Correlation of Length of Radius and Height of Humans

Performed: Herrin High School

Anatomy & Physiology

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Student's Name

INTRODUCTION

Purpose: To learn scientific methods and become familiar with the metric system of measurement.

Hypothesis: The measure of a person's upper limb length is approximately 40% of their height.

MATERIALS

- Adhesive tape
- Calculator or computer spreadsheet
- Data table
- Meter Stick
- Two tape measures

PROCEDURES

1. Use a metric tape measure to obtain the radius length of ten subjects in the class. For each measurement, place one end of the meter stick in the antecubital region of the arm with elbow in bent position. Place the other end of the meter stick in the bend of the carpal region and record the length in centimeters into the data table for radius length.

2. Attach tape measures vertically upon a wall with adhesive tape. Obtain the heights of each student and record in centimeters into the data table.

3. Analyze the data from the two measurements made for each student. The predicted correlation between radius length and height is determined using the following equation:

Height x 0.18 = expected radius length

The actual correlation to be used to test the hypothesis is determined by the following:

Length of radius/height = actual % of height

4. Record measurements for height and radius length of all students in the sample. Use a calculator to determine the expected and actual percentage of height for each student in the sample. Find the average of the expected and actual percentages of height for all students in the sample for use in completing a graph.

5. Plot the distribution of each student's data for radius length and height on a graph. Plot the radius length of each student on the x-axis and the height of each student on the y-axis.

6. Two trend lines should be drawn on the completed graph. Draw one line to represent the expected 0.18 (18%) ratio of radius length to measured height. This represents the original hypothetical data. Draw a second line of best-fit Showing linear regression through the distribution of points of the plotted data for all students. Use rise over run techniques in order to draw the appropriate slopes of both lines on the graph.

RESULTS

Height and Radius Measurements of Ten Colleagues and Corresponding Calculations				
Subject	Measured Radius Length (cm)	Height (cm)	Height x 0.18 = Expected Radius Length (cm)	Actual % of Height (cm)
1	29.0	164	29.5	17.7%
2	28.5	157	28.3	18.2%
3	31.5	175	31.5	18.0%
4	32.0	172	31.0	18.6%
5	32.0	178	32.0	18.0%
6	31.0	169	30.4	18.3%
7	32.5	181	32.6	18.0%
8	33.0	181	32.6	18.2%
9	30.0	166	29.9	18.1%
10	29.0	167	30.1	17.4%
AVERAGE	30.9	171	30.8	18.0%

Figure 1: Radius Length vs. Height

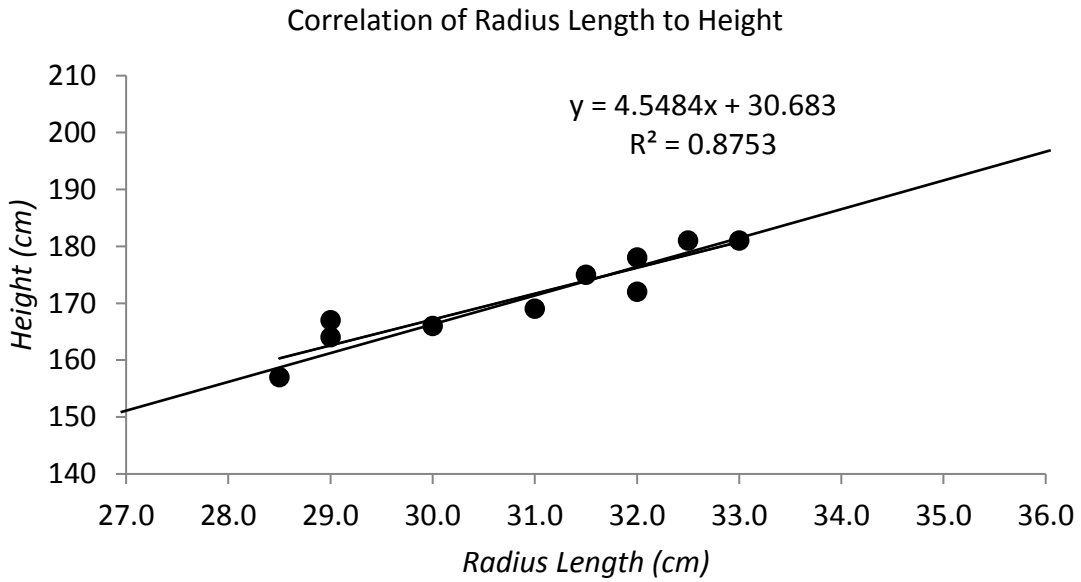

Figure 2: R^2 Correlation of Radius Length to Height

DISCUSSION

The data plotted for the subjects' radius compared to their height are consistent with the hypothesis in that both trends show some direct proportion to radius length and height. As seen in Figure 2, the R^2 correlation between expected and actual measurements of 0.875 is close to one. The expected ratio of radius length (cm) to height (cm) is 0.18 (18%), whereas, the measured or actual ratio of radius length(cm) to height (cm) within the student sample is 18%.

CONCLUSION

For the student sample tested, student radius length is expected to be approximately 18% of their height.

REFERENCES

Angeli, E., Wagner, J., Lawrick, E., Moore, K., Anderson, M., Soderlund, L., & Brizee, A. (2010, May 5). *General format*. Retrieved from http://owl.english.purdue.edu/owl/resource/560/01/

Martin, T.R. (2006). *Hole's Essentials of Human Anatomy and Physiology*. Boston: McGraw Hill.

American Psychological Association. (2009). *Publication manual of the American Psychological Association*. Washington, D.C.: American Psychological Association. Sixth Edition.