

HW 02: LITERATURE ASSESSMENT AND MEASUREMENT AND STATISTICS PRACTICE

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1. A VARIABILITY STUDY OF PRE-MAIN SEQUENCE STARS IN THE EXTREMELY YOUNG CLUSTER IC 348

1.1. *Control of Syntax and Mechanics (4/4)*

The paper was generally easy to read, statements were clear and reinforced by literature.

1.2. *Discipline Conventions (4/4)*

Figures, tables, units were well used and standardized. The paper did well to cite specialized proceedings and acronyms.

1.3. *Content (4/4)*

The author used literature well, citing previous work in the field. Citations were also used to previous models that were compared, which showed the importance of the paper to current theory.

1.4. *Reasoning (4/4)*

Approaches were clearly explained, and the procedures to do calculations were included in equations or in cited literature.

2. OBSERVATIONS AND PROCEDURE

2.1. *Independent Measurements*

The sample size included three individuals of variable wing spans and heights. The instruments used to measure heights utilized a 200 cm stick, a book, and two wooden blocks. Heights were measured initially by directing the subject to stand flushed against a straight wall. The book was then used as a straight edge to flatten extra height, added by hair, and the perpendicular intersection of the book and wall was marked. Wing span was measured with the subject on the floor. Tiles were measured at (30.5 ± 0.1) cm and used as a full unit, N. The wooden blocks were again used as straight edges and placed to allow for the subject's fingers to be on the edge of a unit. The subject then aligned his/her wingspan along a straight line formed by the tiles and the full wing span was then measured by placing the second block where the wing span ended. Full measurements of wing span, in equation 1, were initiated by

adding up the full units first. Then the 200 cm meter stick was used to measure the fractioned final unit, R, which was then added to the full unit. The three samples are represented in figure 1. It is noted that

$$WS = 30.5N + R \quad (1)$$

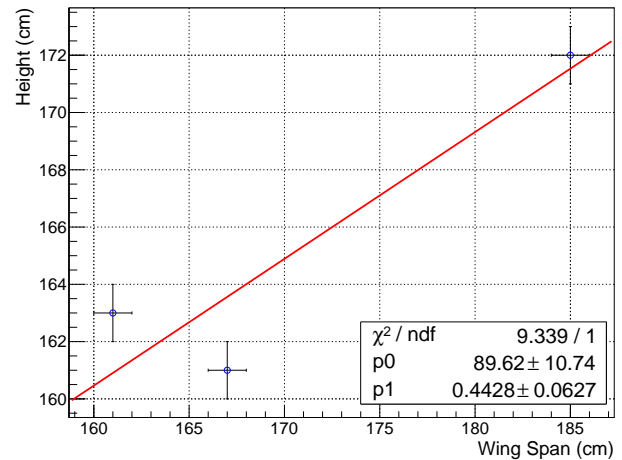


Figure 1. Three samples that measured height and wing span derived from the initial procedures. A linear least squares fit was utilized, represented with a red line.

Table 1. Statistics of independent measurements.

Statistics	Height (cm)	Wing Span (cm)
Range	10.5 ± 0.5	23.9 ± 0.5
Mean	165.3 ± 3.0	171.2 ± 6.9
Median	$1.62.5 \pm 1.0$	167.3 ± 1.0
Variance	5.7 ± 1.0	12.4 ± 1.0

2.2. Class Measurements

The larger sample size consisted of 7 different procedures of measuring height and wing span. The 7 procedure groups resulted in 33 unique measurements. In the class sample, the wing span parameters are generally longer than the heights. Conversely, some samples exhibited longer heights than wing spans.

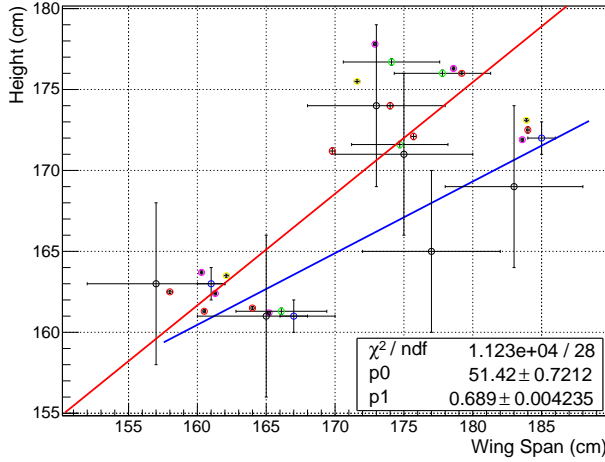


Figure 2. The entire class sample of height and wing span measurements that incorporated a variety of procedures. A red least squares fit line is used against the sample data. The blue line corresponds to the fit in figure 1 for comparative purposes. Different circle colors represent different samples that used variant procedures of measurement.

Table 2. Statistics of the entire class sample.

Statistics	Height (cm)	Wing Span (cm)
Range	16.8±4.9	30.6±4.9
Mean	169.1±1.5	172.5±2.7
Median	171.2±0.2	174.0±0.2
Variance	5.9±1.9	9.0±2.0

3. DISCUSSION

Both sets of samples show a trend of increased wing span with increasing height measurements. Statistics for both the independent and class measurements are listed in tables 1 and 2. Comparing the independent sample against the class sample, the class sample accrued a larger mean for both height and wing span. The means of the independent sample for height and wing span were 163 ± 3.0 and 171.2 ± 6.9 , respectively. These two parameters were compared to the class samples of 169.1 ± 1.5 and 172.5 ± 2.7 , for height and wing span. Figure 2 shows linear least square fits of both data sets. The trends don't exactly measure up, which is most likely due to the tallest students being unmeasured in the independent sample. According to the fits, any individual could have his/her wing span (or height) measured and have the opposing parameter predicted. The class sample shows that in the large spectrum of students at UH Manoa, the height and wing span should be proportional.

The largest source of error is extrapolated from the measurements, as the black circles exhibit over 5 cm of error in both height and wing span. Systematic error was added mainly for the measuring stick (the nearest centimeter was considered) and the straight edge book (accounted for the book not being perfectly straight and/or perpendicular to the wall).

REFERENCES

- Chromey, Frederick R. To Measure the Sky: An Introduction to Observational Astronomy. Cambridge: Cambridge UP, 2011. Print.
Herbst, W., Maley, J. A., & Williams, E. C. 2000a, AJ, 120, 349