“In general, we are least aware of what our minds do best” – Marvin Minsky

Active Inference purports to be a unified theory of sentient behaviour. The fundamental question of how living organisms persist adaptively to its environment (resist the effects of the 2nd law of thermodynamics/entropy) is answered through a normative framework – there is at heart a principle which governs what all organisms must do. Namely, the minimisation of expected ‘Free Energy’ (or surprisal), which loosely speaking is a quantity of the discrepancy between an agent’s internal model and its sensorial inputs.

Agents engage in ‘action-perception’ loops with their environment, making predictions about the causes of their (internal and external) sensations through their generative model and adjusting the parameters of these models through action where discrepancies occur. Action and perception become two sides of the same coin, both in the business of making (unconscious) inferences of the agents hidden internal and external states (where the separation between such states is formalized through Markov Blankets). The inference mechanism is expressed mathematically in a Bayesian framework (where the generative model comprises a prior and likelihood).

The normative perspective of the theory starts from first principles and the first part of the book is dedicated to introducing the main mathematical concepts used in the theory. As different formal ideas are connected from a top-down and bottom-up perspective, interesting insights are revealed in rich and mathematically precise language.

Process theories (e.g., predictive coding) are constructed and used to explain how the free energy principle is implemented in the brain. The application of the theory to multiple problems in psychology and neuroscience using computational approaches from artificial intelligence is provided on the latter parts of the book. These range from problems like perception, action selection, attention, emotion regulation, psychopathology - all at heart can be viewed through the lens of making inferences over time.

A difficult read, but one of the most interesting theories worth mulling over for ages.