

# Evolution of the Human Condition

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# Evolution

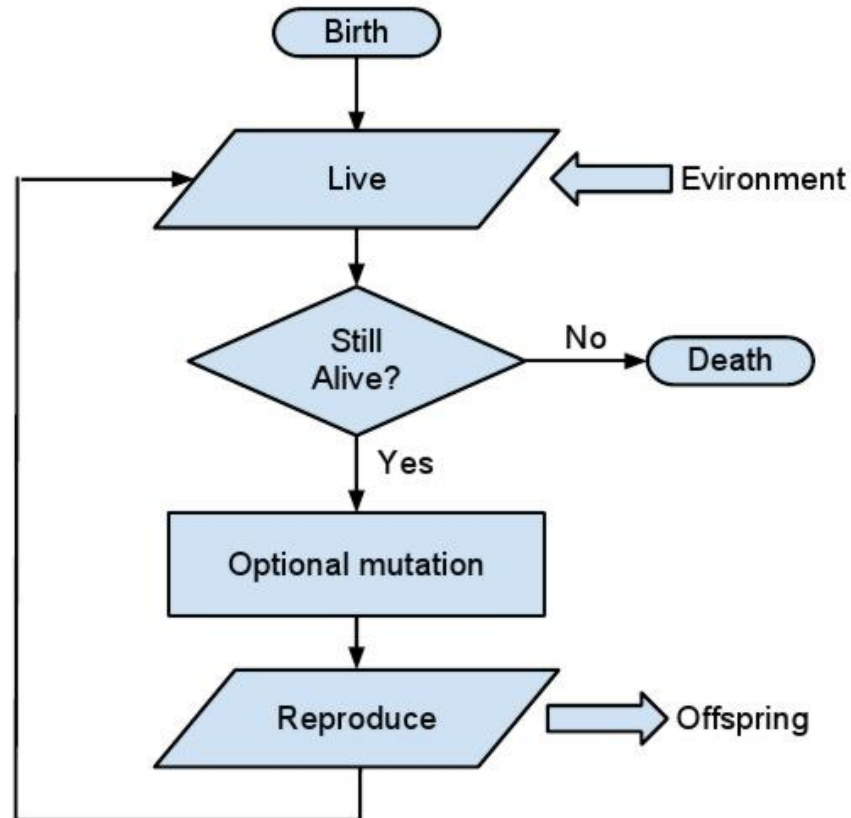
IF:

- Organisms reproduce, with some variation.
- Environmental limits prevent some offspring from surviving and reproducing. (natural selection)

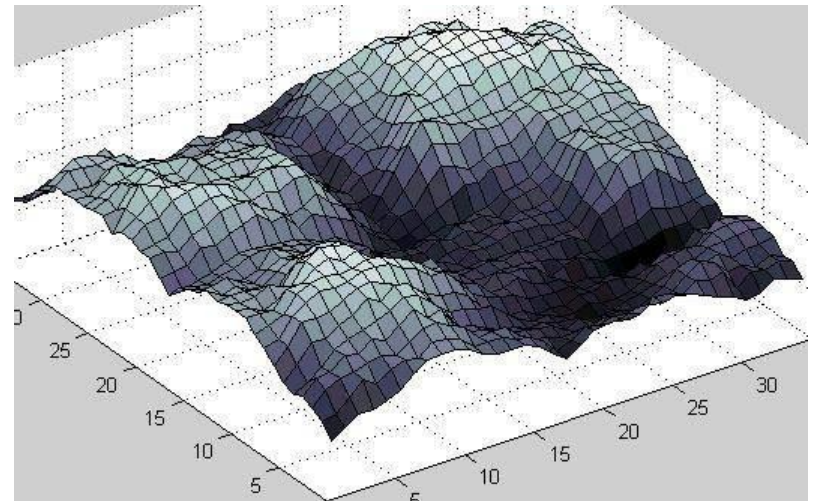
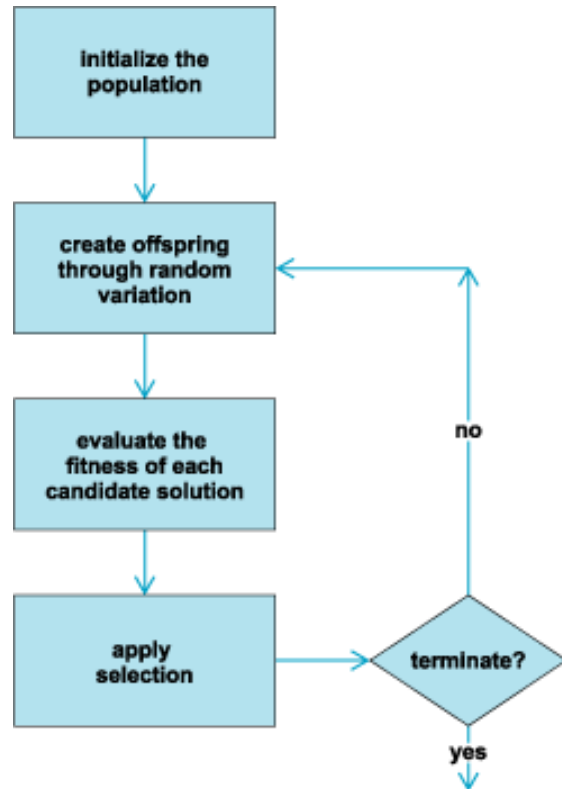
THEN:

- Inherited traits that benefit survival and reproduction will spread.
- Across generations, organisms become better fitted to the environment (adaptation.)

