psychology statistics for dummies Tutorial

psychology statistics for dummies can seem intimidating at first, especially for beginners eager to understand human behavior through numbers. However, grasping the basics of psychology statistics is essential for anyone interested in exploring research findings, making informed decisions, or pursuing a career in psychology or related fields. This comprehensive guide aims to break down complex concepts into simple, easy-to-understand language, providing you with the foundational knowledge needed to navigate the world of psychology data confidently.

Understanding the Importance of Psychology Statistics

Psychology, like many sciences, relies heavily on statistics to interpret data and draw meaningful conclusions. Whether studying mental health, behavioral patterns, or social phenomena, researchers use statistical methods to validate their hypotheses, ensure reliability, and generalize findings to larger populations.

Why Are Statistics Essential in Psychology?

- **Measuring Effects:** Statistics help determine whether observed effects are significant or could have occurred by chance.
- **Summarizing Data:** They allow for condensing large datasets into understandable metrics, such as averages and variability measures.
- **Comparing Groups:** Researchers can compare different populations or conditions to identify differences or similarities.
- **Predicting Outcomes:** Statistical models help forecast future behaviors based on existing data.
- **Ensuring Validity:** Proper statistical analysis ensures that research findings are valid, reliable, and unbiased.

Basic Concepts in Psychology Statistics

To understand psychology statistics for dummies, it's vital to familiarize yourself with core concepts that underpin statistical analysis. Here are some fundamental terms and ideas:

Descriptive Statistics

Descriptive statistics summarize and organize data to make it easier to interpret.

Key Measures Include:

- **Mean:** The average of a dataset, calculated by adding all values and dividing by the number of observations.
- **Median:** The middle value when data points are ordered from smallest to largest.
- **Mode:** The most frequently occurring value in a dataset.
- **Range:** The difference between the highest and lowest values.
- **Standard Deviation:** A measure of how spread out the data points are around the mean.

Inferential Statistics

Inferential statistics allow researchers to make conclusions about a population based on sample data.

Common Techniques:

- **t-Tests:** Compare the means of two groups to see if they differ significantly.
- **ANOVA (Analysis of Variance):** Compares means across three or more groups.
- **Chi-Square Tests:** Examine relationships between categorical variables.
- **Correlation:** Measures the strength and direction of the relationship between two variables.
- **Regression:** Predicts the value of one variable based on another.

Common Statistical Terms in Psychology

Understanding the language of psychology statistics is vital for interpreting research findings accurately.

Significance and p-Values

- The p-value indicates the probability that the observed results occurred by chance.
- A p-value less than 0.05 is typically considered statistically significant, meaning the results are unlikely due to random chance.

Effect Size

- Measures the magnitude of a relationship or difference, providing context beyond p-values.
- Examples include Cohen's d for mean differences and r for correlations.

Confidence Intervals

- Range within which the true population parameter is expected to fall, with a certain level of confidence (usually 95%).

Applying Psychology Statistics in Real-World Scenarios

Knowing how statistics work is one thing; understanding how they are applied is equally important. Here are some common applications:

Research Studies

- Researchers use statistics to test hypotheses, such as whether a new therapy reduces anxiety levels more effectively than existing treatments.

Clinical Assessments

- Psychologists interpret test scores through standardized metrics like z-scores and percentiles to assess individual functioning.

Behavioral Predictions

- Data analysis can help predict behaviors, such as risk factors for mental health disorders or the likelihood of relapse.

Policy Making

- Public health policies are often based on statistical data about prevalence rates, risk factors, and effective interventions.

Common Mistakes to Avoid in Psychology Statistics

While learning about statistics is empowering, there are pitfalls to watch out for:

Misinterpreting p-Values

- A small p-value doesn't necessarily mean the effect is practically significant; consider effect size and context.

Ignoring Effect Size

- Statistical significance doesn't always imply a meaningful or large effect.

Overgeneralizing from Small Samples

- Small sample sizes may not accurately represent the entire population, leading to unreliable conclusions.

Cherry-Picking Data

- Selectively reporting results that support a hypothesis while ignoring contradictory data introduces bias.

