Modeling Subjective Human Experience as an Interplay of Passive, Active and Willful Inference

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Abstract

I want to model the interplay of three levels of awareness by which I think we live: an enactive Passive Inference of actions filtering the past, a predictive Active Inference of conceptions projecting the future, and a cybernetic Willful Inference of equivalences steering the present by balancing Passive Inference and Active Inference and then selecting which to implement. I will look for these three kinds of inference in the interactions of a geometer with an arbitrary triangle. I've chosen the Encyclopedia of Triangle Centers as a historical corpus where I can discern, document, systematize and interpret the limits of our imagination in engaging a triangle. My hypothesis is that for us humans, all systems are basically the same, subject to our ability or inability to interact with them, as when we love our neighbors as ourselves. I expect that understanding our interactions with a model organism - the arbitrary triangle - will yield a vocabulary of basic actions (much like linguistic noun cases), and possible conceptions (triangle centers), and available equivalences (alternate ways to construct the same points). This may translate to a practical understanding of the dynamics of sorting algorithms (Michael Levin's model organisms!), chess, music, poetry, moods, humor, irony, prayers, social norms, natural languages, DNA, proteins, neurotransmitters, biofilms, ant colonies, brains, meaningful experiences, life choices and all else. Neurologically, our options for interacting with a concept or being are perhaps encapsulated in every cortical column. My research will help clarify how the Free Energy Principle could manifest as cognizance, deliberateness, willfulness. Within the Active Inference Ecosystem, I wish to lead an investigatory group on Modeling Subjective Human Experience, involving my colleagues from Math4Wisdom and Econet, and developing the Theory Translator.

Research question(s) and objectives

I will seek to identify and disentangle three levels of awareness which function within us as Passive Inference, Active Inference and Willful Inference. I will attempt to model their interplay.

- Can we understand how three languages (for how actions come to matter, how meaning arises and how events happen) fit together to account for the dynamics of our subjective human experience?
- Can we formulate and apply the Free Energy Principle so that it expresses a Willful Inference that balances Passive Inference and Active Inference and selects from them as two options?
- Specifically, as a simplest form of this challenge, can we understand and empathize with an arbitrary triangle, appreciate the range of its possibilities within the actions, constructions and equivalences of triangle geometry, and learn how to interact with it fully?
- Having an example of such a trilingual interplay, can we observe and show that it is also at work in other domains, such as sorting algorithms, chess, music, humor, poetry, neurotrasmitters... ?
- Could this interplay be introspecting the possibilities of an isolated cortical column?

In pursuing these questions, I wish to achieve the following objectives.

Understand Active Inference, the ontology and the equations, and gain hands on experience in meta-Bayesian modeling with ActiveInference.jl. Collect and systematize the ways that Karl Friston figures things out as I have for other thinkers. Formulate the Free Energy Principle so that it can express cognizance, deliberateness, willfulness, perhaps as Willful Inference, by which I mean, the self-spun narrative of a willful preference when the cost of comparing the difference between the options of Passive Inference and Active Inference is greater than the actual cost difference.

Understand triangle geometry. Identify a small number of basic constructions and their rules of composition by which they can generate all of the current and future data of the Encyclopedia of Triangle Centers. Explain how different constructions can yield the same triangle center.

Understand subjective human experience as the interplay of three levels of awareness, or alternatively, understand the failings of this approach and discover promising alternatives. Illustrate this model in terms of the ways we can interact with an arbitrary triangle. Apply this model to other domains, collaborating with others. Place this model within the framework of Wondrous Wisdom. Establish collaborative knowledge bases, in the Public Domain, as at Theory Translator.

Significance and impact of the proposed research

The Free Energy Principle has been proposed to have not only broad but possibly universal significance. My research will help clarify the universality of the Free Energy Principle if I formulate it convincingly in terms of Passive Inference, Active Inference and Willful Inference.

Universality is the quality that I have sought in my lifelong research, documenting a language of wisdom, Wondrous Wisdom, centering on three minds - answering, questioning, investigating.

Suppose that we can comprehensively understand and intuit the options we have in interacting with an arbitrary triangle. Neurologically, the options we introspect may reflect the design of the cortical column. This may give clues on the purpose of the six layers of the cortical columns.

If the dynamics can be observed in other domains, then there may be no end to the possible application for understanding disciplines or interacting with beings from a loving point of view. We may discover a universal language of love by which we respect, tolerate, embrace, hear out, serve and support others. We can act, infer, serve as peacemakers for universal harmony.

Approach and research methods

I have personally conducted hundreds of philosophical investigations. I choose an existential question, introspect phenomenological data, systematize that structurally, and frame that pragmatically to distill a conceptual language of absolute truth.

In 2017, at VGTU, I taught philosophy. Rather than teach the history of philosophy, I took the opportunity to teach my students how to ask a question they cared about and arrive at an answer. [1]

Given one's question, simplest is to ask a related question for gathering relevant subjective data - typically 20 or 30 examples may suffice - then group examples, contrast groups, distill contrasts, and arrive at a comprehensive structure of all that is humanly possible. The resulting structure is an absolute truth that partly or completely answers the question asked. Performing this repeatedly makes for a conceptual map of the perspectives that the human mind is able to take. My wish is to nurture an investigatory community that would cultivate a science of subjective human experience.

