TRUTH
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As we go through life we each hear, read, and experience many things. These things cause us to form mental models in our mind that are supposed to accurately reflect the world outside us. Some of these things are true, and some are not. For example, most of our mental models include the idea that dropping a drinking glass on the floor will most likely cause it to break. Presuming we want to keep the glass intact, we can use this notion to be extra alert regarding the safety of the glass. We know from experience that dropping it will likely lead to its destruction.

The idea that a glass will likely break if dropped is a commonly held notion that is born out by experience and fairly non-controversial. On the other hand, there are many notions that are not universally held, and are highly controversial. Some obvious examples are religious beliefs and political perspectives. However, in spite of their highly controversial nature, many maintain those other beliefs with the same fervor as notions such as the breaking of a glass. This begs the question, how can two contradictory models both be correct? Surely, one or both are in error.

The value of having an accurate model of the external world lies in predicting the future. An erroneous model is of no value. For example, let us say that a person has an erroneous model of how to build a strong house in their mind. They are very confident about their model. That person builds a house (the future, since the house was built after, in terms of time, they had the model) according to their model. Unfortunately, because of their poor model, that person built a house that could not withstand a few minor storms and ended up falling.

There are two important points here. First, the quality of the model determines the quality of the future events or efforts that were based on the model. The better the model reflects reality or the external world, the better we are at manipulating that external world to the benefit of us and others. A poor model leads to erroneous efforts that do not lead to the desired ends.

The second point is that our belief, confidence, and enthusiasm towards a particular model is utterly unrelated to its level of correspondence with the outside world. In other words, the level of belief, confidence, certitude, and enthusiasm towards a particular mental model does not make it an any more accurate representation of the outside world. Believing in it, does not make it true. An erroneous model is unable to assist us or be the basis for future actions or decisions on our part.

This leads us to the question of how to determine if our model is accurate. Lacking a standard, we are left with no more than opinion.

1   Certitude

Figure 1 can be used as a starting point to understand the pieces of the puzzle. In this diagram, *Model* refers to an understanding, an idea, a concept, or a whole system of related concepts in the mind of the *Person*. *External World* refers to anything that the *Model* is about, or anything that is external to the *Model*. This is typically about something external to the *Person* such as about their co-worker, the location of their home, how to ride a bicycle, the engineering behind an automobile engine, or the meaning of life. It could also be something inside the *Person* (but outside the *Model*) such as their body, or even their own mind.

Belief refers to a measure of how strongly the *Person* thinks the *Model* is correct or accurate. The more the *Person* thinks the *Model* is correct, the greater is their *Belief* in it. *Correspondence* is a measure of how well the *Model* corresponds with objective observation of that which the *Model* refers. Or, in other words, *Correspondence* is a measure of how much proof there is in the *External World* to support the *Model*.
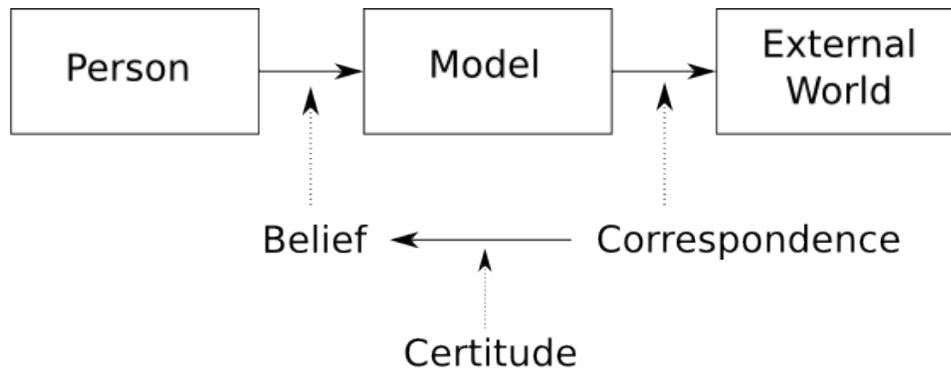
Solid lines indicate a relationship. Dotted lines indicate a name for the relationship.