Resources for Learning More About Psychology Statistics

If you're interested in diving deeper into psychology statistics, consider exploring these resources:

- **Books:** "Statistics for Dummies" by Deborah J. Rumsey provides a beginner-friendly overview.
- **Online Courses:** Platforms like Coursera and Udemy offer introductory courses in statistics.
- **Software Tutorials:** Learning to use SPSS, R, or Excel can help you conduct basic analyses.
- **Academic Journals:** Reading research articles can help you see how statistics are applied in real studies.

Conclusion

Understanding psychology statistics for dummies is a valuable step toward grasping how researchers interpret human behavior and mental processes. By familiarizing yourself with basic concepts such as descriptive and inferential statistics, key terms like p-values and effect sizes, and common analysis techniques, you can better comprehend scientific literature and contribute to discussions about psychological research. Remember, while statistics can seem complex at first, breaking them down into manageable parts makes learning accessible and even enjoyable. With practice and curiosity, you'll develop the skills needed to interpret data confidently and appreciate the power of statistics in uncovering the truths about the human mind and behavior.

Psychology Statistics for Dummies: A Clear Guide to Understanding Data in Human Behavior

Introduction

Psychology statistics for dummies is an essential toolkit for anyone interested in understanding how psychologists interpret human behavior through numbers. Whether you're a student beginning your journey in psychology, a researcher delving into data analysis, or simply a curious reader, grasping the basics of statistics can demystify complex research findings and empower you to evaluate studies critically. In this article, we?ll break down key concepts in psychology statistics in a straightforward, approachable manner?so you can make sense of the numbers behind the stories of human mind and behavior.

Why Are Statistics Important in Psychology?

Psychology, at its core, seeks to understand why people think, feel, and act the way they do. To do this scientifically, psychologists rely on data?information gathered from experiments, surveys, and observations. But raw data alone isn?t very meaningful; it needs to be processed and interpreted statistically.

Statistics serve several critical functions in psychology:

- Summarizing Data: Making sense of large volumes of information through measures like averages and percentages.
- Identifying Relationships: Determining whether variables are related, and how strongly.
- Testing Hypotheses: Assessing whether observed effects are likely genuine or due to chance.
- Predicting Outcomes: Using data to forecast behaviors or responses.
- Communicating Results: Presenting findings in a way that?s clear and scientifically valid.

Without a solid understanding of statistics, it?s easy to misinterpret research findings or fall prey to misleading claims. That?s why even a basic grasp of psychological statistics is invaluable.

Fundamental Concepts in Psychology Statistics

Before diving into specific techniques, let?s review some foundational ideas that underpin all statistical analyses in psychology.

Descriptive vs. Inferential Statistics

- Descriptive Statistics: These summarize and describe the main features of a dataset. Think of them as the ?overview? of your data. Examples include:
- Mean (average)

- Median (middle value)
- Mode (most common value)
- Standard deviation (spread or variability)

- Inferential Statistics: These allow psychologists to draw conclusions or make predictions about a larger population based on a sample. Examples include:
- t-tests
- ANOVA
- Chi-square tests
- Correlation and regression analyses

Understanding the difference helps clarify whether a study is simply describing data or testing hypotheses about broader groups.

Variables and Data Types

- Variables: Characteristics or attributes measured in a study. Examples: age, test scores, reaction times.
- Types of Data:
- Nominal: Categorizes data without order (e.g., gender, ethnicity).
- Ordinal: Ranks data with order but without consistent intervals (e.g., satisfaction ratings).
- Interval: Numeric data with equal intervals but no true zero (e.g., temperature in Celsius).
- Ratio: Numeric data with a true zero point (e.g., weight, height).

Knowing the type of data guides the choice of appropriate statistical tests.

Common Statistical Techniques in Psychology

Let?s explore some of the most frequently used statistical methods in psychological research, explained in a straightforward way.

Measures of Central Tendency

These are summary statistics that describe the center point of a dataset:

- Mean: The ?average? value, calculated by adding all scores and dividing by the number of scores. Sensitive to extreme values.
- Median: The middle score when data is ordered. Useful when data is skewed.

- Mode: The most common value. Useful for categorical data.

Measures of Variability

Understanding how spread out data is helps interpret the mean's significance:

- Range: Difference between the highest and lowest values.
- Standard Deviation (SD): How much scores typically differ from the mean. A low SD indicates data is clustered near the mean; high SD indicates more variability.
- Variance: The square of SD, representing data spread in squared units.

