
Lesson 1 - Does Science Need Ethics?

The students discover how a rabbit and a duck illustrate the way ethical judgments affect economic analysis.

OVERVIEW

Economics

Positive economics is the study of the economy as it currently exists (analysis of facts). Normative economics requires people to make judgments about the way the world ought to be (values). The division between positive and normative economics is not precise, however, because values play a critical role in the selection, collection and analysis of information. Understanding the role of ethics in science can improve self-awareness and impartiality in economic investigations.

Ethics

In conducting positive economic research, economists must make choices: what to study, what type of facts to collect, how many facts to collect and the definition of terms. Values play a role in all these decisions. For example, scientists generally believe the “best” model is the one that can explain the facts in the simplest manner. This means they must make a judgment about how to rate alternative models. Additionally, researchers are expected to tell the truth about their findings, not falsify or withhold them. Ethics contributes to the scientific process.

LESSON DESCRIPTION

In this lesson the students see how biases may enter into the discovery of facts. Then they follow the progress of an economic researcher as she carries out a positive economic analysis. Finally, they come to appreciate that ethical judgments are central to scientific research, including economic analysis.

CONCEPTS

Economic model
Facts
Fiduciary duty
Ideology
Moral hazard
Normative economics
Positive economics
Values

CONTENT STANDARDS

1. Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others.
2. Effective decision making requires comparing the additional costs of alternatives with the additional benefits. Most choices involve doing a little more or a little less of something; few choices are all-or-nothing decisions.
4. People respond predictably to positive and negative incentives.

OBJECTIVES

The students will:

1. Recognize that positive economics relies on ethical assumptions and considerations.
2. Experience how definitions and the collecting of facts come bundled with ethical judgments.
3. Describe why ethical conduct is essential to the scientific process.

TIME REQUIRED

45 minutes

MATERIALS

1. Visuals 1.1 and 1.2
2. One copy of Activity 1.1 for half the students in the class; one copy of Activity 1.2 for the other half
3. One copy of Activity 1.3 for each student

PROCEDURE

1. Tell the students this lesson illustrates how economists select research projects, gather data, analyze evidence and report the results. The lesson reveals how value judgments and ethical conduct are central to the advancement of science, including a social science such as economics.
2. The first part of this lesson is meant to surprise and engage the students as they see how two groups can use the same information to arrive at very different *facts*. Divide the class into groups of four to five students. Place half the groups on the left side of the room (A Groups). Place the other half on the right (B Groups). Explain that each group is a team of field researchers gathering evidence for a scientific study. Give each student in the A Groups a copy of Activity 1.1, and give each student in the B Groups a copy of Activity 1.2.

3. Allow the students a few minutes to work independently through the questions on the Activities. Then give the groups a few minutes to discuss the questions. Ask the groups to reach consensus on the answer to each question.
4. Ask the students if everyone in their group initially answered the questions the same way. Tell the students you're curious to know their individual answers. Display Visual 1.1. Ask them to raise their hands in response to the questions. Record the totals in the columns on the left side of the Visual. Don't let the students discuss their answers.

Question 1: How many students in the A Groups chose carrots? How many chose minnows? How many students in the B Groups chose carrots? How many chose minnows?

Question 2A: How many students in the A Groups chose 20 years? 50 years? 80 years? How many students in the B Groups chose 20 years? 50 years? 80 years?

Question 2B: How many students in the A Groups chose down? How many chose to the side? How many students in the B Groups chose down? How many chose to the side?

Question 3: How many students in the A Groups chose very good? Good? Poor? Very poor? How many students in the B Groups chose very good? Good? Poor? Very poor?

Question 4: How many students in the A Groups chose more? How many chose less? How many students in the B Groups chose more? How many chose less?

5. Ask one representative from each group to give the group's consensus answer for each question. Record the answers in the columns on the right side of the Visual.
6. Ask the class why they think there was disagreement about the answers among the individual students and the groups.
Accept all answers, and then tell the

students the questions are worded in a biased way that influences the answers.

