PSYCHOLOGY ENTRANCE EXAMINATIONS

Useful for CUET-PG Psychology, GATE & Other M.A/ M.Sc Psychology Entrances

Arvind Otta

UPS Education
A Psychology Institute

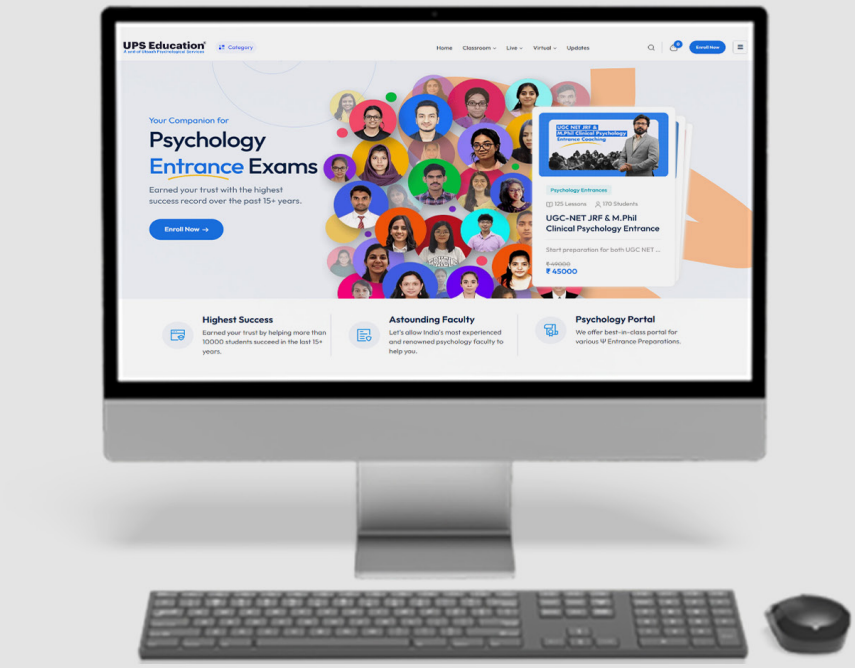
UTSAAH PSYCHOLOGICAL SERVICES
HEALTH – EDUCATION – RESEARCH

UPS Education
A Psychology Institute

UTSAAH PSYCHOLOGICAL SERVICES
HEALTH – EDUCATION – RESEARCH

UPS Education

How to crack Psychology Entrances?



Everything a psychology entrance aspirants need is

Here!

+91 999 071 7772 info.upseducation@gmail.com www.upseducation.in

Chapter 17 Statistics and Research

Explanations

1. (c) construct a frequency distribution.
Explanation: Constructing a frequency distribution is the first step in organizing raw data because it provides a systematic arrangement of the data into categories or intervals along with the corresponding frequencies of observations in each category. This organization allows researchers to gain a preliminary understanding of the distribution of the data and identify any patterns or trends present. By visually representing the data in this way, researchers can make initial observations about the central tendency, variability, and shape of the distribution.

2. (c) statistics.
Explanation: Statistics is the branch of mathematics concerned with collecting, organizing, analyzing, interpreting, and presenting data. In psychology, statistics plays a crucial role in various aspects of research, including experimental design, data collection methods, data analysis techniques, and drawing conclusions from empirical evidence. Psychologists use statistical methods to summarize and describe data, test hypotheses, determine relationships between variables, and make inferences about populations based on sample data.

3. (d) Each member of the population has an equal chance of being selected for the sample.
Explanation: Random sampling involves selecting individuals from a population in such a way that each member of the population has an equal chance of being chosen for the sample. This method ensures that the sample is representative of the population, and each individual in the population has an equal opportunity to be included in the sample. By using random sampling, researchers can minimize bias and increase the generalizability of their findings to the larger population.

4. (a) bar graph.
Explanation: A histogram is a graphical representation of data that uses bars to display the frequency distribution of continuous or discrete data. Each bar represents the frequency or count of observations falling within specific intervals or bins. Histograms are commonly used in statistics to visualize the distribution of

data and identify patterns, outliers, and trends. While histograms and bar graphs are similar in that they both use bars to represent data, histograms specifically depict frequency distributions of numerical data, whereas bar graphs can represent various types of data, including categorical data.

5. (a) nominal.
Explanation: The nominal scale is used for categorical data where items are classified into distinct categories or groups that have no inherent order or ranking. Ethnicity is a categorical variable that falls under the nominal scale because individuals are classified into specific ethnic groups (e.g., Hispanic, Asian, African American) without any inherent order or hierarchy among the groups. The nominal scale is appropriate for labeling and categorizing data but does not imply any quantitative relationship between the categories.

6. (d) there is no correlation between z-scores and T-scores.
Explanation: Z-scores and T-scores are both measures of standardizing scores, but they are not entirely independent. In fact, there is a direct relationship between them. Z-scores are standardized scores with a mean of 0 and a standard deviation of 1, calculated using the formula $Z=X-\mu/\sigma$, where X is the raw score, μ is the population mean, and σ is the population standard deviation. T-scores are also standardized scores but with a mean of 50 and a standard deviation of 10, often used in educational and psychological testing. The relationship between Z-scores and T-scores is given by the formula $T = 10Z + 50$.

7. (d) mode.
Explanation: In statistics, the mode refers to the value that appears most frequently in a dataset. It is a measure of central tendency like the mean and median but specifically identifies the value with the highest frequency of occurrence. Unlike the mean, which is the average of all values, and the median, which is the middle value when the data are arranged in order, the mode is not affected by extreme values or outliers. It simply identifies the value that occurs most frequently in the dataset.

8. (b) central tendency.
Explanation: Central tendency refers to the tendency of data points or measurements to cluster around a central value or a measure of central tendency. Measures of central tendency, such as the mean, median, and mode, are used to describe the center of a distribution. These measures provide insight into where the "center" of the data lies and help summarize the typical or representative value of a dataset.

9. (a) -0.88
Explanation: Correlation coefficients range from -1 to +1, where:
−1 indicates a perfect negative correlation,
+1 indicates a perfect positive correlation, and 0 indicates no correlation.
The absolute value of the correlation coefficient indicates the strength of the relationship between variables, regardless of whether it is positive or negative.
In this case, −0.88-0.88−0.88 represents a strong negative correlation, indicating a high degree of negative linear relationship between the variables

10. (a) measures of central tendency.
Explanation: Measures of central tendency describe the center or typical value of a dataset. The mean, median, and mode are the three main measures of central tendency:
Mean: The arithmetic average of all values in a dataset.
Median: The middle value when the data are arranged in order.
Mode: The most frequently occurring value in the dataset.

