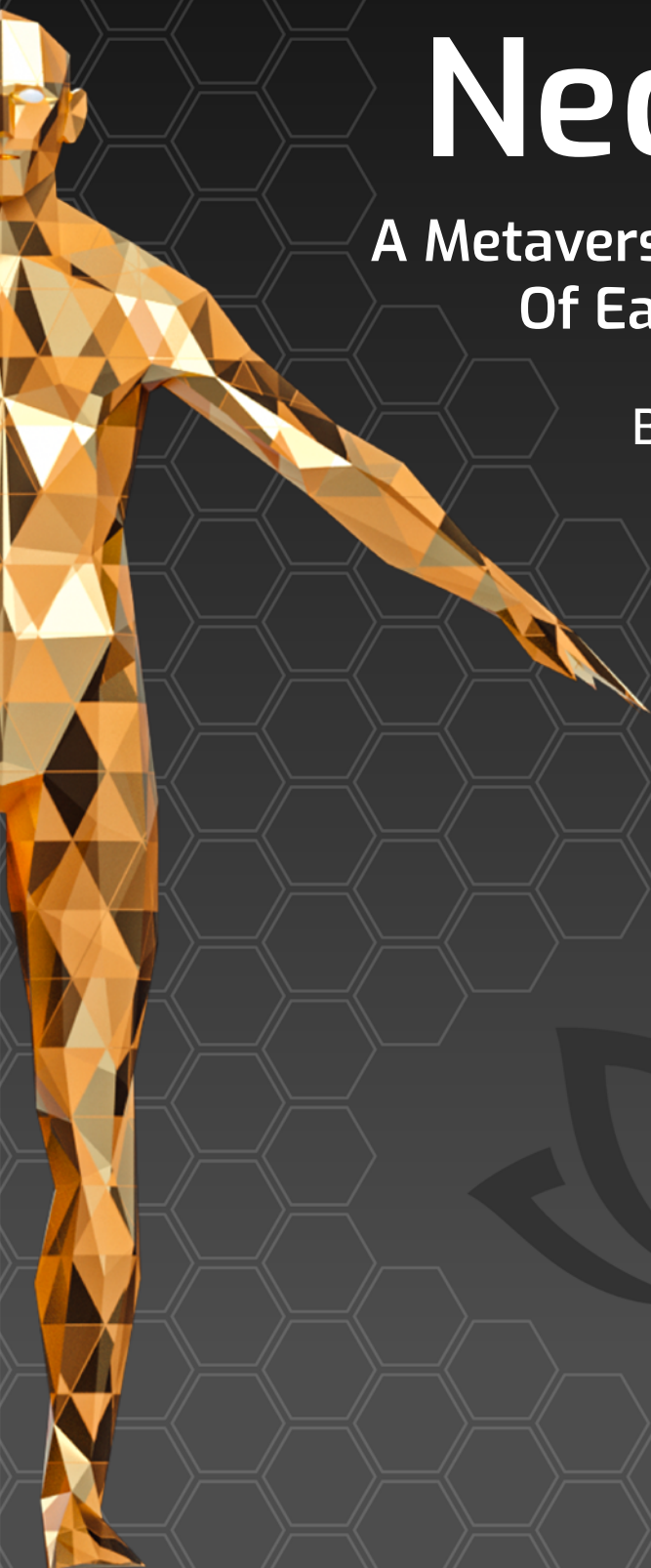




# Neoterics

A Metaverse-Native Population  
Of Early-Stage AGIs

Ben Goertzel  
Nov 1, 2022



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## A Metaverse-Native Population Of Early-Stage AGIs