7. Display Visual 1.2. Help the students appreciate the “ah-ha factor” in this activity by discussing the biases in the questions. Ask the students if they would have answered differently if the questions had been posed differently. ***Most will probably say that they would have answered the questions differently. Bring out the key point that different perceptions affect research.***

8. Ask the students, “What are the implications of this for economic research?” Bring out these key points during the discussion:
 - ***Preconceptions provide the context for understanding economic and other events. People often see what they expect to see and ignore information that contradicts their preconceptions. Focus on duck vs. rabbit, young vs. elderly, 20 percent vs. 50 percent vs. 80 percent and payment vs. avoidance.***
 - ***If there is ambiguity, people tend to interpret based on expectations. For example, children tested on Easter Sunday are more likely to see the animal in Question 1 as a rabbit, compared with children tested six months later. (P. Brugger and S. Brugger, “The Easter Bunny in October: Is It Disguised as a Duck?” *Perceptual & Motor Skills* 76, 1993, 577-578)***
 - ***“Facts” are thus often influenced by biases or ethical judgments. Reality can depend on what someone expects to see. For science to advance, researchers must recognize their biases and be as objective as possible.***
 - ***Economic definitions have ethical implications for people’s lives.***
 - ***Knowledge and interpretation of facts have an ethical impact on people’s behavior.***

9. Tell the students that they will now see how these issues play a role in science.

Explain that economics is a branch of the social sciences, which have goals similar to the goals of the natural sciences. Social-science goals are different, however, because they focus on human behavior in groups. The students will follow along as a researcher goes through the steps of an economic investigation. Distribute a copy of Activity 1.3 to each student. Ask them to read “Maria’s Research Project” and write the answers to the questions. Discuss the answers with the class.

Question 1: What do economists call the study of the way the world actually works? What do economists call the study of policies to make the world a better place? ***Positive economics is the study of how the world actually works (facts and theories that explain the facts). The gross domestic product, the unemployment rate, the price of milk and the trade deficit are all facts that positive economists study and explain. Normative economics involves an analysis of the way things ought to be (ethical or value judgments about “good” and “bad” policies).***

Question 2: Which of the following statements relies on positive analysis and which relies on normative analysis? How do you know?

A. The economy grew 3 percent last year. ***Positive analysis (a statement of fact)***

B. The government should take action to help the economy grow faster than 3 percent next year. ***Normative analysis (involves a value judgment that this outcome is preferable). Normative statements often include the words “ought” or “should.”***

Question 3: How is Maria’s choice of career affected by her ethical beliefs? What value judgments did Maria make in picking unemployment as her subject to study? ***Maria would like to help make the world a better place and believes that as an economist, she can discover ways to do so. She decides to specialize in unemployment because she***

remembers the painful times during her childhood when her father was unemployed.

Question 4: Do Maria's, Jenny's and Robert's perceptions of reality depend on what they expect to see? Do people tend to ignore information that contradicts their preconceptions? *How we perceive an outside reality is partly a function of our inside mental activity. Thus, ideology and our acquaintance with prior random information can bias the identification and collection of what we call "facts." Investigators often "see" what their prescientific vision leads them to expect to see and ignore information that contradicts their preconceptions.*

According to one study, "once a belief or expectation is found, especially one that resolves uncomfortable uncertainty, it biases the observer to notice new information that confirms the belief and to discount evidence to the contrary. This self-perpetuating mechanism consolidates the original error and builds up an overconfidence in which the arguments of opponents are seen as too fragmentary to undo the adopted belief." (<http://skepdic.com/forer.html>)

Question 5: Why do economists include only the most essential variables in an economic model? *An economic model acts like a road map. A map shows the essential highways leading from City A to City B. It does not show all the smaller roads that intersect. By focusing only on the most important variables, an economic model provides a clearer view of the factors that affect economic behavior.*

Question 6: Do economists get facts for free? If not, what factors determine why economists collect some facts and not others? *Economic data come from a variety of sources, some private (teen-spending statistics collected by a research firm) and some public (Commerce Department estimates of*

output and inflation). Either way, it is costly to collect information. The Labor Department can save significant amounts of money by surveying "representative families" rather than "all families" to estimate unemployment. Survey estimates always involve a margin of error. To make a better estimate would cost more (for example, by surveying a larger sample). Are better estimates worth the expense? This is a normative judgment. From the taxpayers' perspective, any money spent on refining the estimate of the unemployment rate comes at the expense of getting a better estimate of the inflation rate or at the expense of higher taxes. There's no free lunch. A decision about which data to collect (and of what quality) is a value decision about what is most important.

