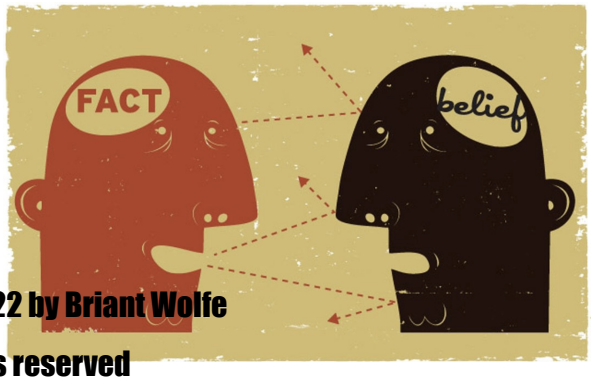
Hacking Human Nature for Good
or
What's Wrong with those People?
Understanding Human Irrationality and How to Overcome It

by Briant Wolfe



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Prologue

Hacking Human Nature for Good
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The title, Hacking Human Nature for Good, comes from a Meetup that I moderated at the Boulder Public Library from 2017 until the advent of covid. It was originally focused on the field of Behavior Economics, inspired by several books including Predictably Irrational by Dan Ariely and Nudge by Cass Sunstein and Richard Thaler. The central idea being that people sometimes behave in economically irrational or sub-optimal ways and need to be nudged (or hacked) into doing the rational thing. Economists such as Thaler are interested in improving the social welfare of society at large.

An example of irrationality is the failure of people to take advantage of 401K savings plans where employers would make matching contributions. If you put say 5% of your salary into a savings plan, your employer would match that amount dollar for dollar, effectively doubling your savings. The rational thing to do would be to look at the numbers and jump into the plan. Free money and doubling your savings sure seemed like a good thing. Crunching a few numbers would make the benefits obvious. All you had to do was fill out a few forms and reap the benefits. However, surprisingly few people actually signed up. Their behavior was described as irrational or they were lazy or uninformed or stupid. Thaler's insight was to recognize that humans have cognitive limitations and that you could influence their environment in order to get them to do the "right" thing. In this case, save more. His solution to increase participation was to automatically sign people up to the matching plan and requiring them to make an effort to opt out. The irrational behaviors identified were the human tendency to go with the default and the impediment caused by the effort of filling out a few forms. These tendencies were barriers to taking advantage of a great deal. Tendencies are often described as biases and Behavioral scientists have now identified hundreds of them.

The subtitle: What's wrong with those people? comes from a question asked at almost all of the 30+ meetups. Many of the attendants were mostly interested in figuring out what was wrong with certain people (often public figures) and why they behaved the way they did. Regardless of the topic of the day, people were looking to answer the question as to what was behind somebody's wrong behavior. Implied in the question about what's wrong with people, is the assumption that the questioner knows what's right. Well, to me that's something that needs to get answered also. How does it happen that I know what is right and the other person does not?

These questions helped shift the focus of my research from Behavior Economics to a broader set of topics. Some those topics were: Neuroanatomy, Anthropology, Behavior Design, Complexity Theory, Cultural Evolution, Learning, Evolutionary Psychology, Religion, Intuition, and Decision Making.

The arrival of Covid closed the library and put a halt to the Meetups. My past experience with on-line meetings led me to believe that they were simply not a good forum for any sort of interactive discussion,

However, I still had more questions and was dissatisfied with the state of my knowledge of human behavior. The meetup topics jumped around as I sought to answer questions or close gaps in my understanding. They certainly weren't organized in any clear fashion. It was a scatter shot approach. With time on my hands I sought to take what I had learned, do more research and see if I could organize it into a more coherent structure, a useful framework for better understanding what drives us, limits us, and where we might intervene to improve our lives and that of others.

I was half hoping to come up with a nice framework that could be used to look at our behavior in a nice linear structured way. However, we are complicated creatures. When writing we know where to start. We begin at the top of the page and work our way down. Examining human behavior is more like examining the surface of a sphere. There is no clear starting point.

My intent was to develop a coherent framework, short enough to be easy to remember but sufficiently detailed to be workable. I was half hoping to come up with a something that could be used to look at our behavior in a nice linear structured way. However, we are complicated creatures. When writing we know where to start. We begin at the top of the page and work our way down. Examining human behavior is more like examining the surface of a sphere. There is no clear starting point and it's hard to figure out where to go next, across the surface or down into the depth. Given the constraint of the linear nature of language, I punted.

In my effort to keep it brief, I've minimized examples and left out references.

This document is divided into three sections: About Human Behavior, An Approach to Analyzing the Irrational and An Approach to Influencing Behavior.
The first and longest section focuses on what it is that can lead to irrational behavior. The latter two sections are shorter and intended as guidelines for using the information in the first section. I hope you find this useful, or at least entertaining. Let me know if you disagree or want to know more.

About Human Behavior

So where to start? From Wikipedia's list of some 200 biases? Nope, The Cognitive Bias Codex, an attempt to group our list of biases into categories? Nope. Somewhere during my readings, the question arose: if we are so irrational, why are we so successful as a species? There are billions of us in every imaginable habitat on the planet. How did that happen if we are so irrational? That didn't make sense. We must have evolved pretty good cognitive systems in order to expand our populations to the level they are today.

At some point in my reading, I ran across the Mismatch Hypothesis. The idea here is that traits that evolved in one environment can be a problem in another environment. Think of the poor opossum trundling across a highway and reacting to the threat of a large moving object by playing dead. That evolved behavior might work for an approaching fox, but not an approaching Ford, Chevy or Tesla. This idea had a lot of appeal for me: aspects of our current world challenging our evolved ways of thinking and thus our behavior. It's not too hard to think of the vast differences between living an eternal camping trip focused on food and shelter vs. instant entertainment and on-demand food delivery. Millions of years of environmental pressure in the former scenario, but not so much in the last few thousand.

I then turned to biological anthropology, and ethnographic studies of foragers. This helped me get a better feel for how life was different for our ancestors than for us today, at least in the western world. They had many different problems than what we face to day, but also many of the same ones. One example is dealing with other people. Now the thing about ethnographic studies is that they are really focused on observing behavior. After all it's what we do that ultimately matters. Therefore, I decided to focus on behavior and the mechanisms that drive behavior. I chose to avoid trying to figure out how those mechanisms actually worked as that seemed just too complicated. I also wanted to look at behavior from an evolutionary perspective in that it's a species' interaction with its environment that shapes its behaviors.

So, on to behavior. There is a question all living things are asking of themselves every minute of every day: how should I behave right now? From bacteria to buffalo, hamster to human, consciously or not, it's appropriate behavior that keeps us alive, allows us to grow and seek opportunities for reproduction. From an evolutionary perspective, rational behavior is that what helps keep you alive and irrational behavior increases your chances of dying. Most creatures live in a fairly narrowly defined environment, a niche. The answer to the question, " How should I behave?" is not open ended, not unlimited. There is a set of rules that evolved to respond to the recurring threats and opportunities where an organism lived. Many of these rules are encoded in the genome. A crab in the intertidal zone, doesn't have to go to crab school to learn how to crawl and eat and find a mate. It develops with those behaviors. Every crab of the same species has the same set of rules to follow.