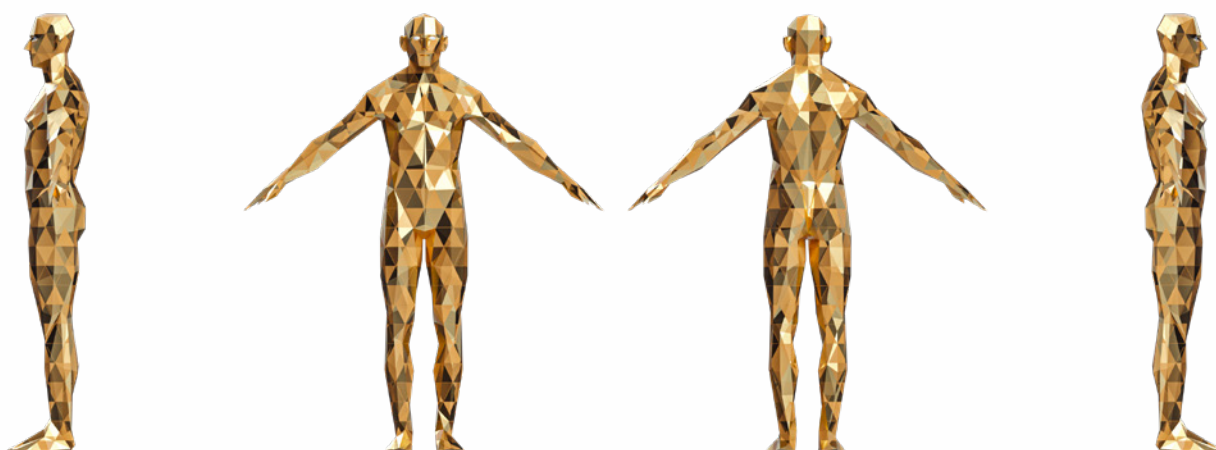
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I describe here the Neoterics, an envisioned new “species” of relatively simple metaverse-native creatures, intended mainly for experimentation with OpenCog Hyperon algorithms for controlling embodied agents displaying, developing and emerging collective intelligence in 3D virtual worlds. We expect to roll them out initially in the [Sophiaverse](#) metaverse-world but also potentially allow them to voyage between different virtual worlds and learn as they go.

“Neoteric” is an old word meaning “new people”; its use here is inspired by the classic SF story “Microcosmic God” by Theodore Sturgeon.



Neoterics are intended to be realizable in a variety of virtual worlds, game worlds, and metaverses. The Neoteric design, which is only sketched here very loosely and preliminarily, should involve standard ways of handling

- Physical body architecture
- Perception and Sensation
- Communication
- External knowledge querying (for seeking knowledge beyond the virtual world)
- “Biological” life-cycle
- Motivational System
- Emotional System
- Social System (including interactions among Neoterics and with humans)
- Cognitive Architecture
- Learning environment
- Seed ontology

which should apply to Neoterics in any platform where they are realized. Some platforms may then involve additional primitives for perception, action, seed ontology, or other aspects.

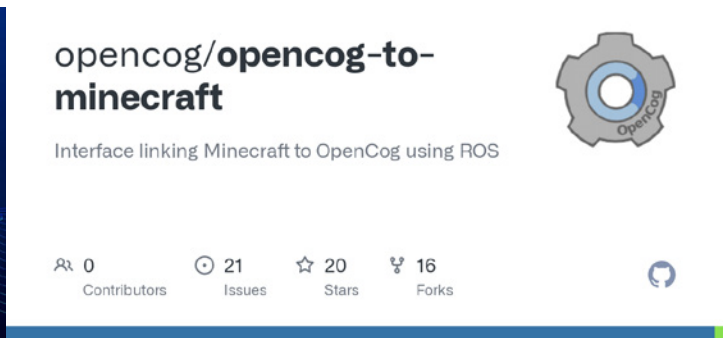
While the Neoterics are primarily proposed as a research tool, there is also clear potential for gamification and monetization in a metaverse context. However, this will only be realizable after a certain amount of research progress has already been made and will only be briefly touched on here at the end of the document.

As the number of Neoterics scales up, maintaining the population in an efficient and manageable way will be a fascinating test case for the AGI-as-a-service framework TrueAGI Inc. is developing for delivering Hyperon services at scale.



Minecraft is being used for OpenCog Hyperon prototype experimentation, but Minecraft has peculiar physics that are not ideal for AGI learning, and is also a closed proprietary ecosystem.