Question 7: Does the way Maria phrases her survey questions influence the answers people give her? If so, what are the implications of this for using surveys to measure economic data? *Behavioral economists have identified many instances in which people give inconsistent and contradictory answers to essentially the same questions. Surveyors should take this "irrationality" into consideration when they develop research questions.*

Question 8: True or false and why? People don't ever make value judgments in carrying out good science. *False. Scientific investigations require ethical choices.*

Question 9: Malcolm is researching a new drug, and his results show that it is not effective. He is suddenly offered a well-paying job with the company that makes the drug — but only if he suppresses his results. What is this situation called? *A moral hazard, because Malcolm has an economic interest to do something unethical. Falsifying or suppressing results of scientific investigations can cause financial or physical harm to innocent people.*

Question 10: For science to advance, what absolute moral standards should all researchers obey? *Some absolute moral standards for researchers are honesty, integrity, fair-mindedness, courage, empathy and intellectual autonomy.*

Question 11: Why is ethical conduct so important for Maria's research? *A researcher's ethical beliefs help determine the way she asks the questions, interprets the answers and uses the research. Maria will do better work if she is conscious of the value choices she makes in defining, collecting and analyzing data. Maria must be careful to avoid moral hazards such as suppressing results that go against her opinions or that would displease her employer or her father.*

CLOSURE

10. Review the ways in which scientific research requires ethical choices. Ask the students what ethical behaviors are required of researchers for scientific research to be effective. *Researchers should be aware that everyone approaches problems from a particular worldview and that this creates possible sources of inspiration but also of bias. Researchers should therefore strive to be as impartial as possible when they do positive economic analysis and to obey absolute moral standards of behavior regarding honesty, integrity, fair-mindedness and intellectual autonomy.*

The bottom line: Economists will do better work if they are conscious of the ethical choices researchers face, including the choices involved in positive economic research.

ASSESSMENT

Multiple-Choice Questions

- 1.1 Researchers in economics
- A. face ethical issues only in normative economics.
 - B. face ethical issues only in positive economics.
 - C. face ethical issues in both positive and normative economics.*
 - D. face no ethical issues because economics is a science.
- 1.2 A moral hazard arises when a researcher
- A. is put in peril from dangerous workplace materials.
 - B. has an economic incentive to behave unethically.*
 - C. is in jeopardy from being overly ethical.
 - D. cannot behave ethically because of a legal restriction.
- 1.3 If productive resources are limited, scarcity implies that
- A. people will collect only the facts they consider most important.*
 - B. people will base their collection of facts solely on objective considerations.
 - C. all facts are of equal importance to researchers.
 - D. researchers don't consider values when they collect facts.

Essay Questions

- 1.1 In what ways are facts different from values? In what ways are they related in economic research? *Economists analyze facts to study the economy as it currently exists. They make value judgments about the way the world ought to be. Research into facts often requires funding. Since funding is scarce, researchers must make value judgments to decide which projects are most important. They must identify, collect and analyze facts. The researcher and project funders must*

make normative judgments about the definition of facts, which facts to collect, how to collect them, how many to collect and how to use them.

1.2 What absolute moral values are necessary to conduct scientific research? *Science relies on honesty, integrity, courage and fair-mindedness. Progress in science is greatly hindered without these absolute moral values.*

GOING FURTHER

Vision: For a discussion of worldview, see the pathbreaking work by Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

Critical Thinking: Critical thinking is a key attribute of good science. *The Skeptic's Dictionary* (<http://skepdic.com>) has many items of interest for students, especially a guide to critical thinking (<http://www.skepdic.com/essays/haskins.pdf>).

Perception: For ambiguities of perception, see “Duck-Rabbit Illusion” at *MathWorld* (<http://mathworld.wolfram.com/Rabbit-DuckIllusion.html>).

Knowledge and Values: For an historical view of the facts-versus-values debate going back to Plato, see Henryk Skolimowski, “Knowledge and Values,” *Ecologist* 5, no. 1 (January 1975): 2-9.