Fig. 1: Certitude
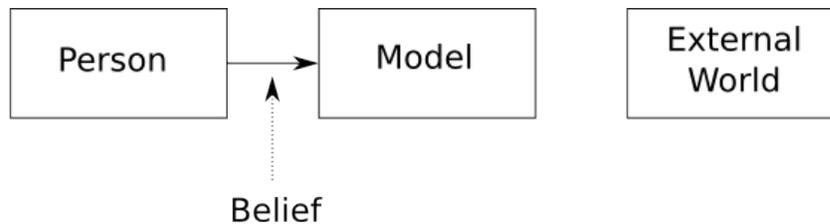
Solid lines indicate a relationship. Dotted lines indicate a name for the relationship.

Fig. 2: Belief

Belief should be based on the level of *Correspondence*, but that is not always the case. Often people believe in things (*Belief*) that have little, no, or contradictory representations in reality (the *External World*). In fact, many people take particular pride in this fact. *Certitude* is a measure of how much *Correspondence* supports a particular *Belief*. The more *Certitude* one has, the more true and justified the Model is, and the greater confidence they may have in their *Belief*. *Certitude* is a key point.

For example, let us say that a person has a certain idea of how planes fly (their *Model*). The person builds an actual plane according to their *Model* or understanding of how planes fly. If their *Model* is accurate, and their building of the plane matches their *Model*, the plane will fly well. However, if the *Correspondence* between their *Model* and the *External World* is low, the plane will not fly regardless of the level of *Belief* they have in their *Model*. The point is that how much *Belief* one has in their *Model* has no affect on its validity or usefulness.

Unfortunately, all too often, people require little or no *Correspondence* between the *Model* and the *External World*. In the most extreme instances, the diagram boils down to what is shown in Figure 2. In this extreme case, there is no relationship between the *Model*, or what that *Person* believes, and the *External World*. Although it may seem that this would rarely be the case, or it would only be the case in inconsequential cases, it is actually very common and for the most significant of cases.

2 Truth

Truth for a person, as defined here, involves two components. First, there must exist a model that accurately reflect the external (real) world. Second, the person must believe the model is true. In

other words, both the belief and correspondence components must be strong.

If there were a model that accurately reflected the world but the person didn't believe it, that person would judge the model false and not true. Likewise, if the person had a strong belief in a model that didn't accurately reflect the real world, that too would be false and not true. Both components must be present in order to have *Truth* as we are using the term here.

Complete correspondence between a given model and the external world, along with a person's full belief in the model is defined here as *Absolute Truth*. Although correspondence is key to justifying a given model, it turns out that it is almost never the case that complete correspondence can be obtained. There are many reasons for this, and without complete correspondence, *Absolute Truth* cannot be obtained.

As shown in Figure 1, belief should be driven by correspondence. The better the correspondence, the stronger the person should believe in the model. The issue of correspondence is important to understand.

2.1 Correspondence

A given model may be created by a combination of many means including observation of the external world (the scientific method), a person's imagination, a culture one grew up in, personal desires, and personal preferences. Although all of these are good sources for the construction of a model, only one, observation of the external world (the scientific method) is useful in determining its correspondence with the external world. The reason things like a person's imagination, a culture one grew up in, personal desires, and personal preferences are not useful in determining the correspondence of a model with the external world is because these things exist in the person's mind and not necessarily in the external world. It makes no sense to test XX (a mind) to see if something exists in YY (the real world). If one wants to see if something is true in the real world, the real world should be tested, and not a mind.

It is always possible to have several models for a given topic. Judging the validity or accuracy among the competing models can be done by no means other than determining which of the models has the closest correspondence with the external world. This is done through observation of, and experimentation with, the external world.

