

COMMENTARY



## Playing with free energy

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### ABSTRACT

Mark Solms's "New Project for a Scientific Psychology" represents an invaluable step in the direction of a generative model of the mental apparatus. In particular, the idea of drawing a connection between conscious processing and variations in the precision of predictions, is an idea worth pursuing. However, the imperative always to minimize free energy is far too limiting. There is no stronger sign of evolutionary fitness than not needing to minimize it and instead playing with it. We may therefore assume that the mental apparatus, and conscious processing especially, have evolved also in order to display their skill at allowing for and handling an abundance of free energy.

### KEYWORDS

Free energy; play; mental apparatus; evolution

Mark Solms' "New Project for a Scientific Psychology" (2020) is an impressive tour de force. He re-imagines, restructures, and revises part I of Freud's Project, breathing new life into it as he updates it sentence by sentence, paragraph by paragraph in light of current neurobiological knowledge and advances in the mathematical modeling of living organisms. Furthermore, he integrates his iconoclastic view of the id – that it is conscious – into the revised Project. The resulting reinvention is no less intriguing and no less impenetrable than the original. It is therefore good to know that a book is forthcoming which expands on it.

An update to Freud's project is worthwhile, given how much more we know today about the neurobiology underlying the conscious and unconscious processes whose description Freud grappled with. In addition to the advances in our physiological understanding, there are those in artificial intelligence and computational modeling of biological agents. Both of these strands of progress serve Freud's original goal of connecting the brain's physiology with what amounts to his own interpretation of Helmholtz's principles of information processing in the brain (von Helmholtz, 1867).

Models of the mind – of affect, cognition, action, perception, attention, dreaming, etc. – are many and varied. They go in and out of fashion in a process only faintly resembling rigorous testing. Instead, straw men are built, promptly found wanting, and declared "debunked." However, perhaps the builders of straw men can be forgiven because the theories they set out to criticize were never formulated consistently enough

in the first place. As Freud's Project and the fact that he left it unpublished show, he certainly wasn't guilty of not trying, nor of not realizing he failed. As a consequence, psychoanalysis has remained without a formal framework underpinning it. At a minimum, such a framework would have equipped it with a guarantee of internal consistency and a sound basis for rational debate and testing of its claims. Psychoanalysis is not alone here. Cognitive and behavioral science, psychology, psychopathology, and related fields all suffer from a dearth of theory, which makes them vulnerable to fads and to the chasing of noise in poorly conceived experimental studies.

125 years later, we are in a better position to develop a formal model of the mind along the lines Freud envisioned. The free energy principle (Friston et al., 2006) allows for the formal description of an agent performing active inference by minimizing expected surprise at its actions and perceptions. As such, it is a realization of the Helmholtzian ideas which (via Freud's supervisor Brücke) influenced Freud and provides a framework in which generative models of the mental apparatus can be proposed and tested. Generative models have the important advantage over informal qualitative descriptions that they give a rigorous and consistent account of how the observations they explain are generated by (possibly unobservable, but inferrable) states of the system (in our case the mental apparatus) they describe.

Solms's New Project represents an invaluable step in the direction of a generative model of the mental apparatus. Much still remains at a verbal descriptive level, and

insofar as there are formal definitions and equations, it would be helpful to have more details on how exactly they are motivated and derived. A particularly intriguing idea is introduced in Equation (3). This defines the change in precision  $\omega$  as a gradient descent on the free energy and gives the corresponding equation in terms of prediction error  $e$ . This is then related to the distinction between conscious and unconscious processes. If I understood correctly, changes in  $\omega$  are associated with consciousness while unconscious processes are associated with constant  $\omega$ . Here and in other places, for instance when we hear of prediction errors exceeding certain thresholds, we enter the domain of qualitative description, leaving that of rigorous definition. Nonetheless, the amount of progress towards formalization is impressive. So is the gain in both internal and external consistency. Internally, relations between the concepts introduced by Freud are more consistent, and externally, these concepts are now related to the mammalian affective organization discovered and described by Jaak Panksepp.

An unnecessarily limiting view is taken in footnote 21: “In biology, efficiency is everything.” But what about the wasteful magnificence of the peacock’s tail? That certainly isn’t an efficient use of the bird’s resources. Can we reconcile such wastefulness with optimization principles like free energy minimization and Helmholtzian perspectives in general? Darwin (and others following him, cf. Miller, 2000), whose take on evolution went beyond mere adaptation for survival, saw the answer to the efficiency-defying richness of nature in sexual selection (Darwin, 1871). In this vein, we may consider the possibility that sometimes an organism might refuse to minimize its free energy precisely because this could endanger its survival. Advertising this refusal prominently like the peacock advertises its tail could then be a promising mating strategy because it indicates that the organism is fit enough to survive without putting all its effort into survival. This introduces free energy into the domain of PLAY, in Panksepp’s sense. If I am able to play with my free energy, letting it grow and reducing it at will, then surely I am a better mating prospect than one who has the boring one-dimensional aim of always keeping his free energy down. The thought itself is playful. Could the best way to reduce my free energy in the long run be to make a

show of not reducing it in the short run? But then wouldn’t it be even better not to reduce it in the long run (and yet survive), etc.? This suggests an alternative answer to the problem of consciousness: being conscious, and being seen to be so, could be a way to advertise an excess of free energy, useful not for survival directly but to impress those who might choose us as mates. In this perspective, the statement in Section 11 “We only represent the outside world cognitively because we must” can be reformulated as “We represent the outside world cognitively not because we must, but because we can.” This would mean we have escaped the dreary dictate of usefulness. In building on Solms’s work to get closer to the goal of a formal generative model of the mental apparatus, we have our work cut out for us. In the end, we should be able to build, at least *in silico*, such an apparatus, however crude an approximation to the real thing it might at first be. It may not even be useful in itself. However, it will help indirectly because the process of building it will sharpen our thinking about the concepts involved and will give us a more consistent picture of how they are connected to each other. This in turn will help foster rational discussion, experimental investigation, and clinical practice.

### Disclosure statement

No potential conflict of interest was reported by the author.

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