Module 1 solutions

Module 2: Solutions to Learning Activities

Activity 2.1

Researchers at a maternity hospital in the 1970s conducted a study of low birth weight babies. Low birth weight is classified as a weight of 2500g or less at birth. Data were collected on age and smoking status of mothers and the birth weight of their babies. The file `Activity_2.1.rds` contain data on the participants in the study. The file is located on Moodle in the Learning Activities section.

Create a 2 by 2 table to show the proportions of low birth weight babies born to mothers who smoked during pregnancy and those that did not smoke during pregnancy. Answer the following questions:

a) What was the total number of mothers who smoked during pregnancy?
b) What proportion of mothers who smoked gave birth to low birth weight babies? What proportion of non-smoking mothers gave birth to low birth weight babies?
c) Construct a stacked bar chart of the data to examine if there a difference in the proportion of babies born with a low birth weight in relation to the age group of the mother? Provide appropriate labels for the axes and give the graph an appropriate title. [Hint: plot the data using the `AgeGrp` variable]
d) Using your answers to the question a) and b), write a brief conclusion about the relationship of low birth weight and mother's age and smoking status.

Answers

Table 1: Cross tabulation of smoking status during pregnancy by low birth weight of the babies among 189 mothers

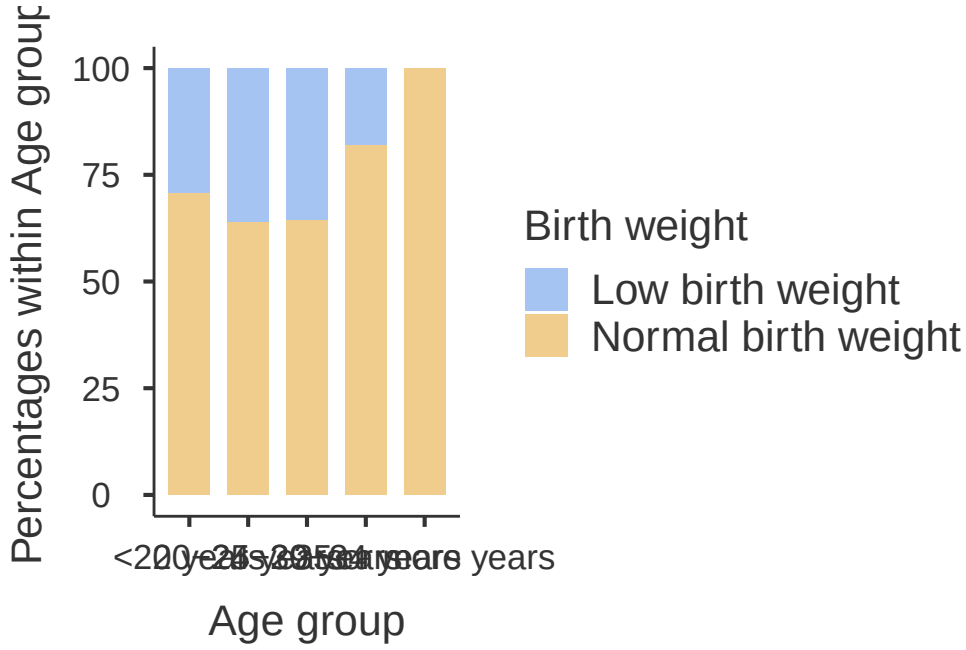
Smoking status during pregnancy	**Low birth weight**		
	Yes (%)	No (%)	Total (%)
Yes	30 (40.5)	44 (59.5)	74 (100)
No	39 (25.2)	86 (74.8)	115 (100)
Total	59 (31.2)	130 (68.8)	189 (100)

Note: this table has been constructed from jamovi output.

a) There were 74 mothers who smoked during pregnancy.
b) 41% of mothers who smoked and 25% of non-smoking mothers gave birth to low-birth-weight babies.
c) See Figure 2.1.
d) A larger proportion of mothers in the <20 years, 20-24 years and 25-29 years age groups gave birth to low birth weight babies compared to mothers aged 30-34 years. No low birth weight babies were born to mothers aged 35 or more (Figure 1). A larger proportion of mothers who smoked during pregnancy gave birth to low birth weight babies compared to mothers who did not smoke during pregnancy (Table 1).

NB: You will revisit two-way tables in Module 7 where you will conduct statistical tests to determine if the there is evidence of a difference in proportions.