There are several problems associated with observation of, and experimentation with, the external world that render complete correspondence almost always impossible to achieve. Let me give some extreme examples. When a person is sleeping, they have dreams. While in the dream, they think that what they are seeing is real. How can a person performing observation of, and experimentation with, the external world be sure they aren't just dreaming?

Another extreme example of a problem with observation of, and experimentation with, the external world has to do with how our brain perceives things. Our brain does not connect to, or have any direct contact with, the outside world. It connects to out own body only. Our brain connects to our eyes to see, our skin to feel, and our ears to hear. All of the input our brain gets is from our own body. When out brain receives input we just *assume* it is caused by something outside our body. There is no way for us to be sure of this.

A further, extreme, example of the prior point goes as follows. Imagine your brain is taken out of your body and put into a vat made up of whatever is necessary to keep the brain functioning. Electrodes are placed into the various parts of the brain that allow us to see, hear, feel, etc.. The other end of those electrodes is fed by a computer causing us to experience whatever input it provides. In this case, all of that person's observations and experimentations are made up. They couldn't rely on any of it.

Granted, these are extreme examples, but they are possible. For this reason, we can almost[1]

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[1] The reason I say "almost" is because there is at least one case that is certain. The case is famously expressed as

never be absolutely certain about any observation of, and experimentation with, the external world.

In addition to the preceding, there are many other problems with our observation with the external world. One problem is that you can't prove a negative. For example, if I say Unicorns do not exist, there is no way to prove it without looking everywhere in the universe. For if one Unicorn exists anywhere, then the statement is false.

The last problem with correspondence I am going to point to has to do with new discoveries. The model called Newtonian physics was used successfully for many years, that is, up until Einstein came up with his theory of relativity. The point here is that it doesn't matter how accurate you may think your model is, a new observation can change the validity of a model in an instant.

Now if observation of, and experimentation with, the external world is the only valid way of achieving correspondence, and correspondence is the only way of validating a model, the question arises as to how correspondence of any type can be achieved. And, if correspondence can not be achieved, how could we ever have truth? The answer is as follows.

Although we can never be sure that what we are observing is real, it may not matter. For example, if I have a pain in my leg and I do XYZ to fix it, does it matter if XYZ fixed the pain or if XYZ caused the machine connected to my brain to stop causing the pain? Either way, the pain is real to me, and XYZ stopped it. Of course this idea only works as long as I can rely on XYZ eliminating the pain.

In the case of new discoveries and improved models, the model in use before the new discovery was based on everything known and observed up to that point. It was useful up until the new discovery. Although it is always possible that an improved model will become available, the best model we have now is still useful.

2.2 Truth

As we have shown, correspondence is achieved through observation of, and experimentation with, the external world. We have also shown that complete correspondence is almost never possible. Therefore, there is a scale from a lot of correspondence to very little or no correspondence between a given model and the external world. As shown in Figure 3, the greater the correspondence, the greater certitude we can have in a model. We each have a great number of models about all sorts of things. Each model has a its own amount of correspondence with the external world. Therefore each model has its own degree of certitude. Therefore, as depicted in Figure 3, each model would exist in a different place in the *Truth Triangle*. As greater correspondence is found, the model moves down towards greater certitude. As new observations are made that contradict a model, the model moves further up the Truth Triangle toward reduced certitude.

An important point is that no model exists in a static place within the *Truth Triangle*. As new observations are made a model may move up or down based on the observation. Since we never know what new observations will be made in the future, we must always understand that the validity of our model is always in question. Certitude of any model is always subject to change.

So now the question is, if all models are in various places within the *Truth Triangle*, how can we ever determine what is *True*?

