

LESSON 3.2

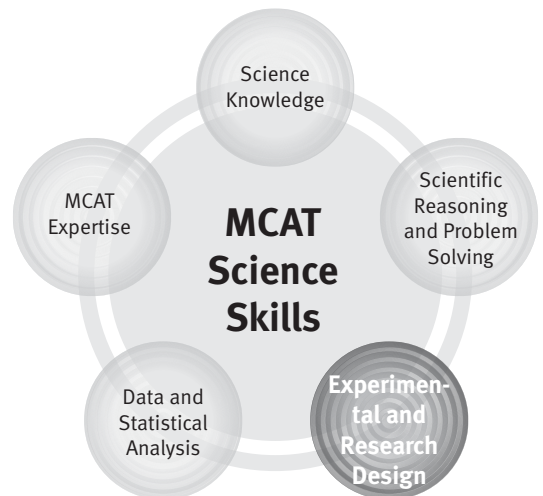
Ethics in Research

In this lesson, you'll learn to:

- Apply the ethical principles of scientific research and experimentation

Science Topics:

- Psychological Disorders





LESSON 3.2, LEARNING GOAL 1:

- Apply the ethical principles of scientific research and experimentation

Beneficence (Equipoise)

1. One year into a two-year study on a new drug for Alzheimer's disease, researchers have sufficient evidence to conclude that the drug delays the onset of certain symptoms by at least six months more than any current treatment. Which of the following actions should be taken by the researchers?
 - A. Begin administering the new drug, instead of a placebo, to the control group.
 - B. End the study prematurely and withdraw treatment from all participants.
 - C. Begin charging participants for the drugs they are receiving.
 - D. Inform participants of the results and continue the study as before.

Justice

2. In choosing research questions to pursue, which of the following hypothesized effects could be used as ethically justified reasons to avoid conducting a study?
 - I. Benefits for older patients but not younger patients
 - II. Results that could only help individuals unlikely to afford treatment
 - III. Benefits that disproportionately accrue to those of a certain ethnic background
 - IV. Improved health for only a very small number of people
 - A. None of these
 - B. I, II, and IV only
 - C. I, III, and IV only
 - D. I and IV only



Respect for Persons (Autonomy)

3. In human subject research, experimenters must honor requests from participants for:
- A. other participants' contact information.
 - B. withdrawal from the study.
 - C. placement in a particular experimental group.
 - D. reimbursement for travel to the laboratory.

Acceptable Risks

4. Assuming informed consent is given by all participants, which of the following is the LEAST acceptable risk in its respective study?
- A. Providing a drug with side effects to volunteers who don't have the disease the drug treats
 - B. Infecting healthy participants with the common cold
 - C. Administering a potentially harmful treatment to a terminal cancer patient
 - D. Requiring volunteers to take actions that have been consistently traumatic in previous experiments

KAPLAN TIP

Knowledge of accepted ethical principles are useful on Test Day in much the same way that knowledge of the scientific method is useful. While you're unlikely to see explicit ethical terms like "autonomy" and "justice" on the test, you may, for instance, be asked to identify problematic aspects of a given study or suggest changes to a study. Fluency in ethical principles will pick up those points for you.



LESSON 3.2 REVIEW

Ethical Principles

Beneficence/Nonmaleficence

- Actions taken by experimenters must be taken with positive, helpful (and, hopefully, achievable) goals.
- In most studies, no harm can be inflicted on participants.
- In rare cases, minimal harm may be inflicted if the potential good far outweighs the harm, and if participants are duly informed and give consent.
- A study cannot be conducted if the experimenters know that one treatment is better than another (or the control). This principle is called equipoise.

Respect for Persons

- The autonomy of patients/participants/volunteers must be respected; coercion, including with compensation, must be avoided.
- Participants of a study must provide informed consent.
- The privacy of participants must be upheld through confidentiality.
- Requirements are more stringent for vulnerable populations such as pregnant women, children, and prisoners.

Justice

- In administering care and choosing research questions, certain aspects of populations (e.g., income, race, sex) should be ignored.

LESSON 3.3

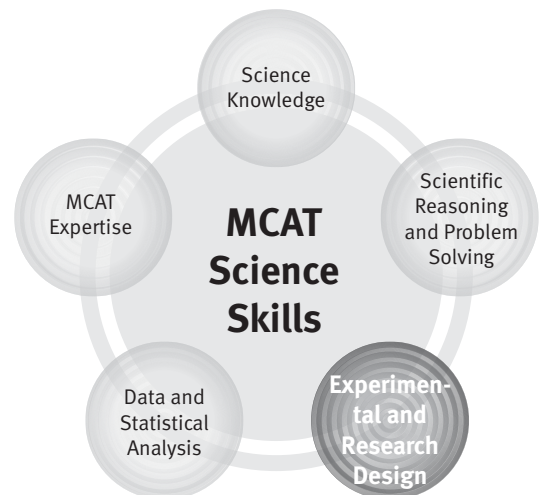
Critique of Studies and Conclusions

In this lesson, you'll learn to:

- Define and distinguish between samples and populations
- Judge the appropriateness of generalizations, based on facts about the sample and population of a study
- Use aspects of a study to determine the likelihood of true associations between variables

Science Topics:

- Psychological Disorders
- Emotion



LESSON 3.3, LEARNING GOALS 1 AND 2:

- Define and distinguish between samples and populations
- Judge the appropriateness of generalizations, based on facts about the sample and population of a study

Samples and Populations

(Circle one)

... *Study participants* were divided into two groups: a control group and an intervention group ...

