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Practice: Using the Binary Logistic Regression Task to Perform a Binary Logistic Regression Analysis

The insurance company wants to characterize the relationship between a vehicle's weight and its safety rating. The **safety** data set contains the data about vehicle safety.

1. Use the Binary Logistic Regression task to fit a simple logistic regression model with **Unsafe** as the response variable and **Weight** as the predictor variable. Use the EVENT= option to model the probability of Below Average safety scores. Request profile likelihood confidence limits, odds ratio plot, and an effect plot.

    1. In the Navigation pane, select **Tasks and Utilities**.
    2. Expand **Tasks**.
    3. Expand **Statistics** and open the **Binary Logistic Regression** task.
    4. Select the **stat1.safety** table.
    5. Assign **Unsafe** to the Response role, and use the Event of interest drop-down list to specify **1**.
    6. Assign **Weight** to the Continuous variables role.
    7. On the MODEL tab, verify that **Main effects model** is selected.
    8. On the OPTIONS tab, in the Select statistics to display drop-down list, select **Default and additional statistics**.
    9. Expand the **Parameter Estimates** property. In the Confidence intervals for odds ratios drop-down list, select **Based on profile likelihood**.
    10. Expand **PLOTS**, and in the Select plots to display drop-down list, select **Default and additional plots**.
    11. Select **Effect plot** and **Odds ratio plot**.
    12. Click **Run**.

    Here are the results.

2. Do you reject or fail to reject the null hypothesis that all regression coefficients of the model are 0?

    The *p*-value for the Likelihood Ratio test is <.0001, and therefore, the global null hypothesis is rejected.

3. Write the logistic regression equation.

    The regression equation is as follows:
    Logit(Unsafe) = 3.5422 + (-1.3901) * Weight

4. Interpret the odds ratio for **Weight**.

    The odds ratio for **Weight** (0.249) says that the odds for being unsafe (having a Below Average safety rating) are 75.1% lower for each thousand-pound increase in weight.

    The confidence interval (0.102 , 0.517) does not contain 1, which indicates that the odds ratio is statistically significant.

Hide Solution