters) and dendrites (receivers). The axons and dendrites of separate neurons connect in a relay fashion and to the input/output signal connections of PRUs in serial and parallel arrangements to create complex networks. Each CN can produce a “pattern” of input signals that connected PRUs can evaluate. These standard CNs are present in all brains and can propagate signals across the brain regions in a relay fashion.

In higher animals, such as humans, the great apes and cetaceans, a long-distance type of neuron called “von Economo” or “spindle” neurons exist. These only have a single axon and dendrite and are exceptionally long, traversing much farther in the brain than standard neurons. It is believed these evolved out of necessity as larger brains evolved. However, the ratio of von Economo neurons in relation to brain size is much greater in humans than any other species—about 80,000 for humans, 16,000 for gorillas, 2,100 for bonobos, and 1,800 for chimpanzees. They are not present in other animals.³⁰¹ This means that humans have a much greater capacity to form CNs consisting of interconnected PRUs and interconnected networks of functional brain areas. These networks do not have to rely on the signal relay by standard neurons.

Various combinations of CNs and the PRUs that they interconnect, taken together, serve as either brain Function Modules (FMs) that process information by recognizing patterns or brain Information Storage Units (ISUs) that store

information by saving patterns. Some of these FMs and related ISUs in cascading hierarchies are accessible to conscious control, and others are subconscious only.

Each PRU has many external neuronal connections to other PRUs via its CN. Each PRU sends and receives signals via these inputs/outputs. The neuronal connections within a single PRU are optimized to recognize a particular pattern of input signals. The input/output signals between PRUs are scalar, not binary. They have specific signal strengths. If the PRU detects its preprogrammed pattern of inputs of sufficient strength to exceed some threshold, it “fires” a set of preprogrammed outputs to connected PRUs. Some of the signal inputs to a PRU act as pattern detection inhibitors or enhancers, either raising or lowering the threshold of detection by that PRU.

PRUs interconnect in cascading chains. Multiple lowest-level PRUs act on discrete sensory signals and their combined outputs feed an intermediate PRU. Then, multiple intermediate PRUs feed their combined outputs to higher-level PRUs. Constellations of highest-level PRUs and CNs comprise the brain’s FMs and ISUs. The CNs between PRUs are created and optimized by repeated use. This optimization makes PRUs, CNs and FMs more energy and time-efficient and information stored in ISUs more easily accessible and permanent.

The ISUs in the brain of an individual animal or human are the “memory” structures. They contain stored information content in the form of the network patterns optimized within them. As “network” patterns, each ISU consists of both “identity” pattern information (describing this item of information) and “relationship” pattern information (links between this item of information and others stored in other ISUs). In animals' case, the initial pattern information was placed there as “instinct” by genetic instructions during embryonic development of the brain structure. In humans' case, there is a small amount of instinctual information built in. Still, most of the brain’s information content was placed there by subconscious experience and conscious thought directing the subconscious throughout the individual’s life.

The various sense organs have autonomous signal preprocessors, in some cases not part of the brain, that filter and integrate the firings of individual stimuli detection cells into usable information signals. These are sent to one or more FMs in the brain. These sensory preprocessors operate subconsciously.

PERCEPTUAL-LEVEL CONSCIOUSNESS (HIGHER ANIMALS)

A Function Module (FM) is a set of PRUs and CNs applied to process a presented pattern of neuronal signals in a certain way once triggered. FMs are networked in hierarchies. Higher-level animals can isolate “entities” from the perceptual field and differentiate between entities—“identities.”

The individual’s brain has a Master Pattern Recognizer (MPR) that is itself an FM that serves as a CPU (Central Processing Unit) for *consciousness* at both the subconscious and conscious levels. The MPR has a limited number of Attentional-Pointers (APs)—approximately five. These APs are the mechanisms that can sustain the pattern of signal inputs pertaining to a perceived entity. Simultaneously, the MPR sends those patterns to other FMs that are triggered to act on them. Whenever a new entity pattern is detected, the brain must allocate one of its five APs to that entity pattern to trigger FMs. This means the brain must temporarily set aside whatever entity pattern the AP was previously considering. It does this by saving the prior entity pattern it was considering to a temporary AP-Memory-Stack made up of ISUs to be brought back into attentional focus by the AP later. There can be multiple AP-Memory-Stacks associated with the various FMs to be executed. Each AP-Memory-Stack can hold multiple saved entity patterns just outside the Attentional-Workspace to recall and deal with as quickly as the brain can do so.

The “Self”

The individual brain has a built-in implicit recognition of itself as the permanently recognized *entity* in relation to which all the other entities pointed to by the APs are considered. At the perceptual level of consciousness, the individual does not need to use one of its APs to represent itself. Additionally, the perceptually conscious animal’s brain learns to recognize the animal’s physical body parts as *self*—differentiating itself from other identities. For example, seeing its own extremity move in its field of vision, it does not consider such extremity an entity apart from itself. It does not eat its paws. A higher animal is “self-aware” at the concrete entity perceptual level.

The individual’s MPR constitutes a mental workspace—an Attentional-Workspace, a four-dimensional (three in space and one in time) mental

workspace in which the entities being pointed to by each AP are placed according to their relationships and as the behaviors of those entities play out. The individual always considers itself at the center of the Attentional-Workspace. Within its Attentional-Workspace, the individual can only actively and simultaneously consider the presence, placement, relationship, and actions of the entities currently being pointed to by its five APs.

An “Entity”

A Perc-Entity-Recognizer-FM operates at the perceptual level of consciousness and compares signals coming in through the sense organs preprocessors to entity patterns previously stored in ISUs and “fires” when an “entity” pattern-match is detected. “Firing” in this case means assigning an AP (Attentional-Pointer) to it in the Attentional-Workspace and triggering a Perc-Identity-Recognizer-FM. The location of the entity within the four-dimensional Attentional-Workspace is reported to the Perc-Identity-Recognizer-FM.

An “Identity”

When a Perc-Entity-Recognizer-FM triggers a Perc-Identity-Recognizer-FM, the brain allocates one of its APs to it, saving its previous content to a temporary AP-Memory-Stack. The Perc-Identity-Recognizer-FM then compares the pattern of detectable attributes of the object entity against known entity attribute patterns stored in ISUs. It does this by repeatedly triggering lower-level Perc-Attribute-Isolation-FMs that look for pattern matches of specific types of attributes, size, shape, orientation, color, motion, etc., and respond to the Perc-Identity-Recognizer-FM with output signals if the particular attribute is detected. If an identity pattern match is detected, the Perc-Identity-Recognizer-FM fires. Firing, in this case, means assigning the AP to the retrieved identity pattern and triggering a Perc-Situation-Recognizer-FM. Suppose the Perc-Identity-Recognizer-FM detects no identity pattern. In that case, it does not fire. The individual disregards the detected entity within its Attentional-Workspace. The AP releases this identity pattern and recalls the one previously saved onto the AP-Memory-Stack. It is important to note that the AP in the mental workspace is pointing to a previously saved mental pattern of

entity attributes that represent the physical item but are not the actual physical item—which cannot exist in our mind.

A “Situation”

When triggered, the Perc-Situation-Recognizer-FM compares the combination of this AP’s entity pattern and the other entity patterns that are being pointed to within the Attentional-Workspace by the other four APs, recognized to be simultaneously present, to known patterns of *situations*, such as *threat* or *opportunity* stored in ISUs, and “fires” when a situation pattern-match is detected. (For example, a pair of lions actively on the hunt is a different situation pattern than a pair of lions napping in the sun.) Firing means triggering a Perc-Situation-Handler-FM. For example, in the case of a threat, a related Perc-Threat-Response-FM is triggered, and firing in the case of an opportunity means triggering a related Perc-Opportunity-Response-FM. If no situation pattern is detected, then the Perc-Situation-Recognizer FM does not fire. The individual’s day continues until a situation does arise within its Attentional-Workspace.

A “Projection”

Whenever a Perc-Situation-Recognizer-FM finds a pattern-match for a situation within the individual’s Attentional-Workspace, and before it triggers a Perc-Situation-Handler-FM, it first triggers a Perc-Situation-Projection-FM. The Perc-Situation-Projection-FM searches known entities relationship and behavior patterns in long-term memory ISUs attempting to *project* how the present situation might unfold in the dimension of time. (Example: the dog detects a ball in your hand and your posture, projects that you are about to throw the ball, and prepares to start running in the direction you are facing even before you throw it.) If a *projection* pattern match is found, it becomes the situation pattern reported to the Perc-Situation-Handler-FM when triggered.

