

STAT 110: Practice Problem 18

Fall 2017

1. The Bayley Scales of Infant Development yield scores on two indices – the Psychomotor Development Index (PDI) and the Mental Development Index (MDI). These can be used to assess a child's level of function in each of these areas at approximately one year of age. **Among healthy infants, both indices have a mean value of 100.** As part of the study assessing the development and neurologic status of children who have undergone reparative heart surgery during the first three months of life, the Bayley Scales were administered to a random sample of 144 one-year-old infants born with congenital heart disease.

The file **PDI_MDI.JMP** contains data collected on the following variables:

- PDI = psychomotor development index
- MDI = mental development index

Research Question: Is there evidence that children born with congenital heart disease who undergo reparative heart surgery during the first three months of life have a mean **PDI** score **less than 100** (which is the mean for healthy infants)?

- a. Use JMP to find both the mean and the standard deviation of the PDI scores. Enter these values in the following table.

Variable	Mean	Standard Deviation
PDI		

- b. Is the t-test an appropriate analysis procedure for these data? Hint: Check the normality assumption behind the t-test for a single mean.

- c. Set up the null and alternative hypotheses to test the research question.

H₀:

H_a:

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d. Find the p-value to test the research question.

p-value: _____

e. Write a conclusion to address the research question in the context of the problem.

f. Use JMP to find the 95% CI for the mean PDI score for children born with congenital heart disease who undergo reparative heart surgery during the first three months of life.

Lower endpoint: _____

Upper endpoint: _____

g. Interpret the confidence interval from part f in the context of the problem.

h. Does this interval agree with your conclusion given in part e? Explain your reasoning.