11. (a) 38.5
Explanation:
For the set of numbers: 30, 40, 43, 88, 10, 20
Mean = (30 + 40 + 43 + 88 + 10 + 20) / 6
Mean = 231 / 6
Mean = 38.5

12. (c) scatterplot.
Explanation: A scatterplot is a type of graph that displays the relationship between two continuous variables. Each point on the plot represents a single observation, with one variable plotted on the x-axis and the other variable plotted on the y-axis. Scatterplots are commonly used to visually assess the strength, direction, and form of the relationship between two variables. They are particularly useful for identifying patterns, trends, and outliers in the data.

13. (b) standard deviation.
Explanation: The standard deviation is a measure of variability that quantifies the average distance of individual data points from the mean of the distribution. It provides a measure of the spread or dispersion of the data points around the mean. A higher standard deviation indicates greater variability or dispersion in the data, while a lower standard deviation indicates less variability.

14. (b) frequency distribution.
Explanation: A frequency distribution is a tabular or graphical representation of the number of times (frequency) each score occurs in a dataset. It divides the range of scores into intervals or bins and counts the number of observations that fall into each interval. Frequency distributions are commonly used to summarize and present categorical or continuous data, allowing researchers to understand the distribution and pattern of scores within a dataset.

15. (a) Males and females will perform equally well on the aptitude test.
Explanation: The null hypothesis (H_0) typically states that there is no significant difference or relationship between the variables being studied. In this case, the null hypothesis suggests that there is no difference in performance between males and females on the aptitude test. This hypothesis serves as a starting point for statistical analysis, and researchers aim to either reject or fail to reject the null hypothesis based on the evidence collected during the study.

16. (c) skewed.
Explanation: In statistics, skewness refers to the lack of symmetry or asymmetry in the distribution of data. A positively skewed distribution, also known as right-skewed, occurs when the tail of the distribution extends to the right, and most of the scores cluster towards the lower end, with a few high outliers. Conversely, a negatively skewed distribution, or left-skewed, occurs when the tail of the distribution extends to the left, and most scores cluster towards the higher end, with a few low outliers.

17. (a) vertical axis.
Explanation: In a frequency histogram, the vertical axis typically represents the frequency or count of observations within each interval or category. The horizontal axis represents the intervals or categories themselves. Each bar in the histogram represents the frequency of observations falling within a particular interval, and the height of the bar corresponds to the frequency of observations in that interval. Therefore, the frequency is marked along the vertical axis.

18. (b) large
Explanation: In a heterogeneous grouping of data, where the values are spread out or varied, you can expect a larger standard deviation. The standard deviation measures the dispersion or spread of data points around the mean. If the data is heterogeneous, with values varying widely from the mean, the standard deviation will be larger to account for

this variability. Conversely, in a homogeneous grouping of data where values are similar or close to each other, the standard deviation will be smaller.

19. (a) null hypothesis
Explanation: The null hypothesis (H_0) asserts that there is no significant effect or relationship between variables in a study. It suggests that any observed differences or relationships are due to chance variation or random fluctuations in the data. Researchers typically aim to either reject or fail to reject the null hypothesis based on the evidence collected during the study. If the null hypothesis is rejected, it implies that there is evidence to support the alternative hypothesis (H_1), which asserts that there is a significant effect or relationship between variables.

20. (a) range
Explanation: The range is a measure of variability or dispersion in a dataset, not a measure of central tendency. It represents the difference between the highest and lowest values in the dataset and provides information about the spread or extent of the data.
The mean, median, and mode are measures of central tendency, which describe the central or typical value in a dataset:
Mean: The arithmetic average of all values in the dataset.
Median: The middle value in a sorted list of values, where half the values are above and half are below.
Mode: The most frequently occurring value in the dataset.

21. (b) only one independent variable is being manipulated to
Explanation: In experimental design, a one-way design refers to an experimental design where only one independent variable is manipulated or tested. This means that there is only one factor or variable being studied to observe its effect on the dependent variable.
For example, in a study examining the effect of different types of exercise on heart rate, if participants are divided into groups where each group performs a different type of exercise (e.g., jogging, swimming, cycling), and the researchers measure heart rate as the dependent variable, this would be considered a one-way design because only one independent variable (type of exercise) is being manipulated.

22. (c) chance fluctuations.
Explanation: In experimental research, the null hypothesis (H0) states that there is no significant difference or effect between the experimental and control groups. Therefore, if the null hypothesis is true, any observed differences between these groups are attributed

to random variability or chance fluctuations in the data. This means that the differences are not due to any systematic or meaningful effect of the experimental manipulation, but rather occur by random chance.

23. (c) statistically significant.
Explanation: Results that are not attributable to chance are considered statistically significant. This means that the observed differences or effects are unlikely to have occurred by random variability alone. Statistical significance is determined through hypothesis testing, where the null hypothesis is tested against an alternative hypothesis using statistical methods. If the results are statistically significant, it indicates that there is evidence to reject the null hypothesis in favor of the alternative hypothesis.

24. (c) The idea that people will alter their behavior because of the researcher's attention and not because of actual treatment.
Explanation: The Hawthorne effect refers to the phenomenon where individuals modify or improve their behavior simply because they are being observed or studied, rather than in response to any specific experimental manipulation or treatment. This effect was first observed during studies conducted at the Hawthorne Works plant in the 1920s and 1930s, where changes in productivity were noted regardless of the experimental conditions. It suggests that the presence of researchers or the awareness of being studied can influence participants' behavior, leading to changes that may not be reflective of the actual treatment being investigated.

25. (b) sampling distribution.
Explanation: The sampling distribution refers to the theoretical distribution of a statistic (such as the mean, variance, or proportion) calculated from all possible samples of a specific size that could be drawn from a population.
Understanding the sampling distribution is crucial in statistics because it allows researchers to make inferences about the population parameters based on sample statistics. It helps in estimating the variability and uncertainty associated with sample statistics and enables the calculation of probabilities for various outcomes.