“Taking Action”

If triggered, a Perc-Situation-Handler-FM, such as a Threat or Opportunity Response FM, retrieves from storage in ISUs an information pattern specific to the situation detected by the Perc-Situation-Recognizer FM. This retrieved information pattern represents a list of instructions for physical actions to be taken by the individual's body. The situation handling information pattern was previously stored in ISUs either by instinct or due to this individual's past instances of success with this particular response to this particular situation. Suppose a Perc-Situation-Handler-FM is triggered, and the recalled list of physical response actions is taken. It will either result in some degree of success or failure (measured by the standard of the individual's nature). A record of the actions taken and the results are stored in ISUs of the individual's short-term memory. This short-term memory is generally sufficient to record all the individual's perceptual detection-response-result experiences throughout one day. It is transcribed into long-term memory during sleep cycles.

“Sleeping”

While the individual sleeps, perceptual-level consciousness of external reality is mostly suspended. The brain is, therefore, free to apply its resources to internal maintenance. However, certain Perc-Entity-Recognizer-FMs and Perc-Identity-Recognizer-FMs processing sensory input signals, such as hearing, remain active. Still, their triggering test patterns and signal thresholds are adjusted to only fire upon sensing significant out-of-the-norm inputs. If these do fire, then the sleep state is interrupted with a return to full perceptual consciousness of the external world.

During sleep, the brain's Attentional-Workspace and Attentional-Pointers (APs) are turned inward. The Attentional-Workspace activates a Subc-Memory-Transfer-FM that moves the recorded information patterns of the day's activities from short-term to long-term memory. The Subc-Memory-Transfer-FM uses the Attentional-Workspace and five APs to process each of the day's recorded situations, entity-identities, actions-taken, and result patterns held in short-term memory ISUs. It triggers specific subconscious FMs to process each item while transcribing it from short-term memory into long-term memory.

During transcription, as each element pointed to by an AP is being dealt with, a Subc-Pattern-Adjustment-FM is triggered. The Subc-Pattern-Adjustment-FM compares the patterns of the day's experience (saved in short-term memory regarding a particular situation-entity-identity-action-result item) to the previously saved patterns and updates the patterns in long-term memory to incorporate any differences (learning from experience). These are "updated" by repeatedly activating the associated ISUs and CNs to strengthen them.

"Dreaming"

During sleep, the Perc-Situation-Recognizer-FMs and Perc-Situation-Handler-FMs remain active and continue to monitor the Attentional-Workspace as the Subc-Memory-Transfer-FM and Subc-Global-Search-FM do their work. As the Subc-Pattern-Adjustment-FM brings various random situations from long-term memory into the Attentional-Workspace to compare and adjust them, the Perc-Situation-Recognizer FM randomly identifies situations and triggers the related Perc-Situation-Response-FM. During sleep, however, the Perc-Situation-Response-FMs are mostly suppressed from taking physical action. These recognized situations and calls for action during sleep are *dreams*. In some cases, the dreams are sufficiently intense to break through the inhibitors while sleeping and trigger unconscious actions, for example, the sleeping dog that begins muffled barking while its paws twitch as if running.

"Goal-Directed Action"

For all living things, sustaining one's existence is their central value and purpose. In the higher animals, evolution provided them with instinct, based on *previous* generations' successful experiences, to guide their actions. In any given situation, instinct in the form of the action lists pointed to by Perc-Situational-Handler-FMs dictate their goals and their actions to fulfill whatever they need to sustain their life—no choice is required. In the absence of instinct, humans must rely on their *conceptual* faculty to choose their actions.

CONCEPTUAL-LEVEL CONSCIOUSNESS (HUMANS):

The human brain has massively greater neural networking capabilities due, in part, to both a larger brain and a greater number of long-distance von Economo cells that network entire functional modules and sub-networks, not just PRUs. A Function Module (FM) is a set of PRUs and CNs applied to process a presented pattern of neuronal signals in a certain way once triggered. Further, a human's plastic brain can create and modify FMs as needed ("cognitive fluidity"). This is another form of optimization where tasks that were previously accomplished more laboriously by multiple discrete lower-level FMs get integrated into new optimized FMs to achieve energy and time efficiency.

A conceptual human has the same Attentional-Workspace and five APs limitation as a perceptual animal. The Perc-Entity-Recognizer-FM, Perc-Identity-Recognizer-FM, Perc-Situation-Recognizer-FM, and the Perc-Situation-Handler FM all function much the same at the perceptual level. However, a human also has additional, greatly enhanced conceptual-level extensions to these function modules. When these FMs are used at the conceptual-level, we can refer to them as Conc-Attentional-Workspace, Conc-APs, Conc-Entity-Recognizer-FM, Conc-Identity-Recognizer-FM, Conc-Situation-Recognizer-FM, and Conc-Situation-Handler-FM. These enhanced brain function modules can form and manipulate mental *abstractions*. These conceptual FMs are not active at birth but are developed over the first few years of childhood. This begins with identifying entities and is facilitated in an infant human by adult humans as follows.

A "Concept"

A human child's Perc-Entity-Recognizer-FM detects something that its parent is pointing to and assigns an AP to it in the Attentional-Workspace. Simultaneously, the parent says the word "chair," and that discrete sound pattern also becomes a detected entity and is assigned another AP in the Attentional-Workspace. Then Perc-Identity-Recognizer-FMs are triggered to see if the object entities are previously known and if not, to save them. However, unlike the more primitive Perc-Identity-Recognizer-FM, the child develops a Conc-Identity-Recognizer-FM capable of associating the sound utterance "chair"

pattern with the physical object chair pattern as a mental symbol for it and saving both patterns plus their association to memory ISUs.

In the future, whenever the child's Perc-Entity-Recognizer-FM detects the presence of a physical entity and assigns it an AP, and a Conc-Identity-Recognizer-FM pattern matches it as a chair, it returns the abstract symbol for "chair." It re-assigns the AP in the mental workspace to the *symbol* pattern rather than the *physical object* pattern. Further, when the Perc-Entity-Recognizer-FM recognizes only a sound pattern entity (a word), the Conc-Identity-Recognizer-FM can identify the sound pattern as the symbol "chair" and return the associated pattern match of a (standard) physical chair, which then becomes the entity to which the single AP is pointing to in Attentional-Workspace, even though no physical chair is present. Remember, physical identity patterns and symbols (words) are both mental representations of entities, not actual entities.

In review, the Perc-Identity-Recognizer-FM operates at the perceptual level and returns the identity pattern of an actual physical object detected in external reality. The Conc-Identity-Recognizer-FM operates at the conceptual level and returns either the symbol for a detected physical entity pattern or the physical entity pattern for a detected symbol pattern. The APs in the Attentional-Workspace can point to either physical entity patterns or symbols that are abstract representations of the physical entity patterns. Suppose most of the individual's APs are pointing to physical entity patterns. In that case, the individual is said to be *perceptually* conscious. If most APs are pointing to symbols, then the individual is said to be *conceptually* conscious. Attaching a symbol (word) label to an entity pattern is the formation of a concept.

While analyzing two entities' characteristics in the Attentional-Workspace, the Conc-Identity-Recognizer-FM can perform comparisons between the entities (chairs), noting their similarities and differences. It is then capable of refining the standard entity pattern description associated with a symbol ("chair") so that the one symbol can be used to refer to similar items whenever encountered by ignoring their minor differences. If the human scans a furniture showroom and sees fifty chairs, only one to five physical entity patterns can be simultaneously pointed to in Attentional-Workspace. The Conc-Identity-Recognizer-FMs quickly identify these as units belonging to the concept "chair," a symbol pattern pointed to by a single AP. After the room's visual scan, all fifty chairs are now held in Attentional-Workspace by the single

AP to the “chair” symbol pattern. This is the “unit-reduction” function of concepts.

