A Guide to Essential Thinking, the Second Part—Oops:

An Introduction to the Many, Many Ways in which Thinking can Go Terribly, Horribly Wrong, with Suggestions for Avoiding Some of the Common Problems and Errors, along with the Usual Irrelevant Pictures of Animals that I Enjoy Looking at and that I, and it Is Hoped, Others, Find Interesting

A picture of a bird in the botanical garden in Bogotá, Colombia (not Columbia)

Section I: Cognitive Biases

A picture of a snail enjoying a succulent in the botanical garden in in Bogotá, Colombia

Cognitive biases are problems that arise in thinking because of the way human brains work (and probably other brains—I'm not a speciesist, nor was Bertrand Russell, who pointed out that chickens could benefit from more refined thinking, but their problem is covered later). I'm avoiding the anthropocentric bias. It would be a reasonable expectation that people can't avoid problems that their own brains cause, and to some extent, that's accurate, but because people can do meta-thinking (thinking about thinking) and can think again, once aware of the biases, there are ways to work around the biases.

As of the time of this writing, there are almost two hundred (!) cognitive biases that have been identified, and more are being described frequently. Not to worry: not all of them will be covered here. Brains don't work so well for essential thinking, apparently, at least until the brains are given another chance, which has implications that it's important to remember: essential thinking is a difficult, time-consuming process. As Henry Ford said, "Thinking is the hardest work there is, which is the probable reason why so few engage in it" (San Francisco Chronical, April 13, 1928). Categorizations of biases can be done in a number of ways: individual or group, cognitive or emotional or social, causes or effects, etc. I'll just plop them in here in the ways they have happened to come to me.

A picture of a butterfly on the tiles outside the visitor center at the Piedras Gordas entrance to the Chingaza National Park, Colombia

It should be noted that cognitive biases are not necessarily disastrous. Some of them, in some contexts, promote safety. Some of them, in some contexts, promote accuracy. Some of them, in some contexts, help people to make decisions in less time than might otherwise be required. So people need these biases, but they are still biases, and it's important to recognize what they are, what they're good for, what they're not good for, and ways to work around them when they're not useful.

A picture of birds on rocks in the Sea of Cortez, off the coast of Bahía de Los Angeles, Mexico

People generally want to maximize their positive experiences and minimize their negative experiences. Fair enough. But life, and thinking, are typically more complex than that, and those preferences can get in the way of clear thinking. Loss aversion happens when people will do more to avoid a loss than to gain something positive: people want to keep their $1 instead of taking a risk to get $5 when none of this is money they had before the experiment. A bird in the hand is worth five in the bush. Related to this is regret aversion, which is what happens when people refuse to do anything lest they come to regret something. It should be noted that avoiding loss and regret often help people to avoid doing stupid things, but they are biases, and decisions should be made based on the best information available, rather than on biases.

And if people can't minimize the bad and maximize the good, they prefer to do nothing at all and leave everything as it is. This is the status quo bias. Even if the status quo is bad, change might be worse (it might also be better), and people don't try to change anything. But sometimes, things need to be done. Making a clear decision based on the best facts available, aligned with bias or not, is the job of the essential thinker.

A picture of a bee on a trail in Chingaza National Park in Colombia

People also like to believe the best about themselves, even when they're not doing so well. This is the illusory superiority bias. When asked, 90% of drivers believe that they are above average drivers. By some definitions of average, only 50% of drivers can be above-average drivers, but this isn't about basic statistics. It's about what people think of themselves. There are logical reasons to be suspicious of reports that people make about themselves, but meanwhile, there is also this cognitive bias. When people are talking about themselves, especially positively, there is good reason to do more investigating. And given the statistics about drivers, it is probable that what we find when we do investigate is not going to align with what the people say about themselves.

A red eft along the Finger Lakes Trail

The self-control bias happens when people make decisions for the short-term that are in conflict with their long-term goals. People live in the now, and the future doesn't exist. One can find lots of financial examples of this bias, but it also shows up in the ways in which people train their kids and pets. I recently watched a mom let her preschooler hit her repeatedly with a toy truck. She did not stop the abuse by making the child responsible for his behavior. He wanted to go play on the playground, and instead of making him behave before being rewarded with time on the playground, she let him go straight from hitting her to playing on the playground. Oops! That's a kid who now knows that he can get what he wants by assaulting his mother, not by behaving kindly. But his mother made a decision that helped her in the short-term (the kid did stop hitting her), but not for the long-term (she now has a child who believes he can get what he wants via assault).

An American toad along the Finger Lakes Trail

When people succeed, people take credit for themselves, and when they fail, they blame circumstances: the self-serving bias. When I was teaching at the university, I saw this one frequently. When students did well on a quiz, exam, or homework, it was because they worked hard and learned a lot. When students did not do well on a quiz, exam, or homework, it was because I had designed an unfair assessment or hadn't explained the material well enough or hadn't made myself available enough for out-of-class tutoring. It's quite possible that I was an inadequate teacher, but most of the time, failure resulted from partying with friends instead of studying, or deciding that it would be more effective to complain to parents or administrators than to do the required work (on this latter point, they were usually right, but this didn't improve their learning of the material).

I don't know what this animal is, but it was in a creek along the Finger Lakes Trail

When using the endowment bias, people like to believe that the things that they own are better, if only because they own them. Even if it's something that was just given to them and has no value to them for use or beauty or meaning, people won't give it up. I can recommend a Simpsons episode for this one: Season seven, episode 13—*Two Bad Neighbors*. During the garage sale, the old woman wants to sell a candy dish for $90. It's not worth $90 to anyone but her, and she wouldn't pay $90 for that candy dish if she needed one and didn't already have that one.

A pinacate beetle fending me off by standing on her/his head in northern Arizona. The stunt didn't work. I picked up these insects regularly, much to their consistent chagrin. I was gentle and didn't eat them, so the head-standing was both unnecessary and ineffective.

People believe that they know more than they do (overconfidence), even when their errors are pointed out (belief revision bias) and they quickly forget that they learned something because once they've learned it, they feel like they've always known it. This is one reason why it's important to keep track of our sources: to remind ourselves that we didn't already know that information. I believe that some instances of plagiarism (copying other people's ideas without giving those people credit for their ideas) arise accidentally, because of these biases. Biases that are about ourselves are especially difficult to maintain awareness of and work past. The best option is to remember that such biases exist, and then not believe everything we think.

A picture of a caterpillar in, I think, Arizona

People tend to believe that they have more control over what happens than they do: illusion of control. I have spent years trying to work with hostile people because I thought I was in control of the situations, or wanted to believe that I had some control in the situations: I thought if I changed what I was doing, they would change what they were doing. I was wrong, and now I use those experiences to remind myself about the overconfidence bias and not believing everything I think. Yes, years of my life lost to a cognitive bias. Don't let it happen to you.

A picture of seals on rocks in the Sea of Cortez

People tend to overreport their good points and underreport their bad points: the social desirability bias. On the plus side, people who are depressed are much more accurate about their abilities and inabilities. Happiness is overrated. On the minus side, people who believe the best about themselves are usually more willing to try, and nothing succeeds that hasn't been tried. And in any case, if people don't brag about themselves, no one else will, and a lot of moving forward in life in the ways that are usually judged successful depend on overreporting one's good points and underreporting one's bad points: even if this is a cognitive bias, it's often required. But we can at least be deliberate about what we're doing, rather than responding automatically to the bias.

A picture of a Colombian caterpillar, also in the Chingaza National Park

What people think about biases them, in various ways. If people think consistently about something, that changes what they notice in the world (attentional bias): while I had braces, I noticed lots of people who had braces, just because I was thinking a lot about braces, and when people see news coverage about airplane accidents, they think that airplane travel is unsafe, even though car travel is so unsafe that car accidents rarely make the news: not noticing what's common is the bias called the availability heuristic.

