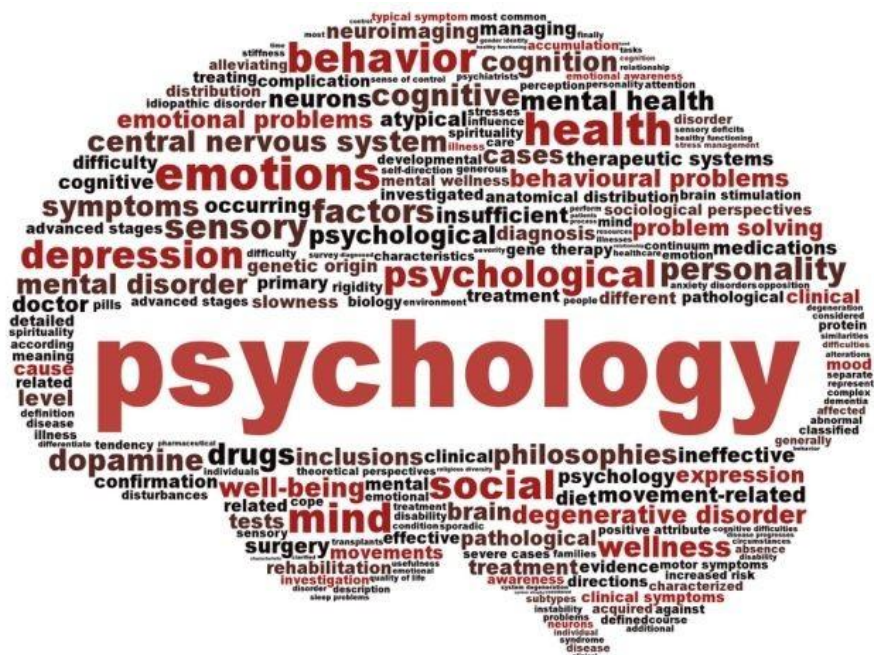


# Psychology Bridging Booklet

## Year 12 Psychology

Name:



# Welcome to psychology!

- This bridging booklet is designed to introduce you to some key terms in psychology and some of the beginning information on psychological approaches you will need to know to get a head start in psychology.
- You will be asked to read information and complete a series of tasks.
- All of these will need to be completed by the end of the third week back in September.
- You will have this reissued in September as a homework assignment on ClassCharts.
- Once you have completed the tasks you can then check your answers at the end with green pen.
- This **MUST** be completed to ensure that you satisfy the initial probationary period of 6 weeks required for all A-Levels.



# Research Methods

## Section 1

## **Comprehension Exercise: Key Working Scientifically Terms**

In scientific research, particularly in psychology, it's crucial to understand and accurately use key terms related to the scientific method. Here are some fundamental terms and their definitions:

1. **Hypothesis:** A hypothesis is a testable statement predicting the outcome of a study or the relationship between variables. It is often formulated as an "if... then..." statement.
2. **Variables:** Variables are elements that can be changed or measured in an experiment. There are different types of variables:
  - **Independent Variable (IV):** The variable that is manipulated by the researcher to observe its effect.
  - **Dependent Variable (DV):** The variable that is measured to see how it is affected by changes in the IV.
  - **Control Variables:** Variables that are kept constant to prevent them from influencing the outcome.
3. **Operationalisation:** This involves defining variables in practical, measurable terms. For example, operationalising "stress" might involve measuring cortisol levels in the blood.
4. **Reliability:** Reliability refers to the consistency of a measure. A study is reliable if the same results can be obtained when the experiment is repeated under identical conditions.
5. **Validity:** Validity is about the accuracy of a measure or the extent to which a test measures what it claims to measure. Types of validity include:
  - **Internal Validity:** Whether the results of a study are due to the manipulation of the IV and not other factors.
  - **External Validity:** The extent to which the results of a study can be generalised to other settings, populations, or times.
6. **Ethics:** Ethics in psychological research involves ensuring the well-being, dignity, and rights of participants. This includes obtaining informed consent, ensuring confidentiality, and debriefing participants.
7. **Sample:** A sample is a subset of the population that is selected for a study. The way a sample is chosen can affect the generalisability of the findings.
8. **Random Allocation:** Random allocation involves assigning participants to different groups in an experiment by chance, thus ensuring that each participant has an equal likelihood of being placed in any group.
9. **Peer Review:** Peer review is the process by which other experts in the field evaluate the quality, validity, and relevance of a researcher's work before it is published.
10. **Qualitative and Quantitative Data:**
  - **Qualitative Data:** Non-numerical data that provides descriptive information.
  - **Quantitative Data:** Numerical data that can be measured and analysed statistically.

