ASSIGNMENT 29

Are the size and weight of your brain indicators of your mental capacity? In this study by Willerman et al. (1991) the researchers use Magnetic Resonance Imaging (MRI) to determine the brain size of the subjects. The researchers take into account gender and body size to draw conclusions about the connection between brain size and intelligence.

Willerman et al. (1991) conducted their study at a large southwestern university. They selected a sample of 40 right-handed Anglo introductory psychology students who had indicated no history of alcoholism, unconsciousness, brain damage, epilepsy, or heart disease. These subjects were drawn from a larger pool of introductory psychology students with total Scholastic Aptitude Test Scores higher than 1350 or lower than 940 who had agreed to satisfy a course requirement by allowing the administration of four subtests (Vocabulary, Similarities, Block Design, and Picture Completion) of the Wechsler (1981) Adult Intelligence Scale-Revised. With prior approval of the University's research review board, students selected for MRI were required to obtain prorated full-scale IQs of greater than 130 or less than 103, and were equally divided by sex and IQ classification.

The MRI Scans were performed at the same facility for all 40 subjects. The scans consisted of 18 horizontal MR images. The computer counted all pixels with non-zero gray scale in each of the 18 images and the total count served as an index for brain size.

Construct an appropriate model in BUGS to answer the question "Are the size and weight of your brain indicators of your mental capacity?". Your model should be constructed very carefully and you should comment on the selection (you may not need all variables).

Reference: Willerman, L., Schultz, R., Rutledge, J. N., and Bigler, E. (1991), "In Vivo Brain Size and Intelligence," *Intelligence*, 15, 223-228.

Authorization: Contact authors

Number of cases: 40

Variable Names:

1. Gender: Male or Female
2. FSIQ: Full Scale IQ scores based on the four Wechsler (1981) subtests
3. VIQ: Verbal IQ scores based on the four Wechsler (1981) subtests
4. PIQ: Performance IQ scores based on the four Wechsler (1981) subtests
5. Weight: body weight in pounds
6. Height: height in inches
7. MRI_Count: total pixel Count from the 18 MRI scans