When the Attentional-Workspace pointers are mostly pointing at different symbol patterns, the Conc-Identity-Recognizer-FM can continue its operations with the mental symbols as the objects to be examined, rather than external concrete entities. It can compare the match pattern requirements of each symbol being pointed-to to search for potential unifying similarities. APs pointing to the symbols “chair,” “table,” “chest,” and “bed” can all be unified under the symbol “furniture,” with the standard match pattern requirement for “furniture” being their common use and context. Four APs are now combined into one—a continuation of the unit reduction process and the beginning of forming a hierarchy of abstractions (concepts).

Taken together, the Conc-Identity-Recognizer-FM’s reassignment of a pointer from an entity pattern to a symbol pattern for that entity, and its refining a symbol’s standard match pattern to subsume a multitude of similar entities based on essential similarities, constitute the definition of “conceptual” thinking—the art of *non-contradictory* identification.

Imagine that a human is intently focused on a podcast being heard through headphones while following someone else through a furniture store. The human’s perceptual-level consciousness can recognize physical objects—chairs, tables, chests, and beds without retrieving from memory their symbols (word names) and guide the human so that he does not bump into them. He might exit the store and not even be able to recall what was there. This is automated mental functioning at the perceptual level of consciousness using the Perc-Entity-Recognizer-FM and Perc-Identity-Recognizer-FM. The Conc-Identity-Recognizer-FM was never called into action—the APs pointing to the entity match patterns detected by the Perc-Identity-Recognizer-FM were never reassigned to point to the symbol patterns (concepts) for those items. The Perc-Situation-Recognizer-FM and Perc-Situation-Handler-FM were triggered to guide the person’s walking automatically. This example indicates the volitional nature of the conceptual-level FMs.

To bring things up to the conceptual level and deal with them as abstractions require greater mental energy and are a relatively slower form of mental processing than what occurs at the perceptual level. A human must choose what he will apply his limited, more powerful, and power-consuming, conceptual

resources to and what he will leave to his perceptual level to handle. At the perceptual level, responses to situations can be automated. When a Perc-Situation-Recognizer-FM fires, it can automatically trigger a preprogrammed Perc-Situation-Handler-FM without triggering conceptual-level-FMs. This is faster and more efficient.

The Perc-Situation-Recognizer-FM compares inputs to a match pattern. When a match occurs, the Perc-Situation-Handler-FM recalls an actions list pattern. The match pattern and action list pattern used at the perceptual level are initially created by two methods. The first method is an *undirected* learned behavior that occurs only at the perceptual level, as it does in the higher animals. Situations that occur with either strong (life-threatening) impact or repetition can form both the *match pattern* and the *behavioral response action list* pattern. The second method is *conceptually directed* learned behavior where the Conc-Situation-Recognizer-FM and Conc-Situation-Handler-FM are triggered. Through their operation, the perceptual-level match pattern and action list pattern are created or modified. When a human encounters a situation, such as walking through the furniture store, and chooses not to apply conceptual-level attention to it, whatever occurs at the perceptual level will be incorporated into the perceptual match patterns and action list patterns as *undirected* learned behaviors as they would with any higher animal. The human will not be conceptually aware of what his perceptual consciousness learned and automated during the experience. Therefore, initial conceptual-level effort—"thinking"—must be invested to intentionally program conceptually directed automation at the perceptual level.

A "Choice—Volition"

The brain's Attentional-Workspace and APs are a limited resource that must be used for both perceptual and conceptual execution of FMs. It can cycle quickly but is faster when operating at the perceptual level rather than the conceptual level. This means that as much as possible must be automated to the perceptual level, thereby maximizing the amount of resource remaining for the more capable but slower conceptual-level processing. On its own at the subconscious level, the brain will automate things based on repetition or strong stimuli. However, automation at the perceptual level can be modified by bringing

the situation match patterns and action list patterns into conceptual-level focus. Volition is the *choice* to apply the brain's conceptual-level resources in a perceived situation—to *focus*—or to let perceptual-level automation handle it without the supervision of conceptual thinking.

The person walking through the furniture store is choosing to allow automated perceptual handling of the action of walking without bumping into things so that remaining Attentional-Workspace and APs resources can be applied to conceptually focusing on the podcast. If he does bump into something, his conceptual-level attention will revert to the act of walking and an examination of what went wrong with the automated handling of the situation, making corrections to the situation match pattern or response actions list as necessary.

In review: the low-level functioning of PRUs and ISUs and the communications between FMs in the brain are referred to as occurring at the *subconscious* (not conscious) level. When FMs are active in recognizing and identifying physical match patterns of entities and the execution of automated behavioral responses to those entities, this is referred to as the perceptual level of consciousness. When FMs are active in handling abstract match patterns of symbols representing entities, this is referred to as the conceptual level of consciousness. A human can choose which situations to apply his conceptual-level consciousness if any. It is a common source of confusion when people say—“He did that unconsciously.” What they accurately mean is—“He did that without engaging his conceptual-level conscious faculty, therefore his perceptual-level conscious faculty handled it according to previously learned behaviors.” No higher animal, including a human, can do anything in the external world “unconsciously.”

“Interrupts”

We have volition as to what to apply our limited and powerful conceptual mental resource toward. We must control when our conceptual consciousness is interrupted by our perceptual consciousness. Otherwise, we would have to consider each entity we encounter, every time conceptually. When a perceptual-level Perc-Scenario-Recognizer-FM triggers a Perc-Scenario-Handler-FM, it is different for an animal vs. a human. For an animal, the list of actions called for by the Perc-Scenario-Handler-FM is an automated response. It was automated

either by instinct or by learned behavior during its lifetime. For a human, the Perc-Scenario-Handler-FM triggers a Salience-Detection-FM that determines if the perceptually detected scenario pattern is of sufficient importance to alert the conceptual level of consciousness by triggering the Conc-Situation-Recognizer-FM.

If the Salience-Detection-FM fires, then a Conceptual-Focus-Interrupt-FM is triggered. This is an “upward” (toward conceptual) channel of the bi-directional bridge between our perceptual and our conceptual faculties. When a Conceptual-Focus-Interrupt-FM is triggered, it is a request that the object scenario pointed to by an AP be examined by our conceptual faculty. Having been interrupted, our conceptual faculty will apply a Conc-Situation-Recognizer-FM and determine whether a Conc-Situation-Handler-FM should be triggered or not. This determination will be saved back to the Salience-Detection-FM match pattern to refine it for the future.

“Stories”

Responding to the Conceptual-Focus-Interrupt-FM means that the AP involved first suspends whatever it was doing, saving that previous state to an AP-Memory-Stack to return later, then brings the scenario pattern being pointed to by the Conceptual-Focus-Interrupt-FM into the Attentional-Workspace. It then activates Conc-Identity-Recognizer-FMs that can examine each of the objects (percepts or concepts) pointed to by the APs, for essential similarities that might enable the identification of its membership in and perhaps unification under a concept. When each of the scenario’s object elements in Attentional-Workspace is conceptually identified with symbols, a Conc-Story-Recognizer-FM is triggered. The Conc-Story-Recognizer-FM recalls the essential natures and behavior patterns for each object concept pointed to in Attentional-Workspace. It then attempts to assemble a linked list of *cause-and-effect* relationship patterns that make up a story. A story is a situation considered regarding *causal relationships* with the element of time. A story identifies which of the entities in Attentional-Workspace are causal actors and makes projections into the future based on previously learned stories of the behaviors of the classes of causal objects (concepts). A story is more complex than an animal’s projection at the perceptual level, which only considers entities’ immediate behaviors. The

added ability of Conc-Story-Recognizer-FM to include *causality* in forming memory patterns of concepts and stories is man's ability to learn how reality works—to learn the Laws of Reality.

For example, upon seeing an antelope in the wild, a human identifies it as the concept “antelope.” He recalls that antelopes as a class usually behave by running away if approached. However, the human also sees a newborn antelope present. His Conc-Story-Recognizer-FM identifies it from story patterns learned in the past as a causal factor that will change the adult antelope's future behavior. It will now charge the human if approached. The human considers this causality when projecting how the story might unfold to choose further action.