**Questions:**

1. What is a hypothesis and how is it usually formulated?
2. Define an independent variable and give an example.
3. Explain what is meant by operationalisation and provide an example.
4. What does it mean for a study to have high reliability?
5. Differentiate between internal and external validity.
6. Why is obtaining informed consent important in psychological research?
7. How can the way a sample is chosen affect a study's findings?
8. What is the purpose of random allocation in an experiment?
9. Describe the process and importance of peer review.
10. What is the difference between qualitative and quantitative data?

## Identifying Variables in Scientific Experiments

### **Instructions:**

Read each scientific aim carefully and answer the questions that follow. Identify the independent variable (IV), dependent variable (DV), and control variables (CV) for each aim.

### **Scientific Aims:**

1. To investigate the effect of different amounts of sunlight on the growth of tomato plants.
2. To determine how the concentration of sugar solution affects the mass of potato cylinders by osmosis.
3. To examine the impact of various temperatures on the rate of enzyme activity.
4. To explore how different pH levels influence the germination rate of seeds.
5. To study the effect of caffeine on the reaction time of adults.
6. To assess how varying concentrations of salt in water affect the buoyancy of an egg.
7. To observe the influence of different types of soil on the height of bean plants.
8. To evaluate the effect of exercise duration on heart rate.
9. To determine how the type of material affects the rate of heat loss.
10. To investigate the impact of different wavelengths of light on the rate of photosynthesis in pondweed.

For each aim, identify the following:

- Independent Variable (IV)
- Dependent Variable (DV)
- Control Variables (CV)

Write your answers on the next page.



## Basic Mathematical Concepts for A-Level Psychology

### 1. Averages (Mean, Mode, Median):

- Mean: The sum of all values divided by the number of values.

$$\text{Formula: Mean} = \frac{\sum x}{N}$$

- Mode: The value that appears most frequently in a data set.

- Median: The middle value in a data set when arranged in ascending order. If there is an even number of observations, the median is the average of the two middle numbers.

### 2. Range Calculation:

- Range: The difference between the highest and lowest values in a data set.

$$\text{Formula: Range} = \text{Maximum Value} - \text{Minimum Value}$$

### 3. Fractions:

- Fractions: A numerical quantity that is not a whole number, representing a part of a whole.

Example:  $\frac{1}{2}$ ,  $\frac{3}{4}$

### 4. Percentages:

- Percentages: A way of expressing a number as a fraction of 100.

$$\text{Formula: Percentage} = \left(\frac{\text{Part}}{\text{Whole}}\right) * 100$$

### 5. Ratios:

- Ratios: A relationship between two quantities, showing how many times one value contains or is contained within the other.

Example: The ratio of 2 to 3 is written as 2:3.

### 6. Significant Figures:

- Significant Figures: The digits in a number that are reliable and necessary to indicate the precision of the number.

Example: 0.00456 has three significant figures (4, 5, 6).

### 7. Standard Form:

- Standard Form: A way of writing very large or very small numbers using powers of 10.

$$\text{Example: } 4,500 = 4.5 \times 10^3$$

### 8. Orders of Magnitude:

- Orders of Magnitude: A class in a system of classification determined by size, each class being a factor of ten greater or smaller than the one before.