A picture of beetles in a thistle, somewhere

When people talk or hear constantly about, say, the dangers of air travel, more and more people come to believe that information, which is the bias known as the availability cascade. I suspect this was part of the reason the Dark Ages (aka middle ages) lasted as long as they did: only one set of ideas could be legally talked about for quite a few centuries. In the back alleys, some exceptional people were doing some exceptional work, and eventually, that exceptional thinking built up enough to make it okay for people to look at the light again. But meanwhile, the one set of ideas was all that anyone could hear or say, and a lot of people thought that those were all of the ideas there were. And some people deliberately prevent themselves from encountering different ideas. They reinforce the bias on themselves, decreasing their chances of getting out of the hole of same-thinking.

A horned lizard near Tucson, Arizona

When people think the worst of others, they'll attribute hostile intentions to those people, even when the actions taken by those people are not malevolent: the hostile attribution bias. This is part of the reason it's easy and effective to manipulate people through fear. If we repeat again and again that some person or group of people or problem are the source of all of our difficulties, we might become afraid of that person or people or problem (availability cascade), and we assume that they're out to get us, when mostly, they're just taking care of themselves or existing without giving the people who are afraid of them a second thought.

A picture of a toad on granite near Tucson, Arizona; the toad is not granite.

What people believe biases them: they might like someone's conclusion because it's what they already think. This is the belief bias. When people are working with the belief bias, they don't evaluate a conclusion based on the argument or evidence leading toward the conclusion, but they do accept the conclusion if it's what they already think or if it's what they want to believe. To be good essential thinkers, we need to pay attention to evidence and the structures of information, and then decide about the conclusion. It's also important to remember that some people can reach a decent conclusion despite lousy structures and inadequate evidence, and in those cases, it's important to back up the intellectual truck and do the research to find the evidence and present the information in responsible ways. I can recommend a television show for this cognitive bias: The X-Files. One main character wants to believe, so he takes everything to be evidence of extra-terrestrial activity. The other character is looking for facts before belief and is willing to change her mind as more information becomes available.

A picture of a bird's head and shoulders in botanical garden in Phoenix, Arizona

The context in which information is presented can change what people think of that information: if I give you information in church, and you think that you can generally trust the information that you receive in church, you are likely to accept that information; if I give you information via a network news source, and you tend to think that the network news source is biased, you are unlikely to accept that information—even if the information given in church and the information given via network news is exactly the same information (framing bias).

A picture of a black-tailed deer in Chingaza National Park, Colombia

People have interesting biases about themselves and their interactions with others. They like to believe that people agree with them (false consensus effect) or are attracted to them (sexual overperception bias), more than people actually do or are. If one is a fat chuckwalla out in the open on a rock on Camelback Mountain in Phoenix, Arizona, one probably is the center of attention for a variety of predators. Being the center of attention is not always (perhaps not usually) a good thing. If one believes that one is the center of attention and that people think the way one thinks and like to look at one as much as one likes to look at oneself, one should probably have a look around to see what massive predator is coming.

People often attribute competence to authority figures in all areas, when people can usually only be informational authorities in limited areas (authority bias). The actor who plays a doctor on television is an expert in playing a doctor on television, not on whatever health product is being recommended. A linguist and logician is an expert on language and logic, not on acting. A botanist is an expert on plants, not on human psychology. But none of this stops anyone from having opinions, and that's why it's important to distinguish between an informed opinion and a preferred opinion.

A picture of a dark, shiny beetle in, I think, Colombia

People tend to believe that the characteristics of an individual are the characteristics of a group (this book is short and has pictures, so it must be the case that all books are short and have pictures—group attribution error), and that the characteristics of a group are the characteristics of individual members of that group (stereotypes: dogs have four legs and like to roam around in the forest, so this dog must have four legs and like to roam around in the forest—but this dog had a couple of legs amputated for some reason and uses a little cart to wheel around the kitchen table).

A picture of a spectacular beetle, but I can't remember where. Probably Colombia

People tend to think that they are easy to get know and that others are easy to get to know (transparency illusion). One of the worst episodes of my life happened because people assumed they knew a lot about me without putting forth any effort to get to know me because: people are easy to get to know, so no effort is required. The mess was spectacular. People also assume that they know more about other people than other people know about them (asymmetric insight illusion). It is possible to have asymmetrical insight, though, usually because of an asymmetrical access to information: the data collectors at the NSA have more information about you than you have about the data collectors at the NSA, for example. These kinds of biases contribute to making social events baffling ordeals for some of us.

A picture of insects flying overhead in Chingaza National Park, Colombia

Brains, the poor things, might be doing their best with the neurons, connections, and chemistry they have, but they can't do everything. People tend to remember the bizarre or negative more than the routine (bizarreness effect, negativity bias, respectively). If it happens all of the time, we don't notice it anymore. I can write travel notes that my mother thinks are interesting, about places that I don't live in. When I live in a place, it's normal, and not worth writing about. So I have to do the writing before I settle in, while I'm still noticing. It's very hard to shake oneself into noticing the routine, but this is an important part of essential thinking, and something that I try to engage in regularly. Profound insights can and have come from noticing what's common or routine or obvious. "There is nothing more deceptive than an obvious fact," said Sherlock Holmes, in the Boscombe Valley Mystery, by Arthur Conan Doyle.

A picture of a snail on the sidewalk in, maybe, Borneo

People tend to have difficulty remembering or working with information from outside their group (outgroup homogeneity bias), and this makes it hard to remember specific characteristics of people who are relatively more different (cross-race effect). To some extent, we have to learn to see in other contexts. During the second visit I made to Borneo, the wild boars were migrating, and when I first saw them in the river, I thought there was just a rapid in the water. The Hobongan, who knew the river, knew that there was no rapid there, and they jumped out of the boat with their spears and made chase (in Hobongan-land, running with sharp objects is a crucial life skill). The next time I saw a rapid-ish phenomenon, I thought it was a group of migrating boar, but that time, it was a a group of white birds flying over the river and flicking up water with their wingtips. Third time's the charm: the rapid was a rapid. I didn't know how to see migrating boar in a river because I had never seen migrating boar in a river. I went through much the same process for seeing monitor lizards in the river. By the time I left, I could see a monitor lizard in the river from a few hundred feet away. The point here is that it's important to experience other contexts and other people in order to learn to perceive. This cognitive bias is more easily recognized and overcome when we have more experiences.

A picture of the Chingaza vegetation, with a spectacled bear. Can you find the bear? Do you know how to see bears in the Chingaza forest?

(The bear, also called a jukumar, kukumari, or ukuku, is in the upper-right third of the picture; only a white marking is distinguishable.)

A moth on Yang Ming Shan, in Yangmingshan National Park, Taiwan

In various versions of autobiography, Mark Twain said that he could remember things, whether they happened or not (cryptomnesia). He was right about himself, and about the rest of us. For a while, it was thought that traumatic memories could be buried, and maybe they can, but at the moment, there is a lot of skepticism (rightly so) about buried memories coming back because, in many cases, those memories were of traumas that never happened. Instead, therapists or other people trying to be helpful hinted at possibilities, and based on those hints, people put together memories of events that never took place. There are also false memories, when we think we came up with something that we in fact remember. I keep all of my language materials that my friend provided in their own folder, separate from the folder of the materials that I collected, so that it is clear to me every time I consult either set of materials that I did not collect those materials. It's easy to forget where information came from, which is why managing sources deliberately and carefully is important.

A picture of butterflies in Borneo

It's easier to remember information that was delivered with humor (humor effect) or that had to be worked for (processing difficulty effect) and harder to remember what was easily found (Google effect). I read about some recent research that said that students prefer for professors to hand them information rather than making them figure out some material on their own. Students might prefer not to put in effort, but if the goal is learning, guiding people as they work to learn the information they need or want to learn is more effective than giving them the expected answer and letting them repeat that back. And now for the humor component: what do you call a short witch who escapes from prison? A small medium at large. What did any of us learn from that? I don't know. Ideally, the humor relates to the information to be learned. This introduction to essential thinking is not ideal in some cases.