During sleep, while each one of the day's situation-and-response experiences for the individual represents a complete *story*, a story's *elements* cannot be compared linearly to those in a similar story in long-term memory. Instead, each element of the day's story must be compared to *all* stories in long-term memory where that element is present and adjust all the stories if necessary. As each element in a day's story is pointed to by an AP and considered, a Subc-Global-Search-FM is triggered. The Subc-Global-Search FM searches all the ISUs where stories are kept in long-term memory to see if the particular element's pattern is contained in the story to compare and adjust if necessary. A human's larger and more distantly connected brain makes Subc-Global-Search-FMs possible. As multiple stories are found that involve the same element, and these stories are updated, our dream seems to repeat over and over with slightly different twists.

A “Conceptual Self”

Without instinct, a human infant is provided by his parents what he needs to live. In the place of instinct, evolution provided humans an insatiable curiosity, a need to learn about how the world around them works. This is how evolution intends for them to obtain the information they need that was not provided by instinct. This information cannot be directly put into their mind for them by their parents. They must actively learn it as they develop their conceptual faculty. This innate curiosity causes the child to explore, to act in a trial-and-error fashion to learn about the world. To toss a ball to see what happens (it always goes down). This initial need to explore and the circumstances of its environment determines

the young child's earliest goal-directed actions. Any new entity detected in its environment is cause for exploration. Observing and interacting with the entity builds the entity, identity, and behavior patterns stored in memory ISUs.

Continuing his exploration of the world, a young human reaches the age where he begins to use his conceptual faculty. He forms the concept “humans” to represent all the people he encounters as differentiated from all the other objects and animals. The child observes other humans' behaviors and can learn to detect when Mommy or Daddy are happy or sad or angry. He learns that these behaviors can be attributed to any member of the class of entities called “humans.” These become the match patterns of scenarios involving human entities that get stored in memory ISUs. The child then recognizes that he has all the physical characteristics of a human and has all the behavioral characteristics that he ascribes to other humans. Unlike the perceptual level, the child does need to use one of his APs to point to himself as an entity when conceptually considering himself as an *abstract entity*—a “human.”

Eventually, due to the need to volitionally choose where to apply his limited conceptual resources at any given moment, the child becomes aware that he can choose between alternatives, that he can use his Conc-Story-Recognizer-FM to identify causal actors and predict outcomes, and that some stories lead to pleasurable results and some to unpleasant results. He is building match patterns of stories involving himself as a causal actor. The child is advancing his conceptual faculty to *introspect*—to examine his feelings of pleasure or discomfort because of his own choices. Each emotional feeling and each instance of choice becomes a perceptual-level concrete entity held in his Attentional-Workspace and examined with his Conc-Situation-Recognizer-FM until he can classify it according to its conceptual symbol, “I’m happy,” “I’m sad,” “I’m mad,” “I want,” “I don’t want,” etc. Then the child learns that he can apply his Conc-Story-Recognizer-FM to identify the alternative outcomes and, therefore, actions he can choose between. At this point, the child has developed a conceptual-level awareness of “self” and an ability to choose his goal-oriented actions. He is now self-aware at the abstract conceptual level. He now has a distinctively human, conceptual mind.

“Conceptual Goal-Directed Action”

Lacking instinct, humans must choose their goals and actions in the face of alternatives. From the first years of life, as a human is developing his conceptual mental faculties, he has accumulated countless experiences that resulted in feelings of pleasure or pain, satisfaction, or discomfort. These experiences have been stored in ISUs as the match patterns of actors, situations, stories, and causality relationships. Later, when facing a situation with alternative actions possible, such as the human hunter seeing an adult and newborn antelope, the human has an advantage over a higher-animal hunter. Both can use Perc-Situation_Recognizer-FMs to recall what types of actions tend to lead to satisfaction or pleasure and what types of actions tend to lead to discomfort or pain, and the varying degrees of both. At the perceptual level, both can determine that they are themselves hungry enough to press the attack. The human, however, has the advantage of being able, at the conceptual level, to use his Conc-Story-Recognizer-FM to assess the story's various match patterns and how the story might play out considering the causal factor of the newborn antelope. This enables the human hunter to be conscious of the increased risk, and he can choose whether to act on the perceptual-level urge to press the attack. Suppose he does choose to press the attack. In that case, the human hunter's conceptual knowledge of *how the world works* helps him choose actions that increase his chances of success while minimizing risks.

“Imagination-Creativity”

When operating at the conceptual level, the APs in Attentional-Workspace are pointing to symbol patterns for concepts. In a manner like using the Subc-Global-Search-FM during sleeping, a Conc-Global-Search-FM can be used to find patterns that have not been saved with any direct relationships but contain some particular element being searched for. When these concepts are held in Attentional-Workspace, the Conc-Situation-Recognizer-FMs are looking to see if they can be integrated to fit any known situations and, if not, whether they represent a new situation that should be saved. This can cause novel combinations of concepts that had not previously been identified. For example, suppose a horse and an antelope's horn are both held together in Attentional-

Workspace. In that case, the Conc-Situation-Recognizer-FM could integrate them into something that it saves under the symbol “unicorn.” This activity is what we call “imagination.” Further, suppose the concept patterns for a box, some poles, and a wheel are held together in Attentional-Workspace. In that case, the Conc-Situation-Recognizer-FM might integrate them into something it saves under the symbol “wheelbarrow.” In this case, we call it *imagination* resulting in “creativity” because it can be brought into existence.

CONCLUSIONS

Consciousness in higher animals and humans is the manifestation of a complex set of functional brain modules executed on pattern-matching neural structures applied in hierarchically and recursively networked fashion and differing between individuals according to their genetically different brain structures and functions and the different external stimuli provided by reality during an individual’s lifetime. To be conscious means to be conscious of reality. The more information an individual can obtain and grasp about how things work in reality, the better it will be to adapt its behaviors for success.

I see no need to treat *consciousness*, *mind*, or *volition* as phenomena apart from the brain. Consciousness is not, itself, an entity. These are descriptions of functional attributes of a brain that has become sufficiently complex for those operations to become possible. Consciousness is not a material-less phenomenon—it is but one attribute of physical human nature. The “mind” is in relation to pattern-recognizer PRUs and CNs in the brain in the same way the faculty of “sight” is related to rods and cones in the eye. Both are attributes of “consciousness” that emerge from a sufficiently complex neurological anatomy—the *mind* is a collective attribute, and *sight* is a more specific attribute.

I also conclude that volition is a direct evolutionary consequence of replacing instinctive automation as directives with a conceptual faculty—the *only alternative to directives is choices*. I also see that consciousness is a primary—it cannot be broken into parts. Consciousness is a faculty that consists of the completely integrated total “whole” of the organism’s physical brain (and its connections to other parts of the body), learned methods of thinking, experiential mental content of how things in reality work, remembered consequences of choices made and much, much more.

Human consciousness is that faculty manifested as being aware of the nature of both external reality and oneself and choosing whether to apply conceptual-level thinking ability to select appropriate behaviors in the face of situations or to leave the selection of such behaviors to perceptual-level automation.

ELABORATIONS AND EXTENSIONS

For those interested in thinking a little deeper, the following elaborations and extensions follow from all we learned in the book and the previous “Theory of Mind” exercise.

The level of consciousness applied by different individuals ranges from *perceptual* to *conceptual* in different degrees. The complex combination of the individual’s habitual thinking choices and the environmental stimuli of a present situation will determine which choice he makes. If, at some point, he learns how to exercise his ability to think and choose, then he is more likely to do so again. The more he does so, the more he becomes preconditioned to exercise his ability to think and choose as a habit—the more conceptual and *volitional* he becomes. Those people mostly devoid of the habit of choosing to think operate mostly at the perceptual and automated level. It is a matter of degree.

One could argue that knowing how to exercise the choice to think and develop a thinking habit is a consequence of the person’s educational and life experience and therefore was not volitional on his part. How can he be held responsible for not learning how to think if he was born tabula rasa and was never taught or shown how? I believe this is true and is another consequence of evolution having replaced instinct with a conceptual faculty. In addition to becoming dependent on continually making choices instead of having automatic instincts, we are also dependent on society as the repository of accumulated knowledge of reality, including what we have discovered about how humans use their conceptual faculty. We must first be taught by our society (parents or their surrogates) how to think, how to use our rational faculty, and then we will be able to learn the knowledge of reality accumulated in our society. The necessity to think and choose our actions and the need to be taught how to think by society is the price paid to evolution to replace our directive instincts with a conceptual-level consciousness. The evolution of language is what gave simultaneous rise to both our conceptual faculty and our society.