For many creatures on this planet, the vast majority of their behavioral rules are encoded in their genome. They are born with the rules they need to survive and reproduce. Many have learning capacities that are related to variations in the pertinent parts of their habitats. Koalas, which depend on eucalyptus leaves for food don't need to learn much about acquiring food, they are born into a eucalyptus forest. On the other hand, Ospreys, whose environment which ranges from Africa to North America, have to learn how to catch different kinds of fish. That is a flexibly adaptive behavior that

exists because of the differences in fish populations across the globe. However, Ospreys are not flexible enough to go after prairie dogs.

Humans have the broadest set of behaviors on the planet. Learning and applying the right behavior at the right time is one of the big jobs of our brains. Search on Youtube for a few minutes and you will find many examples of extraordinary abilities. My next problem became: what behaviors to focus on? This led me to investigate some of the behaviors that made us so successful as a species.

In a dynamic competitive environment, the species with the most flexible set of behaviors is going to win out over a species with a smaller and less flexible set of behaviors. The species that is best able to answer the question "What should I do?" will survive when others don't. This pertains to individuals and groups. The individual with the broadest of behaviors overcomes the individual with the lesser set. The group with individuals who vary in abilities and skills can be more adaptable and successful than the group whose individuals are all alike.

One of the ways that humans achieved their dominance on the planet was their ability to temporarily become a superorganism. This is a set of individuals that could act in a coordinated way to achieve gains and deter threats in a way that no one individual could. A group of hunters attacking a mammoth was a threat unlike any other previously encountered. The hominid hunters could attack from multiple sides simultaneously herding a beast toward a cliff edge. Similarly a group of wielding clubs could deter predators that would easily overcome a lone individual.

Becoming a superorganism required solving a number of challenges. These include coordinating the individuals in the group, distributing resources from outsized gains, specialization of skills, shared objectives, joint problem solving and planning. It also required keeping the group members nearby in order respond to situations requiring coordinated group action. All of these challenges were solved by behaviors supported by cognitive adaptions. These adaptations that were the product of environmental conditions that are different from what we experience today. The researcher Oliver Scott Curry, considers the roots of morality as cognitive solutions to the challenges of cooperation in group life.

I then became engaged in a long iterative process of identifying key differences between our modern and evolutionary worlds and identifying the important cognitive processes that could be affected by those differences and lead to apparently irrational behavior. I've identified 13 topics aspects or features of our evolved cognition that will be reviewed later.

My next problem was how to look at these adaptions in some sort of structured way.

If we dig into the question that all critters ask "What do I do?, we can see
there is more to it than just the one question The tiniest environmental niche is dynamic and changing. The organism must be able to asses their surroundings. Detect what else is nearby and evaluate it. Does it present a threat, or opportunity or should it be ignored? Should I continue my current behavior or select another one? If more than one action is possible, then which one is best? In other words, a decision is required. Here we have the beginning elements of a framework for evaluating behavior: a behavior, the situation that presents threats or opportunities, perception of those threats or opportunities, an internal frame of reference for evaluating what is better or worse and a mechanism to weigh the effort of the behaviors against the internal frame of reference (a decision). Note that I am talking about our intuitive decision processes, the evolved mechanisms that lead to a choice of actions

The researcher BJ Fogg has a simple model of behavior where behavior is a function of motivation, ability and a prompt. A prompt could be anything in the environment that gets perceived as worthy of some degree of attention either consciously or nonconsciously. You and I might walk past the same McDonald's billboard and my glance might remind me that I haven't had lunch, and you might not even perceive it. This is his minimalist model of behavior. While mostly known for his work on habits he uses this model for exploring the gamut of behaviors. A prompt might trigger an automatic behavior, (habit) that we have already learned how to do and internally know how it aligns with our motivations and helps achieve them. A prompt might also be something you say to me that makes me stop and think more deeply before responding

By doing a little modification to this simple model, we can come up with one that is more useful for our purposes.

Substituting motivation for the "better or worse" framework and adding in the context and decision we can now re-write the model as follows: a behavior is the result of a decision occurring within a specific context and is dependent on motivation, ability and perception of a prompt. For our purposes, an irrational behavior is one that appears to have a negative effect on an individual.

Behavior is a function of Context, Motivation, a Prompt, Ability, and a Decision.

We can use this model to ask questions about an observed behavior. What were the circumstances around the behavior? Did they know how to do it? What was their motivation? What were their goals? Did they recognize the opportunity or threat? Did something affect their decision making? Note that if these questions are to be effective, we must be looking from their perspective, not ours. Frankly this is hard to do.

With some knowledge about the cognitive underpinnings of these elements and how they can be challenged by the environment we can do a better job of understanding what is going on.

Here is where we encounter the Mismatch Hypothesis. Our brains evolved many cognitive features in an environment that was sufficiently different from todays world that sometimes those features glitch, or appear to function incorrectly. Much of what we encounter in our daily lives today simply did not exist in our evolutionary past. Actually, much of it did not exist even a few centuries or decades ago. Unless you have spent a lot of time wilderness camping, it's really hard to imagine life without heating and air conditioning and grocery stores and airplanes and iPhones. It's hard to imagine spending every day, exposed to the weather, spending most of your time looking for, capturing and processing food and relying only on face-to-face communication.

As near as we can tell, our hominid ancestors spent their lives in small groups and spent most of their day seeking and processing food. Over a couple of million years these small groups spread across the African and Eurasian continents. We only have evidence of the stone tools they left behind but there was little change in the design of these tools for a million years. About 200,000 years ago there is evidence for an acceleration in tool change and probable use That rate of change continues to accelerate. No one individual can keep up with it.

These small groups were mostly mobile, moving when needed to find new resources. Evidence for year-round permanent settlements goes back only 10-20 thousand years. Since then, civilizations have

grown in scale and complexity, from villages, to chiefdoms to archaic states to empires to modern nations. Populations have scaled up from hundreds, to thousands, to tens of thousands, to hundreds of thousands, to millions and today hundreds of millions. The most common form of government in the past ten thousand years has been some form of autocracy whether it be a chiefdom, a warlord or a ruler claiming define right. While Graber and Wengrow have argued that we could have had an alternative progression, the work of Turchin et al utilizing the Seshat: Global History Databank supports this history.

In the evolutionary past, what you knew about the world was confined to a small geographic space, limited by where you could walk. What was relevant to daily life was visible and those around you helped you make sense of it. It's possible that wide trade networks exposed people to diverse ideas, I'd argue that the repetitive consistency of day to day interactions is what helped encode and define our behavior. If game became scarce, everybody could see it. Today we are affected by many interconnected factors for which we have scarce visibility or knowledge. There is simply too much to comprehend completely.

Along with this growth came new inventions. These included new ways to obtain and transport foods, new ways to organize, new tools new beliefs, an new social institutions all leveraging or constrained by our ancient physical and cognitive abilities Many new cultures evolved, many died out, some thrived and kept expanding. Many of these inventions took centuries to spread and be accepted. Some inventions (roads and boats for example) are thousands of years old. Their forms and purposes have evolved over time to meet different needs, operating under differing constraints. Over time these inventions have become part of the world and we take them for granted, as though they always existed.