Correlation and Regression

- Correlation: Measures the strength and direction of the relationship between two variables, often represented by the Pearson correlation coefficient (r), ranging from -1 to +1.
- +1 indicates a perfect positive relationship.
- -1 indicates a perfect negative relationship.
- 0 indicates no relationship.

- Regression: Predicts the value of one variable based on another. For example, predicting exam scores based on hours studied.

Hypothesis Testing

A core part of psychological research involves testing whether observed effects are statistically significant:

- Null Hypothesis (H?): Assumes no effect or relationship exists.
- Alternative Hypothesis (H?): Assumes there is an effect or relationship.
- p-value: The probability of obtaining results as extreme as the observed ones if H? is true.
- A p-value less than 0.05 is often considered statistically significant, leading to rejection of H?.

Example: Testing whether a new therapy reduces anxiety levels compared to no treatment.

How to Read and Interpret Psychological Statistics

Understanding statistics isn?t just about calculations; it?s about interpretation.

Recognizing Significance

- A statistically significant result suggests that the observed effect is unlikely to have occurred by chance.
- However, significance doesn?t imply practical importance. A tiny effect can be statistically significant if the sample size is large.

Effect Sizes

- Measure the magnitude of an effect, independent of sample size.
- Examples include Cohen?s d (difference between two means) and r^2 (proportion of variance explained).
- Larger effect sizes indicate more meaningful differences or relationships.

Confidence Intervals

- Provide a range within which the true population parameter likely falls.
- For example, a 95% confidence interval suggests we can be 95% confident the true effect lies within that range.

Common Pitfalls and Misconceptions

Statistics can be tricky, and misinterpretation is common. Here are some pitfalls to watch out for:

- Confusing correlation with causation: A relationship doesn?t mean one variable causes the other.
- Ignoring effect sizes: Significant p-values don?t tell you how meaningful the effect is.
- Overlooking variability: Large variability can obscure true effects.
- Misreading graphs: Visual data can be misleading if axes aren?t scaled properly.
- Cherry-picking data: Only highlighting results that support a hypothesis can lead to biased conclusions.

Practical Tips for Using Psychology Statistics

If you?re analyzing data or reading research:

- Start with descriptive statistics to get a sense of the data.
- Check assumptions before applying tests (normality, homogeneity of variance).
- Use the correct statistical test based on data type and research question.
- Report both statistical significance and effect size.
- Always consider the context?stats are tools, not definitive answers.

Final Thoughts: Making Statistics Accessible

Psychology statistics for dummies isn?t about becoming a math wizard overnight but about developing a solid foundation to interpret research responsibly. By understanding core concepts?like measures of central tendency, variability, correlations, and hypothesis testing?you can critically evaluate psychological studies and better appreciate the science behind human behavior.

Remember, statistics are tools designed to clarify the complexities of the human mind, not obscure them. Embrace the basics, ask questions, and keep exploring?the numbers are there to help tell the story of human psychology in a precise and meaningful way.

QuestionAnswer What are the key concepts I should understand in psychology statistics for beginners? Key concepts include descriptive statistics (mean, median, mode), probability, hypothesis testing, p-values, t-tests, correlation, and regression analysis. Understanding these basics helps in interpreting psychological research data accurately. How can I effectively learn and apply statistics in psychology for dummies? Start with foundational books or online courses that simplify complex ideas, practice analyzing real datasets, and use statistical software with user-friendly interfaces. Breaking down concepts into simple terms and applying them to real-world examples enhances understanding. What common mistakes should I avoid when studying psychology statistics? Avoid misinterpreting correlation as causation, neglecting assumptions behind statistical tests, misreading p-values, and relying solely on software outputs without understanding the underlying concepts. Always double-check your data and interpretations. Why is understanding descriptive statistics important in psychology research? Descriptive statistics summarize data effectively, providing insights into data distribution, central tendency, and variability. They are essential for initial data exploration and for communicating findings clearly in psychological studies. Are there any recommended resources or tools for beginners learning psychology statistics? Yes, resources like 'Psychology Statistics For Dummies' by Martin C. Mendelson, Khan Academy's statistics courses, and software like SPSS or Jamovi are excellent starting points. They offer simplified explanations and practical tools suitable for beginners.