Another picture of more butterflies in Borneo

People remember tasks that they haven't completed better than those they have (Zeigarnik effect). Personally, I never wake up in the middle of the night to let my brain go in circles trying to figure out already-resolved problems, but I do wake up to cogitate on puzzles that I haven't resolved yet. (Bluma Zeigarnik was a Lithuanian Jewish female scientist from the 1920s until her death in 1988: with that list of characteristics, one would expect an interesting biography, and indeed, she has an interesting personal history. If you want to remember Bluma Zeigarnik, look her up yourself and make use of the processing difficulty effect.)

A picture of a larva on a twig in Borneo

People tend to believe or accept information they've encountered previously (illusion of truth—familiarity breeds belief) or many times. When people try to control what I believe by constantly pinging me with the ideas that they want me to accept, they are accessing the illusion of truth, assuming that if I hear or see or read a certain set of ideas often enough, I will come to accept those ideas as true or accurate or useful. Fortunately for my mental health and philosophical independence, I am aware of this cognitive bias and people's uses of the cognitive bias to try to manipulate me, so once I recognize what's happening, I can blow off the constant pinging and go back to evaluating ideas for their inherent worth rather than the frequency with which I encounter them.

Another picture of another snail in Borneo

We forget most of the contents of long lists (list-length effect), but remember the last part of the list better (recency effect) and the first part of the list next-best after that (primacy effect). It's important to keep these list effects in mind because they are often used to guide people's attention and memory, and even to manipulate people's thinking by guiding their attention and memory. If someone wants us to think about x, they put x last. And they bury information about m in the middle, where we're more likely to forget it ever existed, even if that information is important to the conclusion someone might be trying to get us to accept. I considered arranging this long list of cognitive biases so that the biases that I think are the most important were last, but I didn't because I might be wrong about which biases are the most important. I'm preferring to imagine that people will not use this list as a list but as a one-a-day kind of nutritional supplement to boost essential thinking.

A spiky insect on a branch in Borneo; the people there consistently tell me not to touch the spiky or hairy ones

Time doesn't heal any wounds, but it does make it harder to remember the details accurately (leveling: blurring the details; sharpening: selective remembering of some details). I wouldn't expect everyone to remember all of the details about cognitive biases in this introduction because I expect leveling. And fair enough: brains aren't perfect and can't do everything perfectly all of the time. I do expect people to remember the gist: that memory is flexible and often unreliable. It's part of good mental hygiene to be skeptical about our own thinking and about why we think what we think.

A picture of a bee on blue flowers near Kaikoura, New Zealand

People better remember information that matches their moods (mood-congruent memory bias). If I'm cranky, I will remember negative information better. If I'm happy, I will remember positive information better. So many ways that memories can be skewed. How many do you remember, which ones do you remember, and what mood are you in while you're remembering what you're remembering?

A picture of a scorpion in Borneo—will the scorpion be a pleasant or unpleasant memory? I liked the scorpion, and I thought it was an overall positive animal to have in the kitchen. My friend disagreed and cut the scorpion's head off with a machete (it was her kitchen). The scorpion was a positive; the beheading was a negative. Life can be complicated like that.

Age affects us: the elderly prefer to remember the good times more than the bad times (positivity effect), and who can blame them? So much of life stinks that when there's not much life left, statistically speaking, it's probably a better experience overall to focus on the positive. The problem arises when the older ones refuse to see that the younger ones have real problems and blame the younger ones for being whiny or not as successful in various ways as the older ones believe is possible. One can believe whatever one wants to believe, but that shouldn't stop any of us from observing what's happening right in front of us. Facts!

A picture of a biting insect in the Chingaza National Park, Colombia. I don't approve of parasitism (a belief), and I killed this one shortly after taking the picture (a fact). Negative parasite, positive death, so I believe, in contrast with the scorpion.

Here is where we all pause to take a nap. Research done on cockroaches in the 1920s showed that they remember new information better if they rest after learning rather than if they go about their usual cockroach business, whatever that might be.

A picture of another spiky insect on a tree in Borneo

Believe it or not, people generally assumed that people's brains worked like cockroach brains. It wasn't until the 1960s that the research was replicated in humans. It turns out that human brains and cockroach brains do work similarly. Napping is good for learning and remembering, whether we go upon two legs or upon six. Napping after learning helps us to avoid the misinformation effect, which happens when memories are skewed because of information that comes in after the event we were trying to remember.

A picture of a large ant in Borneo

Confirmation bias is a big one. People like information better if it's the same as what they already think. We like information we already have so much, in fact, that we'll ignore and otherwise unload any information that isn't what we already think. This one makes learning really difficult, but, like the other biases, it does have its benefits. It protects us from flapping around in the fierce winds of information and opinion that are inevitably blowing, for example, and helps protect us from giving up too easily on information and opinions that we have responsibly worked through. The trick is to distinguish clearly between information that we have responsibly worked through and information that we like just because it's the same as what we already think.

A picture of a butterfly on the ground in Chingaza National Park.

The Semmelweis reflex is one of my favorites, if only because I like saying 'Semmelweis.' The Semmelweis reflex happens when people reject an idea because it challenges assumptions that are important to them. Semmelweis was a competent Hungarian doctor and scientist who found that when doctors washed their hands before helping women to deliver babies, many, many fewer women died in childbirth. Semmelweis' findings were ignored and dismissed, and he was fired and sent to an insane asylum (remember the caveats at the beginning of this whole shebang? To be fair, he was also a bit of a pill, and to be fair, he was right, pill or not.) People were insulted because Semmelweis' findings meant that the doctors themselves were transmitting disease, but that conflicted with their idea was that they were gentlemen and healers, not sources of disease and death. Doctors' pride was, and probably is, more important than women's lives. I'd imagine that poor Dr. Semmelweis is rolling over in his grave every time somebody doesn't wash, or doesn't wash well, but if anyone deserves an eternal peace, it's Ignaz Semmelweis. Wash your hands, people. With soap.

A picture, still in Chingaza, of a bird I don't have time to identify right now

Naïve realism happens when we think that people are ignorant, stupid, or idiotic because they happen to think differently than we do about something(s). It's the basis for a number of other cognitive biases, a number that is probably changing as I write. Naïve realism makes the world a very small and ever shrinking place because it says that anyone who is not me can be dismissed precisely because they are not me. There's some egocentrism. And it's really boring to be the only holder of worthwhile ideas, or at least that's what I think, and if you think you'd like to be the only holder of worthwhile ideas, you're just an idiot, and I don't have to listen to you. So there.

A picture of another unidentified but gorgeous bird in Chingaza. I can tell it's time for me to go to bed, even though I'm not a cockroach (yet—it could happen: read *The Metamorphosis*, by Franz Kafka) because my curiosity and energy to follow up on curiosity are flagging. However, before I zonk out: I used to wonder why my grandmother's favorite color was brown, but in paying attention to the less flashy members of the ornithological universe, I'm beginning to catch on—there are entire, multiple rainbows of brown. This bird has one of my favorite browns.

Chronological snobbery happens when people believe that recent information is better than older information. It's a boost to one's ego to believe that one lives in the most enlightened era ever to have occurred in human history, but it's not a responsible boost. That said, sometimes, in fields where active investigation is happening and competing ideas are being heard and tested (are there still such fields?! we're more likely to find individuals who conduct this kind of inquiry), progress can be made in the collection of information that is available, and in such (rare) cases, newer can be better; even so, newer in such cases is often a rediscovery of something that was known in some way long ago. It's certainly better to realize that normal women have the same number of teeth as normal men, rather than believing that men have more because men were believed to be superior and more is better, as was done for millennia post-Aristotle, until someone finally thought to count people's teeth. I find chronological snobbery in most of what I like to refer to as pseudo-documentaries and in people who refer to those who don't have computers and airplanes as belonging to 'primitive' cultures.