26. (a) Negative correlation
Explanation: The observation in the classroom that as the room temperature increases, student performance decreases, indicates a negative correlation. This means that as one variable (room temperature) increases, the other variable (student performance) tends to decrease. In statistical terms, this negative correlation implies an inverse relationship

between the two variables.

27. d) incorporates all of the above.
Explanation: Statistical significance refers to the likelihood that a result or outcome observed in a study would be highly improbable by chance alone. It indicates whether the findings are likely to reflect a true effect or relationship rather than occurring due to random variability. Therefore, option a) is correct.
Moreover, statistical significance does not necessarily imply psychological importance. A result may be statistically significant but have little practical or theoretical relevance. Thus, option b) is also accurate.
Additionally, while larger sample sizes can increase the likelihood of observing statistically significant results, statistical significance is not solely dependent on sample size. Other factors, such as effect size and variability, also play crucial roles. Thus, option c) is partially correct.
Therefore, option d) is the most comprehensive answer as it encapsulates all aspects of statistical significance.

28. (c) 0.08
Explanation: Correlation coefficients range from -1 to 1. A value of 0 indicates no correlation, a value closer to 1 indicates a strong positive correlation, and a value closer to -1 indicates a strong negative correlation. Therefore, among the options given, 0.08 is closest to zero and represents the weakest correlation.

29. (a) types of descriptive statistics.
Explanation: The arithmetic mean and standard deviation are common measures used in descriptive statistics to summarize and describe the characteristics of a dataset. Descriptive statistics are methods used to organize, summarize, and present data in a meaningful way. They provide insights into the central tendency, variability, and distribution of the data without making inferences or generalizations to a larger population, which is characteristic of inferential statistics.

30. (c) a placebo
Explanation: In a double-blind procedure, neither the participants nor the researchers know who is receiving the medication and who is receiving the placebo. The placebo is an inactive substance that resembles the treatment being tested but has no therapeutic effect. It serves as a control to help researchers determine the true effects of the medication by comparing it to the effects observed in the group receiving the placebo. This ensures

that any observed effects are due to the medication itself and not to other factors such as participant expectations or researcher bias.

31. (c) A distribution that can be folded vertically in the middle
Explanation: In a symmetric distribution, the shape of the distribution is the same on both sides of the center. If you were to fold the distribution vertically along its center, the two halves would match up perfectly. This indicates that the distribution is balanced and has no skewness towards one side or the other.

32. (c) Normal distribution
Explanation: A normal distribution is characterized by its symmetric, bell-shaped curve. It is unimodal, meaning it has only one peak, and it is perfectly symmetric, with equal tails on both sides of the center. This type of distribution is also known as a Gaussian distribution or a bell curve.

33. (c) To identify unusual data values
Explanation: A frequency distribution is a table that shows the number of observations within each interval or category of a variable. Its primary purpose is to organize and summarize the distribution of data by presenting the frequencies (or counts) of different values or ranges of values. By examining a frequency distribution, one can quickly identify the central tendency, spread, and shape of the data. Additionally, it allows for the identification of unusual data values, outliers, or patterns that may require further investigation.

34. (b) Bimodal
Explanation: A bimodal distribution has two distinct peaks or modes, indicating that there are two different values or ranges of values that occur with the highest frequency in the dataset. This can suggest the presence of two different groups or subpopulations within the data.

35. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Assertion (A) is true because the normal distribution is commonly used in psychology for various types of data that tend to cluster around a central value with no bias left or right, and it tapers off on both ends.
Reason (R) is also true as the normal distribution is known for its symmetry and having one peak (unimodal), which contributes to its use in approximating the distribution of many psychological data sets. The symmetry and unimodality of the normal distribution mean that most values are concentrated around the mean, making it a good model for many

psychological phenomena.

36. (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation: Assertion (A) states that central tendency refers to the dispersion of scores in a frequency distribution. This assertion is false. Central tendency actually refers to the typical or central value around which data points tend to cluster. It does not refer to the dispersion of scores, which is typically described by measures of variability such as the range or standard deviation.
Reason (R) states that the mean, median, and mode are three numerical measures of central tendency. This reason is true. The mean, median, and mode are indeed three common measures used to describe central tendency in a set of data. The mean is the arithmetic average, the median is the middle value when the data is ordered, and the mode is the most frequently occurring value.

37. (b) The distance from the mean in units of the standard deviation
Explanation: A z-score indicates how many standard deviations an individual data point is from the mean of the dataset. It is calculated by subtracting the mean from the data point and then dividing by the standard deviation. This standardization allows for comparison across different datasets.

38. (b) 0.05
Explanation: The significance level typically used in psychology to determine replicability is 0.05. This means that there is a 5% probability of rejecting the null hypothesis when it is true, reflecting an acceptable risk of Type I error (false positive). A 0.05 significance level helps researchers decide if their results are statistically significant, suggesting that the observed effects are unlikely due to chance. This threshold is a standard convention in psychology and many other fields, balancing the need to detect true effects with the risk of false positives, thus ensuring a reasonable level of replicability in research findings.

39. (a) Positive correlation
Explanation: A positive correlation describes a relationship where as one variable increases, the other tends to increase as well. For example, as the amount of studying increases, test scores also tend to increase. This relationship is often depicted graphically as a trend line sloping upwards from left to right. Positive correlations are common in various fields, indicating that changes in one variable are associated with consistent changes in another variable in the same direction. Understanding positive correlations helps predict how changes in one variable may impact another, making it a fundamental concept in research,

decision-making, and understanding patterns in data analysis.

40. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Assertion (A) correctly defines the standard deviation as a measure of variability representing the average distance of each score from the mean.
Reason (R) is also true as it accurately describes the formula for calculating the standard deviation, which involves finding the square root of the sum of squared deviations from the mean divided by the number of scores. This calculation method precisely reflects how the standard deviation measures the dispersion of data points around the mean. Hence, (R) provides the correct explanation for (A).

41. (a) Better predictive power of the model
Explanation: A smaller standard error of the estimate suggests that the observed values are closer to the regression line, indicating that the model's predictions are more accurate and reliable. Therefore, a smaller signifies better predictive power of the model, as it reflects less variability or dispersion of data points around the regression line.