A human society that consistently teaches its young how to think properly will increase both the number of individuals who develop the habit of conceptual thinking and the degree to which they come to rely upon the conceptual level as

their preferred level of consciousness. Such a society will be better able to deal with changing reality and continue to evolve. A society that does not teach its young how to think conceptually will devolve back towards an animal-like perceptual existence. However, without instincts to guide them, the individuals and their society will eventually perish. For example, a human born during the Dark Ages is genetically no different than a human born today. A human in the Dark Ages would not have had a chance to learn how his “rational faculty” or the “scientific method” work because knowledge of these was not generally known or taught by society. The opposite, “mysticism,” is what he would have been taught. It was not the individual’s failure of volition that caused him to have a predominantly perceptual-level habit of thinking—he was just never taught how by society. Predominantly conceptual human societies have only existed twice in all human history, one before and one (the present one) following the Dark Ages.

All living organisms receive certain information about how to succeed in their environment from their ancestors via their genetics (phylogeny). For plants, this guidance is limited to triggering simple, genetically determined, stimulus-response behaviors when specific external stimuli occur such as light, temperature, chemical, and mechanical changes. Plants and simple animals are not conscious of the other entities that are causing those stimuli.

Evolution selected for a level of biological complexity sufficient to achieve perceptual-level consciousness in higher animals because it afforded an improvement for survivability in a changing environment. Evolution selected for brains and the ability to sense things at a distance—sight, smell, and hearing. They gained the ability to detect and identify other entities in their environment and do so without the need for that other entity to be in direct, physical, sensory contact. Being able to behaviorally respond to the existence of other entities in one’s environment—to be conscious of them—was an increase in the individual’s ability to obtain and grasp the knowledge of how things work in its environment and successfully respond. However, perceptually conscious animals do not grasp the natures of the entities they detect, or their own nature, or the rules of the game of how entities interact with each other.

Evolution selected *for* a level of biological complexity sufficient to achieve conceptual-level consciousness in humans because it afforded an even greater improvement for survivability in a changing environment. Evolution selected for brains with the ability to form and integrate *abstract mental entities* (concepts) as

the symbols of language representing concrete entities in reality, to detect and grasp the causality relationships between entities (extrospection), and to be aware of itself as an entity and of its mental functioning (introspection). Evolution further selected for individuals with the ability to modify their behaviors based on what they learned about reality during their lifetimes (ontogeny), thereby overriding past knowledge of reality obtained from ancestors via genetically provided instinct (phylogeny).

Being able to behaviorally respond to a broader and deeper grasp of both physical and abstract entities, including their causality relationships, and a grasp of one's mental functioning—to be conscious of all these—and being able to override the no longer applicable instinct, resulted in an even greater increase in the individual's ability to obtain and grasp the knowledge of *how things work* in its environment and even more successfully respond.

Consciousness in humans is *deterministic* only in so far as it depends on the brain's physical functioning and external stimuli. Without the brain and something out there to grasp, there can be no consciousness. However, the physical functioning of the brain is altered by the state of conscious awareness—thinking. This forms a recursive loop that differs between individuals because of three factors: the variability in genetically formed brain function aptitudes at birth, the external stimuli encountered during one's life, and the choices made when applying conceptual thinking.

Given the mental machinery one was born with, the stimuli encountered and the behavioral responses to them form the neural networks in our brains as memories and thinking habits. New stimuli are processed according to previously learned neural networks. That processing either reinforces or alters existing neural networks—presently encountered stimuli and thinking about them affect future thinking and behaviors. Your brain and how you think will be different tomorrow than today because of today's experiences. Indeed, adapting your behaviors to what you learn about your environment is why evolution selected for your form of consciousness—this is how it is supposed to work.

Consciousness is simultaneously deterministic and volitional, each term applying to different aspects of the same phenomenon. Consciousness in humans is deterministic because it is the manifestation of the physical functioning of a brain as preconditioned by prior thinking. Consciousness is also volitional in the aspect that we can choose, in any present moment, what to apply our abstract

thinking faculty toward, if anything. Instinct in perceptually conscious animals provided an automatic, dictated behavioral response to perceived entities—no choice was possible. As the consequence of evolution having selected for the ability to override instinct in conceptually conscious humans, the alternative to having no choice is having choice—volition. What we encounter and choose to think about in our environment today was preconditioned by what we chose to think about yesterday, and our thinking today will precondition what we will choose to think about in the future. However, just like overriding instinct, our continually increasing knowledge of how things work in our environment, applied to a present situation, can cause us to make a thinking choice different than that which we were preconditioned for by past thinking. The ability for present thinking to precondition future thinking—ontological experiential automation—along with the ability to override such preconditioning—volition—are together a capability for adapting our behavior during our lifetime to fit a changing environment. Therefore, evolution selected for our much more powerful, conceptual consciousness.

The infinitely complex range of possible environmental situations and events that an individual might encounter and the unpredictability of future changes in the environment caused evolution to select for better adaptability. Consider just a few of the factors that can affect one's present thinking: the incredible complexity of a lifetime of building neural networks of the individual's past experiences and habits of thinking, including chosen values; the individual's complex neural networks of understanding of the nature of environmental entities including causality relationships and the rules of the game (Laws of Reality); the complex set of stimuli provided by a present situation that is different than anything previously encountered, including the subconscious emotional responses to what the individual last had to eat. One can see that it is simply too inflexible to rely on having a correct automated response for each possible situation out of an infinite variety of them. Only a conscious entity that can apply an understanding of the nature of the environmental actors, including itself and the rules of the game, and capable of choosing from an infinite variety of possible responses (volition), will have an improved chance of arriving at an appropriate behavioral response.

We, humans, traded genetically provided specific-environment knowledge for self-discoverable, variable-environment knowledge. We traded the dictated

specific-environment behaviors (positive stability on a provided course) for the freedom to choose our variable-environment behaviors (negative stability on a self-selected course). We traded the lack of adaptability due to mindless automation for the unlimited adaptability that came with the necessity to think and make choices continuously.

Evolution selected for ontological adaptation over phylogenic adaptation. Successive generations of *Homo sapiens* individuals gained intelligence and knowledge of reality more rapidly than phylogenic adaptation could provide. The increasing knowledge of reality could no longer be stored in the genes—an ontological method of knowledge storage was required. This necessitated the development of language and society. Language was necessary to transmit knowledge from its discoverer to society and then from society to new human individuals. The minds of individuals, not society, are the actors discovering new knowledge—there is no “hive” mind in human society. Society’s evolutionary role is to be the repository for conceptual language-based (spoken, written & multi-media) knowledge across generations of conceptual individuals. New humans are dependent upon their parents or their surrogates to teach them how to use their conceptual faculty (forming education). Then the individual new human is free to choose what subset of total knowledge to acquire from society and what productive work to pursue within society to support his life.

ENDNOTES

¹ Yonk, Richard. (2020). *Future Minds. The Rise Of Intelligence From The Big Bang To The End Of The Universe*. New York, NY: Arcade Publishing

² https://en.wikipedia.org/wiki/Rational_animal

³ Rand, Ayn (1990). *Introduction to Objectivist Epistemology*, 2nd ed., H. Binswanger (ed.), Meridian.

⁴ Dodge, Norman. (2007). *The brain that changes itself*. New York, NY: Penguin Books. p.218

⁵ Dodge, N. (2007)

⁶ Mayer, Emeran. (2016). *The Mind-Gut Connection. How the Hidden Conversation Within Our Bodies Impacts Our Mood, Our Choices, and Our Overall Health*. New York, NY: HarperCollins Publishers Inc.