Related keywords: psychology data analysis, statistical methods psychology, research statistics, psychological research techniques, data interpretation psychology, quantitative psychology, SPSS for psychology, experimental design psychology, descriptive statistics psychology, inferential statistics psychology

Introductory Statistics Kokoska

Introductory Statistics Kokoska is a foundational course designed to introduce students and beginners to the essential concepts of statistics. Whether you're a student preparing for advanced studies, a professional seeking to enhance your data analysis skills, or simply someone interested in understanding how data shapes our world, learning the principles of introductory statistics Kokoska provides a vital stepping stone. This article will explore the core topics, methodologies, and practical applications of introductory statistics Kokoska, helping you grasp the fundamentals and see how they can be applied across various fields.

Understanding the Basics of Introductory Statistics Kokoska

Introductory statistics Kokoska covers the fundamental concepts necessary to analyze and interpret data effectively. This field combines theoretical knowledge with practical skills, enabling learners to make informed decisions based on data.

What is Statistics?

Statistics is the science of collecting, analyzing, interpreting, presenting, and organizing data. It helps in uncovering patterns, making predictions, and supporting decision-making processes.

Importance of Introductory Statistics Kokoska

- Provides foundational knowledge for advanced statistical methods
- Enhances critical thinking and data literacy skills
- Supports decision-making in fields like healthcare, business, social sciences, and more
- Prepares students for data-driven environments in the modern world

Core Topics Covered in Introductory Statistics Kokoska

The course typically includes a broad spectrum of topics, each building on the previous to give a comprehensive understanding of statistical analysis.

Descriptive Statistics

Descriptive statistics summarize and describe the main features of a dataset.

- Measures of Central Tendency: Mean, Median, Mode

- Measures of Variability: Range, Variance, Standard Deviation
- Data Visualization: Histograms, Bar Charts, Boxplots

Inferential Statistics

Inferential statistics allow us to make predictions or inferences about a larger population based on sample data.

- Sampling Methods and Sampling Distributions
- Confidence Intervals
- Hypothesis Testing: Null and Alternative Hypotheses
- p-values and Significance Levels

Probability Theory

Probability forms the basis for many statistical methods, helping quantify uncertainty.

- Basic Probability Rules
- Conditional Probability
- Probability Distributions: Binomial, Normal, Poisson

Regression and Correlation

These tools examine relationships between variables.

- Correlation Coefficient
- Simple Linear Regression
- Multiple Regression Analysis

Practical Applications of Introductory Statistics Kokoska

Applying statistical concepts to real-world problems is a vital aspect of the Kokoska course.

Business and Economics

Statistical analysis helps in market research, quality control, and financial forecasting.

Healthcare and Medicine

Epidemiological studies, clinical trials, and health data analysis rely heavily on statistics.

Social Sciences

Surveys, experiments, and observational studies utilize statistical tools to understand societal trends.

Environmental Studies

Analyzing climate data, pollution levels, and ecological surveys depend on sound statistical methods.

Tools and Software Used in Introductory Statistics Kokoska

Modern statistics courses incorporate various software tools that facilitate data analysis.

Common Statistical Software

- Excel
- SPSS
- R Programming
- Python (with libraries like pandas, numpy, scipy)
- JMP

Choosing the Right Tool

Consider your specific needs, ease of use, and the complexity of analysis when selecting software.

Learning Strategies for Introductory Statistics Kokoska

Effective learning involves a combination of theoretical study and practical application.

Study Tips

- Practice with real datasets to understand concepts better
- Work on problem sets regularly
- Participate in discussions and study groups
- Use online resources and tutorials for additional support

Common Challenges and How to Overcome Them

- Understanding abstract concepts: Use visual aids and practical examples
- Grasping probability: Break down problems into smaller parts
- Mastering software tools: Follow step-by-step tutorials and practice frequently

Benefits of Mastering Introductory Statistics Kokoska

Acquiring a solid understanding of introductory statistics Kokoska offers numerous advantages.

Enhanced Data Literacy

Ability to read, interpret, and critically evaluate data presented in various formats.

Better Decision-Making Skills

Applying statistical reasoning to make informed choices in personal and professional contexts.

Preparation for Advanced Studies

A strong foundation in basic statistics is essential for success in higher-level courses and research projects.

Career Advancement

Many fields value employees with statistical skills, opening doors to diverse job opportunities.

