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Statistical Studies

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Introduction

- _Statistical studies_

Statistical studies are conducted in many different ways.

Subjects of a study are the people ,animals (or other living things)

If the subject s are people , they may be called the participants in the study.

Two basic Types of Statistical Study

- _Observational study_

  researchers observe or measure characteristics of the subjects but do not attempt to influence or modify these characteristics.

- _Experiment study_

  researchers apply some treatment and observe its effects on the subjects of the experiment.

Example

- What type of the study do you think?

- 1. The polio vaccine study is ……………..

- 2. A poll in which college students are asked if they commute or live on campus is………..

Variable of interest

- *The variable of interest* *in a statistical study are the items or quantities that the study seeks to measure.*

- Explanatory variable is a variable that may explain or cause the effect.

- Response variable is a variable that responds to change in explanatory variable.

Data types

- **Quantitative data** consist of values representing counts or measurement.

- **Qualitative data** consist of values that can be placed into non numerical categories.

- **Continuous data** can take on any value in a given interval

- **Discrete data** can take on only particular ,distinct values and not other values in between

Use of percentages in Statistics

- <u>The absolute change</u> is the actual increase or decrease from a reference value to a new value:

  Absolute change = New value – reference value

- <u>The relative change</u> is the size of absolute change in comparison to the reference value

  Relative change = (absolute change/reference value)x100

Use of percentages in Statistics

- <u>The absolute difference</u> is the difference between the compared value and the reference value actual
Absolute difference = Compared value – reference
value

- <u>The relative change</u> describe the size of absolute difference in comparison to the reference value

- Relative difference = (absolute difference/reference
value)x100

Example

Estimate world population in 1950 was 2.6 billion . By the end of 2017 , it had reached 6.9 billion describe the absolute and relative change in world population from 1950-2017

Example

Life expectancy for American men is about 76 years ,while life expectancy for Russian men is about 63 years , Using the life expectancy of Russian men as the reference value ,compare the life expectancy of American men with that of Russian men in absolute and relative terms

Index Numbers

Index numbers is a simple way to compare measurement made at different times or different places. The value at one particular time (or place) must be chosen as the reference value (or base value) The index number for any other (or place is)

Index number = (Value/reference value)x100

Index Numbers

<u>Example</u>

Suppose the cost of gasoline today is $3.60 per gallon. Using the 1980 price ($1.22) as the reference . Find the price index number for gasoline today.

Index number = (current price/base price)x100

$$= (3.60/1.22)x100 = 295.1$$

The current gasoline price is 295.1 % of the 1980 price.

The consumer price index (CPI)

CPI is computed and reported monthly , is based on prices in a sample of more than 60,000 goods ,services ,and housing costs.

The CPI allows us to compare prices at different times. To find out how much higher typical prices were in 2010 than in 1995 , we divide the CPIs for two years

CPI for 2010/CPI for 1995 = 218.1/152.4= 1.43

Concepts and Applications

1. A newspaper reports that the gas price index in 2011 was $3.92 per gallon. What is wrong with that statement ?

2. Suppose the cost of gasoline today is $5.00 per gallon . What is the price index number for gasoline today ,with 1980 price as the reference value ? (1980 price = $1.22=100%)

Concepts and Applications

Year	Price ($)	Price Index (1980=100)	Price as a percentage of 1980 price
1960	0.31	25.4	25.4%
1970	0.36	29.5	29.5%
1980	1.22	100	100%
1990	1.23	100.8	100.8%
2000	1.56	127.9	127.9%

House Price Index

City	Index
A	100
B	102
C	99
D	104
E	110

We can use the index to compare housing price in major cities throughout the country

Price (other town) = price (your town)x index in other town / index in your town

House Price Index

City	Index
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If the house in city A is $300,000 find the price of comparable house in city B