Economic Models and Ethical

Ramifications: To learn how the teaching of positive economics can have ethical repercussions, see the widely-cited articles by Robert H. Frank, “Do Economists Make Bad Citizens?” *Journal of Economic Perspectives* 10 (Winter 1996): 187-192; and Robert H. Frank, Thomas D. Gilovich and Dennis T. Regan, “Does Studying Economics Inhibit Cooperation?” *Journal of Economic Perspectives* 7 (Spring 1993): 159-171.

VISUAL 1.1

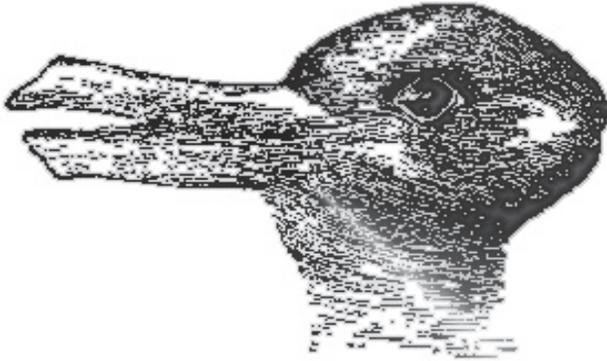
FIELD RESEARCH: COLLECTING THE EVIDENCE

Students in A Groups	Students in B Groups		A Groups	B Groups
		Question 1		
		Carrots		
		Minnows		
		Question 2A		
		20 years		
		50 years		
		80 years		
		Question 2B		
		Down		
		To the side		
		Question 3		
		Very good		
		Good		
		Poor		
		Very poor		
		Question 4		
		More		
		Less		

VISUAL 1.2

FIELD RESEARCH: HOW BIAS AFFECTS PERCEPTION GROUP A [GROUP B IN BRACKETS]

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DIRECTIONS: Answer these questions by **CIRCLING** the response you think is best.

1. Examine the **duck [rabbit]** in the picture on the left. What does this animal like to eat?

Carrots from the garden Minnows from the lake

2. Examine the portrait of the **young woman [elderly woman]** in the picture on the right.

A. What is her age? 20 years 50 years 80 years

B. Where is she looking? Down To the side

3. Your doctor says that you have a **20 percent chance of dying [80 percent chance of surviving]** during a surgical procedure.

How would you rate your chance of survival?

Very good Good Poor Very poor

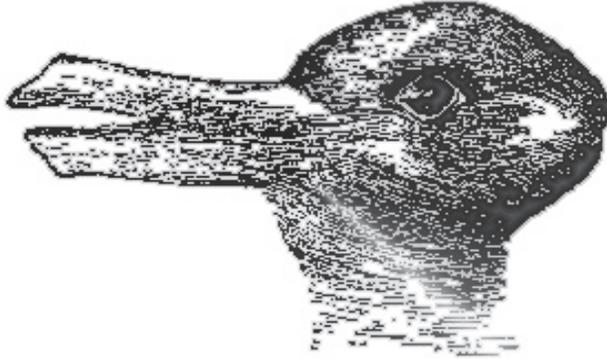
4. An economic study reports that 85 percent of the people in your community **pay their share [avoid paying their share]** of the costs for public projects such as roads and schools. Such **payment [avoidance]** is said to be economically rational. Given this information, are you more or less likely to pay your share of the costs for public projects?

More Less

ACTIVITY 1.1

FIELD RESEARCH: COLLECTING THE EVIDENCE (A GROUPS)

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DIRECTIONS: Answer these questions by **CIRCLING** the response you think is best.

1. Examine the duck in the picture on the left. What does this animal like to eat?

Carrots from the garden Minnows from the lake

2. Examine the portrait of the young woman in the picture on the right.

A. What is her age? 20 years 50 years 80 years

B. Where is she looking? Down To the side

3. Your doctor says that you have a 20 percent chance of dying during a surgical procedure. How would you rate your chance of survival?

Very good Good Poor Very poor

4. An economic study reports that 85 percent of the people in your community pay their share of the costs for public projects such as roads and schools. Such payment is said to be economically rational. Given this information, are you more or less likely to pay your share of the costs for public projects?