# How to Evolve

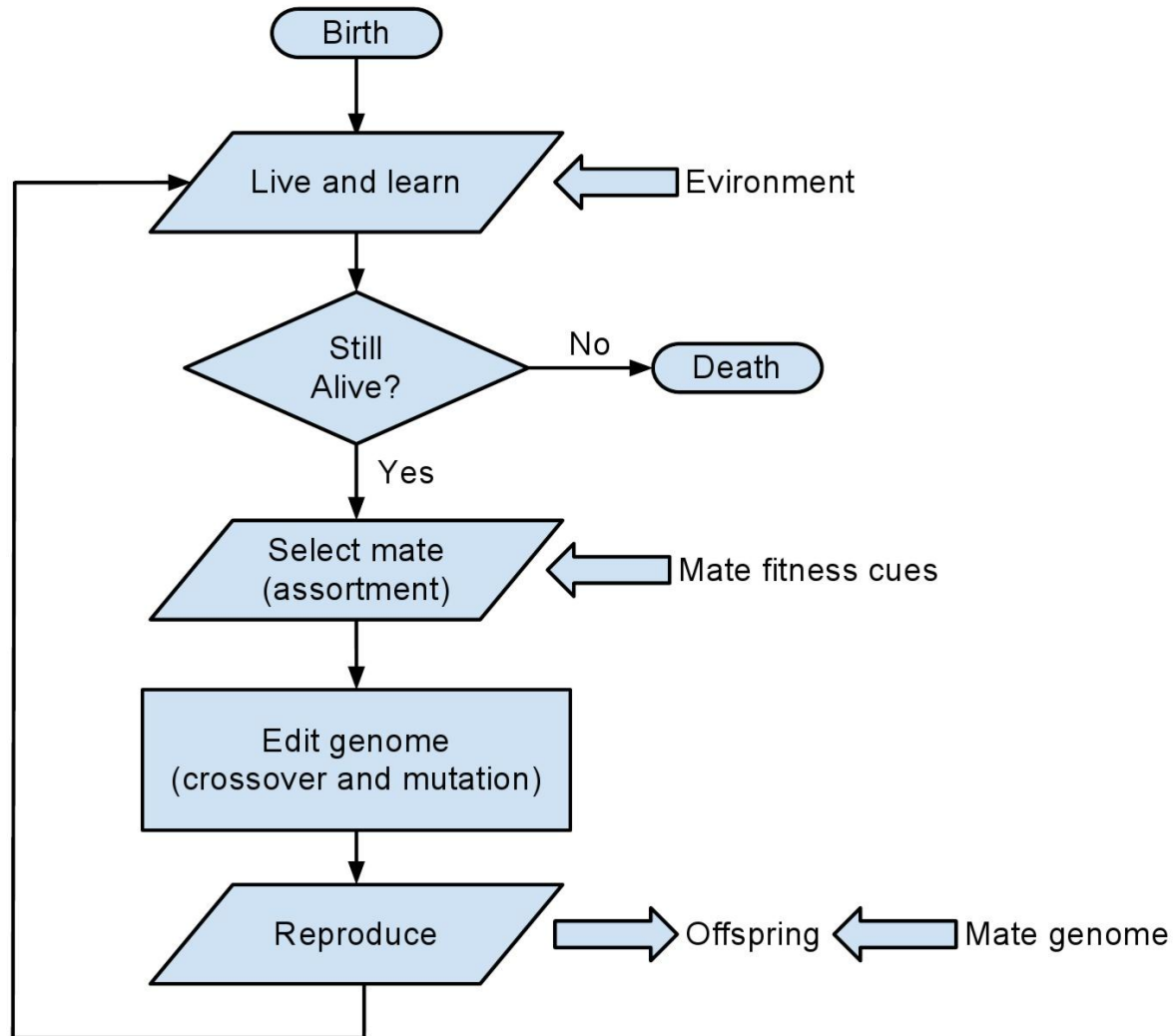


# Evolution: an optimization algorithm

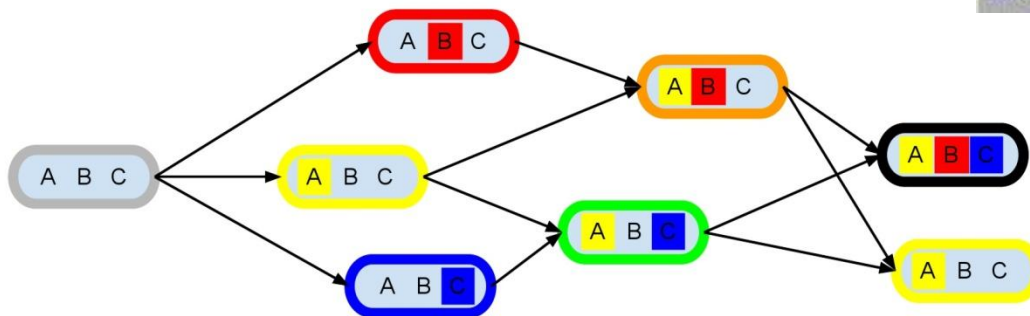
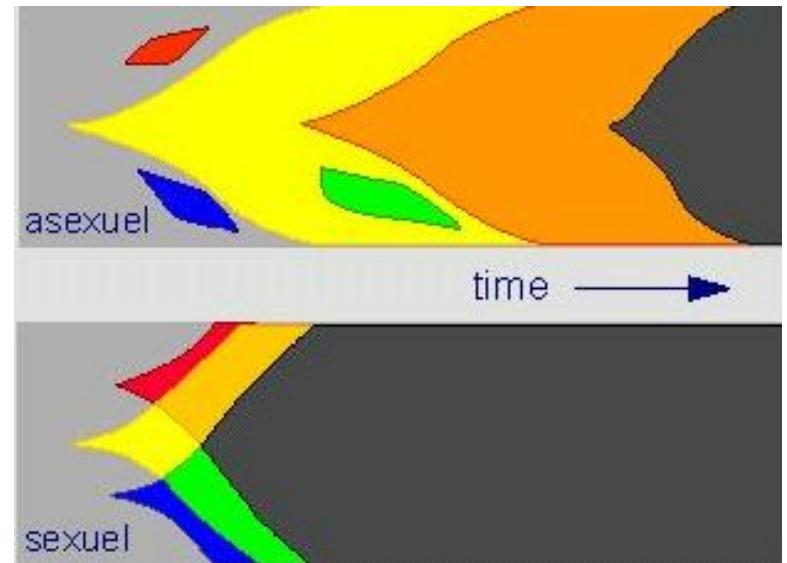