Example:  $10^3$  (thousand) is one order of magnitude greater than  $10^2$  (hundred).



## Questions

1. Calculate the mean of the following data set: 3, 7, 8, 5, 12.
2. Identify the mode of the following data set: 4, 5, 5, 6, 7, 8.
3. Determine the median of the following data set: 9, 3, 6, 7, 8.
4. Calculate the range of the following data set: 15, 22, 9, 33, 18.
5. Simplify the fraction  $18/24$ .
6. Convert the fraction  $3/4$  into a percentage.
7. Calculate 20% of 150.
8. If 40 is 25% of a number, what is the number?
9. Simplify the ratio 8:12.
10. If the ratio of cats to dogs in a pet store is 5:3 and there are 15 cats, how many dogs are there?
11. Round 0.003478 to three significant figures.
12. Express 123,456 to four significant figures.
13. Write 0.00056 in standard form.
14. Write  $7.2 \times 10^4$  as an ordinary number.
15. How many orders of magnitude is  $10^6$  greater than  $10^3$ ?
16. Find the mean, mode, median, and range of the following data set: 4, 8, 6, 5, 9, 3, 7.
17. Simplify the fraction  $45/60$  and convert it to a percentage.
18. Calculate 35% of 240.
19. The ratio of boys to girls in a class is 7:5. If there are 35 boys, how many girls are there?
20. Round 0.05678 to two significant figures and express it in standard form.
21. Write  $6.3 \times 10^5$  as an ordinary number and determine its order of magnitude.
22. Calculate the percentage increase from 50 to 65.
23. Convert the percentage 12.5% to a fraction and simplify it.
24. If 60 is 30% of a number, what is the number?
25. The population of a town increased from 20,000 to 30,000. Calculate the percentage increase.

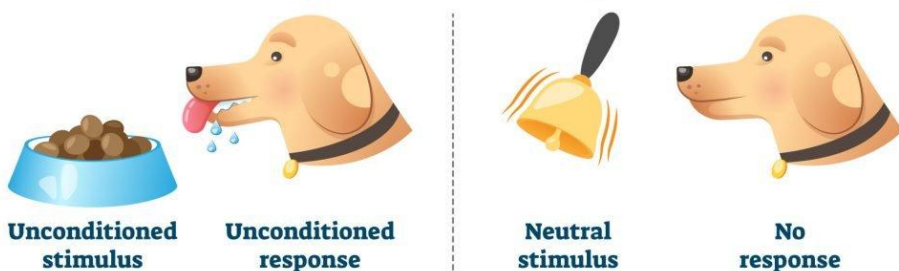
# Approaches in psychology

## Section 2

### CONDITIONING

Pavlov's Dog Experiment

#### BEFORE CONDITIONING



#### DURING CONDITIONING



#### AFTER CONDITIONING



## Wilhelm Wundt

### Wilhelm Wundt: The Father of Experimental Psychology

#### Early Years:

Wilhelm Maximilian Wundt was born on August 16, 1832, in Neckarau, Germany. He studied medicine at the University of Heidelberg, where he developed an interest in the workings of the human mind. Wundt's early academic career was marked by his work in physiology and his interest in the scientific study of consciousness.

#### Contribution to Psychology:

Wundt is often regarded as the "father of experimental psychology." In 1879, he established the first laboratory dedicated exclusively to psychological research at the University of Leipzig in Germany. This marked the formal separation of psychology from philosophy and physiology, establishing it as a distinct scientific discipline. Wundt believed that psychology should be the study of conscious experience and that this experience could be broken down into basic elements.

#### Introspection:

Wundt's primary method for studying the mind was introspection. Introspection involves examining one's own conscious thoughts and feelings. Wundt trained his students to carefully observe and report their internal experiences in response to stimuli. He believed that through introspection, it was possible to analyze the structure of the mind.