Many of these are now essential to our daily lives. Take reading and writing for example which are only a few thousand years old. How many hours did you spend learning to read and write? How much money have you saved in your IRA? How good are you at finance? How about statistics and science? A number of these inventions are hard to very hard to learn and require a lot of practice and effort. The reality for most of us is that we are only as good at these as we need to be. When we don't spend the time to develop expertise, (for whatever reason, lack of interest, or lack of opportunity,) we rely on our intuitions or on others to help us out. We default to our intuitive mechanisms when we don't know better.

In large complex societies, there is much of the world that is simply invisible to us. We don't see the chain of events that it takes to make those packs of blueberries appear at the grocery store or that toaster at our doorstep. It's not just the shipping, it getting the parts, and making the tools to make the parts, etc., etc. We just don't have the exposure to understand how it all works and maybe not the interest either. The researcher Steven Sloman might say that we suffer from the illusion of explanatory depth. We feel that we have the knowledge even though we don't, perhaps because we have others around us to fill in our gaps. A surface level understanding is sufficient for many aspects of our life. I don't need to know all the details of how a car works (engines, transmissions etc.) I really just know how to go and stop and steer.

It is hard enough to keep track of what is going on in our neighborhoods, let alone the next town over. Where we used to interact with our neighbors on a regular basis and engage in regular reciprocal group action (hunting or ceremonies), now we might not see our neighbors for months as we drive into our garages and go indoors with little exposure to the outside. What affects our neighbors is largely invisible to us. This holds true for the town next door and all the towns in our states and countries. It is hard to know what the real concerns are.

This is complicated by the change in how we receive information. While we still gossip, we have to contend with information providers that have incentives to provide us with attention getting headlines which may lure us in but have little relevance to our lives.

In the ancient world, education was hands-on. It was focused on what was needed to survive: how to find food and process it, how to find a mate, how to cooperate, what social rules were inviolate and what you could get away with. As a child, you learned from your parents, siblings, neighborhood children and adults, all sharing and interacting in the same environment with a high degree of consensus. Today our education is much more abstract and segregated. Not only is there a lack of consensus, but we are often presented with many conflicting views. School curriculums are defined by groups that define what they think children should learn but there is no real feedback that insures what is learned really benefits the individual and helps them navigate the world. In the past if you didn't make an arrow correctly you'd get some feedback pretty quickly.

In the past, you learned what was dangerous and you witnessed death frequently. Hunting could result in injury or death. Half of the children around you died before adolescence. Today, we are isolated from the direct experience of witnessing so much death, but we hear about it frequently on the news. We are exposed to threats for which we have no intuitive warnings. Take texting and driving for example. Unless we are accelerating or slowing, we have no real sense of movement, whether we are going 20 or 60 miles per hour. Therefore we have no intuitive sense that we won't be able to react in time to a dangerous situation and have no visceral sense of the consequence of thousands of pounds of metal crashing.

In the past we had to rely on our memories and the memories of others. Group discussion was very helpful in order to figure out the best approach to solving group problems, such as the best direction in search of antelope. Now, we can capture what was uttered by a adolescent 20 years ago and use that to solve a new problem, or castigate them for our own ends.

We evolved to rely on our senses to build models of the world. Through direct experience and the knowledge of trusted others, we learned to navigate the world. Today we increasingly rely on information and tools that operate in a way that is invisible to our senses. Science is a new discipline that is providing new models of how the world works. These models are new and constantly changing and subject to differing interpretations.

Another challenge of the modern world is the sheer abundance of materials that were scarce in the past. They are now available to us in quantities and potencies that did not exist. The term for this is "hyper stimulus." From sugars, alcohol and drugs, to abundant novel news, we are faced with elements of the environment that distort the weighting in our decision making systems.

Some of our new inventions trigger behaviors that are no longer adaptive. Take our need for salts and fats, essential elements for building and maintaining our bodies, but often scarce in our evolutionary environment. They are easily available in quantities that were impossible historically and that affect our bodies and minds. Take the value of novelty, paying attention to unusual situations that offer the potential of threats or opportunities. Today, we have to deal with potato chips and headline news.

In the evolutionary past, when the world was moving at a walking pace, the rules for living were all around us. We could observe things for ourselves on a day to day basis relying on the experiences of

our elders to teach us what we could not know directly. In a world moving at a walking pace this was valuable. At today's pace, the rules keep changing and it takes work to keep up. The world we know is vastly different from that of our parents and sometimes even our siblings. I recall a discussion with my daughter about dating in the late 70's. As a male, I wasn't sure if I should open a door for my date (as I was taught) or not. There seemed to be a 50/50 chance it would be appreciated or considered an insult. Her response: "at least you had some rules to go by, these days nobody as any idea and it's a mess."

To sum up the effects of the Mismatch Hypothesis.

We have evolved many deep seated nonconscious processes geared to answer the question, How should I behave. Aspects of the modern world can cause them to glitch.

Some of the features of today's world, like reading, writing, finance, maths, simply did not exist our past and are very hard to learn. Dyslexia a reading "disorder" would not have been a disorder in our evolutionary past. We have not intuitive mechanisms to deal with compound interest or exponentiation

As a species we are extraordinarily behaviorally flexible but not infinitely so.

We have tremendously to form temporary coalitions in the face of commonly perceived threats and obligations. Given our population size and number of groups we have to interact with, it's hard to have shared perceptions.

The pace of change in the environment is orders of magnitude greater than in the evolutionary past. Learned behaviors must be discarded and new ones created quickly.

Trusted sources of knowledge become obsolete quickly. We have shifted from social groups where elders were tremendous source of valued applicable information, gained from long experience to a world where they are often derided for lack of knowledge about current trends. We now have many competing sources of information, too much to absorb.

We have developed institutions that replaced the social interactions that bound societies together. Laws, police and courts have replaced evolved cultural norms and eliminated the self monitoring and sanctioning that occurred in the past This has not stopped our brains from observing and reacting to deviations from our norms.

We are less likely to have a common shared developmental background with our partners and co-workers, thus creating more opportunity for misunderstanding and worse.

We can use a behavior model to help understand what is going on when we observe irrational or "wrong" behavior: Behavior occurs with a context and is based on an individuals motivation, ability to perform the behavior, perception of a prompt and decision making ability.

Now let's look at some of the evolved cognitive features that have made us so successful as a species, and yet can present challenges in the modern day.

As individuals we are of necessity limited in our knowledge and experience and often rely on our intuitions when evaluating human behavior. Understanding these particular aspects of cognition and then incorporating them into our evaluation processes will significantly add to our ability to answer the questions: What's wrong with them? why we may think they are wrong to begin with and what we may do about it.

Our brains are comprised of many interconnected and interrelated systems and it's hard to draw lines around them and yet I must. And, to go back to my earlier analogy about finding the starting point on a sphere. Where do you start where to go next ?

Well here is my list.

Topics in human cognition and their mismatch and behavior implications:

1 - Consciousness
2 - Motivations
3 - Learning
4 - Categorization
5 - Context
6 - Words and language
7 - Fill in the blanks
8 - Beliefs Values Ideas
9 - Risk/Opportunity assessment
10 - Variability in Humans
11 - Violation Detectors/Social Norms
12 - Decision Making
13 - Brain Assumptions

1. Consciousness

This is one that often gets in our way, so it's probably a good place to start.