⁷ Mayer, E. (2016)

⁸ Mayer, E. (2016) p.161

⁹ Mayer, E. (2016) p.18

¹⁰ Mayer, E. (2016) p.31

¹¹ Mayer, E. (2016) p.132

¹² Mayer, E. (2016) p.176

¹³ Mayer, E. (2016) p.168

¹⁴ Mayer, E. (2016) p.181

¹⁵ Dodge, N. (2007) p.228

¹⁶ Dodge, N. (2007) p.295

¹⁷ Crawford, Matthew. (2020). *Why We Drive. Toward a Philosophy of the Open Road*. New York, NY: HarperCollins Publishers Inc. p.13

¹⁸ Dodge, N. (2007) p.279

¹⁹ Dodge, N. (2007) p.201

²⁰ Dodge, N. (2007) p.287

²¹ Dodge, N. (2007) p.304

²² Dodge, N. (2007) p.59

-
- ²³ <https://www.ucg.org/members/compass-check/three-reasons-not-to-let-life-get-you-down>
- ²⁴ Dodge, N. (2007) p.291
- ²⁵ Dodge, N. (2007) p.313
- ²⁶ <https://www.encyclopedia.com/social-sciences-and-law/sociology-and-social-reform/sociology-general-terms-and-concepts/progress>
- ²⁷ Dodge, N. (2007) p.316
- ²⁸ Dodge, N. (2007) p.312
- ²⁹ Kurzweil, Ray. (2012). *How To Create A Mind: The Secret Of Human Thought Revealed*. New York, NY: Penguin Books. p.82
- ³⁰ <https://www.cweb.com/how-brains-do-what-they-do-is-more-complex-than-what-anatomy-on-its-own-suggests/>
- ³¹ <https://neurosciencenews.com/dendritic-action-potential-15380/>
- ³² Image from US Navy publication “Campus, The Navy Education and Training Monthly” May 1982
- ³³ Kurzweil, R. (2012) p.104
- ³⁴ Yonk, R. (2020)
- ³⁵ https://en.wikipedia.org/wiki/Technological_singularity
- ³⁶ Kurzweil, Ray. (2006). *The Singularity Is Near :When Humans Transcend Biology*. New York, NY: Penguin. p.136,123
- ³⁷ Yonk, R. (2020)
- ³⁸ <https://ourworldindata.org/life-expectancy>
- ³⁹ <https://ourworldindata.org/grapher/life-expectancy?time=1543..&country=GBR+USA>
- ⁴⁰ <https://ourworldindata.org/grapher/life-expectancy?tab=chart&country=GBR+USA>
- ⁴¹ <https://www.census.gov/content/dam/Census/library/publications/2020/demo/p25-1145.pdf>
- ⁴² https://en.wikipedia.org/wiki/List_of_the_verified_oldest_people
- ⁴³ Richtel, Matt. (2019). *An Elegant Defense. The Extraordinary New Science of The Immune System*. New York, NY: Harper Collins. p.406
- ⁴⁴ <https://ourworldindata.org/life-expectancy>
- ⁴⁵ <https://www.kwa29.com/singularity-university-analogies-and-differences-with-universities/>

- 46 Kurzweil, R. (2012) p.158
- 47 <https://intelligence.org/files/DefiningValuesForValueLearners.pdf>
- 48 Peikoff, Leonard. (1991). *Objectivism: The Philosophy of Ayn Rand*. New York, NY: Penguin Group. p.458
- 49 <https://medium.com/the-democracy-network/the-coast-vs-the-heartland-5c58a40e8ca>
- 50 <https://www.nytimes.com/2016/11/03/upshot/why-republicans-dont-even-try-to-win-cities-anymore.html>
- 51 *The Social Dilemma*. January 26, 2020. A Netflix Original Documentary. An Exposure Labs Production. Written by Vickie Curtis, Davis Coombe, Jeff Orlowski. Directed by Jeff Orlowski. Producer, Larissa Rhodes.
- 52 *The Social Dilemma*. (2020)
- 53 *The Social Dilemma*. (2020)
- 54 *The Social Dilemma*. (2020)
- 55 *The Social Dilemma*. (2020)
- 56 Zuboff, Shoshana. (2019). *The Age of Surveillance Capitalism. The Fight for a Human Future at the New Frontier of Power*. New York, NY: Public Affairs. p. 172—While I value Zuboff’s identification of surveillance practices by Big Tech, I disagree completely with her use of the term “capitalism” both in the book’s title and in the way she asserts certain evils of capitalism. I define capitalism as the only political system that protects the freedom of individuals to think and act in their own self interest without being subject to force or sacrifice.
- 57 Zuboff, S. (2019) p.174
- 58 Bokhari, Allum (2020). *#Deleted. Big Tech’s Battle To Erase The Trump Movement And Steal The Election*. New York, NY: Center Street. p.17
- 59 Bokhari, A. (2020) p.18
- 60 Bokhari, A. (2020) p.36
- 61 Bokhari, A. (2020) p.60
- 62 Bokhari, A. (2020) p.83
- 63 Bokhari, A. (2020) p.84-85
- 64 Bokhari, A. (2020) p.83
- 65 Bokhari, A. (2020) p.119,123-124
- 66 Bokhari, A. (2020) p.145-150
- 67 Bokhari, A. (2020) p.21
- 68 Bokhari, A. (2020) p.106-107

-
- ⁶⁹ Bokhari, A. (2020) p.86-87
- ⁷⁰ Zuboff, S. (2019) p.58
- ⁷¹ <https://www.hbletter.com/forum/member-forum/blackmail/#p35937>
- ⁷² <https://smallbusiness.chron.com/laws-subliminal-marketing-69892.html>
- ⁷³ https://en.wikipedia.org/wiki/Subliminal_stimuli
- ⁷⁴ Crawford, M. (2020) p.303
- ⁷⁵ Zuboff, S. (2019) p.196
- ⁷⁶ Crawford, M. (2020) p.28,29,31,32,34
- ⁷⁷ Crawford, M. (2020) p.36
- ⁷⁸ Crawford, M. (2020) p.38
- ⁷⁹ Crawford, M. (2020) p.42
- ⁸⁰ Crawford, M. (2020) p.245
- ⁸¹ Crawford, M. (2020) p.63
- ⁸² Crawford, M. (2020) p.65
- ⁸³ Crawford, M. (2020) p.307
- ⁸⁴ <https://americanaffairsjournal.org/2019/05/algorithmic-governance-and-political-legitimacy/>
- ⁸⁵ Crawford, M. (2020) p.292
- ⁸⁶ <https://www.forbes.com/sites/rebeccabellan/2020/09/22/facebook-google-twitter-youtube-need-to-take-responsibility-for-election-integrity/>
- ⁸⁷ McIntosh, Steve. (2012). *Evolution's Purpose*. New York, NY: SelectBooks, Inc. p.133
- ⁸⁸ Binswanger, Harry (1976). *The Biological Basis of Teleological Concepts*. Los Angeles, CA: The Ayn Rand Institute Press. p.207
- ⁸⁹ Yonk, R. (2020)
- ⁹⁰ Rand, A. (1990) p.55
- ⁹¹ https://en.wikipedia.org/wiki/Big_Bang
- ⁹² https://en.wikipedia.org/wiki/Timeline_of_epochs_in_cosmology
- ⁹³ McIntosh, S. (2012). *Evolution's Purpose*. New York, NY: SelectBooks, Inc.
- ⁹⁴ A quote by Vaclav Havel reported in: Yonk, R. (2020)
- ⁹⁵ https://en.wikipedia.org/wiki/Timeline_of_the_evolutionary_history_of_life
- ⁹⁶ Contera, Sonia. (2019). *Nano Comes To Life. How Nanotechnology Is Transforming Medicine and the Future of Biology*. Princeton, NJ: Princeton University Press. p.23
- ⁹⁷ <https://en.wikipedia.org/wiki/Thumb>