#### Evidence Supporting Wundt's Work:

Wundt's establishment of a laboratory for psychological research provided a model for future research institutions. His work laid the groundwork for various psychological theories and practices. The use of controlled experiments and introspection helped to systematize the study of mental processes, making psychology more scientific. Moreover, Wundt's emphasis on rigorous experimental methods influenced later schools of thought, such as structuralism and functionalism.

#### Evidence Refuting Wundt's Work:

Despite his contributions, Wundt's method of introspection has faced significant criticism. Critics argue that introspection is inherently subjective and lacks reliability, as different individuals may report different experiences in response to the same stimuli. This makes it difficult to generalize findings. Additionally, introspection cannot be used to study children, animals, or individuals with severe mental disorders, limiting its applicability. As psychology evolved, behaviourism emerged, focusing on observable behaviour rather than internal mental processes, further challenging Wundt's introspective methods.

## Questions

1. When and where was Wilhelm Wundt born?
2. What did Wundt study at the University of Heidelberg?
3. What significant event in psychology is Wundt known for in 1879?
4. What was Wundt's primary method for studying the mind?
5. How did Wundt believe conscious experience could be analysed?
6. What was the purpose of Wundt's laboratory at the University of Leipzig?
7. How did Wundt's work influence the development of psychological theories and practices?
8. What are the main criticisms of Wundt's method of introspection?
9. Why is introspection considered subjective and unreliable?
10. How did the emergence of behaviourism challenge Wundt's methods?

## Pavlov and Skinner

### Ivan Pavlov: The Pioneer of Classical Conditioning

#### Early Years:

Ivan Petrovich Pavlov was born on September 14, 1849, in Ryazan, Russia. Initially studying theology, Pavlov shifted his focus to the natural sciences and graduated from the University of St. Petersburg with a degree in medicine and chemistry.

#### Contribution to Psychology:

Pavlov is best known for his work in classical conditioning, a fundamental concept in behavioural psychology. His research laid the groundwork for understanding how organisms learn through association.

#### Pavlov's Experiments:

Pavlov's most famous experiment involved dogs. He observed that dogs would salivate not only when they tasted food but also when they saw the lab assistant who fed them. This observation led Pavlov to conduct controlled experiments where he paired a neutral stimulus (a bell) with an unconditioned stimulus (food). After repeated pairings, the bell alone, now a conditioned stimulus, would elicit salivation, a conditioned response.

#### Evidence Supporting Pavlov's Work:

Pavlov's experiments were groundbreaking in demonstrating the principles of associative learning. His rigorous methodology and careful control of variables provided a scientific basis for behaviourism. Classical conditioning has been applied in various fields, such as education, therapy, and animal training.

#### Evidence Refuting Pavlov's Work:

Critics argue that classical conditioning oversimplifies complex human behaviours and emotions. Some behaviours cannot be explained solely by associations formed through conditioning. Additionally, Pavlov's work was primarily conducted on animals, raising questions about the generalizability of his findings to humans.

### B.F. Skinner: The Architect of Operant Conditioning

#### Early Years:

Burrhus Frederic Skinner was born on March 20, 1904, in Susquehanna, Pennsylvania, USA. He initially pursued a career as a writer before turning to psychology, obtaining his Ph.D. from Harvard University.

#### Contribution to Psychology:

Skinner is renowned for developing the theory of operant conditioning, which emphasizes the role of reinforcement and punishment in shaping behaviour. His work extended the principles of behaviourism and had a significant impact on psychology and education.

#### Skinner's Experiments:

Skinner designed the "Skinner box," a controlled environment used to study operant conditioning. In his experiments, he placed animals, such as rats and pigeons, in the box where they could press a lever to receive food (positive reinforcement) or avoid a mild electric shock (negative reinforcement). He demonstrated how behaviours could be shaped and maintained through reinforcement schedules.