Fitness landscape

# Sex: A better algorithm

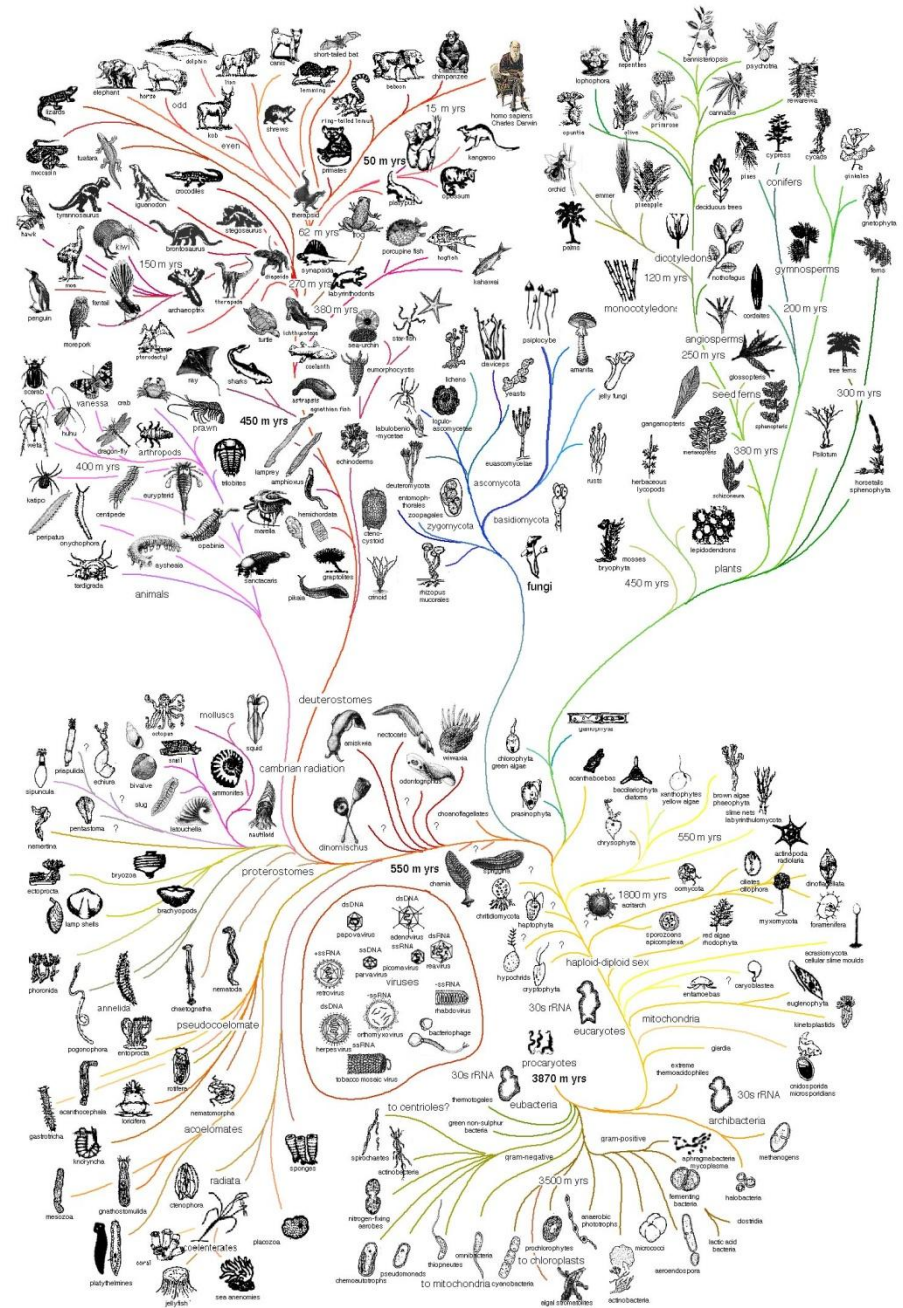


# Sex at the Population Level



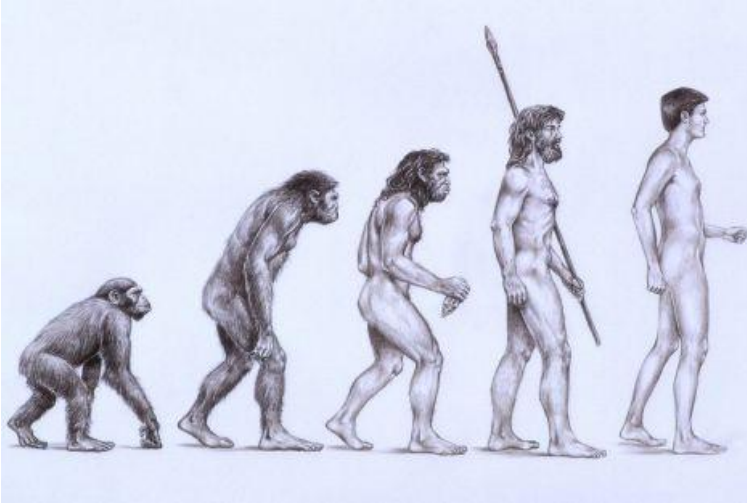
# The Big Picture

Evolution is baroque and senseless, having no purpose beyond survival and spreading into new niches.