In 1988, on the basis of the static structures that I had documented, I hypothesized that human experience could be expressed in terms of three conceptual languages: argumentation by which issues come to matter, verbalization by which meaning arises, and narration by which events happen. As an independent scholar at Vilnius University in Soviet-occupied Lithuania, I analyzed narration because I knew a body of data that I could study to illuminate it: Lithuanian folk tales. In keeping our attention, the stories had to alternate between creating and relaxing tension. We empathize with the victim of the tension, who as the story progresses is unfolded and then folded back up. But the content of the story is given by the tone of voice that creates the tension, whether it is forcing, commanding, explaining or caring. This tone of voice is constant at the beginning of a story, and is a different tone of voice but likewise constant at the end of the story. [2] Thus the Cinderella story starts with commanding and ends with explaining, which determines the content. There are seven kinds of stories. Today, AI could confirm and apply this theory.

In order to work out the languages of argumentation and verbalization, I needed an appropriate body of data and more theoretical insight. In 2012, I read parts of Kahneman's "Thinking, Fast and Slow", and recognized that his System 1 and System 2 accord, in my philosophy, with adding a perspective and adding a perspective on a perspective. [3] There should furthermore be a System 3, full fledged consciousness, adding a perspective upon a perspective on a perspective. In developing Math 4 Wisdom, my supportive investigatory community, I grew to appreciate the centrality of the three minds. I wrote out my notes on how each mind should have its own language.

In 2024, Daniel Friedman discovered Math 4 Wisdom through my YouTube videos. He set up a Coda for Math 4 Wisdom. We meet weekly and I became interested in Active Inference. I think of it as describing the relationship between the answering mind, the unconscious, enmeshed in the world, speaking for it with 100 billion neurons, and the questioning mind, the conscious, divorced from the world, thus modeling it with 100 thousand black boxes, which is to say, concepts, the generative model. I wonder how their relationship, regulated by the Free Energy Principle, could be understood in terms of an investigatory mind. Presumably, it plays with some ambiguity here.

I read the Active Inference textbook and studied it with Cohorts 7 and 8. [4] For me, the key observation is that in an action-perception loop, when our model is wrong, we can update our model or we can update the world. I still need to understand how the Free Energy Principle implements this mathematically and thermodynamically, and I need to code some projects to make sense of this.

In wondering what to code with Active Inference, I returned to my search for the three languages. I considered the role played by tension. Passive Inference (the answering mind) presupposes tension in the environment and simply optimizes the relaxation of tension as when implementing architect Christopher Alexander's patterns. [5] Whereas Active Inference (the questioning mind) creates artificial tension to keep us safe from real trouble. Together they can create and relax tension,

yielding the unit of tension in a narrative. Alexander's patterns can be deliberately composed by selecting from the pattern language to build, for example, a home. As with William James's definition of intelligence, one can choose from different paths to achieve the same end.

The three minds are implicit in Karl Friston's analysis of psychological health as a balance that is possible by dissolution of precision. [6] This likewise balances the direct and indirect pathways in the basal ganglia. [4] The cost of Active Inference is a factor to understand and model. [7] [8].

What is the simplest body of data with which to flesh out an interplay of three minds? Triangle geometry is a meeting place for algebra and analysis, cultivated over thousands of years, though it be restricted to three points on a plane. The facts are given by triangle centers, the specific points that can be constructed given an arbitrary triangle ABC. The Ancient Greeks knew four: incenter, centroid, circumcenter, orthocenter. Hundreds more were noted in the 19th and 20th centuries. The Encyclopedia of Triangle Centers lists more than 60,000 triangle centers. It also has a glossary. [9]

I will study roughly 50 of the most elementary triangle centers. Here are my notes so far. I am looking for basic actions and the purposes they serve. We can draw circles around and inside a triangle to learn about its size and shape. We can bisect sides. We can drop altitudes. What else?

I am looking for 6 basic actions that accord with 6 basic linguistic noun cases, or semantically, with the 6 levels of Kiparsky's hierarchy. [10] An agent acts for a beneficiary in the context of a goal/experience. Here the will acts directly and the tension is natural, as by an environment upon a subject. The will also acts indirectly, from a metalevel, in the reverse direction, through artificial tension, as by a subject upon its environment: An instrument acts on a patient/theme in the context of a location. The answering mind models three minds directly, and the questioning mind indirectly. I will try to identify each basic action and decipher their purposes in defining an arbitary triangle.

Note that these actions are continuous and it matters that they be executed properly. But they generate discrete points, concepts by which meaning arises, the possible Markov states in a generative model. We can arrive at the same point by different combinations of actions. The investigatory mind can choose which statements to construct, how to construct them, where to rely on the continuous actions, and where to rely on the conceptual points. I wish to model this.