For Neoterics, it seems that having an open and fully customizable virtual environment such as Sophiaverse will have certain advantages. Down the road, at some point, it may also be worthwhile to explore porting some of the Neoterics to a robot simulator with realistic physics. The particular development path in this regard is very much subject to change based on technical and business developments.



## Key Aspects of Neoterics and Their Society



Many particulars of Neoterics will surely be worked out in the course of implementation and experimentation. Here, I outline an initial sketch of what seems to be a relatively minimal implementation of human-like virtual-world agents suitable for experimentation with human-like general intelligence in its critical aspects.

No doubt, some of the features suggested here aren't actually necessary for the sort of AGI R&D intended, and some other features that are left out here will come to seem critical as R&D proceeds. If the Neoterics framework is architected and implemented effectively, making modest-scope changes as things progress will not be a major obstacle.



# Physical Body Architecture



Neoterics will present (to themselves and humans) as "virtual robots" with bodies composed of multiple parts that can be replaced. They will be roughly humanoid in form, with arms, hands, legs, feet, torso, neck, head, eyes, ears, and mouth. They should be able to identify and separately move each of these distinct parts and also to remove any of these parts and swap in an alternative.

Locomotion is done by walking with legs/feet, while picking up, moving, and building are done mainly with hands/arms. The eyes and mouth and ears are used for specific purposes (to be mentioned below).

This "surface level human-like-ness" will be in some significant aspects theatrical in Sophiaverse, which won't initially have realistic physics – e.g., walking won't involve realistic leg physics. On the other hand, for Neoterics living in a robotics simulator, we might simulate the physics of walking. In any case, the core purpose of the human-like physical form is to make it easier for practical embodied learning to be ported back and forth between Neoteric bodies and humanoid-robot bodies like those of the Hanson robots and to guide the interactions between Neoterics and humans in an appropriate way.

For aesthetic purposes, the visual look of Neoterics may be varied greatly depending on the platform of realization – for instance, they may have AI-generated 3D art wrapped around them, enabling visually evocative emotional expressions, etc.





Neoterics have rudimentary vision, speech, hearing, and touch senses, designed to roughly approximate the high-level properties of corresponding human or humanoid-robot senses.



## Vision

The default for Neoterics is face-centered vision, i.e., a field of vision corresponding to what they'd see if looking through their eyes. Whether their eyes are open or closed is visible externally to others, and they cannot see if their eyes are closed.

Some special biasing to look at other Neoterics' faces and recognize their expressed emotions may be warranted (humans seem to have such biasing wired in).

An optional perceptual upgrade allows Neoterics to also perceive the world from a top-down perspective, but this is not the initial case to consider. It may be interesting to activate this mode temporarily for some Neoterics for learning purposes.

## Speech

Neoterics can exchange either audio messages or audio+text messages.

The logistics of these messages are designed to emulate the properties of speech.

Each Neoteric has a maximum volume level it can utter (some may be louder than others).

Depending on the volume, if Neoteric A utters a message, then every Neoteric whose ears are within a certain radius of A can hear the message (unless there is a wall in the way or similar).

In the case of an audio+text message, the Neoteric can either generate the text message and rely on a built-in helper tool to translate it to audio or (a less useful case, it currently seems) generate the audio message and rely on a built-in STT tool to translate it to text.

## Audio

Events in the Neoterics' environment should generate sounds in an appropriate way, vaguely resembling the everyday human world.

Walking should generate footstep sounds, which can be made louder or quieter based on the agent's choice, but with faster movement increasing the minimum noise generated.

Objects falling to the ground or colliding with other objects should make sounds.

There should be limits to perception so that the presence of louder sounds inhibits hearing quieter sounds. Different Neoterics may have different auditory acuities.

## Touch

A Neoteric should know if the parts of its body are touching something, including if they are touching each other. Different types of objects should have a different feeling according to touch, so it can tell if it's touching wood vs. metal with its hand or touching another Neoteric's head versus its leg.

## Action

Neoterics can carry out some basic movement actions like walking forward or backward, turning left or right, jumping, climbing up on objects (or each other), sitting down on an object, crouching down, crawling on all fours, lying down, rolling over, wiggling forward on the belly or back, bending over forward...

