

# ***A Core Library for Cognitive Engineering***

## *The Ecological Approach to Visual Perception*

Gibson conceived of the most fundamental ideas I apply, coined the term "affordance," and developed an approach to perception that did not require a mental symbolic model/solver machine to accomplish everyday tasks. The field of Cognitive Science is slowly returning to ideas like this (e.g., Embodied Cognition, Enaction) after decades of thinking that the mind solves perceptual problems like a computer does.

## *The Elements of Typographic Style*

Bringhurst elegantly instructs on how to lay out a page, which typefaces work well together, and other typographic nuances. A poet himself, and a clear and fluid writer; this is the only "reference book" I've read cover to cover.

## *Metaphors We Live By*

Lakoff's seminal work, where he introduces the idea that much of how we think is based on metaphors; not Proust's madeleines, but simple associations we form from birth, like up = more = good.

## *Ecological Psychoacoustics*

Neuhoff compiles research on how we hear, and how we turn sound into meaning. We don't hear waveforms—we hear "through" them to the material properties of the thing making the sound. Our own artifacts must likewise transparently and directly present their referents.

## *Vision Science: Photons to Phenomenology*

Palmer has compiled an encyclopedia of scientific research in vision, with clear summaries and rich references to the original work.

## *Cognitive Psychology and its Implications*

Anderson's classic text on Cognitive Psychology—we must understand the operation of the mind to feed it properly.

## *The Elements of Graphing Data*

Cleveland treats graphs with scientific rigor: do our charts let us extract/understand signals the data actually contains?

## *Elements of Graph Design*

Kosslyn addresses how we can develop charts that properly feed our most basic neural capabilities.

### *The Wall Street Journal Guide to Information Graphics*

Wong developed an open and clear style guide for graphs—tested and refined in front of millions on a daily basis.

### *How Maps Work: Representation, Visualization, and Design*

MacEachren dives deeply into how we understand marks and their spatial organization in maps.

### *Flow: The Psychology of Optimal Experience*

Csikszentmihalyi characterizes how we work when we're at our best: minds on fire, everything at our mental fingertips; a mental state both deeply rewarding and super-productive. Our goal is to get people into the state of Flow.

### *The User Illusion: Cutting Consciousness Down to Size*

Norretranders coins the term "exformation" to help us understand how every communication we send or receive is critically dependent not just what's in the message ("information") but what's exterior to the message: the assumptions sender and receiver have about one another and rely on when communicating.

### *Development of Professional Expertise*

Ericsson collects writings on how we become experts—the processes and internal mental representations that are involved. We must understand the processes to support them well, and must understand the internal representations so our external ones associate easily and capture all an expert needs.

### *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*

Clark addresses how humans have evolved to become expert at recruiting external tools to extend our capabilities.

### *Radical Embodied Cognitive Science*

Chemero goes farther and suggests that those tools are a part of the cognitive process. We are building parts of the mind itself!

### *Cognition in the Wild*

Hutchins studies how several minds combine to do a single task, like piloting a ship. Sounds like science fiction: beyond cyborgs (entities half cybernetic and half organism)—all the way to hive minds. But it already happens; this kind of multi-person thinking plays out right now in many team-based efforts on a daily basis. We can bind them together much more effectively.

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