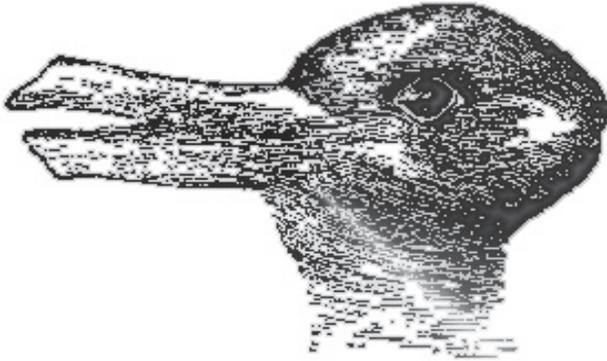
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ACTIVITY 1.2

FIELD RESEARCH: COLLECTING THE EVIDENCE

(B GROUPS)

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DIRECTIONS: Answer these questions by **CIRCLING** the response you think is best.

1. Examine the rabbit in the picture on the left. What does this animal like to eat?

Carrots from the garden Minnows from the lake

2. Examine the portrait of the elderly woman in the picture on the right.

A. What is her age? 20 years 50 years 80 years

B. Where is she looking? Down To the side

3. Your doctor says that you have an 80 percent chance of surviving a surgical procedure. How would you rate your chance of survival?

Very good Good Poor Very poor

4. An economic study reports that 85 percent of the people in your community avoid paying their share of the costs for public projects such as roads and schools. Such avoidance is said to be economically rational. Given this information, are you more or less likely to pay your share of the costs for public projects?

More Less

ACTIVITY 1.3

MARIA'S RESEARCH PROJECT

In this activity we follow a researcher as she selects an economic topic, builds a model, gathers data to test the model and reports the results.

Introduction

Maria Smith has decided that she will become an economist. She believes that economics can help her discover important things about the way the world actually works (*positive economics*). She would also like to help make the world a better place (*normative economics*).

Step I: Picking a Subject for Study (Vision)

When Maria was a child, her father suffered several painful episodes of unemployment during times of economic recession. Maria's initial understanding of economics came from her father's belief that his unemployment was the consequence of employers trying to break the backs of labor unions. This understanding is Maria's *ideology*: the characteristic thinking or beliefs of a particular group, culture or class at a point in time. Ideology — coupled with random knowledge — constitutes the preanalytical worldview or vision that individuals bring to any new study.

Maria decides to specialize within economics to increase her productivity. To choose a specialty, Maria will need to analyze the costs and benefits of different career paths. Maria's analysis is shaped by her value judgment of what she considers most important based on her preanalytical vision and her moral beliefs. For example, Maria would never consider becoming a drug pusher, even if the economic benefits of this career were shown to be highly positive. After some thought, Maria decides to specialize in the study of unemployment and its causes.

Step II: Perception and Model-Building

After she graduates from college, Maria gets a job at a foundation. Her first project is a study on local unemployment. She decides to drive around her city to get a feel for the problem. She invites her friends Jenny and Robert to ride along. As the trio enters a depressed economic area, they observe a group of men in their early twenties clustered on a street corner. Each researcher applies a different mental model to explain what they observe.

- Maria thinks: "Jobs are just not available for inner-city youth. That's why they're standing around in the middle of the day."

ACTIVITY 1.3 (continued)

MARIA'S RESEARCH PROJECT

- Robert, whose father runs a business in the suburbs, thinks: “Jobs are plentiful for people who have a strong work ethic. These kids probably don’t want to work.”
- Jenny thinks: “One of these men looks familiar. I wonder if he works the night shift at the power plant.”

Step III: Methodology of Data Collection

Maria is now ready to start the formal part of her research on unemployment. But she can't gather any *facts* without first knowing which facts are important to look for. To figure this out, she needs a model or theory to explain the causes of unemployment. Her vision can help her decide what type of *economic model* to build and which data to collect. Models contain only the most essential variables, making assumptions that simplify reality. This is a key part of positive economics. So Maria will make choices and collect the facts that she considers most important or that she thinks can be quantified.

Maria realizes she cannot proceed further until she really pins down what she is trying to measure. She wonders, “What exactly is ‘unemployment’?” The Labor Department’s official measurement is based on a sampling of households: People 16 years of age and older who are not currently employed but are actively seeking a job are classified as unemployed. Maria realizes that any definition of unemployment requires value judgments. For example, some people become discouraged and give up looking for work; these people would not be counted as unemployed. In addition, from her experience driving through the city with Robert and Jenny, Maria realizes it is expensive in gas and time to survey every family, so she can question only a small sample. She realizes she must make difficult value judgments about how to collect data and how much to collect.