Sample

Population

... Researchers devised a study to determine whether a causal link existed between income level and psychosis in *urban communities* ...

Sample

Population

... After devising the hypothesis, *randomly selected individuals* from different religious communities were invited to the lab ...

Sample

Population

... The experiment's conclusion was that *individuals with borderline personality disorder* struggle more with self-regulation under high-pressure situations ...

Sample

Population

... In order to study the familiarity of the universal emotions, the professor's students were asked to choose the most likely caption for pictures of faces displaying different emotions...

What is this study's sample?

What is this study's population?

Samples and Populations in Context

Practice Passage I (Questions 1–2)

Although the origin of clinical depression is still in large part a mystery, one possible explanation is monoamine theory. Monoamines are neurotransmitters such as dopamine, serotonin, and norepinephrine. According to the theory, reduced activity of monoamines in the brain is linked to depression. This theory was proposed following the accidental discovery that monoamine oxidase inhibitors (MAO inhibitors) could successfully treat some cases of depression. Monoamine oxidase is an enzyme that catalyzes the breakdown of the monoamines to corresponding aldehydes and ammonia. If monoamine oxidase activity is inhibited, then monoamine levels will rise in the brain.

Experiment 1

Despite successful treatment of certain patients with MAO inhibitors, depression is only partially explained by the monoamine hypothesis. A study was done to analyze the effects of monoamine reduction in healthy persons. Researchers handpicked ten patients to use in the study. After being split into a control group and an experimental group, patients were told which group they were in and informed that the study was designed to reveal the root cause of clinical depression. Using pharmacological agents, the experimental group's monoamine levels were reduced by 35% and maintained at this lower level for three months. At the start of each day, patients in both groups were asked to record their mood in a journal. After the data collection period ended, it was determined that monoamine depletion did not significantly impact mood in healthy individuals.

1. Experiment 1 suffers from several flaws that cast doubt on its conclusions. Based on the information in the passage, which of the following is NOT one of these reasons?
 - A. Lack of randomization
 - B. Selection bias
 - C. The Hawthorne effect
 - D. Lack of blinding
2. Assuming the conclusion of Experiment 2 is found to be well supported, one additional conclusion that can be made from the study is that:
 - A. the symptoms of depression are only partially explained by the monoamine hypothesis.
 - B. lowering monoamine levels by 35% would not significantly impact the mood of depressive individuals.
 - C. many individuals would experience little to no change in mood if prescribed MAO inhibitors.
 - D. the patients who participated in Experiment 2 would likely have their mood improved with MAO inhibitors.

KAPLAN TIP

Even though the MCAT will test flaws in the design and execution of research, it will rarely completely discredit a study in a passage. More likely, the MCAT will ask you to see the positives and the negatives of a study by asking about its potential conclusions and its flaws.





LESSON 3.3, LEARNING GOAL 3:

- Use aspects of a study to determine the likelihood of true associations between variables

Research Design Flaws in Context

Practice Passage I (Questions 3–6)

Although the origin of clinical depression is still in large part a mystery, one possible explanation is monoamine theory. Monoamines are neurotransmitters such as dopamine, serotonin, and norepinephrine. According to the theory, reduced activity of monoamines in the brain is linked to depression. This theory was proposed following the accidental discovery that monoamine oxidase inhibitors (MAO inhibitors) could successfully treat some cases of depression. Monoamine oxidase is an enzyme that catalyzes the breakdown of the monoamines to corresponding aldehydes and ammonia. If monoamine oxidase activity is inhibited, then monoamine levels will rise in the brain.

Experiment 2

Brunner syndrome occurs due to a mutation in the MAO-A gene. Individuals with this genetic condition suffer from dramatically increased aggression due to heightened monoamine levels. Researchers hypothesized that norepinephrine is the primary contributor to this behavioral phenomenon. To test this hypothesis, 25 transgenic mice had their MAO-A gene knocked out. It was calculated that in the knockout mice, serotonin levels were approximately 10 times greater and norepinephrine levels were about 3 times greater. When compared to baseline levels, the knockout mice exhibited fearfulness and increased aggression if threatened. The behavioral effects of the gene knockout were reversed by administration of parachlorophenylalanine, a potent inhibitor of serotonin synthesis. The researchers concluded that increased serotonin concentration is to blame for the aggressive behavior associated with Brunner syndrome and rejected their original hypothesis.

Temporality

3. What would be the most appropriate conclusion to draw if, in Experiment 2, dopamine levels were also measured upon administration of parachlorophenylalanine and were found to be similar to baseline levels?
- A. Dopamine levels likely contribute in some way to the symptoms of Brunner syndrome.
 - B. Dopamine is not likely to contribute to the symptoms of Brunner syndrome.
 - C. Dopamine may or may not contribute to the symptoms of Brunner syndrome.
 - D. Dopamine contributes to the symptoms of Brunner syndrome when levels match those of other monoamines.