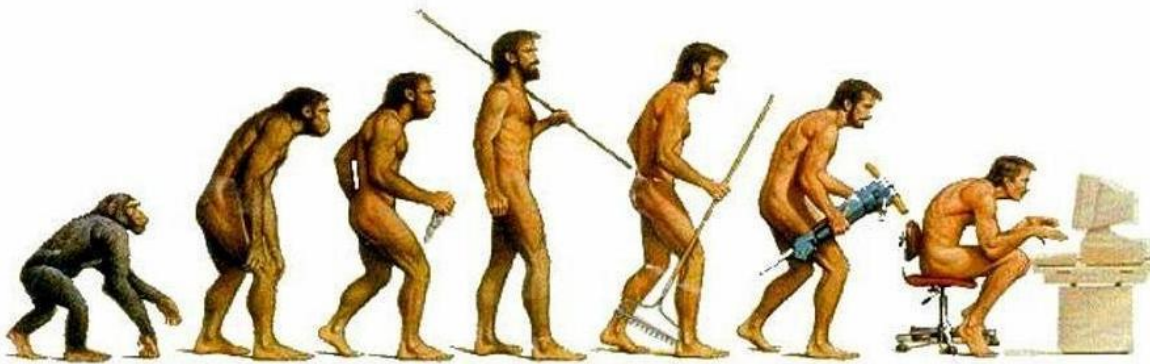


# Human Evolution



What does it mean that humans have evolved?

How should this affect our self-understanding?





# The Human Animal

Human	atg	gca	aat	act	tat	gtc	act	gca	tgt	gat	agg	tat	tgt	ctt	gct	gaa	cca	gt	cag
Chimpanzee	atg	gca	aat	act	tat	gtc	act	gca	tgt	gat	agg	tat	tgt	ctt	gct	gaa	cca	gt	cag
Dog	atg	gca	aat	act	tat	gtc	act	aca	tct	gat	ggg	tac	tgt	ctt	gct	gaa	cca	gtg	cag
Mouse	atg	gca	aat	acc	tat	gtt	gct	acg	tct	gat	ggg	tac	tac	ctc	gct	gaa	ccc	aca	cag
Chicken	atg	gca	aat	aca	tgt	gtc	act	gta	cca	gat	ggg	tac	tgt	ctt	gct	gag	ccc	ata	cag

Changes relative to the dog are highlighted

- Evolution shows our continuity with animals.
- Human DNA is 98% similar to Chimpanzee, but also 85% similar to mouse.
- Structurally, as mammals, humans are superficially unremarkable, having the same organs and bones.
- To a human, the important differences lie in behavior, especially social behavior.

# The Cultural Animal

- Horses and Gorillas are social animals, termites and mole-rats are ultra-social, but only humans are cultural animals.
- Our *use of* culture and our *reliance on* culture make humans unique.
- Language is both a product of culture and its means of transmission.
- Humans evolved capacities for language and behavioral imitation; frogs didn't.

# Uncertainty

I invite you on a journey into a largely unknown land of rationality, populated by people just like us, who are partially ignorant, whose time is limited and whose future is uncertain. This land is not one many scholars write about. They prefer to describe a land where the sun of enlightenment shines down in beams of logic and probability, whereas the land we are visiting is shrouded in a mist of dim uncertainty. In my story, what seem to be “limitations” of the mind can actually be its strengths.

— Gerd Gigerenzer, *Gut Feelings*

# Reason

Man is not a rational animal, he is a rationalizing animal.

— Robert A. Heinlein

So convenient a thing it is to be a *reasonable creature*,  
since it enables one to find or make a reason for  
everything one has a mind to do.

— Benjamin Franklin

Inadequate information and intractable unpredictability limit the usefulness of rational decision-making. This is why humans rarely rely on it. Reason seems to be optimized for explanation, justification and persuasion; that is, for social coordination.

# The Evolved Mind

- Evolutionary psychology is to ordinary psychology as geology is to geography.
- *Why* do humans exhibit the behavioral regularities that they do?
- Behaviors and capacities are assumed to be *adaptive*: to enhance survival and reproductive success.
- Unconscious and intuitive aspects (emotion, motivation) are particularly interesting.

# Nature/Nurture

- Human behavior is partly learned and partly inherited. But how much of each?
- Evolutionary psychology explains behavior:
  - Differences between men and women
  - Conditions for cooperation
- Conclusions may seem politically conservative.
- The nature-nurture question won't go away.
- Even cultural behavior is not safe from evolutionary explanations.

# Cultural evolution: *How* and *why*?

- *Culture*: socially learned information stored in people's brains.
- *Cultural variant*: an idea, skill, belief, attitude, or value acquired by social learning and that guides an individual's behavior.
- What does “natural selection” mean in cultural evolution?
  - Optimized solutions can arise without foresight or understanding.

See Richerson and Boyd 2006, “Not By Genes Alone”.



# Evolution

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THEN:

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# Cultural Evolution

IF:

- People vary in learned behavior, usually imitating others with some variation.
- People are motivated to survive, and to increase their access to resources and influence on collaborators.
- Environmental resources are limited, and access depends on effective cooperation.

THEN:

- Learned behaviors that benefit survival and cooperation will spread.
- Over time, cultures become better fitted to the environment (adaptation.)
- The social environment becomes as important as the material environment in determining fitness.