- 98 <http://www.brainrules.net/pdf/introduction.pdf>
- 99 Rand, A. (1990) p.5
- 100 Rand, A. (1990) p.16
- 101 Rand, A. (1990) p.37
- 102 "On the Intelligence of the Dog," *Nature*, vol.33 (Nov. 12, 1885) p.45
- 103 <http://psychclassics.yorku.ca/Miller/>
- 104 Kurzweil, R. (2012) p.101
- 105 Kurzweil, R. (2012) p.69, 91
- 106 Rand, A. (1990) p.38
- 107 https://en.wikipedia.org/wiki/Wright_Flyer
- 108 Rand, Ayn (1961). *For the New Intellectual: The Philosophy of Ayn Rand*. Penguin Random House. p.121
- 109 Ayn Rand (1962). Talk at MIT on Ethics
- 110 https://courses.aynrand.org/campus-courses/free-will/?utm_source=Universe&utm_campaign=897dd86598-EMAIL_CAMPAIGN_2019_02_07_11_37_COPY_02&utm_medium=email&utm_term=0_3753df5893-897dd86598-289486305
- 111 Binswanger, Harry. (2014). *How We Know. Epistemology on an Objectivist Foundation*. New York, NY: TOF Publications. p.303,305
- 112 Binswanger, H. (2014) p.310
- 113 Binswanger, H. (2014) p.315
- 114 Rand, Ayn (1964). *The Virtue of Selfishness*. New York, NY: Signet. p.15
- 115 Rand, Ayn. (1984). *Philosophy: Who Needs It*. New York, NY: Signet. p.99
- 116 Rand, A. (1961) p.128
- 117 Rand, A. (1961) p.128
- 118 Rand, A. (1990) p.34
- 119 Rand, Ayn. (1971). *The Romantic Manifesto*. New York, NY: Signet. p.19
- 120 Rand, A. (1971) p.19
- 121 Rand, A. (1971) p.38
- 122 Rand, A. (1971) p.38
- 123 Rand, A. (1971) p.39
- 124 <https://en.wikipedia.org/wiki/Language#Origin>
- 125 <https://en.wikipedia.org/wiki/Aristotle>
- 126 https://en.wikipedia.org/wiki/Bhuri_Bai

-
- 127 <https://www.scientificamerican.com/article/will-we-keep-getting-smarter-flynn-effect-says-yes/>
- 128 Yonk, Richard. (2017). *Heart Of The Machine. Our Future In A World Of Artificial Emotional Intelligence*. New York, NY: Arcade Publishing.
- 129 Binswanger, H. (1976) p.191
- 130 Quoted by: Garreau, J. (2005)
- 131 Rand, A. (1961) p.27
- 132 Brook, Yaron. & Watkins, Don. (2017). *In Pursuit of Wealth. The Moral Case For Finance*. Irvine, CA: Ayn Rand Institute Press.
- 133 Contera, S. (2019) p.65
- 134 Peikoff, L. (1991) p.452
- 135 Binswanger, Harry. "Ayn Ran's Philosophic Achievement" The Objectivist Forum (June-December 1982) <http://www.hbletter.com/wp-content/uploads/2016/08/Ayn-Rands-Philosophic-Achievement.pdf>
- 136 Binswanger, H. (2014) p.14-16
- 137 Binswanger, H. (2014) p.17
- 138 Peikoff, L. (1991) p.452
- 139 Binswanger, H. (2014) p.381
- 140 Laughlin, Burgess. (1995). *The Aristotle Adventure. A Guide to the Greek, Arabic, and Latin Scholars Who Transmitted Aristotle's Logic to the Renaissance*. Flagstaff, AZ: Albert Hale Publishing
- 141 Peikoff, L. (1991) p.453
- 142 Peikoff, L. (1991) p.454
- 143 Peikoff, L. (1991) p.454
- 144 Peikoff, L. (1991) p.456
- 145 Binswanger, H. (2014) p.58
- 146 Binswanger, H. (2014) p.382
- 147 Binswanger, H. (2014) p.382-383
- 148 Peikoff, L. (1991) p.457
- 149 Peikoff, L. (1991) p.456
- 150 Peikoff, L. (1991) p.457
- 151 Peikoff, L. (1991) p.458
- 152 Peikoff, L. (1991) p.458
- 153 Peikoff, L. (1991) p.459

¹⁵⁴ Rand, Ayn (2001). *The Art of Nonfiction*. R. Mayhew (ed). New York, NY: Penguin Group. p.176

¹⁵⁵ Peikoff, Leonard. (2012). *The DIM Hypothesis: Why The Lights Of The West Are Going Out*. New York, NY: Penguin Group. p.63

¹⁵⁶ Peikoff, L. (2012) p.64

¹⁵⁷ Peikoff, L. (2012) p.43

¹⁵⁸ Peikoff, L. (2012) p.334

¹⁵⁹ Peikoff, L. (2012) p.338

¹⁶⁰ Peikoff, L. (2012) p.340

¹⁶¹ Peikoff, L. (2012) p.334

¹⁶² Rand, A. (1990) p.71-72

¹⁶³ Rand, A. (1971) p.vii.

¹⁶⁴ Kurzweil, Ray & Grossman, Terry. (2009). *Transcend: Nine Steps to Living Well Forever*. Emmaus, PA: Rodale Press.

¹⁶⁵ Kurzweil, R. (2009)

¹⁶⁶ <http://paperchase-aging.s3.amazonaws.com/pdf/5fa17ba097f8730007f0c2c5.pdf>

¹⁶⁷ <https://ms-my.facebook.com/lifespainio/videos/vb.284846431694459/448000359254369/?type=2&theater>

¹⁶⁸ <https://ms-my.facebook.com/lifespainio/videos/448000359254369/>

¹⁶⁹ <http://paperchase-aging.s3.amazonaws.com/pdf/5fa17ba097f8730007f0c2c5.pdf>

¹⁷⁰ <https://www.innovationtoronto.com/2020/06/synthetic-red-blood-cells-that-have-all-of-the-cells-natural-abilities-plus-a-few-new-ones/>

¹⁷¹ Kurzweil, R. (2012) p.39

¹⁷² Rand, A. (1971) p.32

¹⁷³ Rand, Ayn. (1988). "Of Living Death," *The Voice of Reason*. New York, NY: Penguin. p.55

¹⁷⁴ <https://www.pewforum.org/2013/08/06/religious-leaders-views-on-radical-life-extension/>

¹⁷⁵ <https://advances.sciencemag.org/content/5/6/eaav0547>

¹⁷⁶ <https://www.bbc.com/news/science-environment-26768445>

¹⁷⁷ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3409741/>

-
- 178 Drexler, K. Eric. (2013). *Radical Abundance. How a Revolution In
Nanotechnology Will Change Civilization*. New York, NY: Public Affairs.
- 179 Drexler, K. (2013) p.220
- 180 Drexler, K. (2013) p.201
- 181 Drexler, K. (2013) p.161
- 182 Drexler, K. (2013) p.168
- 183 Drexler, K. (2013) p.234
- 184 Drexler, K. (2013) p.236
- 185 Drexler, K. (2013) p.225
- 186 Drexler, K. (2013) p.282
- 187 Contera, S. (2019) p.1
- 188 Contera, S. (2019) p.3
- 189 Contera, S. (2019) p.1
- 190 Contera, S. (2019) p.6
- 191 Contera, S. (2019) p.9
- 192 Contera, S. (2019) p.12
- 193 Contera, S. (2019) p.15
- 194 Tapscott, Don & Tapscott, Alex. (2016). *Blockchain Revolution. How the
Technology Behind Bitcoin Is Changing Money, Business, and the World*. New
York, NY: Penguin Random House LLC.
- 195 Tapscott, A. (2016) p.11
- 196 Tapscott, A. (2016) p.34
- 197 Tapscott, A. (2016) p.25
- 198 Tapscott, A. (2016) p.253
- 199 Gallardo, Laureano. (2019). *5G Networking. Learning 5G Technology
Explained for Dummies*. Amazon. p.23
- 200 https://cs.brown.edu/courses/csci1800/sources/2017_PRC_NationalIntelligenceLaw.pdf.
- 201 *Cloudy With A Chance Of Catastrophe*. Wired Magazine. (Feb 2020)
- 202 <https://factsmaps.com/pisa-2018-worldwide-ranking-average-score-of-mathematics-science-reading/>
- 203 <https://www.bbc.com/news/technology-56448688>
- 204 *The Man Who Conquered Noise*. Wired Magazine. (Dec 2020)