Plausibility

4. In a retrospective analysis of Experiment 3, the following four external conditions were also found to correlate with aggressive and fearful behavior in the mice being studied. Which one is most likely to be a true causative relationship?
- A. A similar study on monoamines began in a neighboring lab shortly after high aggression was first measured.
 - B. The chairs in the lab's lobby changed shortly before the gene knockout was reversed.
 - C. The highest measures of aggression tended to be measured on Fridays and Saturdays.
 - D. The technician who handles the mice was changed near the times when monoamine concentrations changed sharply.

Alternative Explanations

5. Which of the following is true of Experiment 3 and reveals a flaw in the researchers' reasoning?
- A. Increased serotonin has other proven effects besides those stated in the passage.
 - B. Male mice in the study reacted with more aggression than female mice.
 - C. The study did not produce sufficient evidence to reject the researchers' original hypothesis.
 - D. Monoamine concentrations have not been linked to mood in studies other than this one.
6. Suppose that other studies have confirmed that increased exposure to threatening stimuli over time conditions mice to respond with more fear and aggression. Which of the following additional details about Experiment 3, if true, would support this alternative hypothesis for the increased symptoms observed by the researchers?
- A. Serotonin levels gradually decreased through the study after initially spiking upwards.
 - B. Fear and aggression in the mice dropped immediately as monoamine levels normalized.
 - C. Baseline levels of fear and aggression were defined by past measures in these same mice.
 - D. Baseline levels of fear and aggression were defined by average levels of all mice over time.

KAPLAN TIP

The most important lesson about critiquing studies is simply to see and identify research flaws in the first place. Don't take the experiments in MCAT passages at face value—notice their problems, too!



LESSON 3.3 REVIEW

Samples and Populations

- A sample is the group of individuals that an experiment is conducted on. These are often called subjects, participants, volunteers, or patients.
- A population is the group of people or other beings to whom the conclusion of a study applies.
- A study's conclusion can only fairly be applied to a population if certain criteria are satisfied, including representativeness of the sample and the avoidance of possible flaws, such as those described below.

Possible Flaws in Experimental Design

Temporality

- The independent variable of a study (sometimes known as the “intervention”) must occur temporally prior to the dependent variable.

Plausibility

- When proposing a connection between variables, there must be some scientifically plausible way that one affects the other.

Alternative Explanations

- Attention must be paid to other explanations for a phenomenon besides the one hypothesized by a study.
- If alternative explanations are ruled out, remaining explanations become more likely.

Other Criteria/Possible Flaws in Study Design

- Random assignment
- Selection bias
- Blinding (and double-blinding)
- The Hawthorne effect
- Sample size
- Representative samples
- Consistency
- External validity
- Confounding variables
- Correlation vs. causation

LESSON 4.3

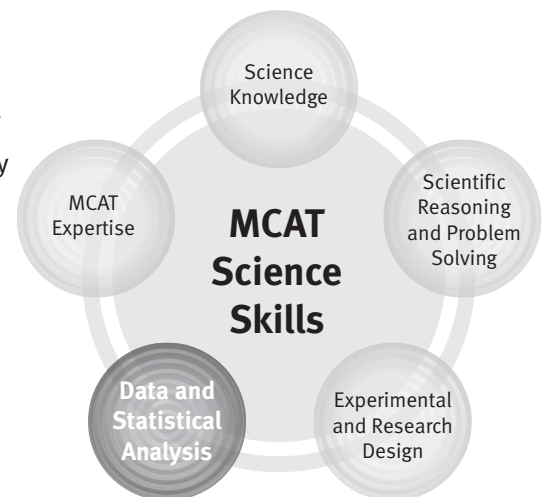
Skill 4: Experimental Error and Uncertainty

In this lesson, you'll learn to:

- Identify random and systematic error
- Compare and contrast random and systematic error
- Explain the statistical significance and uncertainty of a data set

Science Topics:

- Psychological Disorders
- Emotion



LESSON 4.3, LEARNING GOALS 1 AND 2:

- Identify random and systematic error
- Compare and contrast random and systematic error

Sources of Experimental Uncertainty

Study 1

In order to test physiological responses to emotion, a psychologist measures several parameters of the sympathetic response (heart rate, breathing rate, blood pressure) while participants watch a clip of a horror movie with three previously identified suspenseful moments. She also measures the same parameters in a control group who don't receive any stimulation. A sample of the findings is shown in Table 1.

	Heart Rate		Respiratory Rate		Blood Pressure	
	Expt	Control	Expt	Control	Expt	Control
Moment 1	140 bpm	76 bpm	21	10	150/100	120/80
Moment 2	148 bpm	81 bpm	17	12	140/90	115/65
Moment 3	135 bpm	66 bpm	20	11	155/108	125/70

Table 1. Measures of sympathetic response at three predetermined moments.

The psychologist wants to use her data to generalize to a larger population. How might random error in the study limit this?

Study 2

A local health center measures the one-year prevalence rates for psychological disorders in its community by surveying the health records of patients who seek out medical assistance at their facility. Results of the survey are shown in Table 2.