They can kick (each other or objects) with their feet or legs, hit (each other or objects) with their arms or hands, and pick objects up with one hand or both hands. They can hold hands, carry each other around, and cooperate together to carry heavy objects together. They can push buttons with their feet or hands and pull levers with their hands.

Simulating detailed manual dexterity (or pedal dexterity like soccer-playing) is not part of the initial scope for Neoterics; what we're after initially is more of a basic palette of interaction types with objects and other individuals.

Neoteric faces should be reasonably expressive – the facial expressiveness of the Hanson robots and corresponding avatars is a good guide here.



## Communication



It will be desirable to experiment with various modes of communication among Neoterics. Potentially interesting options include:

- Let them make up their own audio (and gestural) language for communication.
- Let them make up their own textual language for communication.
  - Beginning from nothing
  - Beginning from a vocabulary of English nouns, verbs, adjectives, and adverbs grounded in the agents' observations and actions
- Let them make up their own text+audio language for communication (say, a textual language with annotations for emotion and speed and volume, etc., that are communicated by modifying the audio waveform coming out of TTS)
- Let them communicate using MeTTa (or some DSL created within MeTTa for the purpose)
- Let them communicate in e.g., English (text or speech), thus assuming the Neoteric agents themselves have English NL generation mechanisms.

Combinations of these are also possible. For instance, we could have a tribe of Neoterics communicating among themselves via MeTTa, and then another tribe that can communicate only using English-like textual language. The first tribe would then need to collectively cooperate to create an English-like language for communicating with the latter.

Any of these communication modes can be experimented with using the basic mechanisms suggested above.

## Emotion



Emotional expression is another key form of communication. Initially, it will likely be judicious to supply Neoterics with a set of human-like "emotion indicators" (at what point to call these "actual emotions" being a complex conceptual question), manifesting based on their internal and external experience, and with standard facial expressions based on these. Modification of both the emotion palette and the facial expressions or other gestures associated with each emotion should be within the scope of fairly early-stage Neoteric self-organization.

A detailed guide to emulating human-like emotional expression and reactions for human-like robots and avatars is given in [this document on unifying the Psi and CPM emotion models](#).

This is ongoing R&D but is expected to accelerate as Neoterics are implemented in the Sophiaverse world.



## External Querying



In some circumstances, it will be useful to allow Neoterics to ask questions of outside knowledge resources, e.g., looking things up on the Internet or in specifically supplied databases.

- Submitting a text string query, or an image query, to a specific knowledge source
- Submitting a MeTTa pattern-matcher query to a specific knowledge source (Atomspace)

## Biological Life-Cycle



It may be interesting to experiment with Neoterics that “grow up” in their virtual world in the very rough manner of human children.

For instance, one could have “child” Neoterics begin smaller and weaker (but perhaps, for simplicity, with accurate senses) and then gradually grow larger. One could have them begin immobile, then after a certain rough interval of time has passed, gain the ability to crawl (which is slow), then after a little longer have them gain the ability to walk. The point would be to limit their ability to travel afield or cause physical damage until they have had time to learn a bit about the world and how to behave in it.

We don't currently see a point in emulating other aspects of the human biological life cycle like old age/death or sexual reproduction and mating with Neoteric culture. If there turns out to be a clear value to these aspects, they could be introduced later.

## Motivational System



Neoterics should be assumed to operate based on a combination of the pursuit of extrinsic and intrinsic reward, with non-reward-driven internal and environment-coupled self-organization.

The extrinsic reward can take the form of:

- Collecting certain objects (considered as food or treasure or whatever) in their virtual world.
- Surviving, i.e., not being destroyed in some form via the dynamics in the game world (attacked by bad guys, falling off a cliff, etc.)

