**Review of Andy Clark, *The Experience Machine: How Our Minds Predict and Shape Reality***

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Our senses are continually bombarded with incoming data from the world. How do our brains process, filter and encode all this sensory data so that we experience of a world of objects, people, and opportunities? Perhaps they don’t, according to recent theorizing in cognitive neuroscience. Proponents of “predictive processing” suggest that the bulk of our brain’s information processes operate in the opposite direction: our brain starts with models of the world as already structured into objects, people, and opportunities, and uses these models to predict the sensory inputs that it would expect to receive from such a world. If these predictions don’t match the incoming sensory input, then error signals are fed back to correct the models. The more accurate the brain’s predictions, the less processing of sensory inputs is required. This is the idea of the brain as a top-down information-processing machine whose goal is to minimize prediction error.

In *The Experience Machine: how our minds predict and shape reality*, Clark masterfully synthesizes recent work on the predictive brain into an accessible and captivating book for the non-specialist. He explains how predictive processing in the brain can account for accurate perception, but also – and perhaps more fascinatingly – what happens when things go wrong. If the sensory feedback is ambiguous or limited, or if the brain assigns too much weight to its prior model of the world, then errors can occur. Clark illustrates such situations with familiar and compelling examples: why we sense phantom vibrations from our cellphone, why we hear speech in white noise, and why we experience a blue and black dress as white and gold.

In Clark’s hands, however, the predictive brain is not merely an account of how our perceptual systems work. Instead, it is a unifying theory of human minds. Clark weaves a compelling narrative which explores how perception, action, pain, emotion, and consciousness can all be understood as part of the same story: the relationship between our brain’s model of the external world and its model of our own physiological states. Clark explores how the predictive brain can explain PTSD, sporting expertise, the aesthetic response to artistic beauty, and even Patrick Swayze’s character’s attitude to pain in the 1989 movie *Road House*. In one of the book’s most memorable examples, Clark explores what happens when police officers misidentify a non-harmful object or movement as an armed threat. The predictive brain, he proposes, takes the police officer’s own inner bodily sensations (such as increased heart rate) as evidence of a threatening situation, which predisposes the visual system to detect a weapon where is there is none.

This focus on neural processing may surprise those readers familiar with Clark’s earlier work on embodied and extended cognition. Clark has spent several decades arguing that many of our cognitive abilities are not brain-bound, but rather offloaded to our bodies and environments. But Clark is adamant that we should not understand the predictive picture as a return to neurocentrism: he proposes that the predictive brain’s ability to combine inward-looking and outward-looking sensory information is precisely what enables it to exploit non-neural resources to extend its cognitive reach. This is perhaps where the book is at its most intriguing (and also its most metaphorical): Clark proposes that human minds are “seething, swirling oceans of prediction, continuously orchestrated by brain, body, and world”.

What are the practical implications of understanding the brain as a predictive machine? Throughout the book, Clark explores the possibilities that specialized treatments and medical interventions could be used to shape our brain’s predictive processing: biofeedback, psychedelic drugs, and immersive virtual reality are some of the options considered. Clark also raises the question of how we might “hack” our own brains using the power of our own conscious thought, in a way which sometimes sounds ominously close to manifestation: “We must at some level strongly predict that we will occupy the states that we can plausibly attain and that best realize our goals […] Realistic optimism is thus the order of the day.” Although Clark cautions against a pseudoscientific interpretation of predictive processing, some of the book’s rhetoric could be open to misinterpretation.

Scientific and philosophical work on predictive processing has been careful to distinguish neural prediction and precision weighting from what we do as conscious human beings when we estimate outcomes and consider probabilities. In this book, however, Clark is keen to unite our understanding of conscious and unconscious strategies. He suggests that our best understanding of affirmation and visualization techniques, for example, is in terms of the predictive brain’s error minimization strategy. Anyone hoping for an explanation of how our conscious expectations interact with non-conscious neural prediction mechanisms will be left dissatisfied: Clark acknowledges that this part of the puzzle is still missing. But if anyone is going to inspire the next generation of researchers to take on this task, it is Andy Clark.