Disorder	% affected	Number
Any	26	81
Major Depressive Disorder	7	21
Generalized Anxiety Disorder	3	9
Obsessive Compulsive Disorder	1	3

Table 2. Prevalence and number of psychological disorders at the local health center.

The health center wants to use its data to generalize to a larger population. How will systematic error in the study limit this?

Practice Passage I (Questions 1–3)

Although the origin of clinical depression is still in large part a mystery, one possible explanation is monoamine theory. Monoamines are neurotransmitters such as dopamine, serotonin, and norepinephrine. According to the theory, reduced activity of monoamines in the brain is linked to depression. This theory was proposed following the accidental discovery that monoamine oxidase inhibitors could successfully treat some cases of depression. Monoamine oxidase is an enzyme that catalyzes the breakdown of monoamines to corresponding aldehydes and ammonia. If monoamine oxidase activity is inhibited, monoamine levels will rise in the brain.

Experiment 3

Previous research indicates that oral MAO inhibitors limit bodily tyramine breakdown. Tyramine is a primary ingredient in aged cheese and acts as a vasoconstrictor. Due to this dietary limitation, oral MAO inhibitors were removed from the market and replaced with the selegiline transdermal system, another form of MAO inhibition. Six patients diagnosed with clinical depression were treated with the selegiline transdermal system; a dosage of 8 mg/day was delivered to each patient. To determine the precise impact that diet, or the consumption of aged cheese, has on blood pressure using this treatment, the patients were asked to eat cheese in measured increments until they experienced an increase in blood pressure of 30 mmHg; the total amount of cheese eaten (in ounces) was recorded in each case. The procedure was repeated three times and the results are indicated in Table 1.

	Trial 1	Trial 2	Trial 3
Patient 1	3.3	2.5	1.2
Patient 2	3.6	4.4	2.7
Patient 3	2.5	4.8	2.9
Patient 4	1.6	2.7	3.6
Patient 5	4.7	2.9	3.8
Patient 6	1.8	2.7	3.6

Table 1. Number of ounces of cheese consumed to elevate blood pressure by 30 mmHg.

- The results provided in Table 1 indicate that Experiment 3 is subject to what type of error?
 - Systematic error because the selegiline transdermal dosage varied for each patient.
 - Random error because the amount of cheese consumed varied from one trial to another.
 - Neither random nor systematic error because it is unethical to ask patients to eat unhealthy foods.
 - Both types random and systematic error because there are only 6 patients enrolled in the study.
- Which of the following scenarios could potentially be a source of systematic error in Experiment 3?
 - Varying the type of lotion each patient used prior to administration of the selegiline transdermal system.
 - Measuring the patients' blood pressure while sitting in different rooms.
 - Weighing the cheese consumed on a scale that reads 0.25 ounces less than it should.
 - Giving the patients all the same brand of cheese.
- The experimental uncertainty in Experiment 3 could be reduced or minimized by
 - enrolling more patients into the study.
 - standardizing the sphygmomanometers used to measure blood pressure.
 - having the patients measure their cheese consumption using their own scales.
 - I, II, III
 - I, III
 - II, III
 - I, II

LESSON 4.3, LEARNING GOAL 3:

- Explain the statistical significance and uncertainty of a data set

The Null Hypothesis and Significance

Study 1

In order to test physiological responses to emotion, a psychologist measures several parameters of the sympathetic response (heart rate, breathing rate, blood pressure) while participants watch a clip of a horror movie with 3 previously identified suspenseful moments. She also measures the same parameters in a control group who don't receive any stimulation.

What is the null hypothesis for this study?

What results would allow the researchers to reject the null hypothesis?

Study 2

A psychiatrist wants to compare the efficacy of treating the positive symptoms of schizophrenia (delusions and hallucinations) with psychotherapy versus antipsychotic drugs such as Haldol. He randomized patients into two study groups, one receiving 2 hours of psychotherapy daily and the other receiving Haldol daily, and measured the number of positive symptoms at the end of the study period. The results are shown in the graph below:

What is the null hypothesis for this study?

Can this researcher reject the null hypothesis?

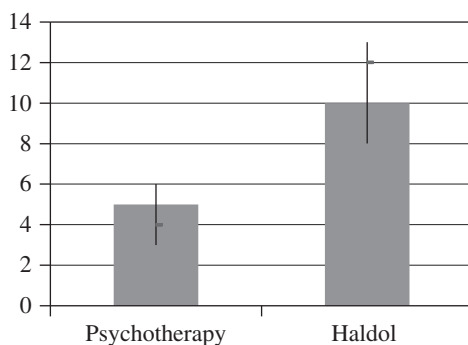


Figure 6. Total # of positive symptoms reported ($p < 0.05$).

KAPLAN TIP

Statistical significance signals the degree to which study results are obtained by chance, while the confidence interval indicates the certainty with which the values are representative of the population.