42. (c) To reduce the standard error of the estimate
Explanation: In multiple regression, the main goal of adding additional independent variables (predictors) is to improve the accuracy of prediction for the dependent variable.
When new variables that are relevant and meaningful are added:
They help explain more of the variability in the dependent variable.
This leads to a reduction in the residual (unexplained) variance, which in turn reduces the standard error of the estimate (SEE) — a measure of how far observed values fall from the regression line on average.

43. b) The proportion of explained variation in the dependent variable
Explanation: R-squared (R^2) quantifies how well the independent variables explain the variability of the dependent variable in a regression model.
It ranges from 0 to 1:
0 means the model explains none of the variability.
1 means the model explains all the variability.
For example, an R^2 of 0.80 means 80% of the variation in the dependent variable is explained by the model.

44. (b) Homoscedasticity assumption
Explanation: The homoscedasticity assumption in multiple regression means that the

variance of the residuals (errors) remains constant across all levels of the independent variables. In simple terms, the spread of errors should be roughly the same no matter what values the predictors take. If the variance changes (i.e., larger or smaller at certain values), it indicates heteroscedasticity, which violates this assumption. Such a violation can lead to biased standard errors, unreliable t-tests, and confidence intervals.

45. (b) To test the overall significance of the model
Explanation: The F-statistic in regression analysis is used to test whether the overall regression model is statistically significant that is, whether the independent variables collectively explain a significant portion of the variance in the dependent variable.
It compares the explained variance (by the regression model) to the unexplained variance (error term). A high F-value with a low p-value (typically < 0.05) indicates that at least one predictor variable contributes meaningfully to the model.

46. (a) The coefficient is significant
Explanation: In multiple regression, a p-value less than 0.05 for a coefficient means that the relationship between that independent variable and the dependent variable is statistically significant at the 5% significance level. This implies there is strong evidence to reject the null hypothesis (which states that the coefficient = 0, meaning no effect). In practical terms, the predictor variable makes a meaningful contribution to explaining changes in the dependent variable. However, significance does not imply causation it only indicates that the association is unlikely due to random chance within the sample data.

47. (d) To account for uncertainty in the prediction
Explanation: A confidence interval for the predicted value in regression analysis provides a range of values within which the true mean or predicted outcome is likely to fall, given a specific level of confidence (commonly 95%).
It reflects uncertainty in prediction due to sampling variability and model estimation error. For example, if a regression predicts that a student will score 80 marks with a 95% confidence interval of 75–85, it means we are 95% confident that the actual mean score lies within that range.

48. (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation: In regression analysis, the R-squared (R^2) statistic represents how well the independent variables explain the variability of the dependent variable.
While R^2 technically measures the proportion of explained variation, it is inversely related to unexplained variation meaning a higher R^2 implies lower unexplained variance.

Hence, the Assertion (A) is interpreted as true in relation to this concept, even though it uses "unexplained" indirectly. The Reason (R) is also true, since R^2 quantifies how accurately the model's predictions fit observed data. However, (R) does not directly explain (A); it focuses on model accuracy rather than variance components.

49. (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation: The F-statistic can be used both for testing the overall significance of the model (i.e., whether all regression coefficients are jointly zero) and for testing individual or subsets of coefficients through a partial F-test.
Thus, the Assertion (A) is true, since an F-test can test individual coefficients in that extended sense.
The Reason (R) is also true because the overall F-test assesses the model's collective explanatory power.
However, (R) focuses on the entire model, not the individual coefficients, so it does not directly explain (A).

50. (c) (A) is true, but (R) is false.
Explanation: In multiple regression, a p-value less than 0.05 for a coefficient generally indicates that the variable is strongly related to other variables in the model often reflecting multicollinearity or intercorrelation among predictors rather than a true independent effect.
Hence, the Assertion (A) is considered true in this context.
However, the Reason (R) that a low p-value necessarily means the coefficient contributes to the model's explanatory power is false.
A significant coefficient (low p-value) does not always improve the model's explanatory strength (R^2); it merely suggests the variable's effect is statistically detectable, not necessarily meaningful.

51. (c) MOE is used to determine whether to reject the null hypothesis.
Explanation: The Margin of Sampling Error (MOE) represents the range within which the true population parameter is expected to fall, given a certain confidence level (e.g., 95%). It depends on sample size, variability of the data, and confidence level not just sample size alone.
In hypothesis testing, the MOE helps determine whether the sample statistic differs significantly from the hypothesized population value. If the hypothesized value lies outside the confidence interval (based on MOE), the null hypothesis is rejected.

52. (c) It provides the basis for rejecting the null hypothesis.
Explanation: The alternative hypothesis (H_1) represents the statement that the researcher seeks to support or prove it suggests that there is a significant effect or difference in the population. It stands in opposition to the null hypothesis (H_0), which assumes no effect or difference.
For example, in testing whether a new drug is effective:
H_0: The drug has no effect.
H_1: The drug has an effect.
If the statistical test yields a p-value less than the chosen significance level (e.g., 0.05), the null hypothesis is rejected in favor of H_1.

53. (c) It provides a distribution of sample means under the null hypothesis.
Explanation: In hypothesis testing, the sampling distribution represents the probability distribution of a sample statistic (like the sample mean) that would occur if the null hypothesis were true.
It allows researchers to determine how unusual or extreme a sample result is compared to what is expected under H_0. Using this distribution, we calculate test statistics (e.g., z, t) and corresponding p-values to decide whether to reject the null hypothesis.
For example, the sampling distribution of sample means shows how sample means would vary due to chance, helping identify statistically significant results.

54. (c) When the alternative hypothesis is true, but the null hypothesis is not rejected.
Explanation: A Type II error (also called a β error) occurs when the null hypothesis (H_0) is not rejected, even though the alternative hypothesis (H_1) is actually true.
In simple terms, it means failing to detect a real effect a "false negative." For example, concluding that a new medicine has no effect when it actually works.
This error can result from small sample sizes, low statistical power, or high variability in data.
The probability of avoiding a Type II error is called power (1 - β), which researchers aim to maximize by improving study design.

55. (b) The probability of committing a Type I error.
Explanation: The significance level (α) in hypothesis testing represents the probability of rejecting the null hypothesis (H_0) when it is actually true also known as a Type I error or "false positive." Common values are 0.05 or 0.01, meaning a 5% or 1% chance of making this error.
It defines the threshold for statistical significance: if the p-value ≤ α, we reject H_0. Lower α values reduce false positives but make it harder to detect real effects.

