Spearman Rho Correlation

Introduction

- Spearman's rank correlation coefficient or Spearman's rho is named after Charles Spearman

- Used Greek letter ρ (rho) or as *rs (*non- parametric measure of statistical dependence between two variables)

- Assesses how well the relationship between two variables can be described using a monotonic function

- Monotonic is a function (or monotone function) in mathematic that preserves the given order.

- If there are no repeated data values, a perfect Spearman correlation of +1 or −1 occurs when each of the variables is a perfect monotone function of the other

Spearman Rho Correlation

+1	0	-1
Perfect Positive Correlation	No Correlation	Perfect Negative Correlation

- A correlation coefficient is a numerical measure or index of the amount of association between two sets of scores. It ranges in size from a maximum of +1.00 through 0.00 to -1.00

- The '+' sign indicates a positive correlation (the scores on one variable increase as the scores on the other variable increase)

- The '-' sign indicates a negative correlation (the scores on one variable increase, the scores on the other variable decrease)

Spearman Rho Correlation

Calculation

- Often thought of as being the Pearson correlation coefficient between the ranked (relationship between two item) variables

- The *n* raw scores *Xi*, *Yi* are converted to ranks *xi*, *yi*, and the differences *di* = *xi* − *yi* between the ranks of each observation on the two variables are calculated

- If there are no tied ranks, then ρ is given by this formula:

$$\rho = 1 - \frac{6 \sum d^2}{n\left(n^2 - 1\right)}$$

Spearman Rho Vs. Pearson R

The Pearson correlation evaluates the linear relationship between two continous variable

ex. relationship of chocolate coat when temperature changes.

Spearman Rank-order correlation

two continous or ordinal variables

ex. Evaluate which emplyess complete a test is relatedto the # of months they have been employed.

Sample Problem

Two students were asked to rateeight different textbooks for a specific course. The scale ranged from 0 to 20 points, with 20 being the highest rating and 0 being the lowest rating. points were assigned for each of several categories, such as reading level, use of illustrations, and use of color. at a= 0.05, test the hypothesis that there is a significat linear correalation between the two students' ratings.

Critical Values of Spearman's Rank Correlation Coefficient

n	0.05	0.01
5	0.900	-
6	0.829	0.943
7	0.714	0.893
8	0.643	0.833
9	0.600	0.783
10	0.564	0.745
11	0.523	0.736
12	0.497	0.703
13	0.475	0.673
14	0.457	0.646
15	0.441	0.623
16	0.425	0.601
17	0.412	0.582
18	0.399	0.564
19	0.388	0.549
20	0.377	0.534
21	0.368	0.521
22	0.359	0.508
23	0.351	0.496
24	0.343	0.485
25	0.336	0.475
26	0.329	0.465
27	0.323	0.456
28	0.317	0.448
29	0.311	0.440
30	0.305	0.432

Research Article

- **Title:**

  "Motivation and Attitude in Learning English among UiTM Students in the Northern Region of Malaysia"

- **Purpose:**

  To describe the relationship between the *students' motivation* and *attitude* to their *English Language performance*

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Method:

- Used a _correlational research_ design

- Independent variables:

  Motivation, attitude, and personal characteristics variables, as measured by a self-report questionnaire

- Dependent variable:

  English Language performance, measured by the UiTM Preparatory English (BEL100) examination result

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Method:

- *Sampling Design*

  The subjects were *139 students from the Perlis Campus, 248 from the Kedah Campus and 233 from the Pulau Pinang Campus*.

- The selection criterion used in attaining the samples was to choose those students who had just received their BEL100 examination result regardless of their status whether as the first timer or repeater for that particular paper.

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Method:

- *Questionnaire*

  Research instrument used was questionnaire that comprised questions on personal characteristics, motivation and attitudes.

  The instrument was adopted and adapted from *Gardner andLambert (1972)* so that it is more appropriate, intelligible and meaningful for the sample concerned.

  The reliability test of the instrument produced a Cronbach Alfa of 0.757, which was satisfactory and acceptable.

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Method:

■ *Data Analysis*

The data collected were computed and analyzed using the *SPSS 12*.

Each student's score on the questionnaire was matched to his or her BEL100 examination grade.

The statistical procedures used in this study were the *descriptive statistics* – mean & standard deviation scores, frequency & percentage, t-test, Spearman Rho Rank-Order Correlation Coefficient & ANOVA.

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Result- Correlation between motivation in learning English & English language performance

- *Spearman Rho rank-order correlation coefficient test*
  Very weak relationship between Intrinsic Motivation & English language performance, which is -.020.

- *One-way ANOVA test*
  Intrinsic Motivation: Critical value of F at alpha = .05 is 2.70. The obtained F value is 1.63, which is less than the critical value.
  Extrinsic Motivation: Computed value for the correlation test which is .043 and the obtained value of F for the one-way ANOVA, 2.39.

  This justifies there is *no significant differences between Overall Motivation (Intrinsic Motivation & Extrinsic Motivation) & English language performance.*

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Result- Attitude in learning English & English language performance

- *Spearman Rho rank-order correlation coefficient test*
  Exists a significant correlation (alpha = .01) between the attitude in learning English & English language performance, which is -.152.

- *One-way ANOVA test*
  F value from the one-way ANOVA test is 6.66, which is greater than the critical value.

- *Mean scores*
  Respondents received A - M = 3.06, B- M = 2.99, C - M = 2.93, D - M = 2.80), it can be concluded that the respondents who obtained an A (high achievers) have better attitude in learning English compared to the low achievers.

  This justifies that *there is a significant difference between the attitude in learning English & English language performance.*