Practice Passage I (Questions 4–5)

Although the origin of clinical depression is still in large part a mystery, one possible explanation is monoamine theory. Monoamines are neurotransmitters such as dopamine, serotonin, and norepinephrine. According to the theory, reduced activity of monoamines in the brain is linked to depression. This theory was proposed following the accidental discovery that monoamine oxidase inhibitors could successfully treat some cases of depression. Monoamine oxidase is an enzyme that catalyzes the breakdown of the monoamines to corresponding aldehydes and ammonia. If monoamine oxidase activity is inhibited, then monoamine levels will rise in the brain.

Experiment 4

Some researchers argue that genetic influence on depressive behavior is less significant than environmental factors. A study was carried out to verify the legitimacy of this claim. At present, there are two known variants of the MAO-A gene, the high activity variant (normal) and the mutated limited activity variant. Four hundred adolescent males with different variants of the MAO-A gene were observed over the course of five years; 39 percent of these individuals were maltreated during their pre-adolescent years. Data analysis indicated that the individuals with a low activity variant of the MAO-A gene were 7 percent more likely to develop adolescent conduct disorder ($p = 0.18$). In addition, the maltreated individuals were 67 percent more likely to be diagnosed with adolescent conduct disorder than the normal individuals ($p < 0.05$, CI of 95 percent). Researchers concluded that both the low activity variant of the MAO-A gene and maltreatment significantly impacted behavior.

4. Critics of the researchers' conclusion might argue which of the following?
 - A. Only maltreatment can be statistically correlated to adolescent conduct disorder.
 - B. The low activity variant and maltreatment are negatively correlated with respect to the disorder.
 - C. Neither the low activity variant nor maltreatment data is statistically significant.
 - D. No valid conclusions can be made since there aren't any confidence intervals provided.
5. Given their analysis of significance and uncertainty, what can the researchers most reasonably conclude?
 - A. There is at least a 95 percent likelihood that maltreated individuals will be diagnosed with adolescent conduct disorder at some point.
 - B. There is less than a 5 percent likelihood that the increased incidence of adolescent conduct disorder in maltreated individuals is a result of chance.
 - C. It is at least 95 percent likely that the average incidence of adolescent conduct disorder in maltreated individuals is the same as that of non-maltreated individuals.
 - D. It is at most 5 percent likely that the average incidence of adolescent conduct disorder in maltreated individuals from the study is the same as that of non-maltreated individuals.

LESSON 4.3 REVIEW

Experimental Uncertainty

1. Random Error
 - Statistical fluctuations in measured data due to the precision limitations of the measurement device
 - Can be in either direction
 - Affects variance
 - Can be overcome by increasing the number of data points
 - For example, getting a different result when performing the same task over several trials
2. Systematic Error
 - A consistent inaccuracy in measured data
 - Often in the same direction and throughout all of the collected data
 - Cannot be overcome by increasing data points
 - Affects the mean
 - For example, using a measuring tool that is not calibrated correctly

Statistical Significance

1. p -value
 - Measures the impact of experimental uncertainty on data
 - Significance indicates the ability to reject the null hypothesis
 - Must be lower than 0.1 (at least) to say the results did not occur by chance
2. Confidence Intervals
 - Allows researchers to estimate population data based on sample findings
 - Needs to be greater than 90 percent (or 95 percent in some cases)

Psychology and Sociology 2: Human Subjects Research

PASSAGE I (QUESTIONS 1–6)

Advances in the understanding of the neuroscience of conscious thought have brought back previously marginalized psychodynamic theories of the unconscious and its role in determining behavior. One such idea that has been investigated is the use of psychoanalysis to recognize and treat repressed childhood traumas. Psychoanalysts hold that childhood trauma is often expressed through differences in behavior and explanatory style. Siblings of children who died of cancer, for example may experience guilt associated with the wish-fulfillment of evicting a competitor that can manifest in behavior later in life.

To test this hypothesis, researchers recruited two sets of participants. One set of “patients” consisted of 14 individuals, seven of whom had the childhood experience of living with a sibling who had cancer, and seven of whom did not. A second set of “raters” consisted of groups of three subjects each: trained psychoanalysts (PSYANs), trained cognitive behavioral therapists (CBTs), inexperienced professionals who were medical students specializing in psychology (INXPs), experienced oncologists (ONCs), and individuals who shared the same experience as the patients whose siblings developed cancer (SEs).

Patients were recorded giving a five minute spontaneous speech on the way they experience their inner and outer world. While this topic was intentionally ambiguous, patients were asked, when applicable, not to speak about their childhood trauma. Raters then watched the videos and received written instructions asking them to determine whether or not the patient had a sibling afflicted with childhood cancer. A score was obtained for each group by coding responses as follows: +2 when raters correctly responded yes or no, +1 when raters correctly responded probably yes or probably no, –1 when raters incorrectly responded probably yes or probably no, and –2 when raters incorrectly responded yes or no. Scores for the rater groups are tabulated in Figure 1.