A picture of a snail in Borneo

My personal favorite, and one I trip over regularly, is information bias, the seeking of more and more and more information even when more information cannot possibly make a difference. I can see the difficulty, but on the other hand, I have never run into a situation in which more information was not helpful or useful. I frequently have to make decisions based on less information than I would prefer to have (time marches on), but then I get to change my mind once I have more and better information. I do like to change my mind, and I encourage others to change theirs regularly, too—it keeps the mental clutter to a minimum, like moving a household regularly. Even so, I also can't be an expert on everything.

A picture of a grasshopper somewhere: I'm well-rested now, but I still don't remember where this was.

The Dunning-Kruger effect is a dangerous one. This happens when people who don't know very much overestimate their knowledge or competence, and when people who actually are competent experts underestimate their knowledge and competence. People just aren't very good at figuring themselves out. So we all have to be careful: the people who say they're good at something probably aren't, and the people who are cautious about claiming expertise are probably the best at what they do. Keep that in mind while you're reading this little introduction to essential thinking—writing this up implies that I think I might have something relevant to contribute to the learning of essential thinking. Hmmm…

A picture of a praying mantis on the side of a fifth-wheel trailer in Prescott, Arizona

Subjective validation bias came up just yesterday. Someone on a pseudo-documentary was saying that it wasn't a coincidence that the human sphenoid bone, butterflies, and the layout of the White House grounds are all similar shapes. Patterns do happen in nature, and such patterns are not necessarily sinister indications of a plot to destroy white males wherever they may be found, or whatever the sinister-plot-du-jour happens to be. First of all, the shapes were not all that similar. Viewers had to do most of the work to make the claims make sense. Making such links between coincidences is called subjective validation.

A picture of my tarantula, Louis—I was thinking of Louise for a while, but when mating season rolled around, it turned out that Louis was male and needed to go find a female, so I took him back out into the Arizona desert and let him go. I hope he found what he was looking for.

Section II: Informal Fallacies

Fallacies are ways to make mistakes in thinking. Fallacies come in two main flavors: informal and formal. Informal fallacies happen when the information is mismanaged. Formal fallacies happen structural problems in arguments (sets of information moving toward a conclusion, not a spat with a sibling)

A picture of a moth on concrete, somewhere

There are many informal fallacies, and different fallacies appear in different sources. There are also different ways to categorize informal fallacies. I'm going to skip all of that and provide some of my favorites, in no particular order. When possible, I'm going to include the Latin names of the fallacies, not because this is a Latin course but so that when we encounter information about the fallacies, we'll recognize them by whatever name. When working through informal fallacies, I recommend that people pick one or two to work on per day, and then find several examples of them throughout the day. I'm going to go further and suggest watching television or YouTube or whatever the favored visual entertainment is because, in my experience, the material presented in commercials, quasi-documentaries, and many fictional narratives on these kinds of platforms are based on informal fallacies.

A picture of a Barbary macaque in Gibraltar

Argumentum ad baculum: an argument from force or violence. If you don't agree with me, I'll kill you/fire you/torture your family, etc. This argument is well known from various tyrannies around the world, but I wouldn't underestimate its use in so-called free societies. Usually the argument comes with threats of social consequences if it's being used in a social context or eternal consequences, if it's being used in religion. Perfectly sane people, like Semmelweis, have been imprisoned for insanity because they had a different idea from the idea that was socially acceptable or expected.

A picture of a moth on moss along the Finger Lakes Trail

Here's one I've been encountering constantly this week: false bifurcation. This is the giving or using of only two options when there are more than two options. Either X or Y, not both, and no Z given or considered. Conservative or liberal. Male or female. Sick or healthy. I can recommend a movie here: "Chicken Run". The stupid chicken has the right response to the "We're going to escape or die trying." When presented with only two options, we should all quote Babs: "Are those the only choices?" And then we can do better than asking about other options: we can look for and identify and analyze those other options. It's also important to remember that some elements of some domains can be stipulated so that there are, actually, only two options. For example, we might want to look at what happens in an equation if we use zero or anything other than zero. That's two groups, stipulated to be two groups. The fallacy isn't committed, so long as the stipulation is stated and remembered. If we forget that the groups were stipulated, or don't let everyone else know that we're making the stipulation, the fallacy can occur.

A picture of yellow spiders on the flower of a wild carrot

I'm going to introduce an informal fallacy here that I've been dealing with recently that I haven't seen identified anywhere else yet. (This doesn't mean that it hasn't been identified. It just means that I haven't seen it.) I'm calling it false monocation, in parallel with false bifurcation. This is false singularity: using, considering, analyzing, or providing only one option when the given situation is more complex. This fallacy seems to be associated with a certain syntactic form in English: definite article and a singular noun (usually). The Muslim world. The People. The truth. The right thing to do. The majority. Life is more complicated than these kinds of over-simplifications allow. This doesn't mean that there are not people or truths or majorities, but the singularity is a problem and plasters over being honest about what's right in front of us.

A picture of a crow on a rock somewhere: I forgot where.

Because I recently cautioned us against committing the fallacy, the next one up is the argumentum ad ignorantiam (arguing from ignorance, or from a lack of evidence). I haven't seen the false monocation, so I am ignorant of whether it exists elsewhere, but my ignorance does not mean that this fallacy has not been identified elsewhere. The argument from ignorance happens when people want to make a claim based on a lack of evidence. Here I can recommend an episode of the Simpsons: Much Apu About Nothing, Season 7, episode 23. In it, Lisa tells her father that a rock she picked up from the street protects from tigers. When Homer questions how the rock works, Lisa responds with "You don't see any tigers, do you?" (A lack of evidence: no tigers.) Whereupon Homer offers to buy Lisa's rock. A lack of tigers is not evidence that the rock protects from tigers. Absence of evidence is not evidence of absence. A lack of evidence is not evidence of anything except a lack of evidence.

A picture of a bug on drying mud, and I also don't remember where this was, but the mud looks southwestern. I don't have evidence of where the mud is, really, so it could be anywhere with mud until I come up with some better evidence or information than a hunch about what the mud looks like.

The straw man fallacy can happen when a person (A) oversimplifies what another person (B) is saying in order to make it easier to demonstrate that that person (B) is wrong. It's a fallacy because the wrongness that person A is demonstrating is only a property of what person A is saying about person B's information, not about person B's information. So person A can demonstrate wrongness in person A's interpretation of person B's ideas. That's not usually what person A wants to do, but it does make person A's job easier, especially if everyone else doesn't notice that person B's information and ideas have been misrepresented. This is a very common fallacy.

A picture of storks nesting in Faro, Portugal

The argumentum ad hominem comes in a couple of main flavors, the abusive flavor and the circumstantial flavor. The argumentum ad hominem (abusive) fallacy happens when person A decides to attack person B as a person, rather than dealing with person B's ideas or information. In its most transparent form, this is name-calling or otherwise insulting people directly. In 2016, a majority of electors elected a president who is a specialist in the use of this fallacy, and he's not particularly subtle about it. But essential thinkers who are awake are getting lots of practice identifying this fallacy.

A picture of two gastropods who appear to be somewhere between snails and slugs, and more on the slug side of the continuum, and a snail who is more on the snail end of the hypothesized continuum

Another flavor is the argumentum ad hominem (circumstantial). It happens when a person or person's idea is criticized because of the person's context: conflict of interest, personal background, special interest, etc. In using the circumstantial argumentum ad hominem, the evidence and structure of the information are not being discussed, and that's why this is a fallacy. The ideas are separate from the person. None of this means that conflicts of interest, or personal background, or special interests are irrelevant. They are relevant (remember to ask cui bono: who benefits?). But they are not the crucial factor when evaluating information. The information stands alone and needs to be evaluated separately from the person who is delivering the information.