### Evidence Supporting Skinner's Work:

Skinner's research provided a comprehensive framework for understanding behaviour modification. Operant conditioning has been widely applied in areas such as education, behaviour therapy, and organizational behaviour management. Skinner's work also underscored the importance of environmental factors in influencing behaviour.

### Evidence Refuting Skinner's Work:

Critics of Skinner's approach argue that it neglects the cognitive and emotional aspects of human behaviour. Operant conditioning may not fully explain complex behaviours involving internal thought processes and motivations. Additionally, ethical concerns have been raised about the use of reinforcement and punishment in behaviour control.

### Questions

1. When and where was Ivan Pavlov born?
2. What field did Pavlov initially study before shifting to the natural sciences?
3. What is Pavlov best known for in the field of psychology?
4. Describe the basic setup of Pavlov's most famous experiment involving dogs.
5. What did Pavlov's experiments demonstrate about associative learning?
6. In what ways has classical conditioning been applied in real-world settings?
7. What are some criticisms of Pavlov's work on classical conditioning?
8. When and where was B.F. Skinner born?
9. What career did Skinner initially pursue before studying psychology?
10. What is Skinner best known for in the field of psychology?
11. Describe the basic setup of the "Skinner box" experiment.
12. What is the difference between positive and negative reinforcement in Skinner's theory?
13. How did Skinner demonstrate the shaping and maintenance of behaviours?
14. In what areas has operant conditioning been widely applied?
15. What are some criticisms of Skinner's work on operant conditioning?
16. How did Pavlov's and Skinner's approaches to studying behaviour differ?
17. How did Skinner's work underscore the importance of environmental factors in influencing behaviour?
18. What ethical concerns have been raised about the use of reinforcement and punishment in behaviour control?
19. How do Pavlov's and Skinner's contributions to psychology complement each other?
20. How might the cognitive and emotional aspects of behaviour challenge the principles of classical and operant conditioning?

Write your answers to the Pavlov and Skinner comprehension here:



Answers



## Key Working Scientifically Terms Answers:

1. What is a hypothesis and how is it usually formulated?

- A hypothesis is a testable statement predicting the outcome of a study or the relationship between variables. It is often formulated as an "if... then..." statement.

2. Define an independent variable and give an example.

- An independent variable (IV) is the variable that is manipulated by the researcher to observe its effect. For example, in a study on the effects of sleep on test performance, the amount of sleep would be the IV.

3. Explain what is meant by operationalisation and provide an example.

- Operationalisation involves defining variables in practical, measurable terms. For example, operationalising "stress" might involve measuring cortisol levels in the blood.

4. What does it mean for a study to have high reliability?

- A study has high reliability if the same results can be obtained when the experiment is repeated under identical conditions.

5. Differentiate between internal and external validity.

- Internal validity refers to whether the results of a study are due to the manipulation of the IV and not other factors. External validity refers to the extent to which the results of a study can be generalised to other settings, populations, or times.

6. Why is obtaining informed consent important in psychological research?

- Obtaining informed consent is important to ensure that participants are fully aware of the nature of the study, including any potential risks, and agree to participate voluntarily, thus respecting their autonomy and rights.

7. How can the way a sample is chosen affect a study's findings?

- The way a sample is chosen can affect the generalisability of the findings. If the sample is not representative of the population, the results may not be applicable to the broader population.

8. What is the purpose of random allocation in an experiment?

- Random allocation is used to assign participants to different groups by chance, ensuring that each participant has an equal likelihood of being placed in any group, which helps to eliminate selection bias.

9. Describe the process and importance of peer review.

- Peer review involves other experts in the field evaluating the quality, validity, and relevance of a researcher's work before it is published. This process is important for maintaining scientific standards and ensuring the credibility of published research.

10. What is the difference between qualitative and quantitative data?

- Qualitative data is non-numerical and provides descriptive information, while quantitative data is numerical and can be measured and analysed statistically.