Consciousness is hard to define. We don't know how it works but it often seems to be involved with language, images and feelings. It certainly has a lot of benefits. With it we can rehearse conversations before actually having them. We can play out scenarios and possible outcomes. We can imagine things that are not, and could be or should be. We can recall past events. All of this takes place safely within our skulls. We need not risk harm for thoughts in our heads. But it has its limits. What we perceive is filtered by our past experiences and the constraints of biology.

We can't introspect the level of compounds in our bile ducts but we can get a sensation that we can learn to interpret as hunger. We can focus our limited attention and not notice important things around us. We perceive that we are doing many tasks simultaneously when we are really switching between tasks without noticing the time it takes to switch between them. We have a limited amount of attention and whatever it's drawn to is what is important to us.

A problem with consciousness is the "What you see is all there is" phenomenon. We process information as though what is in our heads is all we need to know. What is most important is what has drawn our attention. Everything else fades away. If we don't perceive it, it doesn't appear to be relevant.

Another problem with consciousness is that we can only hold so much in our memories at one time. Our working memories are limited, a historic reason for a 7 digit telephone number. A consequence of this is our tendency to simplify. If there are 5 factors influencing a situation we just can't keep them all in our heads.

We feel that we can give conscious control over everything. We decide to go left or right on the way to the grocery store and decide what do buy when we get there, but when we get home we find we got more junk food than we intended.

Depending on the individual, we may spend a great deal of time on introspection or none at all. We may try to figure out why we did, or did not do something. Sometimes it's helpful, but often not.

For our purposes in figuring out irrational or illogical behavior, it is easiest if we assume that we are simply looking at the nonconscious processes and that consciousness is a process that's invoked by the nonconscious. Consciously we can feel like we are multitasker's, or multiprocessors and can handle many things at once. Science has shown that we are task switchers and don't notice the time lost in recalling where we were in the prior task when we switch back. Our nonconscious processes constitute true multi-processing — all kinds of trade-offs are being evaluated on an on-going basis. The hand off to consciousness may be only a thought or feeling and we just can't accurately explain how it happened. Consciousness can get in the way of further understanding if we get fixated on that conclusion that gets handed to it.

What we are going to do in the rest of this section is examine some of those processes occurring below the level of consciousness. We want to make visible those features that are generally hidden.

2. Motivations

Why do we do anything? Motivations are the drivers of all our behaviors. Motivations are complex. They vary in strength by individual and circumstance, minute to minute and day to day. They elicit a number of actions and influence our decision making, helping to choose between alternatives.

We can look at two aspects of motivation, the proximate and the ultimate. Proximate is what is most visible and can be closely related to an action. The feeling of hunger is the proximate motivator to getting me to eat. The ultimate motivation is survival and obtaining the necessary nutrients in order to survive and reproduce. The proximate motivations arise out of our evolutionary past.

Since there are so many possible proximate motivations, I am going to focus on our ultimate motivations.

The literature on motivations is inconsistent. They are categorized and defined differently. For convenience's sake, I've slotted them into 5 categories. They are not mutually exclusive and are interrelated. At least one motivation must be present in order for a behavior to occur. More than one may be present at any time.

Although motivations are the ultimate drivers of behavior an individual may not be consciously aware of them. I might recognize that I am hungry, and perceive that hunger is my motivation to eat. However, that is a proximate driver. The ultimate driver is survival.

The five categories of motivations are: Sex, Maintenance/Control, Sense-Making, Groupishness and Status. Brief descriptions follow.

The first core motivation is **Sex**. It is pretty clear that if there is no sex, there is no species. Reproduction only occurs as a result of interaction between individuals. Communicating availability, desirability and interest are important aspects of this motivation. This manifests in many ways such as how we dress, how we react, what we say to people and what we pay attention to.

The next grouping of motivations is **Maintenance/Control**. This is sometimes referred to as homeostasis, but I extend the drive to include regulation of the external environment. It includes various detection mechanisms and drives response mechanisms. Self regulation such as mood regulation, temperature regulation and impulse control reside here. Using temperature regulation is an example, when it's hot, our brains dilate our capillaries and start perspiration without conscious awareness. We might shed clothing or move to shade when we notice the discomfort of heat. We can build structures to shelter us from the sun and ultimately start managing our personal weather with air conditioning systems. We maintain within ranges of tolerance. Seeking to stay within tolerable limits, which vary by individual, we create buffers against variability and attempt to manage uncertainty, reducing threats and stockpiling against shortages. We really dislike uncertainty. We dislike not knowing what to do.

Sense-Making is the next category. Here lies curiosity, novelty seeking, gossip, association, determining cause and effect, and prediction. Our brains build models of how the world works and these give us the rules for living. Evolutionarily, these are based on our interactions with others in the world. We build models of the world automatically, largely based on our experience and, importantly,

based on what others tell us. These models tell us how to find food and how to process it. the consequences of our actions, the expected actions of others. These models allow us to predict outcomes. This also includes the rules of social behavior that we call norms, how individuals should behave toward each other in the group. We learn what to expect out of others. This helps define our rules of behavior. Understanding cause and effect is key to prediction and knowing what to do.

The next two categories are intimately related. The first of these is **Groupishness**. Our species and their ancestor hominids have been in groups for as much as 50 million years. That's over a million generations of building deep-seated mechanisms related to group life. Long before language, we were watching each other, assessing each other for opportunities and threats within the group. While we don't have a window on the evolution of group/group conflict, we know from countless studies that in-group out-group identity is real. Being part of a group is essential to survival and is the source of knowledge about how to survive. The need to belong to something is powerful. Group related motivations cause us to feel lonely, drive us to seek recognition, prove our worth, signal allegiance and to seek contact. Groups have provided defense against threats and enabled us to derive opportunities from nature in ways that no individual could do by themselves. The ever-present challenge for groups is how to balance the benefits of the group with the desires of the individuals within it. How do you maintain group integrity and coordinate actions? One mechanism evolution has given us is a fairness calculator by which we evaluate the contribution of others. Sibling squabbling over sharing the remaining pie would be an example. What's my fair share? We all have fairness "calculators" in our heads, but they are all slightly different. The concept of fairness is powerful, it can work in a small group setting but suffers at scale. In a complex world fair does not necessarily mean equal.

Other mechanisms include empathy for others and a drive to cooperate. We will find here the elements of morality, a sense of fairness, reciprocity, and respect for others as they contribute to group cohesion. These mechanisms never really achieve a steady balance point. Given the variability in individuals, there is a constant on-going dynamic within groups. Our evolved mechanisms have served to constrain the extremes that threaten group integrity, but not to achieve consistent harmony. An important element to groupishness is identification of fellow group members.

The last item on this list is **Status**. This is a mechanism that allows for achieving and recognizing differentiation within a group. In our evolutionary history, those with higher status either due to authority or prestige got proportionately more resources e.g. sex and food. Higher status is also associated with leadership and competency. That could have been the difference between surviving or not or reproducing or not. Status can be signaled by many mechanisms including behavior, dress, owned objects, ideas and speech patterns. What constitutes status is tremendously variable and largely depends on what your group values.

Remember, many of these drives influence our behavior and decision making and aren't readily apparent. Note also that they can be inhibitors. For example, if one is in a situation with people, fear of embarrassment may inhibit an action that would otherwise occur.