Conclusion

Introductory statistics Kokoska serves as a crucial gateway to understanding the world through data. By mastering core concepts such as descriptive and inferential statistics, probability theory, and data analysis tools, learners can develop critical skills that are highly valued across numerous industries. Whether you're aiming to enhance your academic pursuits, improve your professional skill set, or simply satisfy your curiosity about how data influences decisions, investing in a solid understanding of introductory statistics Kokoska is a wise choice. Embrace the learning process, utilize practical tools, and apply your knowledge to real-world scenarios to unlock the full potential of statistical analysis.

Introductory Statistics Kokoska: A Comprehensive Guide to Building Your Foundations in Data Analysis

In the ever-evolving landscape of data-driven decision-making, understanding introductory statistics kokoska is essential for students, professionals, and anyone interested in deciphering the stories data can tell. Whether you're a beginner stepping into the world of statistics or someone looking to reinforce foundational concepts, this guide will walk you through the core ideas, methods, and applications associated with introductory statistics kokoska. By exploring key principles, common techniques, and practical examples, you'll be equipped to navigate the initial stages of statistical analysis confidently.

What Is Introductory Statistics Kokoska?

Before diving into details, it's important to clarify what introductory statistics kokoska entails. The phrase combines two components:

- Introductory Statistics: The branch of mathematics concerned with collecting, analyzing, interpreting, presenting, and organizing data. It lays the groundwork for understanding variability, relationships, and inference.
- Kokoska: A term that might be specific to a regional curriculum, a particular textbook, or a teaching method. For the purposes of this guide, we interpret kokoska as representative of foundational or beginner-level approaches to statistics, often emphasizing clarity, simplicity, and core concepts.

Together, introductory statistics kokoska signifies beginning-level statistical education, focusing on the essential tools and ideas that form the backbone of more advanced statistical analysis.

Why Is Introductory Statistics Kokoska Important?

Understanding the basics of statistics is crucial for several reasons:

- Informed Decision-Making: Many daily decisions, from health choices to financial planning, depend on interpreting data correctly.
- Scientific Research: Proper statistical methods underpin credible research findings across disciplines.
- Data Literacy: In a data-rich world, the ability to understand and communicate statistical information is a vital skill.
- Foundation for Advanced Topics: Mastering introductory concepts prepares learners for more complex statistical methods like regression, hypothesis testing, and machine learning.

Core Principles of Introductory Statistics Kokoska

- Descriptive Statistics

Descriptive statistics summarize and organize data to reveal underlying patterns or characteristics.

Key concepts include:

- Measures of Central Tendency:
- Mean: The average of a data set.
- Median: The middle value when data are ordered.
- Mode: The most frequently occurring value.

- Measures of Variability:
- Range: Difference between the maximum and minimum.
- Variance: Average squared deviation from the mean.
- Standard Deviation: Square root of variance, indicating typical deviation.

- Data Visualization:
- Histograms: Show data distribution.
- Box Plots: Visualize spread and identify outliers.
- Bar Charts: Compare categorical data.

- Probability Basics

Probability provides the foundation for inferential statistics.

Key ideas include:

- Understanding the likelihood of events.
- Calculating simple probabilities.
- Combining probabilities using rules like addition and multiplication.
- Concept of independent and dependent events.

- Inferential Statistics

While descriptive stats describe data, inferential statistics allow us to draw conclusions about larger

populations.

Main topics:

- Sampling methods and importance.
- Estimation (point estimates and confidence intervals).
- Hypothesis testing basics.

Practical Steps in Introductory Statistics Kokoska

Step 1: Collect Data

- Define your question or problem.
- Choose an appropriate sampling method (random, stratified, cluster).
- Gather data ethically and accurately.

Step 2: Summarize Data

- Calculate measures of central tendency and variability.
- Visualize data with plots.
- Identify outliers or anomalies.

Step 3: Analyze Data

- Explore relationships between variables using scatter plots or cross-tabulations.
- Calculate correlation coefficients.
- Conduct basic hypothesis tests if applicable.

Step 4: Interpret Results

- Draw conclusions based on data summaries and analysis.
- Consider limitations and potential biases.
- Communicate findings clearly.

Common Techniques and Tools in Introductory Statistics Kokoska

Descriptive Methods

- Calculating means, medians, modes.
- Creating frequency distributions.
- Drawing histograms and box plots.