The intrinsic reward can take forms such as:

- Curiosity, i.e., a motive to gain new information
- Creativity, a motive to create new structures and patterns in the environment
- Emotionality, a motive to experience reasonably intense emotions
- Choice, i.e. a motive to make decisions that have a substantial estimated impact on the agent's life
- Individuation, a motive to make the agent distinct from its environment
- Self-transcendence, a motive to encourage the agent to ongoingly embody new patterns and aspects that it didn't have before
- Socialization, a desire to interact with other agents and to do so in an informationally complex way
- Compassion, in the simplest initial form, a motive to perceive that other Neoterics are getting their extrinsic and intrinsic rewards fulfilled

To make this sort of compassion initially functional, a "mirror system" type mechanism will be valuable, wherein a Neoteric has a built-in capability to "put itself in the place of" another observed Neoteric and estimate the degree of extrinsic and intrinsic reward it would get if it were in this other Neoteric's place.

More abstract and broad forms of compassion may then afterward be learned via inferential generalization from this relatively simplistic form (which is ultimately not fully ethically satisfactory as it is so closely tied to the close similarity between the reward structures of the self and the other).

The degree of fulfillment of various initially built-in rewards will be key ingredients in initial calculations of emotional response.

## Social System



Neoterics, by default, will be assumed to live in small tribes. This will be encouraged via the socialization and compassion of intrinsic rewards, but also by the design of the environment in such a way that achieving rewards is done much more easily via small-group cooperation.

The evolution of civilization and advanced technology, of course, has in human history created environments in which achieving rewards is done best via large-group cooperation. But with initial Neoteric experiments, we are aiming more to model dynamics at the small-social-group level, thinking e.g., of a tribe or a group of classmates at preschool or school. It may be that a more complex Neoteric civilization naturally evolves from this (as happened in human history), or it may be that we want to tweak the Neoteric motivational system specifically to work well with large-group dynamics – in any case, it seems OK to leave that aspect for the further future, at this point.

Subtler social dynamics within tribes may be achieved via having variation of the properties and abilities of individual Neoterics, e.g.

- Having some much stronger than others could lead to a warrior (or say, construction-worker) type role...
- Having some more intelligent or more capable of external queries than others could lead to a magician or shaman-type role ...
- Having some be more compassionate than others could lead to a healer-type role...
- Having some better at communication than others could lead to an educator-type role...

If a tribe has “child” Neoterics in it, then Neoteric society will end up having an “AGI preschool” aspect but with the twist (compared to prior AGI preschool proposals) that the teachers are also proto-AGIs (“adult” Neoterics). What sorts of roles emerge will depend strongly (among other factors) on the environment and external rewards utilized.

There is also potential to have Neoterics engage in barter and/or money-based economics. As different tribes build things, they could sell or trade these to other tribes.

Competition among tribes could be handled in multiple ways, but at the moment, I don't see a need or value in introducing violence or death into the Neoteric world. The construction of barriers by Neoterics to prevent or guide the movement of other Neoterics naturally emerges from the basic Neoteric capabilities discussed above, and this seems to provide enough possibilities for adversarial behavior that we don't need to enable Neoterics to murder each other or forcibly disassemble each others' bodies, etc. Fences, walls, jails, playpens, and so forth will be natural mechanisms and can be used quite creatively.

## Cognitive Architecture



The human-like aspects of Neoterics, as outlined above, make the most sense if Neoterics have a cognitive architecture that is human-like in a few key respects, including e.g.

- Special handling of visual, auditory, speech, and touch perception
- Special handling of movement and of actions aimed at object manipulation
- Working memory, which includes sensory and language aspects
- Mirror system for social modeling
- Self-modeling that includes modeling the physical body, habitual environment, behavior patterns, and social relationship patterns
- Long-term memory that works for both physical and social situations

These are all relatively straightforward to do in Hyperon but would require a particular “Neoteric configuration” for a Hyperon system, specifying the collection of Atomspaces and associated processes required. A “humanoid robot configuration” for Hyperon would be relatively similar but might have some additional aspects.



Designing the right environment for the Neoterics will be a significant and interesting challenge. The basic concept is simple: We want to create environments in which:

- The agents need to work together, often building stuff in the world together, to achieve the goals that will get them an extrinsic reward.
- In most cases, there are various different ways (different things to build) to achieve these goals so that there is the opportunity for flexible creativity and for agents to pursue their intrinsic rewards in the course of pursuing their extrinsic ones.