3. Learning

There are two ways that organisms acquire (learn) behaviors. The first is through evolutionary inheritance and is embedded in our genetics. The second is through experiential learning.

Learning is not magical. It is biochemical. It's a complex series of molecular changes within the organism. It can be temporary, or, with enough repetition and reinforcement, permanent. In some cases can learning can be fast, as in touching a hot stove but for most things it takes time. If there is learning in the brain, there are changes within neurons and between them. Dendrites (connections that cross neurons) are formed and grow and connect with other neurons to establish new information links. It's building new structures at a molecular level, new paths of connections. These paths can have different strengths. Some can be akin to a faint game trail crossing a meadow, where it is easy to change course. Some can be like a trail at the bottom of a narrow canyon, where your only option is to go forward as the cliffs around you are too steep to allow a change in direction. In this case, in order to avoid the destination at the end of the canyon, you must not enter the canyon.

In the human species, learning all the different ways to behave takes a long time, a very long time. It is driven primarily by experience. We may quickly associate learning with schooling but we evolved without schools, without books. We evolved to learn through experience and to learn from others. It's trial and error and repeated exchange with others that helps us sort the important from the unimportant. One of the ways we do this is though repetition. This might bring to mind the supposedly mindless memorization of addition tables, but that is how our brains learn. When we are learning languages as a child, it is the repeated sampling and association of sounds that builds up the rules of communication. How often something occurs is a key aspect of our learning systems that builds the neural connections into our intuitive systems. Learning about something does not build it into our cognitive systems. I can learn all about making a 3-point shot in basketball, where to stand, my posture, getting set, looking at the rim, however that won't get me on the team until I've integrated that into my nervous system, with the help of many practice shots. Similarly, I can learn all about confirmation bias, but that won't necessarily prevent me from succumbing to it.

We learn what is socially important by watching what people who appear to be like us are wearing or doing. How many of them are doing it and their status affects what we learn.

Because so much learning takes place in our development, as we grow from infancy to adulthood, our cognitive processes become tuned to that environment. Unlike the osprey, which lives around the world but can only hunt fish, humans can adapt to whatever is in their environment. All the different varieties of food and environmental conditions are just there. In the evolutionary past this would include climate, landscape flora and fauna, but also the beliefs of those around you. Today, this includes technology, sports teams, and a host of ever evolving cultural institutions. For an entertaining perspective on how the world has changed, take a look at the Beloit College Mindset list. This was originally devised to make the faculty aware of changing cultural references so that they could recalibrate their own references to incoming students. Outdated cultural references tend to fall flat in lectures.

Much learning is associative, connecting this with that. Connecting the crinkling of a potato chip bag with the taste of a salty fatty chip. Pressing your foot on the brake pedal connects to the sensation of the car slowing down. We can associate almost anything with anything. This is especially useful in

dangerous situations. It helps us see the connections between things, and between humans. However, we can and do make associations that are spurious and don't reflect physical reality.

For a cultural species like ours, we usually turn to others in order to learning what to do. In fact, for humans we can't do without this. A challenge here is knowing how to trust the source of information. This is especially so in situations with a high degree of uncertainty.

One of the great mysteries about learning is the mechanisms that lead us to stop learning. Clearly, learning can't be completely open ended. There is a point where our mental models are "good enough" and we stop learning. We stick with the models we have created in our heads and work hard to prove they are correct. We need the right circumstances in order to learn new things. Some things are nearly impossible to unlearn. For example, just try and unlearn how to read these words. I'd bet big dollars that you can't. The experience of learning to read made new permanent connections between neurons in your brain and no amount of exhortation or wishful thinking is going to change that.

4. Categorization

Our brains have an amazing ability to quickly categorize living and non-living objects into groups. We see a coffee cup and can rapidly identify other objects as coffee cups, even though they may have many different shapes and colors and are made of different materials. We pick out the key attributes and assign them to all similar objects. This is great because it speeds up processing and saves energy. If you learn what a cow is, you don't have to think about the next one you see. You just know. We learn about a type of tree and associate those features to all similar trees.

Somehow we are able to strip away a lot of contextual information about the object and record significant features or attributes. It's a fast, automatic nonconscious cognitive process. We do it all the time, with objects, animals and other people. We do this with situations. If we have the time and opportunity we can learn about individuals. If not, we tend to lump them all together. It is easy to miss the variability in and multiple qualities of people we don't get to know.

We would not survive without this ability. We would never have the time to examine every detail about everything we encounter. Our species would have been eaten to extinction long ago.

5. Context

We are profoundly **contextual.** The context of a situation limits the possible behavioral options. The ability to quickly assess a situation reduces the effort to determine what can be done and allows for a faster response. Our nonconscious systems orient to the specific circumstances we are in and adjusts our evaluation accordingly. An example of this is when we go to a room to do something and promptly forget why we are there as our attention is drawn to something in our surroundings that takes precedence. A challenge we face in the modern world is our attempt to apply behaviors universally as though situations don't matter. The fact that we are often not consciously aware of the contextual processing we are doing leads us to ignore this influence when evaluating the behavior of others.

6. Words and Language

We don't think much about words or about all the processing that goes on in our heads to perceive them or the complex coordinated sequences of muscle movements in our lungs throat and mouths in order to produce them. After all, they are just variations in the density of air molecules. That's a lot of cognitive processing that has no visibility to our consciousness. Yet we can take in those sounds and link them to significant meaning. One sound can convey a huge amount of information, or misinformation The sender and recipient must have a shared understanding of that meaning. I can simply name or label an object and you know lots of things about it. What it can and cannot do, what it's good for, if it's good or bad. Labeling can also limit what you know about an object or person. You simply recall what you know and stop thinking. You aren't even aware you have done so.

Words can be a great source of confusion and miscommunication especially if I assume that you and I share the same meaning and we don't.

Language facilitates learning. It dramatically expands the information available to us as we can benefit from the experience of others both alive and dead. It reduces the information we need to keep in our heads. It facilitates cooperation and coordination.

The written word enables vast amounts of learning across time and cultures. However, writing is very hard. And it's different from conversations. If you were to transcribe an average conversation it would have little in common with the dialogue script in a movie or play. Rather than well crafted complete sentences, a transcript would be littered with incomplete sentences and people talking over each other. Conversations are hugely dependent on shared experiences, and expectations.

Face to face conversations can shift the meaning of words dramatically. A phrase accompanied by an eye roll can have a completely different meaning that what one would infer by looking at words on paper.

One fascinating aspect of language is that it is a serial form of communication coming out of a multidimensional brain. When we are talking, we are simultaneously listening, predicting and speaking. The researchers Morten Christensen and Nick Chater write about the cognitive challenge of overcoming the now or never bottleneck. We only have milliseconds to process sounds before they are overwritten by incoming sounds. They claim that language acquisition is a learning process.

The split brain experiments conducted by Michael Gazzaniga and others revealed our ability to confabulate. We respond to others doing our best to pull together a story that hopefully makes sense in the moment. We rely on what we can perceive and recall and they are not necessarily accurate reflections of reality.

Language can also serve to enhancing social cohesion by reducing the need for violence between individuals. I don't have to beat you up in order to keep you in line, I can bad mouth your reputation. Or, I can spin a yarn, that is just good enough to convince you of how right I am.