Probability Calculations

- Simple probability of single events.
- Compound probability for combined events.
- Use of probability trees and Venn diagrams.

Inferential Techniques

- Estimating population parameters with confidence intervals.
- Conducting t-tests for mean differences.
- Performing chi-square tests for categorical data.

Software and Resources

- Basic tools like Excel, Google Sheets.
- Introductory statistical software such as SPSS, R (for beginners).
- Educational resources, tutorials, and practice datasets.

Common Challenges in Introductory Statistics Kokoska and How to Overcome Them

- Misinterpreting Data

Solution: Focus on understanding what each statistic represents; avoid jumping to conclusions based solely on visualizations.

- Confusing Correlation and Causation

Solution: Remember that correlation indicates association, not causation. Consider study design and other factors.

- Overlooking Variability

Solution: Pay attention to measures like standard deviation and confidence intervals to understand data spread and uncertainty.

- Misapplying Statistical Tests

Solution: Learn the assumptions behind each test and verify whether data meet these conditions before application.

Tips for Success in Introductory Statistics Kokoska

- Practice Regularly: Work through exercises and real datasets.
- Visualize Data: Use plots to build intuition.
- Understand the Context: Always interpret statistics within the context of the data.
- Seek Clarification: Don?t hesitate to ask instructors or peers when concepts are unclear.
- Utilize Resources: Use online tutorials, textbooks, and statistical software tutorials.

Conclusion

Mastering introductory statistics kokoska sets the stage for a deeper understanding of data analysis and interpretation. By grasping fundamental concepts like descriptive statistics, probability, and basic inference, learners develop critical thinking skills that empower them across academic, professional, and everyday contexts. Remember, the key to success lies in consistent practice, curiosity, and a willingness to question and explore data stories. As you progress in your statistical journey, these foundational principles will serve as reliable guides in navigating the complex and fascinating world of data.

Embark on your statistical adventure today by applying these principles to real-world data, and watch your confidence grow as you decode the stories hidden within numbers!

QuestionAnswer What is the primary focus of 'Introductory Statistics Kokoska'? 'Introductory Statistics Kokoska' is designed to introduce students to fundamental statistical concepts, methods, and data analysis techniques, providing a solid foundation for understanding and applying statistics. Who is the author of 'Introductory Statistics Kokoska'? The book 'Introductory Statistics Kokoska' is authored by Robert Kokoska, a renowned statistician and educator known for his clear explanations and engaging teaching style. What topics are covered in 'Introductory Statistics Kokoska'? 'Introductory Statistics Kokoska' covers topics such as descriptive statistics, probability theory, inferential statistics, hypothesis testing, confidence intervals, regression analysis, and data

visualization. Is 'Introductory Statistics Kokoska' suitable for beginners? Yes, the book is designed for beginners with little to no prior experience in statistics, offering accessible language and practical examples to facilitate learning. Does 'Introductory Statistics Kokoska' include real-world data examples? Absolutely, the book incorporates numerous real-world data examples to help students understand how statistical methods apply to everyday situations and various fields. Are there any online resources associated with 'Introductory Statistics Kokoska'? Many editions of 'Introductory Statistics Kokoska' come with supplementary online resources, including datasets, practice problems, and instructional videos to enhance learning. Is 'Introductory Statistics Kokoska' suitable for online or hybrid courses? Yes, the book's clear explanations and accompanying resources make it well-suited for online, hybrid, and in-person introductory statistics courses. What pedagogical features does 'Introductory Statistics Kokoska' offer? The book features chapter summaries, review questions, practice exercises, and real data analysis projects to reinforce learning and assess understanding. Can 'Introductory Statistics Kokoska' be used as a textbook for college courses? Yes, it is widely used as a primary textbook for introductory college-level statistics courses due to its comprehensive coverage and student-friendly approach. Where can I purchase or access 'Introductory Statistics Kokoska'? 'Introductory Statistics Kokoska' is available through major book retailers, university bookstores, and online platforms such as Amazon, or through institutional access if provided by your educational institution.

Related keywords: introductory statistics, Kokoska, statistics textbook, basic statistics, descriptive statistics, probability theory, statistical analysis, data analysis, statistical methods, learning statistics

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