A picture of a spider on concrete--somewhere

The argumentum ad misericordiam is related to the circumstantial ad hominin but from the other side. In the circumstantial ad hominem, the problem arises in response to the information presented. The argumentum ad misericordiam arises when a person uses circumstances to try to make their information more convincing. It's an appeal to pity. Accept my ideas because I'm a victim. Accept my ideas because you feel sorry for me. Accept my ideas because bad things have happened to me. But—as with the previously presented fallacy, the information is separate from the person and needs to be evaluated separately from the person. Maybe the person really does need some kind of help, and we can be compassionate and generous toward that person as a person, and even so, maybe that person's ideas are terrible and should not be accepted. People are not ideas. Ideas are not people.

A picture of a moth with glowing eyes, on linoleum in Borneo
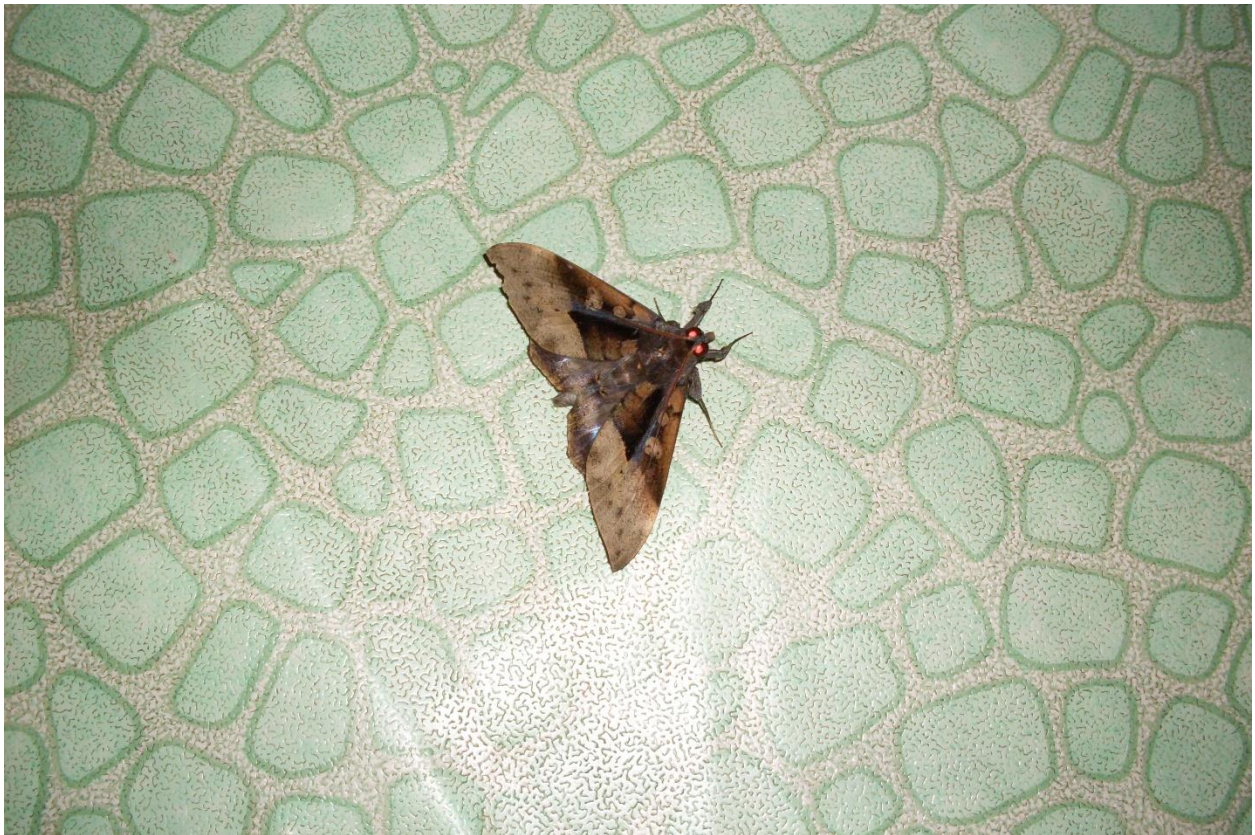
The argumentum ad populum is an argument or appeal based on people, literally. More modernly, it's the idea that we should do or think what other people do or think because those other people are doing or thinking as they are. This fallacy is also called the bandwagon fallacy: everyone else is doing or thinking something, so I should, too. But what other people are doing or thinking might not be a good idea. And even if people are doing or thinking well, it's not the fact that they're doing or thinking that makes the idea good. Essential thinkers need to distinguish between people and ideas, consistently and carefully.

A picture of a moth with partially somewhat transparent wings, on a towel in Borneo

The argumentum ad verecundiam is closely related to the authority bias in the cognitive biases section. It's a problem to say that an idea should be accepted because the person who delivered the idea is an authority in the area. Experts usually have more information, and more relevant information, than non-experts, but it's not the person who makes the information better in various ways. Yes, even when, perhaps especially when, a person is an authority in a certain field, we have to be careful to distinguish between, you guessed it, the person and the idea. Noticing a theme here?

A picture of a moth on a porch in Borneo

Non causa pro causa is a fallacy of mistaking something that is not a cause for a cause. Superstitions: black cats don't cause problems for people unless the people trip over the cats (as usual, paying attention can prevent a lot of problems). But in the most common form of this fallacy in the English-speaking world, temporal sequence is often mistaken for causality: post hoc ergo propter hoc (after this, therefore because of this). The black cat walked in front of me, and later that day, I wrecked my car. The fact that I took a nap while driving is not the cause, no. It was definitely the cat.

This is a picture of a parasite that came out of a praying mantis that my friend's cat caught and killed in Borneo, Indonesia. At some time, one of the Hobongan found one of these and put it in his pocket. He happened to die a couple of days later, and now, many Hobongan believe that these parasites are deadly. This is not necessarily a bad thing; they now leave the praying mantises mostly alone, once they remember these parasites. It turns out that, if one is not a praying mantis, these are quite harmless. I handled it and remain okay, at least as okay as I ever am. It feels as wire-like as it looks, except that it moves on its own. The cat was fine and ended up having an adorable litter of kittens, or a litter of adorable kittens, or both. The man did not die because he handled this parasite: he died after he handled this parasite. That's an important distinction. If there were an official mascot for essential thinking, this would be the one.

When we try not to work with the actual material in front of us but make a distraction, this is the red herring fallacy. Maybe instead of dealing with the fact that I took a nap and blamed a cat instead of taking responsibility, I would prefer that you not notice that I was being irresponsible both with what I was doing and with what I was thinking, and I say, "Look! An eagle!" There might be an eagle, but the distraction is the problem in thinking in this case. Uses of the red herring fallacy are usually more subtle than this. Maybe I really like my piano, and I asked you to wash your hands before playing my piano, and later, I find sticky fingerprints all over my piano, and I ask you why you put your grubby fingers on my piano after I asked you not to. Instead of owning up to your responsibility in being damaging to my piano, you decide to ask me what ownership really is, and how I could own a piano, and beyond that, why I should be in charge of your decisions, and further, maybe accuse of me of being a silly little despot. This is a common fallacy among those who wish to get away with whatever corrupt or undesirable activities they're engaging in. If you're looking for examples, look for a politician defending him/herself from accusations of any kind.

A picture of a caterpillar with an orange projection on the non-head end

For the next one, we need to make a distinction between language use and meaning. Petitio principii literally means begging of the question. In essential thinking, it means assuming what needs to be proven or demonstrated. But in everyday speech, the phrase 'beg the question' is used to mean introduce or raise a question. So in this essential thinking material, we can say "beg the question", but we're talking about a fallacy, rather than an introduction to an inquiry. Or we can use the Latin and avoid confusion entirely. I deserve to have the most money, because the most deserving people have the most money. Believe it or not, this is how the argument for some people having vastly more than other people usually goes.