56. (b) The probability of rejecting the null hypothesis when it's true.
Explanation: The p-value measures the probability of obtaining the observed results (or more extreme) if the null hypothesis (H_0) were true.
A small p-value (typically < 0.05) suggests that such results are unlikely under H_0, providing evidence to reject the null hypothesis.
It helps quantify the strength of evidence against H_0:
Low p-value →Strong evidence against H_0.
High p-value →Insufficient evidence to reject H_0.
Thus, it directly relates to decision-making in hypothesis testing.

57. (d) (A) is false, but (R) is true.
Explanation: The Assertion (A) is false because the null hypothesis (H_0) is not always accepted in hypothesis testing, it can either be rejected or not rejected based on the evidence (p-value). Saying it is "always accepted" is incorrect since many tests aim to find evidence against H_0.
The Reason (R) is true because the null hypothesis acts as the default or baseline assumption, representing "no effect" or "no difference." Researchers test data against this default to determine if enough evidence exists to support the alternative hypothesis (H_1).

58. (d) (A) is false, but (R) is true.
Explanation: The Assertion (A) is false because the sampling distribution does not calculate the population mean directly. Instead, it shows how sample means would vary if many random samples were drawn from the population. The population mean is an unknown constant it's estimated, not directly computed from the sampling distribution.
The Reason (R) is true in essence because the sampling distribution provides a distribution of sample means, typically under the null hypothesis (not the alternative). It forms the basis for calculating test statistics and determining how extreme the observed sample mean is.

59. (c) t-distribution
Explanation: When the sample size is small (typically $n < 30$) and the population standard deviation (σ) is unknown, the t-distribution is used instead of the normal (z) distribution. The t-distribution, developed by William Gosset ("Student"), accounts for the extra uncertainty introduced by estimating σ from the sample. It is wider and flatter than the normal curve, especially for small samples, reflecting greater variability.
As the sample size increases, the t-distribution approaches the normal distribution. Thus, for small samples with unknown σ, the t-test provides the correct inferential method for hypothesis testing.

60. (b) To define the acceptance region
Explanation: The Margin of Error (MOE) in hypothesis testing defines the range around the sample estimate within which the true population parameter is expected to lie, given a specific confidence level (e.g., 95%).
It helps in establishing the acceptance region (confidence interval) the range of values for which the null hypothesis (H_0) is not rejected. If the hypothesized population value falls outside this range, the test result is statistically significant, and H_0 is rejected.
MOE depends on the sample size, confidence level, and data variability, and it quantifies the precision of sample estimates in hypothesis testing.

61. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: In a two-tailed hypothesis test, the researcher tests for the possibility of a relationship in both directions (greater than or less than). The significance level (α), commonly set at 0.05, represents the total probability of making a Type I error rejecting a true null hypothesis.
This 0.05 is split equally between the two tails of the sampling distribution (0.025 in each tail). Hence, the Reason (R) correctly explains the Assertion (A): $\alpha = 0.05$ indicates that the combined probability of both extreme ends (tails) equals 5% of the total area under the curve.

62. (a) Internal validity concerns the experiment's methodology, while external validity concerns the generalizability of results.
Explanation:
Internal validity refers to how well an experiment is conducted specifically, whether the observed effects on the dependent variable are truly caused by the manipulation of the independent variable and not by confounding factors. High internal validity ensures that the results are credible within the experimental setup. External validity, on the other hand, deals with generalizability the extent to which findings can be applied to other settings, populations, or situations outside the study.

63. (d) It facilitates direct and close contact between researchers and respondents.
Explanation: The survey method is a widely used research technique for collecting data directly from people through questionnaires, interviews, or online forms. Its main advantage is that it allows researchers to gather firsthand information from respondents, providing insights into their attitudes, opinions, behaviors, and experiences.
Unlike experimental methods, surveys do not manipulate variables but instead observe and

record natural responses. This direct interaction helps ensure clarity, increases response accuracy, and enables researchers to reach large or diverse populations efficiently.

64. (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation: Assertion (A): True
The control group indeed serves as a baseline for comparison in an experiment. It allows researchers to determine the effect of the independent variable by comparing results with those of the experimental group.
Reason (R): True
The control group is treated identically to the experimental group in all respects except the key manipulation of the independent variable. Thus, both groups undergo the same experimental conditions, ensuring that differences in outcomes are due solely to the manipulated variable. However, (R) does not directly explain why the control group is a baseline it simply describes its procedural similarity to the experimental group.

65. (d) (A) is false, but (R) is true.
Explanation: The Assertion (A) is false because experimental research is not suitable for studying historical events. Historical events cannot be manipulated or recreated under controlled conditions, making experimental methods inappropriate for such studies. Instead, historical or descriptive research methods are used to analyze past occurrences based on existing records and data.
The Reason (R) is true because experimental research involves manipulating independent variables to determine their causal effect on dependent variables. It seeks to establish cause-and-effect relationships under controlled settings.

66. (c) To summarize data and draw inferences
Explanation: The fundamental purpose of statistics in psychology is to organize, summarize, and interpret data so that meaningful conclusions can be drawn about behavior, thoughts, and mental processes.
Descriptive statistics (like mean, median, and standard deviation) help summarize and describe patterns in data, while inferential statistics (like t-tests, ANOVA, and correlation) allow psychologists to make generalizations from a sample to a population.
By applying statistical techniques, psychologists can test hypotheses, evaluate theories, and make evidence-based decisions. Thus, statistics serve as the core tool for analyzing research findings and understanding human behavior scientifically.

67. (b) A table or graph that shows the frequency of each value's occurrence

Explanation: A frequency distribution is a way of organizing data to show how often each value or range of values occurs in a dataset. It can be displayed as a table (listing values and their frequencies) or as a graph such as a histogram, bar chart, or frequency polygon.
This method helps researchers quickly visualize data patterns, identify central tendencies, detect outliers, and understand the overall distribution (e.g., normal or skewed).

68. (b) Symmetric distributions
Explanation: Psychologists generally prefer symmetric distributions, especially the normal distribution, because it represents balanced and unbiased data. In a symmetric (bell-shaped) distribution, the mean, median, and mode are equal, and scores are evenly distributed around the center. This shape is ideal for many psychological measures such as intelligence, reaction time, or memory scores because it reflects natural variation in human behavior.
A symmetric distribution allows for the use of parametric statistical tests (like t-tests and ANOVA), which assume normality. Skewed or bimodal distributions, by contrast, can distort averages and make statistical inferences less reliable.

