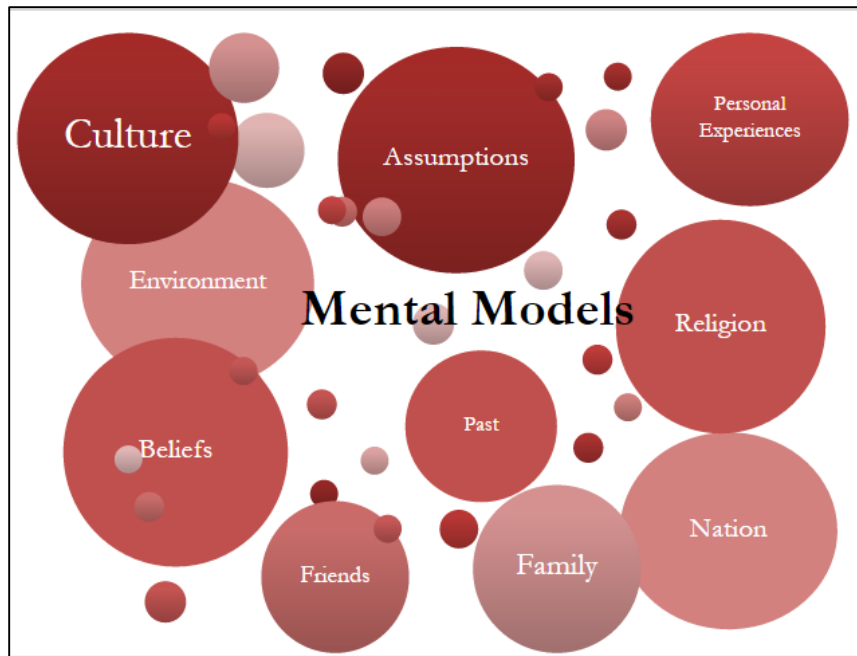# Introduction to Mental Models

A central focus of your work for the remainder of the course will be related to the idea of mental models; Becoming aware of models that do not serve us well; And discovering and employing mental models that can serve as tools to help us think more effectively across disciplinary boundaries.

To accomplish this, first we'll need to take a deep dive into the notion of mental models from a number of different points of views. Understanding mental models is critical if one hopes to understand the processes associated with intellectual fusion, both from an intrapersonal perspective as well from an interpersonal perspective.

First, you will come to recognize the ubiquity of mental models in your life, how you came to develop your own mental models, and how you employ them continuously (usually subconsciously) in order to form impressions and make decisions. Based on these newfound realizations, you'll (hopefully) gain a new appreciation for how different people can view the world, or any topic or issue, so very differently; how our own biases subconsciously influence our judgement; and how we can develop abstract thinking skills to use mental models from across disciplines to think, innovate, and problem solve more effectively. Let's get started!

Understanding the mechanics behind how we form impressions is an important first step toward learning how to accept (and ultimately appreciate) how the fusion of different perspectives leads to more accurate representations of complex issues, and more innovative approaches to

decision making, problem-solving, and innovation with respect to the issue at hand.

Learning about mental models will most likely change the way you think about *the way you think about* your cherished beliefs and opinions! You may not change your mind about your closely held beliefs, but you may find that you become a little more tolerant of others who hold beliefs that may conflict with your own.

Beyond a new metacognitive appreciation for the mental processes that allow you to construct your own sense of reality (and make decisions accordingly), you'll learn: 1) How to challenge some of your own mental models that may have outlived their usefulness; 2) How cognitive biases unconsciously influence your thinking; 3) How to build new mental models that will make you a more effective thinker, learner, and decision maker – both as an individual and as a member of an interdisciplinary team; 4) And finally, how to think abstractly about ideas from across disciplines in order to develop your own mental models.

To begin with, take a moment to check out this brief video summarizing Plato's Allegory of the Cave:

https://www.youtube.com/watch?v=1RWOpQXTltA

I hope you enjoyed that little presentation – and that you let your mind wonder as you pondered the nature of reality!

Note: By the way, it's worth noting that the "discipline" of Philosophy might be considered as the transdisciplinary amalgam from which all other disciplines originated.

Here in this module, you'll have an opportunity to read one of my favorite little stories, *Shadows of the Neanderthal*, which is based on Plato's Allegory of the Cave, and connects the allegory with the concept of mental models.

And, as I mentioned, we'll be thinking about mental models from a number of different points of view, as there are a number of different ways in which mental models are conceived and applied to accomplish our learning objectives. But first, some distinctions worth noting:

From a purely academic and theoretical perspective, mental models theory is one possible explanation for how people reason, or exhibit varying degrees of rational thinking. But what does it mean to be rational, to think rationally? Much of the social sciences research points to the idea that in order to be rational, one employs the rules of logic, which would consist of syllogistic reasoning – of the application of deductive reasoning to arrive at a conclusion.

A deep dive into the field of logic is beyond the scope of this course, but it is interesting to note that a good deal of academic rigor and energy is currently being expended into discovering the fundamental machinery underlying deductive reasoning. Is it based upon mental models (arrays) or deduction rules (propositions)? The appeal of finding a "grand unified theory" of reasoning is obvious, but the likelihood of achieving this must also be considered. In reviewing the literature and criticisms of mental models theory, you would see that the arguments (on both sides) focus on the mechanics behind human reasoning.

Confused yet? No problem! The good news is that we won't be spending a lot of time thinking about mental models in regard to the intellectual debates currently happening on the "cutting edge" research front of human reasoning. Instead, we'll look at mental models from a few well-vetted and application-oriented points of view.

In particular, mental models can be conceptualized in a few different ways:

1. As a type of cognitive schema, a pattern of thought or behavior that organizes categories of information and the relationships among them – a process that precedes our overt behaviors. In this case, we can think of mental models as the lenses we use (sometimes consciously, sometimes unconsciously) to make sense of the world.