## **Identifying Variables in Scientific Experiments Answers:**

1. To investigate the effect of different amounts of sunlight on the growth of tomato plants.
  - IV: Amount of sunlight
  - DV: Growth of tomato plants (measured in height, number of leaves, etc.)
  - CV: Type of tomato plant, soil type, amount of water, temperature, container size
  
2. To determine how the concentration of sugar solution affects the mass of potato cylinders by osmosis.
  - IV: Concentration of sugar solution
  - DV: Mass of potato cylinders
  - CV: Size and type of potato cylinders, temperature, duration of exposure, volume of solution
  
3. To examine the impact of various temperatures on the rate of enzyme activity.
  - IV: Temperature
  - DV: Rate of enzyme activity
  - CV: Type of enzyme, pH level, substrate concentration, reaction time
  
4. To explore how different pH levels influence the germination rate of seeds.
  - IV: pH level
  - DV: Germination rate of seeds
  - CV: Type of seeds, temperature, amount of water, light exposure, soil type
  
5. To study the effect of caffeine on the reaction time of adults.
  - IV: Amount of caffeine
  - DV: Reaction time of adults
  - CV: Age and health status of participants, time of day, type of caffeine source, testing environment

6. To assess how varying concentrations of salt in water affect the buoyancy of an egg.

- IV: Concentration of salt in water
- DV: Buoyancy of the egg (floating or sinking)
- CV: Size and type of egg, temperature of water, volume of water, container used

7. To observe the influence of different types of soil on the height of bean plants.

- IV: Type of soil
- DV: Height of bean plants
- CV: Type of bean plant, amount of water, amount of sunlight, temperature, container size

8. To evaluate the effect of exercise duration on heart rate.

- IV: Duration of exercise
- DV: Heart rate
- CV: Type of exercise, fitness level of participants, age of participants, time of day, hydration level

9. To determine how the type of material affects the rate of heat loss.

- IV: Type of material
- DV: Rate of heat loss
- CV: Initial temperature, surrounding temperature, thickness of material, size of material

10. To investigate the impact of different wavelengths of light on the rate of photosynthesis in pondweed.

- IV: Wavelength of light
- DV: Rate of photosynthesis (measured by oxygen production or bubble count)
- CV: Type of pondweed, temperature of water, concentration of CO<sub>2</sub>, volume of water, light intensity

## Basic Mathematical Concepts for A-Level Psychology Answers

1. Mean:  $(3 + 7 + 8 + 5 + 12) / 5 = 7$
2. Mode: 5
3. Median: Arrange in order: 3, 6, 7, 8, 9; Median: 7
4. Range:  $33 - 9 = 24$
5. Simplified fraction:  $18/24 = 3/4$
6. Percentage:  $(3/4) * 100 = 75\%$
7. 20% of 150:  $(20/100) * 150 = 30$
8. Number:  $40 / 0.25 = 160$
9. Simplified ratio:  $8:12 = 2:3$
10. Number of dogs:  $(15 * 3) / 5 = 9$
11. Rounded number: 0.00348
12. Four significant figures: 123,500
13. Standard form:  $5.6 * 10^{-4}$
14. Ordinary number: 72,000
15. Orders of magnitude difference: 3
16. Mean:  $(4 + 8 + 6 + 5 + 9 + 3 + 7) / 7 = 6$   
Mode: No mode (all values appear once)  
Median: Arrange in order: 3, 4, 5, 6, 7, 8, 9; Median: 6  
Range:  $9 - 3 = 6$
17. Simplified fraction:  $45/60 = 3/4$ ; Percentage: 75%
18. 35% of 240:  $(35/100) * 240 = 84$
19. Number of girls:  $(35 * 5) / 7 = 25$
20. Rounded number: 0.057; Standard form:  $5.7 * 10^{-2}$
21. Ordinary number: 630,000; Order of magnitude: 5
22. Percentage increase:  $((65 - 50) / 50) * 100 = 30\%$
23. Simplified fraction:  $12.5\% = 12.5/100 = 1/8$
24. Number:  $60 / 0.3 = 200$
25. Percentage increase:  $((30,000 - 20,000) / 20,000) * 100 = 50\%$