After considering these issues, Maria develops a survey of randomly selected households in her city. One bit of information she’d like to verify from respondents is their reported incomes. But to get this information she might have to lie and pretend to work for the Internal Revenue Service. Maria decides not to gather this information.

Step IV: Analysis, Dissemination and Impact

In any branch of science, including economics, more than one explanation may exist for the way the world works. Thus, Maria’s research on the causes of unemployment may differ from studies done by other researchers. Which theory is correct? For economics to advance, people must subject different theories to external evaluation to

ACTIVITY 1.3 (continued)

MARIA'S RESEARCH PROJECT

verify or disprove. The ethical standards for carrying out any debate in economics include first the prime moral commitment to truthfulness. In addition, other *values* play an important role, such as fairness, openness and transparency. For debate to be helpful, there must be a competitive marketplace for ideas.

Suppose Maria's analysis contradicts her father's belief that employers deliberately created unemployment to break the backs of labor unions? Or, what if her results contradict views that benefit the foundation she works for? Maria's narrow economic advantage might be to behave unethically and falsify or suppress her results to gain material rewards from her boss or the praise of her father. This situation is called a *moral hazard*: an economic agent has an economic incentive to behave unethically.

Choosing to behave unethically can have serious negative consequences for others. What if Maria's falsified research leads people to make choices that cause economic loss, injury or death? For science to flourish, people must trust the scientific process. Scientific research thus requires *fiduciary duty*. A fiduciary relationship is one of trust and the expectation of virtuous conduct. For science to work, researchers need the virtues of humility, honesty, courage, empathy, intellectual autonomy, integrity and fair-mindedness. Fortunately, Maria resists the moral-hazard temptation and completes her research in an honest way.

Maria's positive study on local unemployment and her explanation for its causes is published in the *Positive Economic Journal*. After reading it, a senator from her state introduces legislation in Congress to start a public program to train the unemployed.

Summary

Maria's story highlights the role that ethical choices play in positive scientific research. Impartiality and objectivity are highly desired characteristics for researchers. But perfect impartiality and objectivity are impossible to achieve, and researchers should be aware of how their own values and biases may influence the definition, selection, collection and analysis of information. Economists, like all researchers, have ethical responsibilities. Given this reality, it is clear why certain absolute moral standards are essential for scientific researchers.

Maria's study of positive economics — descriptions or explanations of the world as it is — cannot be perfectly separated from ethical choices she made during her study. Economists will do better work if they are conscious of the ethical choices they make in carrying out positive economics. Value-free science is not possible, nor is it desir-

ACTIVITY 1.3 (continued)

MARIA'S RESEARCH PROJECT

able for a number of reasons:

- Choices about what to study involve the researcher's own value judgments.
- Models or theories are often influenced by worldview.
- Facts about the world come bundled with value judgments regarding which and how many facts to collect.
- Knowledge of facts and theories changes a person's view of the world.
- Scientific research requires absolute moral standards.

Questions

1. What do economists call the study of the way the world actually works? What do economists call the study of policies to make the world a better place?

2. Which of the following statements relies on positive analysis and which relies on normative analysis? How do you know?

A. The economy grew 3 percent last year.

B. The government should take action to help the economy grow faster than 3 percent next year.

3. How is Maria's choice of career affected by her ethical beliefs? What value judgments did Maria make in picking unemployment as her subject to study?

4. Do Maria's, Jenny's and Robert's perceptions of reality depend on what they expect to see? Do people tend to ignore information that contradicts their preconceptions?

5. Why do economists include only the most essential variables in an economic model?

ACTIVITY 1.3 (continued)

MARIA'S RESEARCH PROJECT

6. Do economists get facts for free? If not, what factors determine why economists collect some facts and not others?

7. Does the way Maria phrases her survey questions influence the answers people give her? If so, what are the implications of this for using surveys to measure economic data?

8. True or false and why? People don't ever make value judgments in carrying out good science.

9. Malcolm is researching a new drug, and his results show that it is not effective. He is suddenly offered a well-paying job with the company that makes the drug — but only if he suppresses his results. What is this situation called?

10. For science to advance, what absolute moral standards should all researchers obey?

11. Why is ethical conduct so important for Maria's research?