# Evolutionary Parallels: IF

## Genetic

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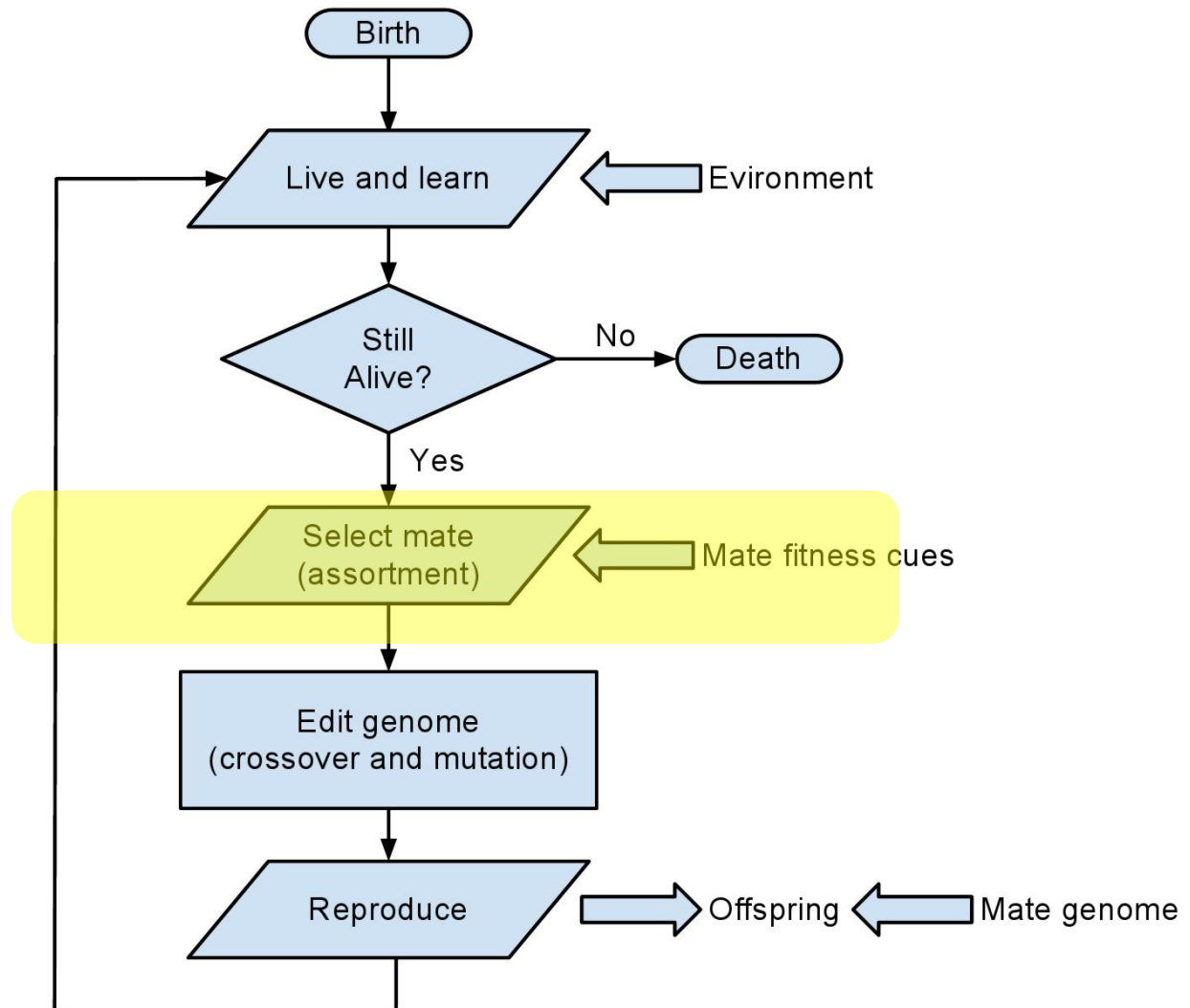
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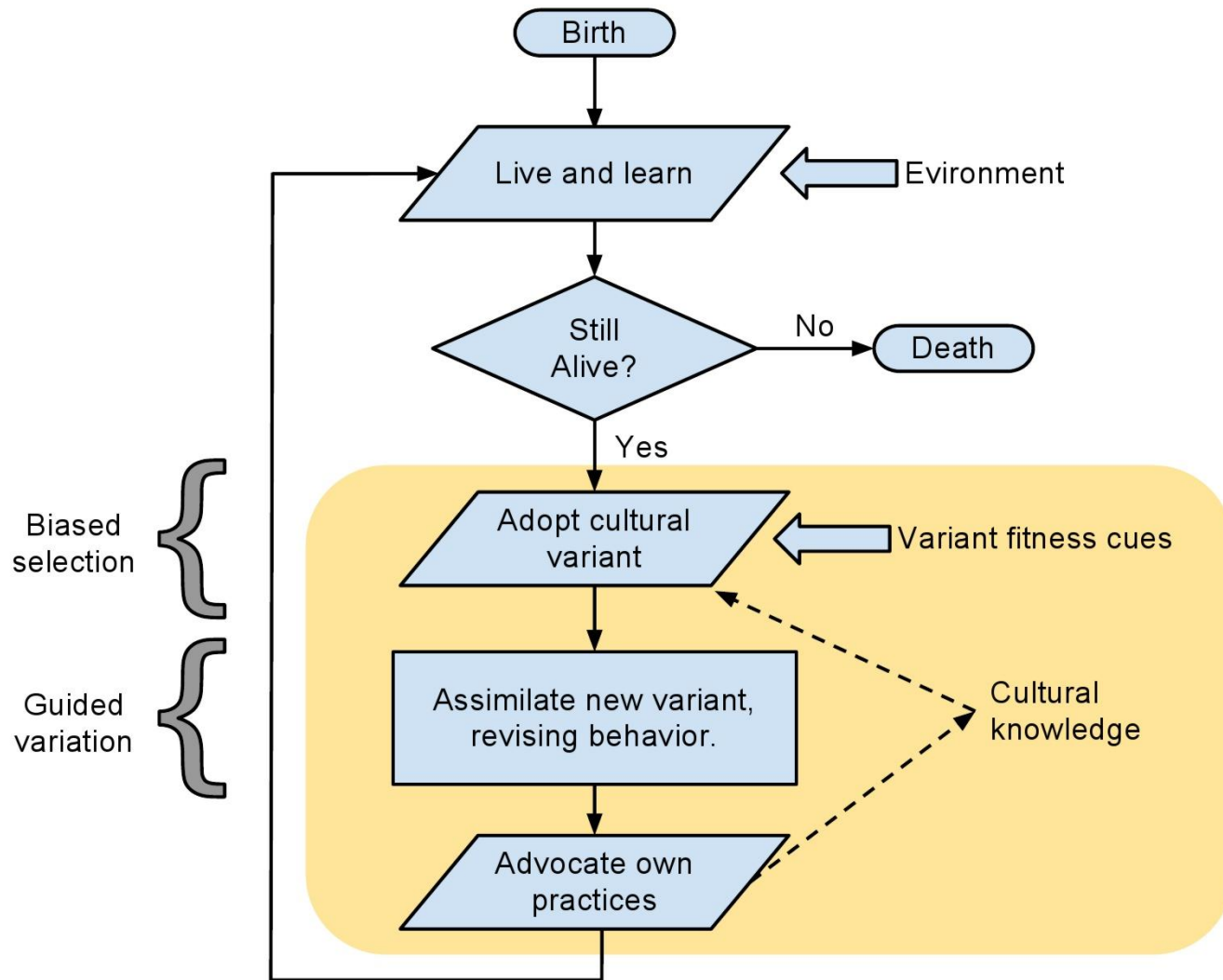
# Unique to Cultural Evolution