## Wilhelm Wundt Answers

1. Wilhelm Wundt was born on August 16, 1832, in Neckarau, Germany.
2. Wundt studied medicine at the University of Heidelberg.
3. In 1879, Wundt established the first laboratory dedicated exclusively to psychological research at the University of Leipzig in Germany.
4. Wundt's primary method for studying the mind was introspection.
5. Wundt believed that conscious experience could be analysed by breaking it down into basic elements.
6. The purpose of Wundt's laboratory at the University of Leipzig was to conduct controlled experiments to study mental processes and to establish psychology as a distinct scientific discipline.
7. Wundt's work influenced the development of psychological theories and practices by emphasizing rigorous experimental methods and helping to systematize the study of mental processes, making psychology more scientific.
8. The main criticisms of Wundt's method of introspection are that it is subjective, lacks reliability, and cannot be used to study certain populations, such as children, animals, or individuals with severe mental disorders.
9. Introspection is considered subjective and unreliable because different individuals may report different experiences in response to the same stimuli, making it difficult to generalize findings.
10. The emergence of behaviourism challenged Wundt's methods by focusing on observable behaviour rather than internal mental processes, thus emphasizing objective measurement and reliability in psychological research.

## Pavlov and Skinner Answers

1. Ivan Pavlov was born on September 14, 1849, in Ryazan, Russia.
2. Pavlov initially studied theology before shifting to the natural sciences.
3. Pavlov is best known for his work in classical conditioning.
4. Pavlov's most famous experiment involved pairing a neutral stimulus (a bell) with an unconditioned stimulus (food) to elicit salivation, demonstrating associative learning.
5. Pavlov's experiments demonstrated that organisms could learn to associate a neutral stimulus with a significant event, leading to a conditioned response.
6. Classical conditioning has been applied in education, therapy, animal training, and understanding phobias and other psychological conditions.
7. Criticisms of Pavlov's work include the oversimplification of complex human behaviours and the challenge of generalizing findings from animal studies to humans.
8. B.F. Skinner was born on March 20, 1904, in Susquehanna, Pennsylvania, USA.
9. Skinner initially pursued a career as a writer before turning to psychology.
10. Skinner is best known for developing the theory of operant conditioning.
11. The "Skinner box" experiment involved placing animals in a controlled environment where they could press a lever to receive food or avoid a shock, demonstrating operant conditioning.
12. Positive reinforcement involves adding a rewarding stimulus to increase a behaviour, while negative reinforcement involves removing an aversive stimulus to increase a behaviour.
13. Skinner demonstrated the shaping and maintenance of behaviours through reinforcement schedules in controlled experiments using the "Skinner box."
14. Operant conditioning has been widely applied in education, behaviour therapy, and organizational behaviour management.
15. Criticisms of Skinner's work include neglecting cognitive and emotional aspects of behaviour and ethical concerns about reinforcement and punishment.
16. Pavlov's approach focused on classical conditioning and associative learning, while Skinner's approach emphasized operant conditioning and the role of reinforcement and punishment.
17. Skinner's work underscored the importance of environmental factors in influencing behaviour by demonstrating how behaviours could be shaped through reinforcement.
18. Ethical concerns about reinforcement and punishment include the potential for manipulation and control of behaviour in ways that may not respect individual autonomy.
19. Pavlov's and Skinner's contributions complement each other by providing a broader understanding of learning and behaviour through classical and operant conditioning.
20. Cognitive and emotional aspects of behaviour challenge the principles of classical and operant conditioning by suggesting that internal thought processes and motivations play a significant role in behaviour beyond mere associations and reinforcements.