- 205 Singh, Ajit. (2019). *5G Simply In Depth*. ajit_singh24@yahoo.com
<http://www.ajitvoice.in>
- 206 Singh, A. (2019)
- 207 Singh, A. (2019)
- 208 <https://www.lifewire.com/6g-wireless-4685524>
- 209 Binswanger, H. (1976) p.107
- 210 Binswanger, H. (1976) p.70,166
- 211 Binswanger, H. (1976) p.136
- 212 Binswanger, H. (1976) p.24
- 213 Binswanger, H. (1976) p.118,129
- 214 Rand, A. (1964) p.17
- 215 Binswanger, H. (1976) p.66,64
- 216 Binswanger, H. (1976) p.126
- 217 Binswanger, H. (1976) p.133,130,172
- 218 Binswanger, H. (1976) p.77-78
- 219 Binswanger, H. (1976) p.148,147
- 220 Binswanger, H. (2014). p.38
- 221 Kurzweil, R. (2012) p.210
- 222 Binswanger, H. (2014) p.45
- 223 Rand, A. (1984) p.90
- 224 Rand, A. (1961) p.156
- 225 Rand, A. (1984) p.5
- 226 Rand, A. (1961) p.121
- 227 Rand, A. (1964) p.15
- 228 Sotala, K. (2016)
- 229 <https://futureoflife.org/2019/08/14/how-can-ai-systems-understand-human-values/>
- 230 <https://link.springer.com/article/10.1007/s11023-020-09539-2>
- 231 Garreau, Joel. (2005). *Radical Evolution. The Promise and Peril of Enhancing Our Minds, Our Bodies—and What It Means to Be Human*. New York, NY: Broadway Books.
- 232 <https://ieeexplore.ieee.org/abstract/document/7874163>
- 233 https://dam-prod.media.mit.edu/x/2018/03/23/p43-kapur_BRjFwE6.pdf
- 234 <https://hpluspedia.org/wiki/Fyborg>
- 235 Kurzweil, R. (2012) p.127

-
- 236 Yonk, R. (2017) p.29
- 237 Yonk, R. (2017) p.145
- 238 <https://www.eurasiareview.com/10052020-scientists-demonstrate-quantum-radar-prototype/>
- 239 Jaeger, Lars. (2018). *The Second Quantum Revolution From Entanglement to Quantum Computing and Other Super-Technologies*. Switzerland AG: Springer Nature.
- 240 Bernhardt, Chris. (2019). *Quantum Computing For Everyone*. Cambridge, MA: The MIT Press.
- 241 <https://phys.org/news/2014-11-largest-factored-quantum-device.html>
- 242 <https://www.eurasiareview.com/20032020-chip-based-devices-improve-practicality-of-quantum-secured-communication/>
- 243 Bernhardt, C. (2019) p.176
- 244 Bernhardt, C. (2019) p.177
- 245 Bernhardt, C. (2019) p.181
- 246 Bernhardt, C. (2019) p.182
- 247 <https://thenextweb.com/google/2017/11/14/ibm-claims-quantum-supremacy-over-google-with-50-qubit-processor/>
- 248 <https://www.quantamagazine.org/google-and-ibm-clash-over-quantum-supremacy-claim-20191023/>
- 249 Bernhardt, C. (2019) p.184
- 250 <https://blogs.intel.com/policy/2018/12/14/senate-advances-national-quantum-initiative-act/#gs.29s4g5>
- 251 Peikoff, L. (2012) p.126
- 252 <https://en.wikipedia.org/wiki/Tokamak>
- 253 <https://en.wikipedia.org/wiki/Tokamak>
- 254 <https://www.history.com/news/human-ancestors-tamed-fire-earlier-than-thought>
- 255 Parisi, J. & Ball, J. (2019). *The Future of Fusion Energy*. London, UK: World Scientific Publishing Europe Ltd. Ch 2.3
- 256 Parisi, J. & Ball, J. (2019) Ch 2.3.4
- 257 Parisi, J. & Ball, J. (2019) Ch 2.3.5
- 258 Parisi, J. & Ball, J. (2019) Ch 2.3.6
- 259 Parisi, J. & Ball, J. (2019) Ch 2.3.7
- 260 Parisi, J. & Ball, J. (2019) Ch 2.3.8

261 Parisi, J. & Ball, J. (2019) Ch 2.3.9
 262 Parisi, J. & Ball, J. (2019) Ch 2.3.10
 263 Parisi, J. & Ball, J. (2019) Ch 2.3.2
 264 Parisi, J. & Ball, J. (2019) Ch 2.3.1
 265 Parisi, J. & Ball, J. (2019) Ch 2.4
 266 Parisi, J. & Ball, J. (2019) Table 2.1
 267 <https://www.iter.org/mach>
 268 <https://www.iter.org/proj/inafewlines#2>
 269 <https://www.iter.org/mach>
 270 <https://phys.org/news/2020-12-korean-artificial-sun-world-sec-long.html>
 271 <https://www.wsj.com/articles/fusion-startups-step-in-to-realize-decades-old-clean-power-dream-11581001383>
 272 <https://firstlightfusion.com/>
 273 Parisi, J. & Ball, J. (2019) Introduction.
 274 Parisi, J. & Ball, J. (2019) Ch 12.
 275 <https://infuse.ornl.gov/>
 276 Parisi, J. & Ball, J. (2019) Ch 10.
 277 Parisi, J. & Ball, J. (2019) Ch 11.
 278 Dr. Edith Packer, J.D., Ph.D. 1991 Summer Conference of the Jefferson School. Transcript published in the March and May 1993 issues of “The Intellectual Activist.”
 279 Hurd, Michael. (2000). *Grow Up America! Learning to Live the Happy, Responsible Life*. Washington, DC: Living Resources Press. p.286
 For those who wish to further pursue an understanding of the *psychology* required to achieve happiness and the heroic vision they had for themselves as a child, I recommend that you begin with the above referenced book and other books and resources found at Dr. Hurd’s web site: <https://drhurd.com>
 280 Rand, A. (1984) p.200
 281 Rand, A. (1984) p.201
 282 Rand, A. (1984) p.203
 283 Drexler, K. (2013) p.273
 284 Drexler, K. (2013) p.283
 285 Drexler, K. (2013) p.286
 286 My Story. From Harry Binswaner’s blog at hbletter.com 7/30/2015
 287 Rand, A. (2001) p.27

-
- 288 Kurzweil, R. (2012) p.112
289 Peikoff, L. (2012) p.345
290 <https://intelligence.org/files/DefiningValuesForValueLearners.pdf>
291
<https://www.aaai.org/ocs/index.php/WS/AAAIW16/paper/download/12633/12353>
292 <https://link.springer.com/article/10.1007/s11023-020-09539-2>
293 Rand, A. (1961) p.130
294 Kurzweil, R. (2012) p.223
295 Quoted by: Garreau, J. (2005)
296 Rand, A. (1961) p.viii
297 <https://www.hbletter.com/forum/member-forum/altruism-debate/#p36364>
298 Andrew Carnegie, "The Best Fields for Philanthropy" Archived January 13, 2003, at the Wayback Machine, *The North American Review*, Volume 149, Issue 397, December 1889 from the Cornell University Library website
299 https://www.brainyquote.com/quotes/vince_lombardi_382625
300 Kurzweil, R. (2012) p.38
301 Kurzweil, R. (2012) p.110

INTELLOPY

Experts predict that American society will collapse into totalitarianism in 20–30 years, there will be a permanent Mars colony, and AI will be more intelligent than all humans. Is society unraveling? Should we fear a “Terminator?” Will technology accelerate society’s collapse, or will it help us correct course, go to the stars and awaken the universe? How does one resolve such questions, plan for the future, and achieve happiness? Most feel—“Big ideas like these are too complicated and there is no way to determine the truth.”

An expert at providing simple explanations of how things work, author JJ Kelly shows us that thinking about the cause-and-effect principles behind our changing society and technology’s impact is not difficult. INTELLOPY describes *Six Critical Processes* causing all that we see and *Eight Transcendent Technologies* determining our future. **Become a New Intellectual. Learn how the world works. Anticipate the future. Achieve your heroic vision. Apply technology beneficially.**

JJ Kelly, former President/CEO of US Telecom and a recognized Founder of the Telecommunications Revolution, has decades of first-hand experience in society’s use of technology. Needing to know how everything works, JJ analyzed the interactions between society, business and advancing technology to identify the cause-and-effect principles.



Now, as “The Future Coach,” JJ applies his exceptional personal communication skills to explain clearly for the rest of us everything we see in our collapsing society with advancing technology and how to anticipate the future. JJ enjoys helping individuals navigate turbulent change to achieve their heroic vision and helping organizations apply technology to benefit, not harm, our society.

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