- (IF) People are motivated to survive, and to increase their access to resources and influence on collaborators.
- (THEN) The social environment becomes as important as the material environment in determining fitness.
- Social learning is analogous to sex.
- In cultural intercourse, language transfers information, just as sex does.
- The result of social learning is a mixing recombination of cultural knowledge, somewhat similar to sexual assortment.

# Sex Revisited



# Cultural algorithm



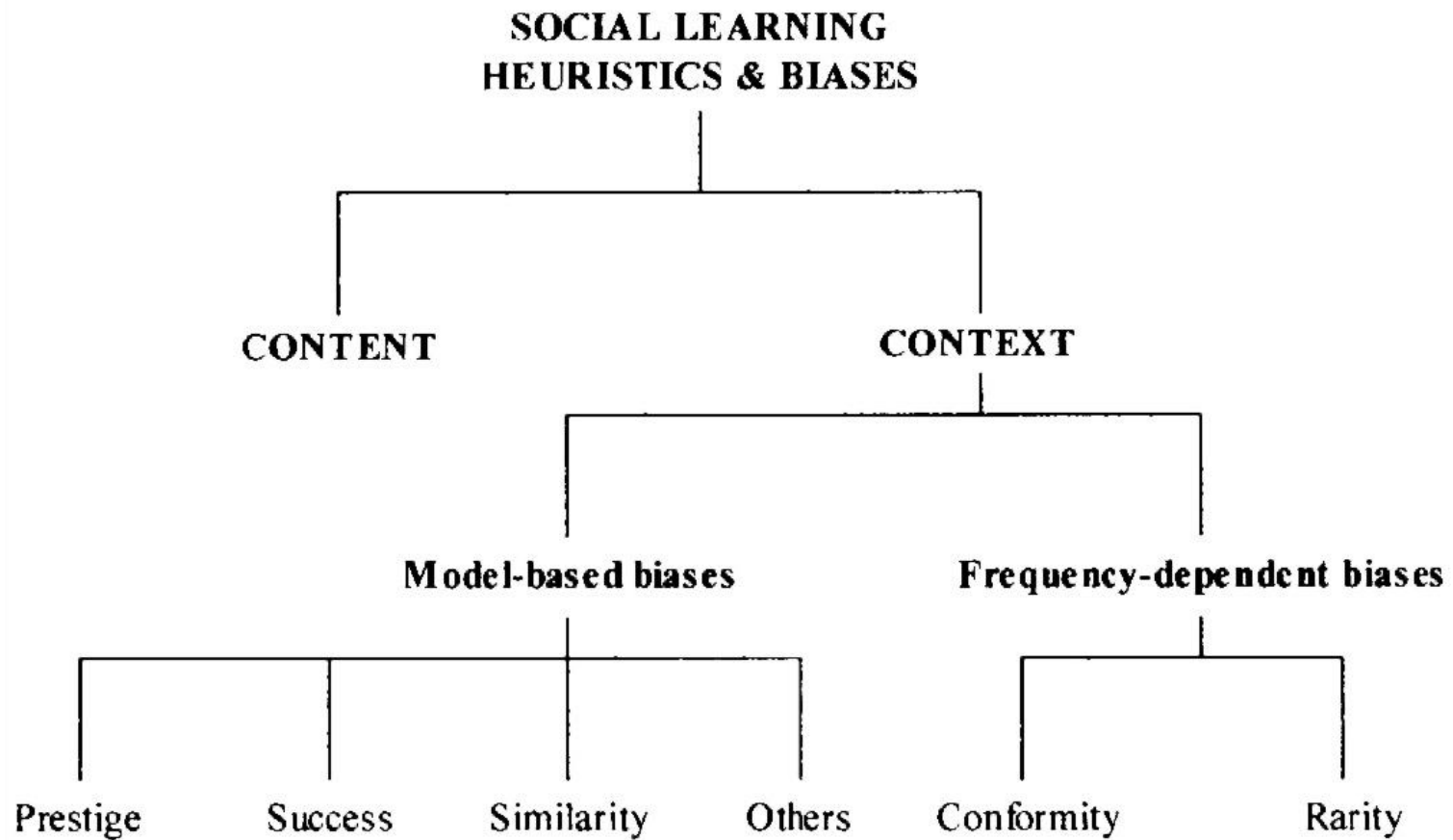


# Biased Selection

Contextual selection biases are Boyd & Richerson's biggest contributions to cultural evolution.