   With respect to the idea of *intellectual fusion*, recall that in order to solve complex problems, effectively integrating knowledge and perspectives from a diverse (and sometimes conflicting) array of disciplines or perspectives is foundational. In order to facilitate this process, stakeholders first need to be able to appreciate the points of view that everyone brings to the table. Understanding how mental models work, and using this understanding toward developing the

habit of "radical open-mindedness" is our goal here.

Recall the idea of disciplinary epistemologies that we discussed in Module 1B? Can you see a connection there? From an intellectual perspective, disciplinary epistemologies are the tools used to construct the mental models associated with academic disciplines. This is an important connection!

2. We'll also explore cognitive biases as a form of tacit mental models – automatic and unconscious ways that our brains process information that can lead to faulty conclusions or inaccurate representations of reality. There is some debate regarding whether or not cognitive biases are actually the same thing as mental models or perhaps some other type of cognitive process. For our purposes, that distinction isn't particularly important. Cognitive biases are indeed *replicable patterns of thinking* in which human judgments and decisions lead to conclusions, many of which are not particularly rational. Likewise, heuristics are automatic *replicable patterns of thinking* that lead us to certain conclusions that may (or may not) be rational. In that regard, we can consider these two concepts to fall within the domain of mental models for our purposes.

   With respect to the idea of *intellectual fusion*, a deeper understanding of the ways in which we are all susceptible to bias in our thinking, and how that might impede the process of integration, helps create a more fertile soil in which the fusion of diverse ideas can grow.

3. Finally, we will explore my favorite connection to mental models, and that's the idea of a "latticework" of mental models that serve as powerful tools that we can learn to use to our advantage. The more of these tools we have in our toolbox, the more effectively we can process information, think rationally, and integrate effectively.

   Take a moment now to watch this short little video that explains this concept beautifully – it's produced by my friends at Farnam Street (one of my absolutely favorite websites / blogs).

   https://vimeo.com/177585900

If you're so inclined, you can head over to Farnam Street by clicking [HERE](#).

Through this conceptualization of mental models, *intellectual fusion* happens within your own brain, as you begin to think more integratively by building your own toolbox of powerful ideas, across myriad disciplines.

Let's get down to some specifics, Dave!

Mental models put simply your own mental representations of reality (what's right, what's wrong, what's happening and why) inside your head. [Wikipedia defines Mental Models as](#):

> *"A mental model is an explanation of someone's thought process about how something works in the real world. It is a representation of the surrounding world, the relationships between its various parts and a person's intuitive perception about his or her own acts and their consequences. Mental models can help shape behavior and set an approach to solving problems (akin to a personal algorithm) and doing tasks."*

So why should we care about mental models? [Charles Munger](#) sums it in an address to the USC Business School in 1994:

> *"What is elementary, worldly wisdom? Well, the first rule is that you can't really know anything if you just remember isolated facts and try and bang 'em back. If the facts don't hang together on a latticework of theory, you don't have them in a usable form. (Just reading this sentence should awaken your awareness of what you learned in Module One!)*
>
> *You've got to have models in your head. And you've got to array your experience—both vicarious and direct—on this latticework of models. You may have noticed students who just try to remember and pound back what is remembered. Well, they fail in school and in life. You've got to hang experience on a latticework of models in your head.*
>
> *What are the models? Well, the first rule is that you've got to have multiple models—because if you just have one or two that you're using, the nature of human psychology is such that you'll torture reality so that it fits your models, or at least you'll think it does. You become the equivalent of a chiropractor who, of course, is the great boob in medicine.*
>
> *It's like the old saying, "To the man with only a hammer, every problem looks like a nail." And of course, that's the way the chiropractor goes about practicing*

medicine. But that's a perfectly disastrous way to think and a perfectly disastrous way to operate in the world. So you've got to have multiple models."

Mental models can range from simple generalizations ("old people are forgetful") through to complex theories (for example Occams Razor, or the Scientific Method). Mental models shape the ways in which we think and act.

Two people with different mental models can also observe the same event and describe it very differently (in itself a mental model called the Rashomon effect). I hope you're beginning to make some connections between these phenomena and the potential challenges of very different people, from very different backgrounds, working together in an integrated manner. Depending on the mental models invoked, integration (intellectual fusion) can be helped or hindered. Given the challenges people seem to have with diverse perspectives, it may seem like our own mental models (left unexamined) may do more harm than good.

Our minds move at lightning speeds, processing huge amounts of information. But this can often result in causing us to immediately "leap" to generalizations so quickly that we never think to stop and test or interrogate.

In the book the Fifth Discipline by Peter M. Senge, a business world example illustrates this nicely:

> *"At one firm, many top managers were convinced that "Customers buy products based on price; the quality of service isn't a factor." And it's no wonder they felt that way; customers continually pressed for deeper discounts, and competitors were continually attracting away customers with price promotions. When one marketer who was new to the company urged his superiors to invest in improving service, he was turned down kindly but firmly. The senior leaders never tested the idea, because their leap of abstraction had become "fact" - that "customer don't care about service, customers buy based upon price." They sat and watched while their leading competitor steadily increased its market share by providing a level of service quality that customers had never experienced, and therefore had never asked for."*

According to the Fifth Discipline, the problem here is that a mental model has become entrenched and has stifled deeper problem solving:

> *"The problem with mental models lie not in whether they are right or wrong - by definition, all models are simplifications. The problem with mental models*

arise when they become implicit - when they exist below the level of our awareness."

Mental models can certainly be employed to our advantage as well. The first step is "making the invisible visible" and that's what I'm hoping we will begin to accomplish in the module of the course!