We want there to be simple “toy” tasks of this nature for young Neoterics to pursue (AGI preschool style), and then more difficult tasks for adult Neoterics to pursue.

In some cases, we want adult tasks that involve competition among more than one tribe. In other cases, we want adult tasks that can only be achieved via cooperation among multiple tribes.

While the focus should be on tasks involving cooperation, there should also be some tasks that agents do themselves to get individual rewards.

Some basics that would be natural to build into the environment:

- A need for Neoterics to get a certain amount of “food” per unit of time.
- Lack of food may directly cause unhappiness and may also slow down movement, which makes it harder to pursue various plans for improving happiness.
- Emotional boost from certain particular sorts of food.
- Other creatures run (or fly) around with a propensity to take food for themselves (thus yielding a need to protect food)
- Weather conditions that sometimes cause physical discomfort and/or ruin food, and/or impede movement.
- Ability to make devices to carry large amounts of food around (wagons etc.), or trap food-stealing animals, or protect food from animals.
- Ability to plant seeds that will grow into food-bearing plants... and to nourish plants by feeding them plant food which then needs to be gathered.
- Ability to make machines that will decrease the energy required to give food-bearing plants the needed attention as they grow.
- Ability to train certain sorts of animals to carry out certain useful tasks like pulling carts





# Learning To Build Circuits, Machines, and Programs



The basic tasks outlined above can be pursued without a lot of advanced engineering (wheels on carts being perhaps the maximal complexity involved). However, there is also a clear avenue for more sophisticated mechanical design to play a role in the above tasks, e.g., motorized carts that burn plants as fuel or motorized robots that scare animals away, or tools for helping lift large numbers of blocks when making buildings (forklifts, etc.).

In Minecraft, there are various extensions that go in this direction:

- Redstone allows the building of electrical-style circuits and various simple machines in Minecraft, <https://www.thegamer.com/minecraft-simple-redstone-machines/>
- A classic Minecraft mod called ComputerCraft has been forked into a new version called cc-tweaked: <https://www.curseforge.com/minecraft/mc-mods/cc-tweaked>

Similar tools may be built for SophiaVerse but with greater elegance, e.g. using OpenCog Hyperon's MeTTa language instead of using Lua as cc-tweaked does.

These sorts of features basically would let us use Neoteric life in SophiaVerse (along with other similarly featureful virtual worlds) to lead proto-AGI systems up to the point of doing some basic automated program learning, where the programs being learned are:

- Tied in with the life goals of the (Neoteric) AI systems doing the program-learning
- Being communicated-about in the same practical language used to describe percepts, actions, program requirements, etc. (among Neoterics)

## Seed Ontology



For Neoterics to do the kind of learning and reasoning needed to flourish in their environments, it will require one or more of:

- A very large (and possibly unrealistic) amount of quasi-random simulation to fuel pattern mining and reinforcement learning
- A dataset created by humans puppeteering Neoterics, carrying out relevant actions and interactions
- A seed ontology specifying relationships among key aspects of Neoteric environment and life

Our current inclination is to specify a fairly thorough seed ontology AND create a dataset by having humans puppeteer Neoterics. Even given all this guidance, I suspect a lot of quasi-random simulation and associated learning will be needed to get to reasonably intelligent and interesting Neoteric behavior.

Regarding a seed ontology, we have started creating one based on a formalism with the following properties:

- Compatibility with SUMO ontology
- Extension beyond SUMO to include
  - PLN-style fuzzy and probabilistic uncertainty
  - Non-well-founded-set models of collective understanding and self-modeling
  - Paraconsistent logic

The seed ontology needs to cover aspects of the Neoterics' physical environment and bodies, their cognitive architectures and learning mechanisms (to guide introspection), and their social interactions and relationships.

Of course, every piece of knowledge in the seed ontology must be considered mutable and open to revision based on the Neoterics' individual and collective learning.

## Initial Neoteric Experiments



A great variety of interesting experiments will be possible to carry out with Neoterics, and it will obviously be best to design these dynamically as the research progresses.