- Frequently a variant lacks an obvious intrinsic appeal, and the outcome of adoption is unknown.
- We then fall back on rough intuitive guidelines (gut feelings.)
- Solves shortcomings of meme theory, and resembles actual human behavior.

# Selection Biases



# Guided Variation

Individuals are still the source of all innovation in cultural evolution, but:

- The individual contribution need not be high-quality, based on correct understanding or accurate foresight, because many other people are trying many other equally speculative modifications.
- This process upgrades the mindless mutation and sexual recombination steps in genetic evolution.
- Cultural evolution is Lamarckian: we can pass on what we learn.

# Implications of Cultural Evolution

Culture is not completely arbitrary.

- Must mesh with the individual's instincts.
- Practices must “work” (or at least not be too harmful), and may work for unknown reasons.
- Good solutions can evolve in the face of uncertainty and human fallibility.
- Cultural variants and cultures that are less productive will be out-competed and die off.
- It's not about happiness—consider the state.

# The State

A major transition in the cultural environment:

- State monopoly on the use of force, taxation and power hierarchy.
- Closely associated with grain agriculture, writing, rise of priestly and artisan classes.
- Combination of military and economic power quickly absorbed or killed off neighboring tribal peoples.

# Life in the Neolithic State

Life was hard in early states:

- Skeletal remains show that nutrition grew poorer, but populations increased.
- Power of lords tended to absolute, a dramatic contrast to egalitarian tribal structures.
- Few would choose this lifestyle, but they did not need to. Mostly they grew up in it. It was the only game in town. No one signed a social contract.

# Evolution of Governance

Over the years several innovations have reduced the power of military and religious leaders:

- Monetary systems and market economics,
- Rule of law,
- Democracy

Though desirable to the common man, a major reason these changes endure is because they increase productivity. Oppression reduces human potential.



# Modern Developments

The U.S. is an exemplar of a modern trend toward extreme individual autonomy and responsibility. This freedom has personal benefits, and seems to increase productivity, but something is always lost:

- Transportation, communication and fee-for-service alternatives have eroded traditional supports of extended family and community.
- Social and economic complexity offers a baffling variety of mostly-unproven choices.
- With rapid change, the choices of previous generations are probably no longer best, and may even be unavailable.

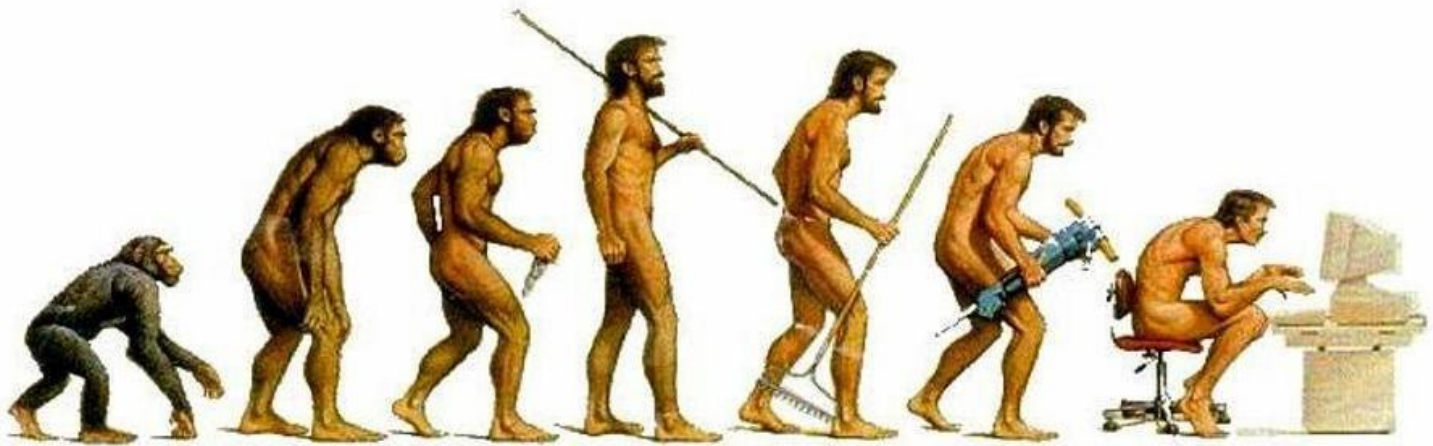
Modern life is both stimulating and exhausting. Anxiety, depression and stress-related illness are at high levels.

# Cave Man in the City?



A major hypothesis of Evolutionary Psychology is that human behavioral instincts are adapted to the environment before 20,000 years ago. This can explain human frustrations and counterproductive inclinations in modern life.

# Self-Domestication



Genetic-cultural co-evolution provides an alternative to this “big mistake” theory.

- Explains why self-destructive behaviors may persist,
- Notes that the environment has been dramatically transformed by social change, creating strong selective pressures even in historic times.

# Recent Human Genetic Evolution

It is likely that there have been subtle genetic changes in human behavior during the past few millennia and even the past few centuries.

- Life in a state placed strong emphasis on impulse control, obedience to authority, and clever subversion of authority.
- Life in an agricultural or market economy places a strong value on delay of gratification and self-regulation.
- The possibility of ascending power hierarchies creates a stimulus towards cleverness in speech and in political manipulations (people skills.)

Sexual reassortment is more rapid than mutation, so changes in frequencies of pre-existing genes will be the main form of recent genetic change. Genetic evidence has confirmed that at least 10% of genes have been under significant recent selective pressure, and there are suggestions the pressure has intensified in the past few millennia.

