Psychology 312: What is Science? Lecture 1

Slide #1

What is Science?

Understanding our world through the application of the scientific method.

Audio:

We are going to begin the class with a discussion about science. What it is and we can understand it in the world around us. In doing so we are going to compare the scientific method to other common ways of understanding the world. This discussion is intended to highlight the advantages that the scientific method may have in contrast to others ways in understanding the world.

Slide #2

No Title

Image of a diagram of ways of understanding or knowing.

Audio:

So what are the various ways that we can understand or know the book around us. Our textbook mentions several of them. They include tradition or what we could call tenacity or authority or what some call dogma, common sense or intuition, reasoning and logic and finally the scientific method. Let's talk about each of these in turn. In the case of tradition or tenacity an individual is accepting an explanation simply based on that claim has been around for a very long time. So for instance if someone says I believe in astrology, because after all it has existed for thousands and thousands of years and there was must be something to it this would be a classic case of tenacity. In the case of authority or dogma an individual's is accepting an explanation based simply on the idea that explanation has been provided by an authority figure. So when we accept claims based on the fact that our parents told us they were true or our priest or pastor told us they were true or even our professors tell us those claims are true then these are all insistent of dogma. In contrast to the first two common sense asks us to relie very heavily on our own personal experience and to use our own personal experience as a foundation of our beliefs. So in this case we may accept the particular claim if that claim is consistent with our personal experience and we make reject other claims if they seem inconsistent with that experience. When we look a little more closely at these three ways of knowing the world we can see that there are certain inheritant risks that come with them and those risks are a reflection of the type of evidence that they ask us to use as the foundation for our conclusions.

Slide #3

No Title

Image of a diagram of ways of understanding or knowing.

Audio:

In the case of tradion or tenacity it simply isn't the case that the longevity of an idea is evidence of its truth and we can think of many cases in which claims have been able to endure for quite

some time and ultimately have been shown to be incorrect. In the case of authority or dogma it is possible that the experts we are relying upon our potentially untruthful, maybe bias or maybe just plain incorrect at the end of the day. Finally in the case of common sense or intuition a long history or cognitive psychology has shown us that in fact as humans we fall prey to a lot of thinking problems and those thinking problems can trip us up if we use our personal experience alone as the foundation for accepting or rejecting particular claims. So let's turn to the last two ways of knowing the world. Reasoning and logic or the scientific method. In the case of reasoning or logic we are saying that we would accept our ideas based on the assumption that the rules of logic only permit correct conclusions to follow from the specified premise. Let's look a little more closely at what we mean by that.

Slide #4

An Example of Reasoning/Logic

- Begin with a premise:
 - o "All WSU students attend classes on the Pullman campus."
- Make an observation:
 - o "Sam is a WSU student."
- Draw a conclusion:
 - o Therefore, Sam attends classes on the Pullman campus."

Note: This conclusion is correct only if the premise from which it is derived is correct. But how do we know if our premise is correct?

Audio:

instances of reasoning and logic often begin with what's called a premise statement. So let's imagine the following premise statement "All WSU students attend classes on the Pullman campus." Let's further imagine that we then make an individual observation. In this case "Sam is a WSU student." Now based on this premise statement and our individual observation we can then draw a logical conclusion. If all WSU students attend classes on the Pullman campus and Sam is a WSU student then same attends classes on the Pullman campus. Notice that in this case the conclusion that we draw is correct only if the premise statement from which it was derived is also correct. In this case I have chosen a premise statement that is in fact incorrect and as a result of that the conclusion that is drawn from it may also be incorrect. So here is a potential problem if we intend to use reasoning and logic alone as a way to understand and know the world around us how can we ever be sure if the premises under which we are operating are in fact correct. **Slide #5**

Another Example of Reason/Logic

Of the two containers shown here, which contains the greatest volume of water?

Audio:

To drive this idea home let's imagine another example. Imagine that you show a friend perhaps this image and you ask that individual of the two containers shown here, which contains the greatest volume of water. What is interesting about this particular problem is that you may get very different answers depending upon age of the participant that you choose. **Slide #6**

Another Example of Reason/Logic

- The typical 4 year-old child will chose the container on the right.
- According to Piaget, this is because the typical 4 year-old does not yet understand "volume conservation" and mistakenly assumes that "taller equals more."

Incorrect <u>premise</u> \rightarrow incorrect <u>conclusion</u>.

Audio:

If your participant is the average four year old and he or she will probably choose the container on the right. The taller of the two containers. According to Piaget this is because the typical 4 year-old does not understand the concept of conservation and instead mistakenly implies an incorrect premise. The premise in this case is that taller equals more. So again we see an instance in which an incorrect premise has lead to an incorrect conclusion.

Slide #7

No Title

Image of a diagram of ways of understanding or knowing.

Audio:

We can know return to the emerging visual of the ways of understanding and knowing the world around us. We have previously covered how tradition, authority and common sense are all potentially associated with certain risks. Risks that can lead us to make incorrect conclusions about the world. We can also see that the application of reason and logic alone can be risky business. That is to say that correct conclusions can be drawn from correct premise statements, but in the real world it may be very difficult to know whether are original premise statements are correct. If we cannot be certain be certain whether our premise statements are correct we therefore cannot be certain whether if any of the conclusions drawn from those premise statements are correct.

Slide #8

No Title

- So what can we do?
- We can employ the scientific method
- In doing so, we
 - Minimize the <u>problems</u> associated with tradition, authority and common sense.
 - And compensate for the <u>limitations</u> associated with reason/logic alone.

Audio:

So what can we do? Fortunately there is a fifth way of knowing the world we can choose to employ the scientific method. In doing so we will actually be able to minimize many of the problems associated with tradition, authority and common sense. And we will be able to compensate for the limitations associated with the application of the reasoning and logic alone.

Slide #9

No Title Image of a diagram of ways of understanding or knowing.

Audio:

Returning back to our visual we will drop out of the first four ways of knowing the world and move the scientific method to the central location. We will then bring reasoning and logic back. As you will see over the course of this semester reasoning and logic will play a very important role in the scientific method. However they are not going to stand alone. We are going to combine them now with systemtic observation. Reasoning and logic are going to allow us to move logically from premise statements to conclusion, but with the addition of systematic observation we will be able to actually empirically test and evaluate our assumptions. In doing so we will now be holding our conclusions to an objective standard. The additional advantage of doing so is that it means that other people will also be able to replicate our observations and be able to determine for themselves the truth and accuracy of our conclusions.

Slide #10

Scientific Method

- The scientific method is what you will learn about in this course...
 - Both its power and its limitations!

Audio:

The scientific method is what you will learn about in this course both its power and its limitations.

Slide #11

Next Lecture

- That concludes this lecture
- Next we will discuss "Psychology as a Science."

Audio:

That concludes this lecture. Next we will discuss "Psychology as a Science.