7. Filling in the blanks

Another feature of our brains is our ability to take in a little bit of information and combine it with what is already in our heads. It's advantageous to be able to quickly understand a situation with a little bit of information. We have a remarkable ability to do so. I bet you can easily read the following two sentences: What is m ss ng from this sentence?; The rset can be a taotl mses. In one case I left out a vowel. In the other, I kept the first and last letters of the words and scrambled up the rest. Nonetheless ,you could figure this out. Our visual systems do this to give us the appearance of a seamlessly detailed world, and yet our eyes have a very narrow detailed field of view. We ignore the flickering saccades our eyes make, several per second to cover a wider area.

In a similar way, we have a great ability to draw on our past experiences and merge them with the current input we are getting from the environment to form a seamless experience. In all sorts of situations, we only need a little bit of outside information from which to draw a conclusion. Then we merge it with what is in our heads and form an impression. This happens quickly, automatically. We need not have a full understanding of a situation to come to a conclusion on what's happening in the heads of the people being observed, We make our conclusions largely based on what is already in our heads.

8. Beliefs, Values, Ideas

Beliefs are not things that resides within one's head. They are models of the world. They can serve two functions: they represent how things work (or should work), and they signify group membership. They are acquired over time and are recalled automatically. They are learned. They are biologically set patterns in our brains and not likely to change quickly. They are intimately related to our sense-making motives. They become a reference point for how things or people are expected to work or behave.

Having a model of how the world works allows for predictability. If I can anticipate what may happen, I can act quickly, which may be life saving. If you and I share the same models of gazelle behavior, we stand a better chance of catching one in a cooperative hunt. We can learn about gazelles from others and beliefs about gazelle behavior can be tested and refined though experience.

Not all beliefs are readily testable. If I believe the tree spirits influence the size of the fruit crop and you do too, we must be alike. When multiple factors can influence an outcome, (rain, sun, wind and tree spirits) it is difficult to know what the important ones are. Beliefs can be a way to signal to others that you are part of the same group. Beliefs may be accurate reflections of the environment that one can test through experience but they don't have to be. They could be explanations for phenomena that are untestable.

Science has been a key invention that contributes to our modern societies at scale, but for many, science is really a belief. It is the idea. that, through rigorous testing and examination of results we can uncover new information about how the world works. Unless you have gone through the tedious process of setting up experiments, collecting data and analyzing the results, it is just something other people do.

Values are similar to beliefs. They are not a thing we possess in our heads. They describe some attribute we use in describing our decision-making to others. Of course, if I say to you "I value family life over work!" and I actually spend 70 hours a week on the job and constantly miss my kids' birthdays, you might not think that I really do value family life. You might have heard someone say, "We just need to instill the proper values into them!" That is actually too vague to be helpful. One of the challenges we face when describing beliefs and values is that we do so out of context, as though they were useful across all situations and contexts. They are not. We are contextual, not universally consistent.

Ideas are also similar to beliefs in that they can be models of how the world works or should work. The spread of ideas has been a significant factor in cultural evolution. Some linger far longer than they should and some die quickly. Cultural ideas can persist for generations and generations.

Shared beliefs, values and ideas along with cultural and technological inventions enabled our societies to scale up to where we are today.

Some ideas are what I call "potato chip ideas." Their attraction lies in their affinity with our evolved cognition and they seem good, but they offer no real social nutrition. You can modify them to make them seem better, like substituting carrots for the potato, but ultimately is just the lure of salts and fats that is attractive and they don't get you very far. An example of a potato chip idea: Fats are bad, they clog our arteries and make us fat, so we should eliminate fats from our diet. Years later research finds that fats are essential to our health, people added more sugars to food to make them more palatable which contributed to weight gain. Fats on our plate don't immediately pass to our arteries, how we breakdown and utilize our nutrients is very complex and there is no clear link from point A to point Z.

Ideas can get in the way of making life better. In the West we tend to think of the world as mechanistic, like a machine with separate parts. If I can find the broken part, I can fix the whole thing. We are used to doctors prescribing pills to fix an ailment, the mechanic fixing the car and the persistent view that we can fix all sorts of problems by passing a law, all very visible activities. In a very complex world we can't see all the interdependencies between parts of integrated systems. We can only see the parts and trying to fix only one part of a dynamic system seldom resolves anything. Another persistent idea is that we can effect change by simply providing information.

Yet another related bad idea is that we can engineer or design our way out of problems. That is a good starting point but we simply don't have the ability to design complex interdependent systems. Complicated machinery is possible because there are clearly defined static connections between the various parts. People are not static. We are variable and subject to many forces. In complex systems the interaction between the various components can have a huge effect on the behavior of the system. These interactions are often nearly invisible to us. They can be very important in understanding the behaviors of groups.

Beliefs, values and ideas are also markers of group identity and markers for affiliation. In the absence of shared experiences, they can convey a great deal of information about an individual. Or rather they can allow us to infer a great deal of information based on our knowledge base. What can we infer about people who say they are members of a book club?

9. Risk and Opportunity Assessment

In our evolutionary environment, we learned about risks and opportunities based on a combination of evolved intuitions (like fear of falling) experience and impact (consequences). The number of times an event occurred had a huge impact on our evaluation of the circumstances. Combined with the information provided by trusted elders we developed ways of assessing potential gains and losses. Modern situations like texting and driving make it hard to asses current risks. Sitting in a car while driving at 60 mph does not give us feeling of speed in the same way we would get skiing down a hill. It's hard to judge how much time we need to switch our full attention from the small screen to the fast approaching lamp post. Risk are often presented in terms that are difficult to understand, and don't have an intuitive basis. Today we read about risks in terms of percentages and probabilities but there is often nothing visceral about that information. Look up texting and driving and you will find that 1 in 4 car accidents is caused by texting, but you have no idea how many accidents there are and your chance of being in one. Numerical representations of risk are meaningless to our evolved cognitive systems. A headline may read that some dire event could happen with no supporting evidence, but that vague possibility could trigger anxiety in an individual.

In the modern word opportunities and risks are not evenly distributed.

10. Variability

Variability is built into our genome. We are all slightly different, in physical and cognitive skills, motivations, perception, risk taking and many other dimensions. In a group setting, this makes us more behaviorally diverse and flexible, better able to adapt to different threats and opportunities. When we have the opportunity to interact with individuals we can learn how to interact with them for positive outcomes. This is much harder today as we don't get to interact and we succumb to our ability to categorize and generalize We have a tendency to ignore this variability. This leads us to apply a standard model to all members of a group however we end up defining a group. We can think of states being blue or red, but the reality is they are never either/or. They are always a mix of some sort.

We often miss the time dimension of variability, people and systems change but it is often too easy to retain an static model of others.

In order to truly benefit from variability, there needs to be enough commonality among members of a group for it to be effective. You can easily see the benefits of a diverse set of skills when building a house. It is better to have a group with carpenters, and plumbers and electricians and bricklayers than only have a group of bricklayers. However, if they don't all speak the same language and have a common view as to how they work together, you will probable get a crummy house.

11. Violation Detectors - Social Norms

A key feature of complex systems is the ability to detect when things go out of balance, and then correct the imbalance. (I've already mentioned temperature regulation.) Another feature is threat detection, when things might go out of balance. A breaking branch might signal an enemy in the bushes. These have clear survival benefits.