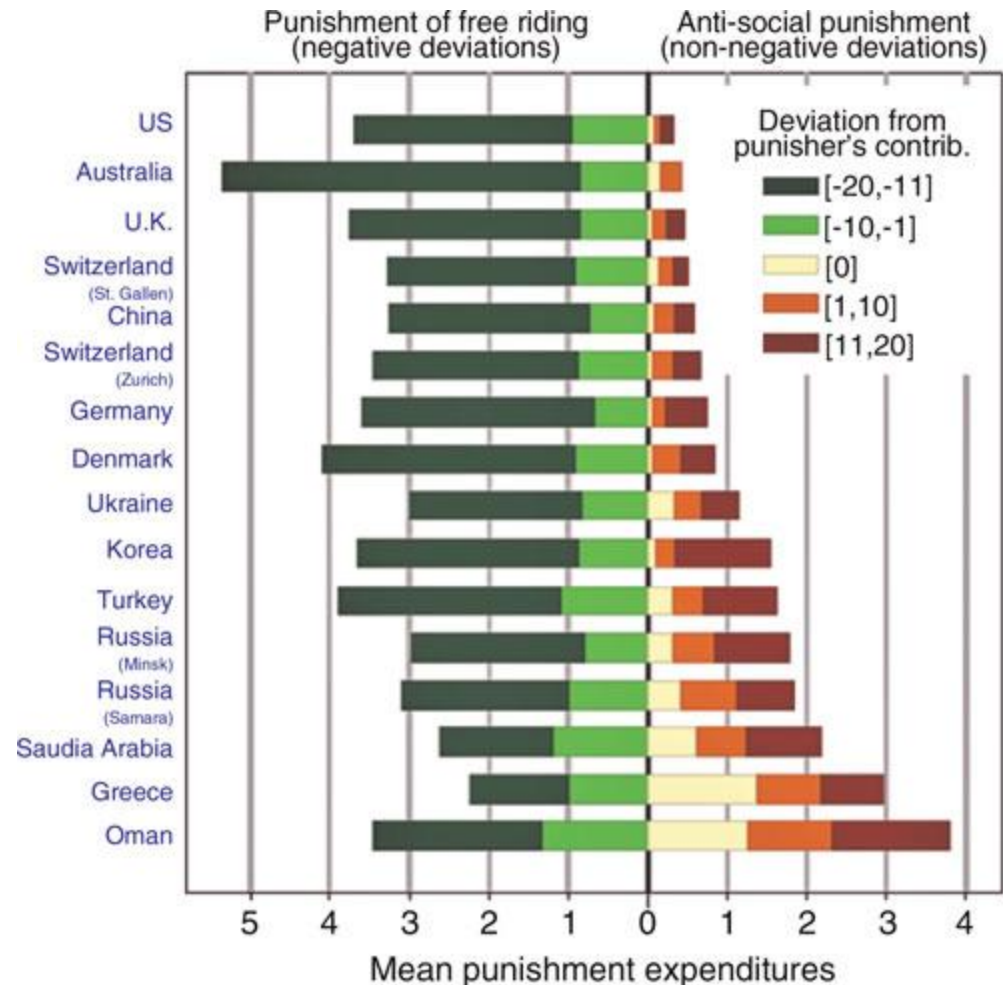
# WEIRD People

Behavioral scientists routinely publish broad claims about human psychology and behavior in the world's top journals based on samples drawn entirely from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies. Researchers assume that either there is little variation across human populations, or that these are as representative of the species as any other population. Are these assumptions justified? Here, our review of the comparative database from across the behavioral sciences suggests both that there is substantial variability in experimental results across populations and that WEIRD subjects are particularly unusual compared with the rest of the species hence, there are no obvious a priori grounds for claiming that a particular behavioral phenomenon is universal based on sampling from a single subpopulation. Overall, these empirical patterns suggests that we need to be less cavalier in addressing questions of human nature on the basis of data drawn from this particularly thin, and rather unusual, slice of humanity. We close by proposing ways to structurally re-organize the behavioral sciences to best tackle these challenges.

— Heinrich et al., 2010, *The weirdest people in the world*

# WEIRD is different

Behavioral sciences (psychology, sociology, and behavioral economics) are primarily American disciplines. Test subjects are drawn from American college students, children of faculty, and so on. While if a behavior is universal, it should also be universal among WEIRD people, the reverse is not true. Cross-cultural studies of important social behaviors such as cooperation and rule enforcement show that widespread and seemingly adaptive behaviors such as altruistic punishment are *not* universally seen across cultures.



# Human Equality

- People are different, and therefore not equal in the mathematical sense (interchangeable.)
- This diversity is a source of creative potential.
- The most socially desirable type of person is defined by the cultural context.
- People well-fitted to the culture thrive, while others flounder.
- What should we do?

# Equality of Worth

Our belief in the inherent worth and dignity of every person cannot be derived from nonexistent biological or cultural equality. Instead, it comes from the Golden Rule, a product of cultural evolution. Cultures that adhere to this value are certainly more pleasant to live in, and probably more productive.



# The Possibility of Progress

- I feel that substantial progress has happened over the course of history. Probably individual happiness is mostly unchanged. That's human nature.
- Possible future cultures are constrained not only by human genetic relics, but also by what "*works*": the need to foster productive collaboration while addressing the problem of selfish and anti-social behavior.
- Progress will be faster if we strive for what's good; fortunately super-human virtue or ability is not required.
- Wise people do disagree on what *is* good. Cultivate humility about your vision of the future. You too are almost certainly wrong.
- If ain't too broken, don't fix it too much.

# Summary

- Reduce your opinion of yourself. You *are* unique, but also blinded by positive illusions. You're a small part of a big thing that's been going on for a long time.
- Reduce your expectations of advisors and leaders. Nobody knows what is going on, let alone what will happen, and nobody is really in charge.
- Find something you're good at and plunge ahead. Try to do the right thing and hope it all works out in the end. We've always muddled through so far somehow.