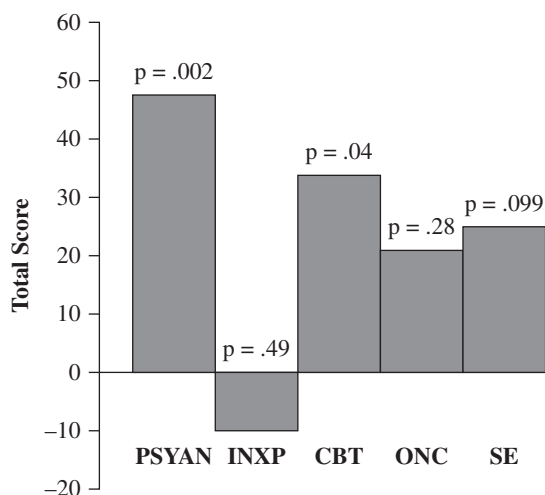


Figure 1. Scores for the rater groups.

1. The passage provides enough information to conclude that each of the following is a potential flaw in the design of the study EXCEPT:
 - A. Unconscious experimenter bias cannot be adequately ruled out given the procedure used in the study.
 - B. The sample size of the “therapist” group is too small to yield statistically significant results.
 - C. The researchers are not accurately studying the constructs they wish to investigate in the study.
 - D. The researchers have not considered that control “patients” might have experienced other childhood traumas.
2. Based on the passage, which of the following of Hill’s criteria for correlation could be used to criticize the results of the study?
 - A. Strength
 - B. Temporality
 - C. Coherence
 - D. Plausibility
3. Which of the following would LEAST account for the difference between psychoanalysts and cognitive behavioral therapists as demonstrated in the study?
 - A. Cognitive behavioral therapists may be less experienced with interpretation of free-association.
 - B. Cognitive behavioral therapists may have been more accurate but less certain in their assessments.
 - C. Psychoanalysts may have more experience with patients who have suffered childhood trauma.
 - D. Psychoanalysts may have outperformed cognitive behavioral therapists due to random chance.
4. The experimental procedure, as described in the passage, is designed to make use of which of the following defense mechanisms in the 14 patient participants?
 - A. Repression
 - B. Projection
 - C. Rationalization
 - D. Reaction formation
5. A Jungian theorist might most reasonably explain the ability of the psychoanalysts to differentiate between the patient groups in which of the following ways?
 - A. The psychoanalysts were able to see past the personas of the patients in order to discover their true feelings.
 - B. The psychoanalysts were able to tap into the collective unconscious to sense differences between patients.
 - C. The psychoanalysts perceived the patients’ anima schemas and could tell who was more emotional.
 - D. The psychoanalysts knew that victims of childhood trauma tend to be more introverted than the general population.
6. Based on the power of the observed effect for the inexperienced professionals being 12%, researchers determined that this sample did no better than chance. What is the probability that inexperienced professionals would be able to successfully distinguish between patient groups?
 - A. .12
 - B. .51
 - C. .88
 - D. There is not enough information to determine this probability

PASSAGE II (QUESTIONS 1–5)

Two experiments were conducted to examine the effects of false positives in prenatal testing on expectant parents.

Experiment 1

Researchers surveyed 88 mothers of newborns who had been screened for genetic abnormalities using mass spectrometry. While all of the infants in the study were born without abnormality, 49 of the infants had received a false-positive screen, and 42 had received a normal screen. The screenings have a false-positive rate of 0.09 percent, with a positive predictive value (PPV) of 41 percent (PPV = # of true positives/total # of positive tests).

Researchers found that the two groups of infants were demographically similar, though the false-positive group tended to be about 9 months older on average at the time of screening and tended to be from families of lower socioeconomic status. Mothers in the false-positive group were more likely to worry about their child's future development (21 percent versus 5 percent for the normal screen group) and were more likely to have visited a primary care physician or hospital within the first six months of the infant's life. Furthermore, 17 percent of mothers in the false-positive group received scores on a stress inventory that were indicative of the necessity for treatment. No mothers in the normal screen group scored within this range.

Experiment 2

A similar study included a false-positive group of infants ($n=18$) who had shown soft markers for potential abnormalities on an ultrasound and required further testing. This group was compared against a normal control group whose ultrasounds revealed no such potential abnormalities ($n=17$). Mothers in both groups were compared on scales for anxiety and depression three times during and after their pregnancy: once during the third trimester (T1), once at birth (T2), and once two months after giving birth (T3). Results are summarized in Figure 1.