These variance detectors often operate at a level below consciousness. They are "on" regardless of what we are doing. As I noted before, individuals vary in their abilities. Some are more sensitive to detecting variations and some vary in their response. This is sometimes called the smoke detector effect, its value is that it alerts us before something bad may happen. An advantage of being in a group is that while I might be engrossed in some activity and not notice the breaking twig, someone in the group would hear it and alert all to the threat. Of course, you have to be a part of a group for this to be effective.

One set of mechanisms that humans use to maintain group cohesion is the use of social norms and management of violations. We are very good at detecting variances from how people should behave. We also have a variety of mechanisms to deal with the violator, from gentle joking reminders, to physical punishment, banishment or even death. We are upset when others actions don't conform to our expectations. These mechanisms come into play even when we are interacting with people we don't know. A peculiarity of these mechanisms is that they are focused on how other people should behave.

We are not very good at being consciously aware of when our own behavior goes awry. It's as though the evolutionary value of a very high level of self-knowledge wasn't necessary for those mechanisms to evolve as the presence of others served that function.

12. Decision Making

We don't understand just what the brain does when we make decisions. But there are some things we do know. Our nonconscious is a true multi-tasking systems that is constantly evaluating multiple factors that lead to an action or an inaction. What we can't do with a spreadsheet and complicated statistical analyses, our brains can do in moments or fractions of moments. Our decisions are based on what we have learned and what has become part of the neural connections that comprise the decision-making systems. Our experience in similar situations changes our internal decision making systems. If we have done something often enough and it has enough value, it can become a habit. A near-automatic behavior, triggered by the cue, need not even bubble up to our consciousness but it is a decision nonetheless. At the other end of the decision spectrum is something that is completely new and novel, which we struggle to deal with. Your brain's considerations in making decisions include the possible outcomes, the likelihood of those outcomes occurring, how they fit with your motivations, and the effort involved. Each of these is a factor that is weighted by what you have learned. The more distant and more abstract the factors involved, the less useful our intuitive systems are and the more we need to rely on methods that help use avoid leaping to conclusions that are no longer valuable. Using this framework we can get a more useful understanding of what is going on and what we might do.

13. Brain Assumptions

It's easy to see that the on-going presence of gravity has had an effect on our physiology and cognition. Our feet, our upright posture, our vestibular system are all adaptations that are a response to the effects of gravity. Our biology assumes the presence of gravity. Our vision system assumes that light comes from above and that faces are convex as can be demonstrated in numerous "optical illusions".

We evolved in an environment of scarcity and existential threats. We have evolved many mechanisms to deal with them. For example, our bodies quickly retain surplus calories as fats and are slow to give them up. Our metabolism adapts to levels of effort. We have fast processing mechanisms that filter out noise from the environment and respond quickly to opportunities and threats. A consequence of scarcity is energy saving mechanisms. For example: Don't move when you don't have to, don't think when you don't have to and pay more attention to the novel than the mundane.

Our biology also assumes the on-going dynamic presence of other hominids in our environment. Since the dawn of primates, our ancestors have been living in dynamic groups and we have evolved cognitive mechanisms to respond to each other.

There are a number of these assumptions that can have a big impact on the way we behave and interpret the world but don't fit nicely into the previous categories. Therefore I list them below.

- The way I think is the model for how all people should think. This is our knee-jerk default for judging others. If they don't follow our model, there is something wrong with them

- The people around me share the same world view. Another default.

- The people around me share the same social norms so they should know what to do. We assume they know the same rules of behavior we do and react negatively when they violate them.

- There are people around me to help complete my thinking by reminding me of what to do. I don't need to have a perfect memory or perfect self control because there are others watching me all the time. They will help keep me in line.

- What happens in this moment is more important than some vague thing in the future. We intuitively weight near-term consequences and benefits more heavily that those in the future

- It's important to pay attention to anything that might present a danger to you or the group. It's better to be safe than sorry.

- Save energy whenever you can. Don't move unless you have to. Don't think if you don't have to. Habits save energy so don't think if you can invoke a habit. It worked before, so just do it again.

One other brain assumption is important to keep in mind. That's the unheard voice that says I must be right! However you are behaving, you are doing so because that is what your brain has decided you should be doing. The comedian George Carlin once said, "Have you ever noticed that anybody driving slower than you is an idiot, and anyone going faster than you is a maniac?" Something is wrong with them, not you. This reaction is not limited to driving cars, the same cognitive process happens regardless of what we are doing.

These assumptions vary in intensity by individual.

To Sum Up

It is important to focus on behavior because ultimately it is what we actually do that matters. In the millions of years our ancestors lived in small groups, we evolved the cognitive mechanisms that allowed our species to spread into every available environmental niche and eventually create large scale societies. Some of the most important mechanisms relate to maintaining groups and coordinating action within the group. We learn most of our behaviors from others, but our behaviors are heavily influenced by our evolved mechanisms and it is impossible to clearly separate out what is innate and what is cultural.

Aspects of our modern world are very different from our evolutionary past. These differences, along with our evolved cognitive mechanisms are the source of many behaviors that appear irrational.

The complexity of the modern world makes it difficult to understand many of the cause-and-effect relationships of events. Often we default to our intuitions to make sense of things. As a result, we come to intuitive conclusions that are wrong. These intuitions then lead us to attempt remediations that are ineffective or even counterproductive.

By applying a little structure to an analysis, we can do a better job than just relying on our natural intuitions. We can more clearly identify the multiple factors that affect behaviors and come up with interventions that are more likely to be effective.

The next section will outline an approach to identify the factors that likely led to the apparent irrational behavior. Note that there are usually multiple factors affecting behavior. Once we have identified those factors, we can then go on to the next topic, remediation.

An Approach To Analyzing Irrational Behavior

Given the near-infinite possible range of irrational behaviors, and our near universal dislike of highly structure procedures, I've made this as simple as possible.

This approach consists of a few sequential steps to follow and a list of questions to review.
You start with a quick high level pass through the steps and then dig down into more detail as needed.

Your gut reaction will probably be that this is too much work. That merely illustrates the need to take such an approach.

I'll start with the assumption that you have identified a behavior that is illogical, irrational or we don't understand. Something in your head is telling you their behavior is off somehow. Let's start by assuming you are correct.

Here is an outline of steps to take.

Step # 1. Say to yourself, "Pause", and "I might be wrong." We can't help but view others behavior from our own perspective. We need to work at looking at their perspective. This is hard. Saying these things might help a bit.

Step # 2. Write down the illogical/irrational behavior, exactly as you observed it. Our memories are fluid and if you don't write it down it will be a moving target. Also, write down exactly what you think they should have done. The more detail the better.

Step # 3 Describe the context in great detail. Do so from the perspective of the target, not your perspective. If you can't do this, you should stop your analysis and recognize you don't know enough to judge, even if you feel that you do.

Step # 4 Identify the areas of mismatch. Is there difficulty at understanding something at scale? Are institutions involved? Statistics? What groups are involved?

Step # 5 Look at the behavior model, make sure that all the elements are present and assess each element.

Behavior is a function of Context, Motivation, a Prompt, Ability, and a Decision.