I expect to gain key insights by systematizing the ways of figuring things out in triangle geometry. I have arrived at the same 24-fold pattern in systematizing the epistemologies of mathematics, physics, biology, neuroscience, sociology, Gamestorming, chess, and also individuals - Jere Northrop, Franz Nahrada, Jesus, the Gaon of Vilna and myself. [11] [12] [13] [14] Theoretically, alongside my study of triangle geometry, I will be contemplating the three minds and related conceptual frameworks, the language of wisdom I call Wondrous Wisdom.

When I have figured out how to look at triangle geometry, and worked out the dynamics, then I will code this in ActiveInference.jl. I will extend existing Active Inference models to illustrate the investigatory mind. I will select and craft aspects to visualize the dynamics. I will also reach out with my YouTube videos to invite geometry teachers and students to work together on this research.

I will express my findings in the language of Active Inference, consulting with experienced researchers. I will study Karl Friston's classic papers and sketch out his epistemological portrait.

If I am successful, then it will be exciting to work with collaborators to seek this dynamics in other domains such as the sorting algorithms which interest Michael Levin. [15]

Alignment with the Active Inference Institute's mission

Accessibility. Triangle geometry will newly illustrate Active Inference. More people may engage with Active Inference if we place it alongside Passive Inference and Willful Inference. I will share the ways that Karl Friston figures things out. If the ActiveInference.jl team wins EU funding, then I will author a tutorial and organize a project repository.

Rigor. I will learn from and contribute to the Active Inference ontology. I will investigate how the Free Energy Principle could relate Passive, Active, Willful Inference, and mathematically reconcile the theories (enactive, predictive, cybernetic) in Chapter 3.7 of the textbook. [4]

Applicability. I envisage Active Inference as a lingua franca for connecting frameworks in consciousness studies, neuroscience, artificial intelligence and psychiatry, as at Theory Translator. I hope to work with thinkers such as M.Levin, C.Fields, S.Dobson, J.Bach and I.McGilchrist.

Anticipated measurements (outcomes and deliverables)

Data collection
• A description of perhaps 50 triangle centers in terms of actions that construct them.
• A distillation of the key steps, ideas, actions in proofs of perhaps 100 statements.
• A classification of those 100 statements in terms of the ways of figuring out their proofs.

Distillation
• A systematization of the ways of figuring things out in triangle geometry.
• A list of basic actions and rules of composition that generate the constructions I considered.
• An explanation how these can generate the present and future entries of the Encyclopedia.
• A metaphysical interpretation of these actions and rules.
• A mathematical model in the language of the Free Energy Principle.
• A systematization of the ways Karl Friston figures things out.

Presentation
• An interpretation of the dynamics in terms of Passive, Active and Willful Inference.
• One or more computer models illustrating the dynamics of these constructions.
• Presentation at Active Inference Institute livestreams and Theoretical Neurobiology meetings.
• Online presentations to interested audiences and potential collaborators.
• Academic publication in one or more relevant journals.

Extension
• Collaborations with others to look for analogous dynamics in other domains.

• Collaboration on the Theory Translator as a shared resource about the three minds.
• Collaboration to collect and systematize the methods of various disciplines as here.
• Collaboration on collecting, from interested individuals, their deepest values in life, investigatory questions and relationships with truth as here and here.
• Essays on the three minds and other conceptual frameworks at the Theory Translator.
• Consultations with mentors on how best to publish, pursue and fund my work.
• Informal organization of researchers of subjective human experience who would like to work together at the Active Inference Institute, at Econet, in academia and outside of it.

Timeline and milestones

• 6 months: Analyze the first 50 triangle centers in terms of actions, concepts and equivalences. Systematize the ways of figuring things out in triangle geometry. Consult with geometers.
• 6 months: Think through this data in terms of three languages: how do actions matter, how does meaning arise in concepts, and given equivalences, how do particular constructions happen?
• 6 months: Construct models with ActiveInference.jl that illustrate the interplay of Passive Inference, Active Inference and Willful Inference in triangle geometry.
• 6 months: Model this same interplay in two or three other domains with ActiveInference.jl

People and institutions involved

I can work by myself but I welcome collaborators. I am active at the Active Inference Institute, including the Discord server and the Theoretical Neurobiology meetings.

I lead a supportive community Math 4 Wisdom. I meet by zoom on Wednesdays with Daniel Friedman, Marcus Petz, Bill Pahl and Ryan Buchanan. I am applying for our group to be included in the Active Inference ecosystem under the title "Modeling Subjective Human Experience".

I meet with John Harland and Thomas Gajdosik to talk about math, physics and philosophy related to the three minds. I will reach out to the 1,200 YouTube subscribers of my Math 4 Wisdom videos.

Jere Northrop and I nurture Econet. We propose Active Inference for Bioregion Representation.

I seek funding for my research. In 2024, the Active Inference Institute submitted my proposal Active Inference of Absolute Truth to the Templeton Foundation but it was rejected. As a Research Fellow, I will apply to the California Institute for Machine Consciousness and other institutions.

Any dependencies or contingencies that might affect progress

I am currently looking for part-time work or funding. If I do need to take a full time job, perhaps moving to another country, then this will take time away from my research. Also, my parents are in their eighties, and if they should ever need my help, then that could also take time away.

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