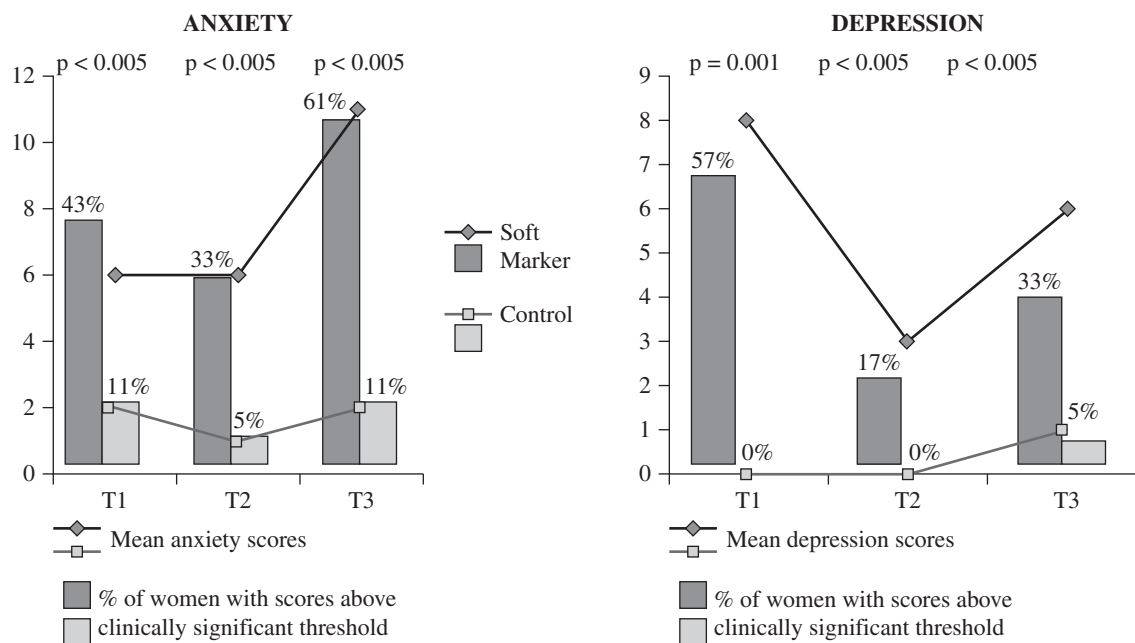


Figure 1. Anxiety and depression in mothers during and after pregnancy.

1. The circumstances of the experimental groups in both studies described in the passage can be said to result from which of the following?
 - A. Random error
 - B. Systematic error
 - C. Type I error
 - D. Type II error
2. Congenital adrenal hyperplasia (CAH) has an incidence of one in 15,000 and a PPV of 0.53%. A newborn included in the study for Experiment 1 tests positive for CAH. Which of the following describes the infant's chances of having the disease?
 - A. The newborn has a one in 15,000 chance of having CAH.
 - B. The newborn has a 0.53% chance of having CAH.
 - C. The newborn has a 50% chance of having CAH.
 - D. The newborn has a 99.47% chance of having CAH.
3. Researchers found that while most mothers in the false-positive group of Experiment 2 reported a negative experience, the 17% that required clinical intervention for stress felt less able to cope with their circumstances. This result can be most accounted for by differences in:
 - A. primary appraisal.
 - B. secondary appraisal.
 - C. social readjustment.
 - D. the exhaustion stage.
4. Based on a meta-analysis of these two studies, an attempt is made to conclude that there is a correlation between false-positive test results and the well-being of patients. Which of the following could be stated regarding this conclusion?
 - A. It is an appropriate conclusion to make given the parameters of the original studies.
 - B. It is not necessarily supported because the original groups aren't representative of the population.
 - C. It is too strong a statement given the statistical significance of the effects in the original studies.
 - D. It is suspect because the groups studied are more likely to be susceptible to observational bias than the population.
5. According to the passage, which of the following could most reasonably be done to increase the accuracy of prenatal and neonatal health screening?
 - A. Remove the mandate for health screening in favor of opt-in testing.
 - B. Increase the resolution of images generated by pre-natal ultrasound.
 - C. Restrict testing to children from families of a higher socioeconomic status.
 - D. Test newborns for genetic abnormalities as soon after birth as possible.



PASSAGE III (QUESTIONS 1–6)

The search for an accurate theory of moral reasoning has gone through several iterations, beginning with the work of Lawrence Kohlberg, whose stages of morality are based loosely on the ideas of Jean Piaget. Several psychologists, including Carol Gilligan, have criticized Kohlberg's stages as being androcentric and focusing too much on ideas of justice. Gilligan herself proposed an alternative scale of morality based on emotion and social interactions. This perspective is also not without its critics. Many, such as social psychologist Jonathan Haidt and cultural anthropologist Richard Shweder, cite research that supports the notion that there is very little correlation between gender and style of moral reasoning, and feel that Gilligan has gone too far in the other direction in her framework.

Furthermore, Haidt holds that morality comes most often not from well-reasoned arguments, but rather from inborn intuitions; the reasoning cited in Kohlberg's studies is no more than a post-hoc explanation of an emotional, unconscious reaction to a moral dilemma. To demonstrate this, he presented individuals with ambiguous moral situations somewhat like the Heinz Dilemma that Kohlberg used in his assessment of moral reasoning, with the difference being that these were meant to illicit a more visceral reaction. It is Haidt's position that people have an intuitive "moral disgust" reaction that is an evolutionary byproduct of the disgust reaction that people have to tainted foods that protects us against pathogens. This position is the basis of Haidt's Social Intuition Theory.

Building upon these concepts and other work by Shweder, Haidt attempted to categorize the kinds of instincts that people have when reacting to moral stimuli. According to the Moral Foundations Theory, there are six such building blocks of moral reaction, stated as opposing ideas on a scale: care versus harm (of others); fairness versus cheating; liberty versus oppression; loyalty versus betrayal; authority versus subversion; and sanctity versus degradation (which Haidt described as the tendency to avoid disgusting things, food, and actions). In his book *The Righteous Mind: Why Good People Are Divided by Politics and Religion*, Haidt's central thesis is the idea that differing political views often come from differences between individuals in focusing on some of these building blocks over others, and that the varied focus is closely related to the identity and socialization of the individual.