A picture of perfect timing: new manicure, and a chipmunk dashing between cars in a parking lot

It's important to be careful when figuring out whether the petitio principii fallacy (also circular reasoning) is being or has been committed. Part of the difficulty is that any thinking process has to start somewhere, so we have to make an assumption. We can have good reasons for making an assumption, and we can be clear about what that assumption is and why we have assumed it, but we need to keep track of the fact that everything that happens after that assumption is based on that assumption and in some way confirms that assumption. Basically, any process of reasoning ends up being circular eventually. The problem arises when the circle is too small and there isn't sufficient intervening evidence or thinking. It is also a problem when other assumptions aren't considered. Insisting on an assumption to the exclusion of other assumptions often results in circular reasoning. Considering more than one circle can help prevent us from getting stuck in a thought loop.

A picture of starfish who had recently migrated down a slope off the coast of the Hawai'ian island of 'Oahu

Managing assumptions turns out to be a productive aspect of essential thinking. In the fallacy of complex question, a question is asked that includes an assumption: Have you stopped touching my piano with your grubby fingers? The question contains the assumptions that you're the one who has left grubby fingerprints all over my piano, and that you keep doing so. Maybe in fact you are not the one who has being stickifying my piano, and maybe you only did it once but have been careful to wash your hands since then. It's difficult to answer complex questions because one has to sort out the assumptions first and respond to those, rather than answering the question that has been asked. In everyday speech, tag questions provide a structure for assuming that someone agrees with us: nice day, isn't it? These aren't generally considered complex questions as fallacies in part because there is a structure that identifies clearly what is happening and in part because most people aren't particularly careful about their uses and understanding of language. We can use language to enhance essential think, but we also need to cut ourselves and other people some slack when we just want to have a friendly conversation without being on guard for every detail.

A picture of a butterfly near Flagstaff, Arizona

Ignoratio elenchi happens when a set of information or ideas is used to support an irrelevant conclusion. Maybe the information and ideas are fine on their own, but they're not getting to the point that we need to get to. If the question is who stole the piano, we need to demonstrate who stole the piano, not that it's difficult to steal pianos or that it's wrong to steal pianos or that anyone who stole a piano must be nearly as big as a piano, etc.

A picture of an iridescent beetle near Flagstaff, Arizona

When we're working on essential thinking as such, we need to be really clear about what the words mean. If we use the same word in different ways, the fallacy of equivocation is the result. The Abbot and Costello routine, "Who's on First?" could be fallacious equivocation, except that they were being funny and pointing out why equivocation is a problem, rather than trying to make an argument in favor of something. "Who" was used both as an interrogative pronoun and as a proper noun naming an individual. Several other unforgettable characters were used, too, and I highly recommend watching the sketch, by which I mean the comedy sketch, not, for example, a charcoal sketch or other kind of sketch. Headlines are also good places to look for equivocation: March Planned for August. 'March' as an activity, or 'March' as a month?

A picture of a horned lizard near Flagstaff, Arizona

Words aren't the only pieces of language that can carry two or more different meanings. Structures can also be ambiguous: amphiboly. Ambiguous structures are often humorous and are not necessarily fallacious. They only become a problem when the ambiguity is used to support an idea that can be misinterpreted because of the ambiguity. Because journalistic writing tries to pack a lot of information into single sentences, that kind of writing is a good place to look for funny examples: a drunk driver struck and killed a local woman jogging through a park in a pickup truck. We can sort of make sense of this. I would assume that the drunk driver was in the pickup truck, not that the park was in the truck, or that the woman was jogging in the truck. But what do I know? Maybe she was a tiny little woman in a tiny little park that fit in the back of the truck. Or a much larger-than-usual truck. In English, the problem of amphiboly can often be avoided by shortening sentences and sorting the information into different sentences: A local woman was killed by a drunk driver. The driver was driving a truck through the park where the woman was jogging. Other languages have other structures, so other strategies would work for avoiding amphiboly.

A picture of a female tarantula near Phoenix, Arizona

The fallacy of accent occurs when emphasis is used misleadingly. Headlines are a good place to find examples of this. A reworking of a recent one: SHORTAGE OF SURGICAL MASKS IN CRITICAL AREAS. Well, maybe, but then the rest of the article was about how demand for surgical masks had increased thanks to a newly identified virus, and the hypothesis was that if the virus continued to spread, and manufacturing of surgical masks was not increased, there could be a shortage of surgical masks. That's a lot of conjecture: about how many people the virus would infect, about what people would try to do to prevent infection (wear masks), about how many masks are currently manufactured compared with the number of conjectured infectees, about the lack of change in manufacturing. Wow. Almost anything could happen in a list of that many conjectures. Go ahead: make your own list: if this happens, then that could happen, etc., for at least 5 steps. I bet I could be a giraffe in fewer than five steps, myself. If I were radiated at the airport, my genetic structure could change, and if I produce more growth hormone, and if I were on the way to Botswana when I was radiated at the airport, and I toughened up my bare feet, I could be a giraffe, twelve feet tall, and browsing on trees in no time.

A picture of a large larva near Flagstaff, Arizona. I think this one looks like the hookah-smoking caterpillar in *Alice in Wonderland*, by Lewis Carroll, a book, and author, I highly recommend for essential thinkers.

The fallacy of appealing to emotion (argumentum ad passiones) happens when someone tries to control thinking via emotions rather than by encouraging thinking via the responsible use of facts. This fallacy is common in propaganda, and as I write, any part of the world's population that is within reach of any government's or nation's or neighborhood's propagandists is being intellectually assaulted with this fallacy. People are being told that they need to fear for their lives because there's a virus loose in the streets. There are always viruses loose, and everybody dies sooner or later. There are also other pathogens, and many of those are factually more worthy of generating fear than the current fear-generating virus. But the fallacy is about fear, not facts, and the people who generate the fear are also then the people who tell other people what to do, or work for people who tell people what to do, so that fears can be minimized: create the problem and the solution. Ignore the fact that much of what people are being told to do is ineffective and provides and false sense of security. This is not about facts. This is about some people telling other people what to do, and getting away with that kind of bullying by appealing to fear. Part of the reason that people have been so easily manipulated through this fallacy is that not many facts have been available: the virus was only recently identified, and research to find facts and thinking about facts take time.

A picture of crabs on a dock in Labuan Bajo, Indonesia

The fallacies of accident and division are tricky for me to keep straight in my mind. The fallacy of accident (the Latin is less common for this one, but here it is: a dicto simpliciter ad dictum secundum quid) happens when a general rule is applied to all cases. In general, honesty is a good policy, and maybe the best policy under some circumstances, but most people also accept the idea that it's better to lie than to cooperate with murder. So if you're hiding someone in the basement or other hidey hole, and a known murderer comes to the door, the better policy is now to lie. Lots of people who were hiding Jews during WWII decided that preventing murder was more important than honesty. But someone committing the accidental fallacy would choose in favor of honesty in all cases, no matter the consequences to themselves or someone else.

A picture of pelicans and a sailboat off the coast of Mexico in the Sea of Cortez

The converse accidental fallacy or hasty generalization is in some ways similar to the accidental fallacy. The converse accidental fallacy happens when characteristics of an individual are applied to a group. This person from the US has blonde hair and blue eyes, so everyone from the US has blonde hair and blue eyes. Not even close. But I have encountered more than one person who has made exactly this argument, while looking at a US citizen who happens to have brown eyes. The hasty generalization term points toward an important consideration: generalizing can be an important tool, but it cannot be conducted in a hurry. What makes the difference between being hasty and being careful is often a matter of some consideration and discussion. Usually, additional evidence or ideas will need to be included in order to justify a generalization.

