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.

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|  |  | RESULTS |  |  |
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| Height and Radius Measurements of Ten Colleagues and Corresponding Calculations |
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| 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*  |  |  |  |
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| *Figure 2: R2 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 R2 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.