Although it is possible that Unicorns exist, I have no evidence (correspondence) that they do, therefore the model representing Unicorn's will be high on the *Truth Triangle*. As one might imagine, there are an infinite number of models, just like that for Unicorns, that there exists little or no correspondence (or proof) for. The key here is that, given the limited time each of us has, it is *impractical* for a person to spend a lot of time and concern over those things. Although it

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"I think, therefore I am." This means that I can be certain that I exist simply by asking the question because to be able to ask the question means that something exists - the thing that asked the question.
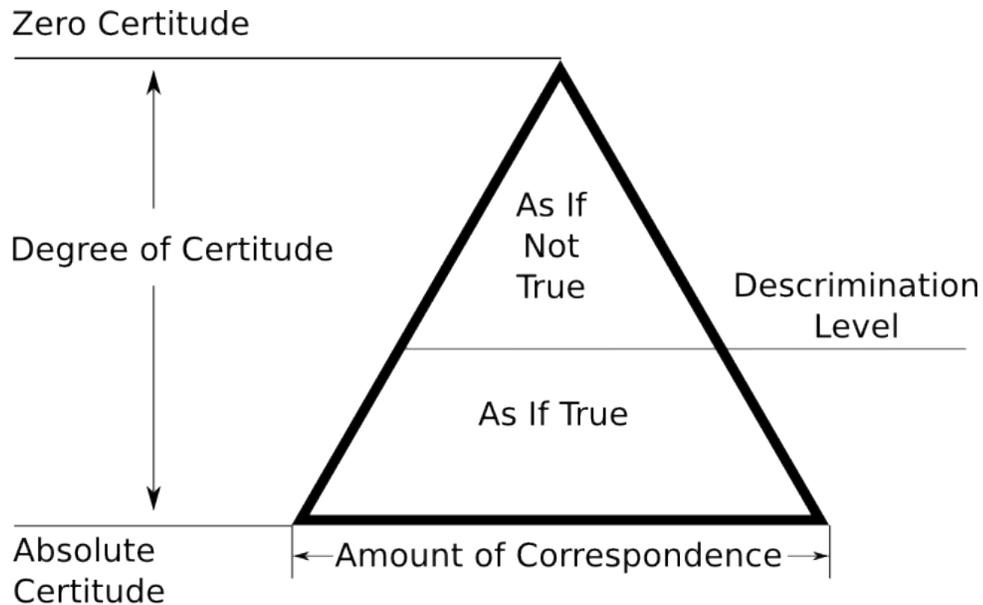
Fig. 3: Truth Triangle

is *possible* that a thief has entered my garage to steal my automobile, and that I can chase them away, it is *impractical* for me to go into my garage every five minutes to check because there is a low degree of certitude that this is occurring.

On the other hand, a have a model that says my home exists at a certain address. There is a lot of evidence (correspondence) for this given the number of times I have gone to my home. The model telling me the address of my home has a lot of evidence so it exists very low on the *Truth Triangle* providing a high degree of certitude.

What we have here is that models that appear lower on the *Truth Triangle* can be better relied upon. We also see that there are an infinite number of items higher up on the *Truth Triangle*, and that we don't have enough time for all of the possibilities. Not knowing *Absolute Truth*, the only practical solution is to draw a *Discrimination Line* in our *Truth Triangle*. For practical purposes, we will treat all models above the *Discrimination Line as if* they were not true, and we will treat all models below the *Discrimination Line as if* they are true. We also have to remember that as we make new observations, any given model may move its position on the *Truth Triangle* so that what was once treated as not true may henceforth be treated as if true and vice versa.

For example, we have very little proof that aliens exist. This places the notion of aliens high on the *Truth Triangle*, clearly above the *Discrimination Level*. For this reason, we operate *as if* aliens do not exist until presented with greater evidence.

In conclusion, our beliefs must be based on observable facts. Since we can never be absolutely certain about our facts, for practical purposes, we must only rely on, and judge as true those, notions that have a sufficient body of supporting facts to warrant our belief. Notions without sufficient supporting facts must be treated as untrue until additional supporting facts are obtained. Lastly, we must always keep in mind that notions that made sense in the past may no longer be treated as true when taking into account new observations — and vice versa.