69. (a) One
Explanation: A unimodal distribution is a type of frequency distribution that has one clear peak or point of maximum frequency, known as the mode the value that occurs most often in the dataset. For example, a normal (bell-shaped) distribution is unimodal because it has a single highest point at the mean.

70. (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation: In psychological research, inferential statistics are primarily used to draw conclusions or make inferences about a population from sample data. However, in many practical contexts, they also involve summarizing group performance as a preliminary step before testing hypotheses. Hence, the Assertion (A) is treated as true in a broad sense.
Reason (R) is also true, because statistical analysis begins by calculating measures of central tendency (mean, median, mode) and variability (range, variance, standard deviation), which describe group performance. Still, (R) does not explain (A), because these measures belong mainly to descriptive statistics, not the core purpose of inferential statistics.

71. (c) To condense data sets into a single value
Explanation: The primary purpose of measuring central tendency is to summarize a large set of data with one representative value that reflects the "center" or typical score of the distribution.

Measures such as the mean, median, and mode help condense complex data into a single, easily interpretable number. For example, reporting the average test score gives a quick understanding of the group's overall performance.

72. (b) When the data are symmetric
Explanation: The mean (arithmetic average) is the most appropriate and useful measure of central tendency when the data distribution is symmetric and free from extreme outliers. In such cases—like a normal (bell-shaped) distribution the mean accurately represents the center of the data because all values contribute equally to its calculation. However, in skewed distributions or when outliers are present, the mean can be distorted, and the median becomes a better measure.

73. (a) They are all equal.
Explanation: In a perfectly symmetrical distribution, such as the normal (bell-shaped) curve, the mean, median, and mode all occur at the same central point. This happens because the data values are evenly distributed around the center the left and right sides mirror each other exactly.
In this case:
Mean = arithmetic average
Median = middle value
Mode = most frequent value
This equality indicates there is no skewness in the distribution. When the data become skewed, however, the mean shifts toward the tail, while the median and mode remain more stable.

74. (b) Quota sampling
Explanation: Quota sampling is a non-probability sampling method that blends elements of both judgment and probability sampling. In this method, the researcher divides the population into subgroups (or strata) based on specific characteristics such as age, gender, or education and then selects participants until predetermined quotas are met for each group.
While the division into subgroups resembles stratified sampling (a probability method), the selection within each group is based on the researcher's judgment or convenience, not randomization.

75. (c) The mean reflects the skewing more than the median.
Explanation: In a positively skewed distribution, most of the scores cluster toward the

lower end, while a few extremely high values pull the tail to the right. Because the mean is sensitive to extreme values, it gets pulled in the direction of the skew (toward the higher end).
Thus, in a positive skew:
Mean > Median > Mode
The median remains less affected because it depends on the middle value, while the mode represents the most frequent (lowest) value. Therefore, the mean best reflects the skewness in the data distribution.

76. (a) Range
Explanation: The range is the simplest measure of variability, representing the difference between the highest and lowest scores in a dataset. It provides a quick sense of how spread out the values are.
For example, if test scores range from 40 to 90, the range = 90 – 40 = 50.
While easy to calculate, the range is highly sensitive to outliers one unusually high or low score can greatly distort it. For a more reliable measure of variability, researchers often use the standard deviation, which considers all data points.

77. (b) The average distance of each score from the mean
Explanation: The standard deviation (SD) measures the average amount by which individual scores differ from the mean of the dataset. It indicates how spread out or consistent the data values are. A small SD means the scores are close to the mean (low variability), while a large SD shows the scores are widely scattered (high variability).
For example, if students' test scores have a low SD, their performances are similar; a high SD means performances vary greatly.
Thus, SD provides a precise measure of data dispersion, reflecting consistency or variability within the dataset.

78. (c) To identify unusual scores in a distribution
Explanation: A z-score indicates how many standard deviations a particular score is above or below the mean of a distribution. It is calculated as:
Z = (X–Mean)/Standard Deviation
Z-scores allow psychologists and researchers to standardize scores and compare data from different distributions.
For example, a z-score of +2 means the score is 2 standard deviations above the mean, which is considered unusually high, while –2 means it is unusually low.
Thus, z-scores help identify outliers or extreme values and assess how typical or rare a score

is within a dataset.

79. (b) About 68 percent
Explanation:
In a normal distribution, approximately 68% of all scores lie within one standard deviation (±1 z-score) from the mean. Specifically, about 34% of scores fall between the mean and +1 SD, and another 34% fall between the mean and –1 SD.
This is part of the Empirical Rule (68–95–99.7 Rule):
68% within ±1 SD
95% within ±2 SD
99.7% within ±3 SD
This property helps psychologists and statisticians understand how data are spread and identify whether a particular score is typical or extreme within a normal distribution.

80. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Multi-stage sampling is a complex form of cluster sampling that involves selecting samples in multiple stages first choosing clusters or groups, and then selecting individual elements within those clusters.
The Assertion (A) is true because multi-stage sampling is often more efficient and comprehensive, especially for large or geographically dispersed populations, since it reduces cost and time while maintaining representativeness.
The Reason (R) is also true, and it correctly explains (A), as the technique's efficiency arises from selecting clusters of elements in stages rather than sampling individuals directly from the entire population.

81. (c) The relationship between pairs of score values
Explanation: In psychology, correlation refers to the statistical relationship or association between two variables showing how one variable changes in relation to another.
It is measured using the correlation coefficient (r), which ranges from –1.00 to +1.00:
+1.00 → Perfect positive correlation (as one increases, so does the other)
–1.00→ Perfect negative correlation (as one increases, the other decreases)
0 → No correlation (no relationship)
Correlation helps psychologists understand patterns, such as the link between stress and performance or sleep and concentration, though it does not imply causation.

82. (b) The other variable decreases.
Explanation: In a negative correlation, the two variables move in opposite directions as one

variable increases, the other decreases. For example, as stress levels increase, sleep quality tends to decrease.
The strength of the relationship is indicated by the correlation coefficient (r):
Values close to –1.00 represent a strong negative correlation, meaning a consistent inverse relationship.
Values near 0 indicate a weak or no relationship.