A picture of an insect on a flower in Borneo

An extra tidbit here, with regard to saying that all Americans have blue eyes while looking at a brown-eyed American: While engaging in essential thinking, it's not always the most important component of the thinking project to remember the names of the fallacies. Most of the time, paying attention to what's right in front of us corrects a lot of errors. The trick, of course, is to be honest about what's happening right in front of us.

A picture of a blue penguin in the process of hauling up on the rocks for the night. Are blue penguins (the type of penguin) actually blue, according to this picture?

The fallacy of composition is similar to the hasty generalization fallacy, but it assumes that the property of some part applies to the whole tidbit being examined. This grain of sand is very tiny. Therefore, this entire beach is also very tiny. Not really. This seems ridiculous when applied to beaches, but I've been seeing it frequently in cases of actions. This person did something bad at some point, therefore everything this person has ever done is bad, and further, this entire person is bad. Most people are more complex than that, but this fallacy ignores the complexities, and makes thinking easier. This project isn't about easier thinking. It's about essential thinking.

A picture of a large green beetle near Flagstaff, Arizona

In order to confuse myself still further, I'm going to have similar pictures for the accidental and division fallacies. The fallacy of division happens when some property of the whole is taken to be also a property of individual parts. This farm produced eight million bushels of soybeans, so this field in the farm produced eight million bushels of soybeans. But maybe that field wasn't under cultivation for soybeans, and it was the farmer's kitchen garden, with vegetables and herbs and flowers, and no soybeans at all. Again, this one sounds ridiculous, but it comes up frequently, particularly in reference to the economy. Maybe the economy as a whole is doing better, but that could mean that some few people are doing better and that most people are not doing better, not that each person who participates in any given economy is doing better. For example, the US economy has grown almost three percent in the past year, but one friend's income grew more than three percent, another friend is entirely out of work, and still another friend hasn't had a raise in over a decade. None of the individuals have the properties of the whole, and the whole economy doesn't align with the personal economies of any of the individuals I know.

A picture without a sailboat but with the pelicans and the rocks and the Sea of Cortez and the sky

Section III: Formal Logical Fallacies

Fallacies are ways to make mistakes in thinking. There are two main categories of fallacies, if you'll recall, and even if you won't, and this section is about the other main flavor of fallacies: formal fallacies. Formal fallacies happen when the structures of relationships between and among pieces of information are not managed well.

A picture of the back ends of two swans in Kensington Park, London

Formal fallacies happen when structural problems occur in arguments. An argument in this sense is a set of information presented in order to reach a conclusion. It is not a spat with one's sibling. Arguments in the sense we want to use it here can also be used in spat-arguments with siblings. Spats with siblings can be good practice in essential thinking, but kindness still matters.

A picture of an iguana in Panama

Traditional presentations of logic, which is a structural analysis of the underlying principles of essential thinking, teach that arguments are comprised of two premises and a conclusion, and it's important to keep that structure in mind for some of these formal fallacies, but I will do my best to write generically about the fallacies and provide accessible examples because this particular introduction is not so advanced as to need or require the kinds of formality that are typical of more advanced introductions. Plus, I'd like us all to be able to recognize what's going wrong, even when arguments are not presented in traditionally formal ways, which is something that more advanced students sometimes have trouble with. The formal presentation distracts from the ways in which formal fallacies occur in everyday life, and it can be difficult for people to recognize the relationship between formal logical structures and what people do with those structures outside of a logic classroom.

A picture of a skunk in Treman State Park, New York

As with the rest of this project, there is no particular order in the presentation of these fallacies. I'm covering them in the order in which they came to me while I was brushing up on this material. And there are more, but I'd like to keep this section more simplified. It might be worth revisiting this section after wandering through part III.

A picture of frogs in a ditch along the Finger Lakes Trail

Earlier today, I said: "If I finish my homework, I'll go out for ice cream." Later, you see me at the ice cream shop. What do you think? Did I finish my homework? If you think I did finish my homework, you've just committed the fallacy of affirming the consequent. (The consequent is the second part of an if-then statement.) Affirming the consequent is a problem because I didn't say anything about what would happen if I didn't finish my homework. Maybe I'm going out for ice cream no matter what.

A picture of a larva in northern Arizona

Denying the antecedent is the other side of confirming the consequent. The antecedent is the first part of an if-then statement. If I don't sleep well, I'm tired all day. I'm going to deny the first part of that: I did sleep well. What do we conclude? Nothing at all. I didn't say how I feel when I do sleep well. Actually, I'm tired whether I sleep well or not, thanks to a chronic illness. There can be many reasons why a person is tired all day.

A picture of a fly on the flower of a wild carrot (aka, Queen Anne's lace)

The undistributed middle is a problem because it makes a term a connection, suggested to be the only connection, when there might be other connections. It's dark at night. It's dark in the closet. So it's night in the closet. Not really. Night and day are about where we are relative to the location of the surface of the earth where we are and the sun. It's night when the side of the planet we're on is away from the sun, and it's day when the side of the planet we're on is toward the sun. The fact that it's dark in the closet doesn't have much to do with the position of the earth unless the closet has windows.

A picture of a grasshopper, maybe in Taiwan, maybe elsewhere

As a general rule, we can't make claims beyond the initial information we start with or of a greater extent than what we start with. If we start with negative information, we can't get to a positive conclusion. If we try it, we engage in the illicit negative. If we start with positive information and try to make a negative conclusion, we engage in the illicit positive.

Illicit negative: None of us watch that news channel. No one who watches that news channel is a real patriot. Therefore, we're the real patriots. This pattern of thinking is a problem because there's no connection made (but there is one assumed) between who watches what and who the real patriots are. We could say that some people who are not us watch other channels, but that's a negative conclusion from negative information, which is okay.

A picture of a bobcat in Prescott, Arizona

Illicit positive/affirmative: Trees are plants. Some plants are tall. So some trees are not tall. I made a tricky one: some trees, in fact, are not tall. I repotted some short trees this very morning, actually. But we're looking at the form of the information, not the result, and it's important to keep in mind that bad structures can be used to reach accurate conclusions. But we can't rely on them. The problem here is similar to the problem with the previous example. There's no connection made, but assumed, between not being tall and being a tree that isn't tall. We can say that some plants are trees, but that's about it, and that's a positive result from the information we were given about plants and trees, and that's okay.

A picture of a butterfly somewhere—I take a lot of pictures of insects, and I don't always remember where the insects were

The names of illicit positive and illicit negative are backwards of what I think they should be. The negative conclusion to positive information is wrong, and I would call that the illicit negative because the negative is the problem. And the positive conclusion to negative information is wrong, and I would call that the illicit positive. But I've been back and forth and around and around a number of sources, and apparently, I think incorrectly. It happens. I'll have to try to realign myself, or I can go back to the idea that the names of the patterns is less important than understanding the patterns, or I can continue to use the terms the way I want to use them and be misunderstood by people for whom these names make sense. I'm sure there are more options.

A picture of a sea turtle flying over, and some fish swimming around, part of a sunken ship off the coast of 'Oahu

If we start with a little bit of information, such as information about a small group of people, we can't expect that information to apply to larger kinds of information, such as to larger groups of people. This is the formal version of the fallacy of composition or hasty generalization: assuming that a characteristic of one or a few is also a characteristic of the whole crowd. Remember the sand and beach example? If not, it's time for another visit to the beach to check out the size of a grain of sand and the size of the whole beach. Plus, it's a trip to the beach. Why not?

Some trees are plants, but that doesn't mean that all plants are trees. There are grasses. There are forbs. There are algae. There are succulents. And more. I'm not a botanist yet.