We'll describe here a couple of possibly interesting directions, which may reflect what's on my mind at the moment as much as the potential of the overall Neoterics setup.

### Intersection of Social Dynamics and Language Learning

One very interesting initial direction will be to give a tribe of Neoterics a task that requires multiple Neoterics to collaborate in complex ways (e.g., on gathering and building stuff), and encourage them to develop their own language for communication focused on practical collaboration.

Social dynamics will tie in with language creation here. One can imagine a subgroup of a tribe converging on certain linguistic patterns and thus working most effectively with other members of that subgroup. The shared understanding among this subgroup will be effectively modeled and manipulated using non-well-founded sets a la situation semantics.

Other tribe members who only partly embrace these linguistic patterns and sometimes prefer others will then be on the margins of this subgroup – their membership in the subgroup will be paraconsistent and marginal. The maintenance of the paraconsistent membership relation with these marginalized members will be key to driving language evolution.

The intersection of language evolution grounded by collective problem-solving with social conformity/marginalization dynamics will then provide a relatively simple context in which to explore inference that incorporates sophisticated tools like paraconsistent uncertain logic and infinite order probabilities.

## Simulate/Emulate Mithen's Hypothesis of Language/Music Origin

Steven Mithen's book "The Singing Neanderthals" presents a hypothesis about the origin of language and music. He posits that human communication began with a communication system he refers to as "HmMMMM" because it had the following characteristics: it was Holistic, manipulative, multimodal, musical, and mimetic.

Basically, "HmMMMM" combined sound and gesture and action and imitation – somewhat like the pre-verbal/semi-verbal communication one sees in many one-year-old children, but with more adult-level cognitive sophistication underlying. His proposal is that HmMMMM came first and then spawned both language and music, which evolved from HmMMMM in their own different directions.

A brief summary and some debate on the hypothesis [have been posted online](#) and are worth reading.

An interesting albeit fairly difficult challenge would be to coax Neoterics to invent language and music along the lines of the HmMMMM theory (and I note this could be an interesting and valuable thing to do regardless of how fully accurate the theory turns out to be as a story of human communication evolution).

This challenge could be confronted via several steps. One approach will be to lead the Neoterics through these steps by having human-puppeteered Neoterics interact with the AI Neoterics providing examples of what to do in the world context.

## Step 1: Coax Neoterics to Learn Hmmmmm Semi-Supervised, By Imitating Puppeteered Examples

Begin with teaching (by example, using a puppeteered Neoteric) how to make imitative sounds and gestures in order to serve as signs for things that the listener/viewer has not directly seen.

Then at the next level of sophistication, these become indirectly depictive -- e.g., making a barking noise to indicate a dog that was seen, even though the dog was not actually barking when seen.

From here, it is not a huge step to construct "Hmmmmm" performance-series that depict stories/narratives observed .. or stories/narratives that the storyteller would LIKE to see enacted in the future.

## Step 2: Use "Hmmmmm" to shape provided grounded words into an overall language

One approach to bridging the gap between learned Hmmmmm and "actual language", which might accelerate language emergence with little loss, would be to give the Neoterics "baked in prior knowledge" of some nouns, verbs, adverbs, adjectives, and their groundings in their world.

They would then be given some puppeteered examples of how to enact upgraded "Hmmmmm" communications by using words in the mix of Hmmmmm performances.

Once they have started using words in their Hmmmmm, they are then ready for semi-supervised syntax learning, from examples of syntactic "English-enhanced Hmmmmm" usage given by puppeteered Neoterics in-world.

The outcome of this, if all goes well, will be Neoterics able to communicate English sentences along with gesture and auditory variations, associated with groundings.

## Step 3: Use "Hmmmmm" together with physical devices to create music

We can stock the Neoterics' world with a few easy-to-use musical instruments, such as

- Drums that make rhythms when hit
- Flutes that they breathe into (modulating volume and timbre with breath) while pushing buttons to make notes
- Piano-type instruments that make notes when their keys are hit

Puppeteered Neoterics can then show them music-making and show them the possibility of using musical instruments to follow the contour of Hmmmmm communications. Dancing can be demonstrated in this way as well.