In some cases we observe a situation where we think that a person should have done something but did not. Looking at the behavior model can help identify if it could have been performed at all. If one of the elements is missing, no new behavior will occur.

Remember that individuals have different life experience that all weigh on these elements. As an observer, your experiences have been different.

The context constrains the range of possible behaviors. Both the physical and social environmental aspects are important. Likely motivations are also constrained by context. Which of the motivations

appear to be influencing the behavior: Sex, Maintenance/Control, Sense-Making, Groupishness and Status. Do they actually have the ability to notice the prompt? What do we know vs. assume about their ability to perform the behavior? Have they done it before in the same context? What are the immediate outcomes related to the decision? What models of the world did they use in their evaluation and decision making? How much uncertainty was involved? What generalizations were made? What experiences could have influenced them? Look for anything that might be an inhibitor.

Step 6 # Review the remaining topics that influence our behavior.

a. To what degree was consciousness involved? Was the behavior largely driven by non-conscious processes?

b. To what degree were generalizations involved? Did they over generalize?

c. Was information taken out of context?

d. Was the language precise - were all participants actually working with the same definitions?

e. Did the participant act with insufficient information, jumping to conclusions?

f. What beliefs values and ideas were expressed. Were they all shared by the participants?

g. On what basis were the risk and opportunity assessments made - personal experience, the work of experts? Were the experts valued by all participants?

h. Was there an unreasonable expectation regarding consistency? Was there some referential model assumed to reflect a role.

i. What social norms were involved. Did all participants share the same norms? How do you know that?

j . Is there any transparency in the decision making?

k. What, if any, brain assumptions were involved.

It's possible that you will see that from the target's perspective, the behavior is not at all illogical or irrational. But if that is not the case, continue.

Now, go through steps 3-6 for yourself. I can hear you groan. Your brain is telling you with absolute certainty and conviction there is no point in wasting your time and energy. However, you made a lot of assumptions about what should have happened and going through this exercise will allow comparison with what you uncovered for your target. If you want to really get at the issue, this step is necessary.

Approaches to Influencing "Better" Behaviors

Whenever we perform a behavior, we are doing what we know how to do, what we have learned. If we have done it before with a positive result, we are likely to do it again. If we repeat it enough it will become more automatic and we will be less likely to be consciously aware of what we are doing. We have built up a strong set of connections in our brain with a history of a positive outcome. Evolutionarily, it's very efficient and effective.

If we want someone to do something differently, we are introducing a change, but it is very hard to rewire established neuronal connections. We really have two things to consider: inhibiting an existing behavior and teaching a new behavior. We must do both.

To be successful at this, you have to be willing to experiment. We are complex, and it may require multiple adjustments and alternative approaches. A methodical approach will be more effective than random changes. Remember there are often multiple paths to a destination and you may have to try a few different ones to head in the right direction.

We can use the elements of the behavior model again to identify areas to act on.

Behavior is a function of Context, Motivation, a Prompt, Ability, and a Decision

Let's start by looking at how we could inhibit the existing behavior. First can we modify the context? Can we change the physical or social environment? Can we eliminate the cues that signal the behavior, can we make it harder to perform? Can we de-motivate? Can we modify the outcomes that will affect the decision. If we want to reduce people eating candy we can do a number of things, we can swap the clear jar for one that is opaque. We can move it from the top of the desk to the bottom drawer. We can lock the drawer. We can stop buying candy for the office all together.

If you have performed an analysis of the behavior you should have some ideas on where to start first.

As for the new behavior, you probably already have some ideas what they should be. Here, you need to be very specific and detailed as to what the behavior is. Write it down. Vague terms lead to confusion. Then make it as easy as possible. Focus first on the behavior because that is what is most visible. Make sure the outcome of the behavior has some immediate positive alignment with the core motivations and won't inhibit any of them. Make sure it is easy to recognize the cues that indicate that now is the time to perform the behavior.

Adjust and Repeat. It takes time to wire in new behaviors. We may be able to quickly demonstrate we know how to do something in a classroom type setting but that is not the same as having it wired into our brains that we can do anywhere or anytime. That takes time.

At this point I really can't get more specific because of the wide range of possible situations. However I offer up some suggestions and hints.

Things to keep in mind

This framework is intended to help look for non-obvious factors that influence behavior. As a framework, it is going to have some holes in it as it can't account for every individual and every situation. It won't cover everything but it will give you places to investigate further.

Trust and connection are essential. You have to be perceived as trustworthy and non-judgmental or you well never get past step one. You need to be clear about your intent.

Uncertainty is a great inhibitor. If people are uncertain about an outcome or how to do something they are more likely to revert to their defaults. Uncertainty adds stress.

Do not underestimate the power of groupishness. Needing to belong, to be recognized and to connect is a huge driver of behavior. Recognizing this can be a powerful aid in solutions, but you need to find the right group or it can backfire.

The most salient is the most important. Focusing on just one thing makes that the most important, even when it may not be. You need to keep a broad perspective.

Focus on ability before focusing on motivation. Make it as easy as possible and eliminate obstacles. Ability is much easier to observe.

Be wary of potato chip ideas. These can have great appeal because they tap into our core motivations but often they have no actionable basis. These ideas often include abstract concepts like fairness. They sound good intuitively, but are really hard to realize at scale unless we get very specific about the actions.

Be very careful with your words. Generalizations obscure the real problems. The order in which you present words makes a real difference.

Single point solutions seldom work. Getting a desired behavior may involve managing the environment, making the activity easier, creating an immediate positive outcome and a lot of repetition.

Solutions have to work with our motivations and cognitive abilities, not against them. Telling people not to categorize will not work as that is what our brains do. Shifting the focus to a better category may aid the solution.

Non-testable beliefs are hard to change quickly. We can build models of the world based solely on input from others and never have to test them ourselves. Through repetition they can become entrenched. Butting directly against them seldom works. You need to look for common objectives.

Understanding problems at scale is hard. Statistics are hard. If numbers are involved, you really have to dig into them. We don't intuitively understand compounding (as in finance) or exponential growth (as in spread of a virus). We ignore base rates when we see percentages in the headlines. Educate yourself on the challenges of understanding and presenting statistics.

The world is not like a machine where you can simply fix a broken part. Neither are relationships between people. No one really understands how all the parts interact. When working with problems at scale, it is important to understand the concept of emergence. Many properties of the world are not designed, rather they result from the interactions of many individuals and they constantly shift and change.

The world is not evenly distributed. We are very prone to categorize, generalize and simplify. We hear about averages and treat them as representative while they hide important variability.

We are prone to anthropomorphize things we shouldn't. For example: we get upset at companies, because they don't behave like good people, even though they aren't. We try to influence them by using our intuitive abilities that seldom work.

There are many paths to an outcome. We often get fixated on a single solution that just seems right but in a complex world there are usually many paths to where we want to go.

Change takes time. Reconfiguring our neurons can take a very long time, while our imaginations can see it in an instant.

All evolution is co-evolution. Whenever you read something like "Fire made us human," or "Bipedal locomotion made us human" read it instead as "Control of fire was one of the many important developments in our evolution" or "Bipedal locomotion was one of the many important developments in our evolution."

Humans are most successful when operating under a shared world view, whatever it may be.

Experiment methodically. Track results. Be careful of narrow metrics. If it doesn't work the first time, try again.