A picture of a sparrow in Bahía de Los Angeles, Mexico

Here's where we get back to the "lamentable faith of the chickens," as Bertrand Russell called it. One day, the farmer comes, and the farmer feeds the chickens. The next day, the farmer comes, and the farmer feeds the chickens. The day after that, the farmer comes, and the farmer feeds the chickens. Every day for some duration of time, the farmer comes, and the farmer feeds the chickens. What do the chickens think when the farmer comes? Exactly. But then one day, the farmer comes and cuts the head off one or more of the chickens. The chickens don't expect to be slaughtered. They expected to be fed because they were generalizing from some of the days to all of the days.

A picture of fish off the coast of Peru

Here's a technical term: affirming a disjunct. A disjunct is an 'or' statement, and either side of an 'or' expression can be accurate, or both. What happens when the fallacy of affirming a disjunct happens is that a person forgets, intentionally or unintentionally, about both parts being possible. She's a politician or a doctor. She's a politician, so she's not a doctor. Why not both? This fallacy is related to the false bifurcation fallacy that's an informal fallacy. Here's another technical term: either-or thinking. That term refers to false bifurcations, affirming disjuncts, false dilemmas, all of which are different terms for related phenomena. The 'either-or thinking' term is relevant here because in English, using 'either… or' can be used to distinguish between cases in which there really are only two options: it's either zero or non-zero. But this use of the expression is not consistent for making the distinction but is a possibility.

A picture of a gray whale calf in the Laguna de San Ignacio in Mexico

The other side of affirming a disjunct is denying a conjunct. A conjunct is an 'and' expression. I'm not a doctor and a politician. I'm not a doctor, so I'm a politician. The way this kind of expression works in English makes this fallacy a tricky one to recognize, but again, this is about the structure of the information, not the way in which English is usually used. The problem is that the negative applies, structurally, to the whole expression: I'm not a doctor, and I'm not a politician. So we can make the distinction, if we want to, but we don't have to. And we can make another move that makes the English clearer: I'm not a doctor or a politician. That's DeMorgan's Law, and we'll get to that in part III, but meanwhile, if I mean to say that I'm not a doctor, and I'm not a politician, the most idiomatic and most clear way to make that clear is to use a negative 'or' expression. So if we state the negative instead of stretching it, the problem becomes clearer: I'm not a doctor, and I'm not a politician. I'm not a doctor, so I'm a politician. Now the problem in what I wrote before is more recognizable.

A picture of a king snake near Prescott, Arizona

In the previous two examples, some of the differences between a strict understanding of the structure of information and the ways in which language is usually used and the ways in which different language expressions can clarify or obfuscate stricter understandings of structures of information have been important. This is not to say that the language is weak, or not useful for essential thinking. It is possible to use language systematically, but it is not always easy. Language is much more complex than any principles of essential thinking yet devised, but in my opinion, we could move essential thinking forward by looking at language, in addition to what is usually done, which is using essential thinking to evaluate language.

A picture of an oyster catcher in New Zealand

But this is also not to say that we shouldn't or can't apply essential thinking to language. Consider: I'm not a doctor and a politician. I'm not a doctor or a politician. I'm not a doctor, and I'm not a politician. The underlying structure, strictly interpreted, is the same for the level of essential thinking we're working on. But these different English phrasings give us access to more subtle distinctions than we'd get if we only looked at a strictly interpreted structures. We can use language (and other tools) to enhance our essential thinking. We can use essential thinking (and other tools) to enhance our understanding and use of languages. We can do both. This is not a false bifurcation.

A picture of a seal in the water off the coast of New Zealand: the land is used as the starting area to delineate the boundaries of the water, not vice versa. If an aquatic animal, such as a seal, were speaking English, the water might be used to delineate the land. New Zealand is off this seal's water. Both perspectives could be useful, like with language and essential thinking.

Section IV: Manipulation

Another picture of another oyster catcher on Stewart Island, New Zealand: there's only one New Zealand

A note on another way in which essential thinking can go terribly, horribly wrong: so far, the problems have been in what we can do ourselves to create problems for ourselves, by misunderstanding or misusing information and structures in various ways. When other people try to create problems in people's thinking, it's called manipulation, and there are lots of ways to do this, most of them using cognitive biases or formal fallacies or informal fallacies. It's a terrible thing, but there are a LOT of people in the world who are willing to use our own weaknesses against us and to their benefit.

A picture of a lizard in Borneo

Manipulation needs to be distinguished from persuasion. Both are about changing minds, or guiding thoughts, but they are different. If a person uses good evidence and information and structures to convince people to change their minds, and the people who change their minds are encouraged to do their own essential thinking and still decide to change their minds, that's persuasion. Manipulation happens when someone tries to limit other people's engagement in essential thinking while getting them to change their minds without using good evidence and information and structures.

A picture of an insect helping itself to a larva in Borneo

One of the best ways to avoid being manipulated is to be aware of the biases and fallacies and one's own particular balance of weaknesses in those areas: some people can be manipulated easily with a bandwagon fallacy, and some people cannot, for example. Combinations of fallacies and biases are especially dangerous because the assaults on essential thinking can become difficult to sort through) and to recognize, based on people's uses of the biases and fallacies to manipulate people instead of encouraging and enabling essential thinking. I find it helpful to identify to myself, out loud or in writing, that someone is trying to manipulate me. I intentionally remind myself that the person is dangerous to my thought processes and to essential thinking in general and that I need to be especially careful around that person, avoiding such people whenever possible. It might sometimes be helpful to point out to manipulators that they're attempting to manipulate, but in my experience, manipulators like to manipulate, and they're not interested in changing. Some people manipulate almost automatically because it's a pattern of interaction that they grew up with (heaven forefend, but it does happen), but most manipulators are accustomed to getting what they want from other people via manipulation (sadly, manipulation works), and they're unwilling to do the difficult and time-consuming work to get what they want in more honest ways that respect the individuality of whomever they're tying to manipulate.

A picture of a hopping insect with exceptionally long antennae—given the number of insect bites on my leg, I believe this picture was taken in Borneo, Indonesia

Of course, this gets into the moral considerations of essential thinking. It's all well and good to use essential thinking for oneself, but beyond that, in my opinion as an essential thinker and as someone who agrees with the Platinumn Rule (treat others the way they want to be treated) and the Kantian Imperative (only do what it would be okay for everyone to do) and the Avoid Being Abused Principle (mine: avoid people who don't at least try to treat me as well as I treat them), it is essential not to engage in manipulation. I wish to engage in essential thinking, and even though I have the knowledge and skills to be a first-rate manipulator, I choose not to be. I expect the same choice to be made by those who wish to interact with me.

A picture of an insect on granite in Prescott, Arizona

Everybody has a bad day once in a while, and I can cut people some slack if they slip up and try to manipulate, but when the number and pattern of attempts to manipulate become frequent or systematic, those people become what I think of as Bad People, and I stop cutting them slack, and I try to avoid them. And if a manipulator is a member of a group in which other members of the group are predominantly Bad People, I avoid the group, as well. Not every member of a group has the characteristics of the group, and not every group has the characteristics of the individuals, so the pattern must be identified in both directions in order to be fair, but one also doesn't need to waste time looking for a needle in a haystack when there's a needle factory just down the road. Intellectual self-defense is a necessary aspect of being an essential thinker who engages in essential thinking.

A picture of a wasp in Borneo: not all wasps stingers, but most of those that one sees out of the hive or burrow do, so it's prudent to be cautious.

Both formal and informal fallacies can occur because people have made a mistake or because people intentionally use them. The formal and informal fallacies usually access a cognitive bias, so the fallacies can be used to manipulate people often without those people recognizing the manipulation. Results are different from process: even a bad process can have a good result, and vice versa. So what happens on the other side of a fallacy might not be a problem. We need to do essential thinking about the entire process, as well as about the results, and the sorts of events that can occur after considering ideas and deciding on actions.

A picture of an iridescent spider on my friend's hand in Borneo