One would ultimately want the Neoterics to discover things like:

- Discover that dancing to music is pleasurable and creates a feeling of togetherness which fosters collective action and communication.
- Discover that drumming entuses a group to carry out physical tasks together.
- Discover that listening to melodic music puts the mind in a state conducive to creativity.



Given that the Neoterics' emotion models will be similar to, yet in many particulars different from, those of humans, it may be that the music they create to express their own emotions and influence each others' emotions will be significantly different from human music. On the other hand, if puppeteered Neoterics play human-style music, then the Neoterics may shape their native music accordingly. One can envision a script that takes a certain Neoteric Hmmmmm communication and then creates a melodic and harmonic musical composition following the contours of this particular Hmmmmm communication.

#### **Step 4: Visual Correlates of Hmmmmm and Auditory Language**

Teaching by puppeteered example to make sculptures and "cave paintings" with communicative intent (e.g. if one Neoteric wants to tell another one to go to a certain place or report something that happened far away, it may in some cases be easier to draw or sculpt an imitation of the object of communication than to try a purely body-based Hmmmmm communication)

Can we nudge Neoterics to invent some sort of hieroglyphics by giving them a few examples of the composition of simplified pictograms to correspond to sentences with compositional structure – and having them abstract the principle from the examples and start inventing/composing their own pictograms? (this notion came out of discussions w/ Ruiting Lian...)

...

All of these specific suggestions involve some measure of "cheating," aka learning-acceleration, and in most cases, it is not clear how much of this will be necessary or critical. It is clear that human culture evolved over many, many generations, and many practices and skills we now consider basic and automatic were only learned by humans over very many generations, and we don't necessarily want to emulate this precisely in our simulated proto-AGI society, just because it might take quite a long time. So learning-acceleration tricks are, in a sense, a way to partially bypass the gradual nature of cultural evolution. These tricks are probably not necessary for having Neoterics learn human-level AGI, but they may perhaps provide massively faster Neoterics intelligence increase via bypassing bottlenecks that might otherwise end up taking many, many generations of cultural learning.



Initially, we found Minecraft the most convenient virtual world for Neoteric experimentation, but we always felt that as things developed it would be optimal to move some Neoterics to a more customized virtual world. This is the route to enable Neoterics to learn about building stuff under more physically realistic dynamics than Minecraft allows – and also allow more flexibility in terms of business and community outreach for Neoteric tribes as they grow. Sophiaverse is, of course, ideally suited for this role!

Possibilities for “Neoterics in Sophiaverse” are numerous and may include:

- A Neoterics “reality show” focusing on highlights of a particular Neoteric tribe as it grows (presumably with highly artistic bodies, faces and environment, and various human-controlled avatars joining in to interact with the Neoterics, including potentially well-known scientists and celebrities etc.)
- Auto-generation of blog entries or news articles (e.g. for Mindplex magazine) summarizing interesting things happening in Neoteric society, with direct links for readers to plunge into the Neoteric metaverse and watch for themselves
- Gamification in which a game-player can adopt a tribe of Neoterics, and then make and sell NFTs of the most interesting things their Neoterics have invented, or artworks they have made.
  - The game would incorporate some certification that the given inventions or artworks were actually created by the Neoterics.
  - This could also include some AI-based assessment of the degree to which the Neoterics were primed in their creative activities by specific human interactions (i.e. an originality rating, which would be higher if the Neoterics contributed more to the creation, and lower if they were basically following human instructions).
  - So the game would involve TRAINING one's adopted tribe of Neoterics, but training them in such a way that they would then go on to invent/create NEW stuff differing from their specific training.
    - I.e., the only way to succeed at the game (and get NFTs of creations with a high originality rating from one's adopted Neoteric tribe) would be to **educate one's Neoterics for creative generalization**

These aspects would be exciting and drive the growth of the Neoteric ecosystem, but would become really interesting only after Neoterics with a certain level of capability have been created. Which may, of course, come soon enough, given the rate at which AI is progressing these days.