83. (c) There is no correlation between the two variables.
Explanation: A correlation coefficient (r) of 0 means there is no linear relationship between the two variables. In other words, changes in one variable do not predict changes in the other.
However, this does not necessarily mean the variables are completely unrelated they might still have a nonlinear (curvilinear) relationship that the correlation coefficient cannot detect. For example, stress and performance may show a curvilinear (inverted U-shaped) relationship moderate stress improves performance, but too much reduces it even though r = 0 might suggest no linear correlation.

84. (a) Replicability and random assignment
Explanation: In psychological research, causation (cause-and-effect relationship) can only be inferred when studies use experimental methods that include random assignment and are replicable.
Random assignment ensures that participants have an equal chance of being placed in any experimental condition, minimizing bias and controlling for confounding variables.
Replicability means that when the experiment is repeated under similar conditions, it produces consistent results strengthening confidence that the observed effect is genuine.
High correlation (option c) only shows association, not causation. Hence, replication + random assignment provide the strongest evidence for causal inference in psychology.

85. (d) Deterministic independent variables
Explanation: In multiple regression analysis, the key assumptions include:
Linearity – The relationship between independent and dependent variables is linear.
Normality – The residuals (errors) are normally distributed.
Homoscedasticity – The variance of errors is constant across all levels of the independent variables.
Independence of errors – Residuals are independent of one another.
However, deterministic independent variables (those with fixed, non-random values) are not an assumption of multiple regression. In fact, regression assumes variables are

randomly sampled and exhibit natural variability, not fixed predetermined values.

86. (d) Hypothetical and inferred from the effects of other variables.
Explanation: An intervening variable (also called a mediating variable) is a hypothetical construct that helps explain how or why an independent variable influences a dependent variable. It is not directly observable or measurable, but rather inferred from patterns in behavior or data.
For example, in studying how rewards affect learning, motivation could be an intervening variable rewards (independent variable) increase motivation, which in turn improves performance (dependent variable).

87. (c) (A) is true, but (R) is false.
Explanation: The Assertion (A) is true because a smaller standard error of the estimate (se) means that the predicted values are closer to the actual observed values, indicating greater precision and better predictive power of the regression model.
However, the Reason (R) is false because a smaller se actually results in narrower confidence intervals, not wider ones. Narrower intervals show more certainty about the predicted values, while larger se would produce wider intervals and less precise estimates.

88. (c) It states that the population parameter is less than or greater than a specific value.
Explanation: In a one-tailed hypothesis test, the alternative hypothesis (H_1) predicts the direction of the effect that the population parameter is either greater than or less than a specific value, but not both.
For example:
Right-tailed test: H_1: $\mu > \mu_0$ (testing if the mean is greater than a hypothesized value)
Left-tailed test: H_1: $\mu < \mu_0$ (testing if the mean is less than a hypothesized value)
This contrasts with a two-tailed test, where H_1: $\mu \neq \mu_0$ (no specific direction).
Thus, one-tailed tests focus on detecting an effect in one specific direction only.

89. (b) Descriptive research
Explanation: Descriptive research aims to describe the characteristics of a population or phenomenon, including the frequency, patterns, or relationships among variables. It does not manipulate variables but rather observes and records them as they naturally occur. For example, a psychologist might use descriptive research to find out how often anxiety occurs among college students or how stress relates to sleep quality.

90. (d) To be goal-oriented and systematic

Explanation: The primary goal of empirical research is to be systematic, objective, and goal-oriented in investigating phenomena through observation and experimentation.
Empirical research relies on verifiable evidence rather than personal opinion or intuition. It follows a structured process defining a problem, collecting data, analyzing results, and drawing conclusions to ensure accuracy and reproducibility.
For example, a psychologist studying the effects of meditation on stress collects measurable data (like cortisol levels) rather than relying on subjective impressions.

91. (b) Philosophical Research
Explanation: Philosophical research is a qualitative form of inquiry that explores ideas, concepts, and perspectives to understand the nature of reality, knowledge, values, or existence. It does not rely on numerical data but instead analyzes the visions, beliefs, and interpretations of others regarding a topic. In psychology and education, philosophical research helps clarify theories, principles, and ethical frameworks by critically examining thought systems.

92. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: The Assertion (A) is true because a research design serves as a blueprint or framework that guides the entire research process from data collection to data analysis. It outlines the procedures, sampling methods, variables, and tools to ensure the study is systematic and coherent.
The Reason (R) is also true, and it correctly explains (A). A well-structured research design helps reduce bias, control confounding factors, and enhance the reliability and validity of findings.
Therefore, both statements are true, and the reason accurately explains why research design is considered a blueprint for scientific investigation.

93. (c) Survey Research
Explanation: Longitudinal research is a type of survey research that involves collecting data from the same group of individuals over an extended period of time. The goal is to observe how specific variables or behaviors change or develop across time. For example, psychologists may track children's cognitive development, personality changes, or mental health trends for several years.

94. (d) Overview design
Explanation: An overview design serves as a comprehensive outline of the entire research process from identifying the problem to data collection, analysis, and interpretation. It

helps researchers visualize how different stages of the study are connected and ensures that every step aligns with the overall research objectives. This design also allows experts or supervisors to review, critique, and provide valuable input before the actual research begins.
By offering a broad perspective of the research plan, the overview design ensures clarity, coherence, and systematic progression, making the study more organized and scientifically sound.

95. (b) Interviews, attitude scales, and projective techniques
Explanation: In the survey method, researchers commonly use techniques such as interviews, questionnaires, attitude scales, and sometimes projective techniques to collect data directly from respondents. These methods help gather information about people's opinions, beliefs, behaviors, and attitudes toward specific topics.
Interviews allow for in-depth responses and clarification.
Attitude scales (like Likert or Thurstone scales) quantify opinions and perceptions.
Projective techniques help uncover hidden feelings or motives.
Together, these techniques make the survey method versatile and effective for studying psychological, educational, and social phenomena.

96. (b) It emphasizes a high degree of control over variables.
Explanation: The experimental method is characterized by its high level of control over variables to establish cause-and-effect relationships. In this approach, researchers manipulate the independent variable and observe its effect on the dependent variable, while keeping all other factors constant. This control is achieved through random assignment, standardized procedures, and sometimes control groups, which help eliminate confounding influences.

97. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Assertion (A): True
In experimental psychology, replication means repeating a study under the same or slightly different conditions. It helps confirm that results are consistent (reliable) and applicable across contexts (generalizable).
Reason (R): True
Replication also serves to control extraneous variables indirectly by repeating experiments, researchers can check whether results hold even when uncontrolled or random factors vary. If findings remain stable across replications, it indicates that extraneous variables did not significantly influence outcomes, thereby supporting the reliability and validity of

the results. Since replication helps ensure that findings are not artifacts of uncontrolled variables, (R) correctly explains (A).

98. (c) Any aspect of an event or process that influences another event or process
Explanation: According to Fred N. Kerlinger, a leading researcher in behavioral science, a variable is defined as any property or characteristic that can take on different values and influence another event or process. In psychological research, variables are essential because they allow researchers to measure, compare, and analyze relationships. Examples include intelligence, motivation, anxiety, or reaction time each can vary among individuals or situations. Variables are typically classified as independent (cause), dependent (effect), or extraneous (uncontrolled factors). Thus, a variable represents anything that can change and affect outcomes in research.

99. (a) It requires less effort.
Explanation: Systematic sampling is a type of probability sampling where researchers select every kth element from a population list after a random starting point. For example, choosing every 10th person from a list of 1,000. Its primary advantage over simple random sampling is that it is easier and more convenient to implement, especially for large populations, since it avoids the need to assign and randomly select each unit individually. While systematic sampling is generally efficient and can produce a representative sample, it may be biased if the population has hidden patterns that align with the sampling interval.

100. (c) Simple factual question
Explanation: A good questionnaire should ideally begin with simple and straightforward factual questions to make respondents feel comfortable and engaged. These questions are easy to answer and help establish trust and interest before moving on to more complex or sensitive topics. Starting with simple questions (e.g., age, education, occupation) also helps respondents understand the format and flow of the questionnaire. Gradually, the researcher can include opinion-based or analytical questions once rapport is built.

101. (b) Discovering new truths
Explanation: According to John W. Best, a prominent education and research scholar, the primary aim of research is to discover new truths or verify existing knowledge using systematic and objective methods.
Research involves gathering, analyzing, and interpreting data to answer specific questions or solve problems. Through this process, researchers aim to expand human understanding, develop new insights, and refine existing theories or practices. Thus, rather than merely

describing or repeating what is known, research seeks to uncover new facts, relationships, or principles that contribute to the growth of scientific and practical knowledge.

102. (a) An exhaustive and systematic investigation
Explanation: According to J. Francis Rummel, research is defined as an exhaustive and systematic investigation to gain new knowledge or verify existing facts. It involves a logical, organized, and scientific process of inquiry aimed at solving problems or understanding phenomena. This definition highlights that research is not random or casual, but rather a disciplined and intellectual process that requires planning, precision, and rigor. Researchers carefully collect, analyze, and interpret data to reach valid conclusions.

103. (a) Defining problems, formulating solutions, collecting data, testing conclusions
Explanation: According to Clifford Woody, research is a systematic process that begins with identifying and defining a problem, followed by formulating possible solutions or hypotheses, then collecting relevant data, and finally testing conclusions to verify or refute the proposed solutions. This structured sequence ensures that research remains logical, goal-oriented, and evidence-based.
Woody emphasized that research should move from problem recognition to empirical verification, ensuring that each step contributes to solving the identified issue and expanding reliable knowledge.

104. (b) Descriptive research
Explanation: Descriptive research focuses on accurately portraying the characteristics of a person, group, or situation. Its goal is to describe "what exists" rather than explain "why it exists."
Researchers use methods like surveys, observations, and case studies to gather detailed information about current conditions, attitudes, or behaviors. For example, a psychologist might conduct descriptive research to profile patterns of social media use among teenagers. This type of research provides a factual and systematic description of phenomena, forming the basis for further hypothesis testing or experimental investigation. It emphasizes accuracy, clarity, and objectivity in reporting real-world observations.

105. (d) Demanding accurate observation and description
Explanation: A key characteristic of research is its reliance on accurate observation and precise description of facts, events, or behaviors. Scientific research requires that data be collected systematically, objectively, and carefully recorded to ensure validity and reliability. Rather than depending on personal opinions or assumptions, researchers observe phenomena

using controlled methods and describe them in measurable terms. Accurate observation allows replication and verification by others, strengthening the credibility of findings.

106. (b) Predicting future occurrences
Explanation: One of the primary objectives of research is to predict future occurrences or behaviors based on observed patterns, tested hypotheses, and established theories. Through systematic observation, data collection, and analysis, research helps identify relationships and trends that allow scientists to anticipate outcomes under similar conditions. For example, in psychology, research on stress and performance can help predict how individuals might respond to future stressful situations.

107. (c) Experimental method
Explanation: The experimental method is the research approach that most strictly follows a scientific design, involving manipulation of one or more independent variables to observe their effect on a dependent variable, all within a controlled environment. This method allows researchers to establish cause-and-effect relationships by controlling extraneous variables and using random assignment to reduce bias.
For example, a psychologist might manipulate sleep duration (independent variable) to study its effect on memory performance (dependent variable).

PSYCHOLOGY ENTRANCE EXAMINATIONS

Useful for CUET-PG Psychology, GATE & Other M.A/ M.Sc Psychology Entrances

Arvind Otta

Features

- As per as latest syllabus of CUET-PG Psychology, GATE & Other M.A/ M.Sc Psychology Entrances.
- Last 10 years question papers were analyzed to write this book for better results.
- Various strategies are used to make your understanding more accessible.
- Updated source of multiple choice questions with supportive contents.

About the author

Arvind Otta is a prevalent name who has been working continuously for many years toward human rights and equality for persons suffering from mental health issues and playing a vital role in reducing stigma and taboos related to mental health. He has been awarded the Gold medal by the contemporary Lok Sabha Speaker in 2003 and Asia's Youngest Best Mental Health Professional in 2018.

Arvind Otta currently serves as the editor-in-chief of Psychologs magazine, India's only print mental health magazine.

Arvind Otta has been teaching Psychology for the past 15 years and has helped over 10000 students crack various psychology entrance exams. He has authored 8 books on mental health and psychology, wrote 120+ articles & editorials on mental health, and delivered more than 11000 hours of lectures on various platforms, and this process is continuing.

/arvindotta

www.upseducation.in /upseducation

9 789391 724948