1. Suppose a person responded to Haidt's theory by saying, "People shouldn't do things that others find disgusting." Which of Kohlberg's stages of moral reasoning best describes this response?
 - A. The preconventional stage
 - B. The conventional stage
 - C. The postconventional stage
 - D. This response does not correspond with Kohlberg's stages
2. Which of the following scenarios is most closely related to Erikson's views on identity?
 - A. A child develops rudimentary political views through role-playing the positions of others.
 - B. A twelve-year-old is able to begin thinking about the political beliefs of others using abstract reasoning.
 - C. An adolescent begins to question her political beliefs and distances herself from her parents.
 - D. An adult finds that his beliefs about personal responsibility come from reactions to parental neglect in his childhood.
3. A three-year-old looks at a series of pictures depicting a boy accidentally throwing away his brother's toy while taking out the garbage. Which of the following describes the three-year-old's most likely appraisal of this story?
 - A. The boy should be punished to the same degree as someone who threw away the toy on purpose.
 - B. The boy should be punished because the three-year-old understands that the brother values his toys.
 - C. The boy should not be punished because he was not aware he was doing anything wrong.
 - D. The boy should not be punished because the three-year-old would also not like to be punished for accidental actions.
4. A child, going to school for the first time, learns that raising her hand and waiting to be called on, while not necessary at home, is an appropriate behavior for that setting. This is an example of:
 - A. Primary socialization
 - B. Secondary socialization
 - C. Anticipatory socialization
 - D. Group socialization
5. A new law restricts the definition of free speech as it applies to corporations and draws fervent support from some but is vehemently opposed by others. According to the Moral Foundations Theory, which of the following is the most likely cause for this difference of opinion?
 - A. Emotional reactions to political ideologies that are automatic and subconscious
 - B. Strongly held and abstract beliefs regarding the right to express one's views freely
 - C. Socialization and identification with groups that share political norms
 - D. Understanding and valuation of the concepts of justice and the social contract
6. Moral beliefs are at least in part a result of group identity and observation. Which of the following is the strongest source of moral guidance for an adolescent?
 - A. A same-sex peer
 - B. A same-sex parent
 - C. An opposite-sex parent
 - D. An opposite-sex celebrity



DISCRETE PRACTICE QUESTIONS (QUESTIONS 1–6)

1. Once a drug is approved for use in the population, a researcher may continue to closely monitor the use of the drug among clinical sample groups. This procedure is meant to correct for which of the following concerns?
 - A. Potential maleficence of the treatment
 - B. Unknown external validity of the original trials
 - C. Observation bias in the original trials
 - D. Selection bias between drug and placebo groups
2. A member of a university faculty conducts a study in which he asks an undergrad to guess the shapes on randomly selected cards, which are hidden from view. If the undergrad guesses wrong, an electric shock is administered. For which of the following reasons would this study be deemed unethical?
 - A. The study, as described, lacks sufficient beneficence to justify harm done.
 - B. Informed consent, even if obtained, would be invalid given the nature of the study.
 - C. The population that would most benefit from the results is not being tested.
 - D. Paranormal research of this type would be a waste of university resources.
3. A drug trial is conducted using a standard experimental design: half of the patients in the trial are administered the drug being tested and half are administered a placebo. Halfway through the trial, two other studies are published demonstrating the effectiveness of the drug. Should the current trial continue?
 - A. Yes, because further independent confirmation will strengthen the evidence of the drug's effectiveness.
 - B. Yes, because the participants in the trial must be treated similarly to the subjects of the published studies.
 - C. No, because clinical equipoise no longer exists within the context of the current drug trial.
 - D. No, because the researchers can do more good by spending the funding for the drug trial elsewhere.
4. A study calls for random telephone calls to the home phone numbers of a sampling of individuals in a city between 1:00 p.m. and 3:00 p.m. Based on the findings, it concludes that 72 percent of the city's residents are unemployed. Which of the following is a likely source of error in this study?
 - A. The Hawthorne effect
 - B. Systematic error
 - C. Selection bias
 - D. Detection bias
5. A nutritionist conducts a study and finds that eating a certain brand of breakfast cereal reduces the risk of coronary heart disease in 50-year-old women from 46% to 44% ($p = .002$). Which of the following best describes this result?
 - A. It is irrelevant because the participants of the study are not representative of the general population.
 - B. It should be investigated further, since the researchers have not ruled out potential confounding variables.
 - C. It has shown that this brand of breakfast cereal might be an important factor in the prevention of heart disease.
 - D. The result, while statistically significant, lacks the practical significance to be relevant to the general population.
6. Two people throw darts at a dartboard. Person A always hits the dartboard, but the distance of the shots from the center varies. Person B misses the dartboard entirely, but his darts always land in the same spot below the bottom of the board. Which of the following describes the type of error demonstrated?
 - A. Both Person A and Person B are imprecise.
 - B. Both Person A and Person B are inaccurate.
 - C. Person A is precise, while Person B is accurate.
 - D. Person A is accurate, while Person B is precise.