Figure 1: Relative frequency of low birth weight by mother's age group



Process

After reading in the data and creating more meaningful variable names, Table 1 was created as follows. Note that we request **Row Percentages**:

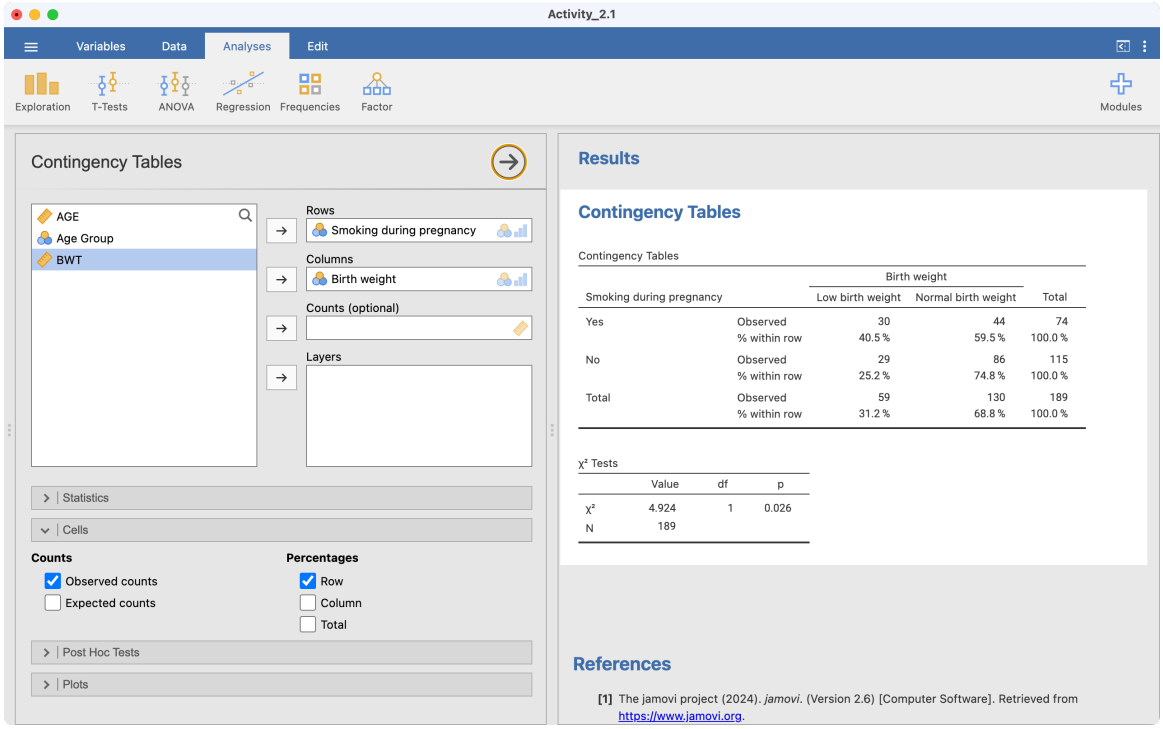
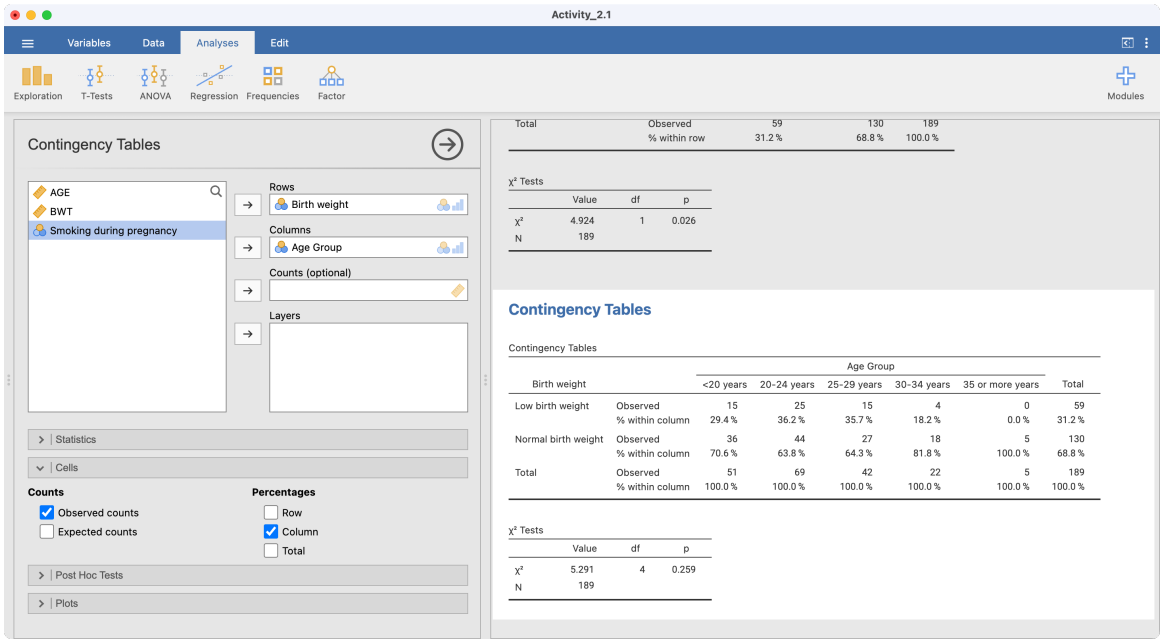
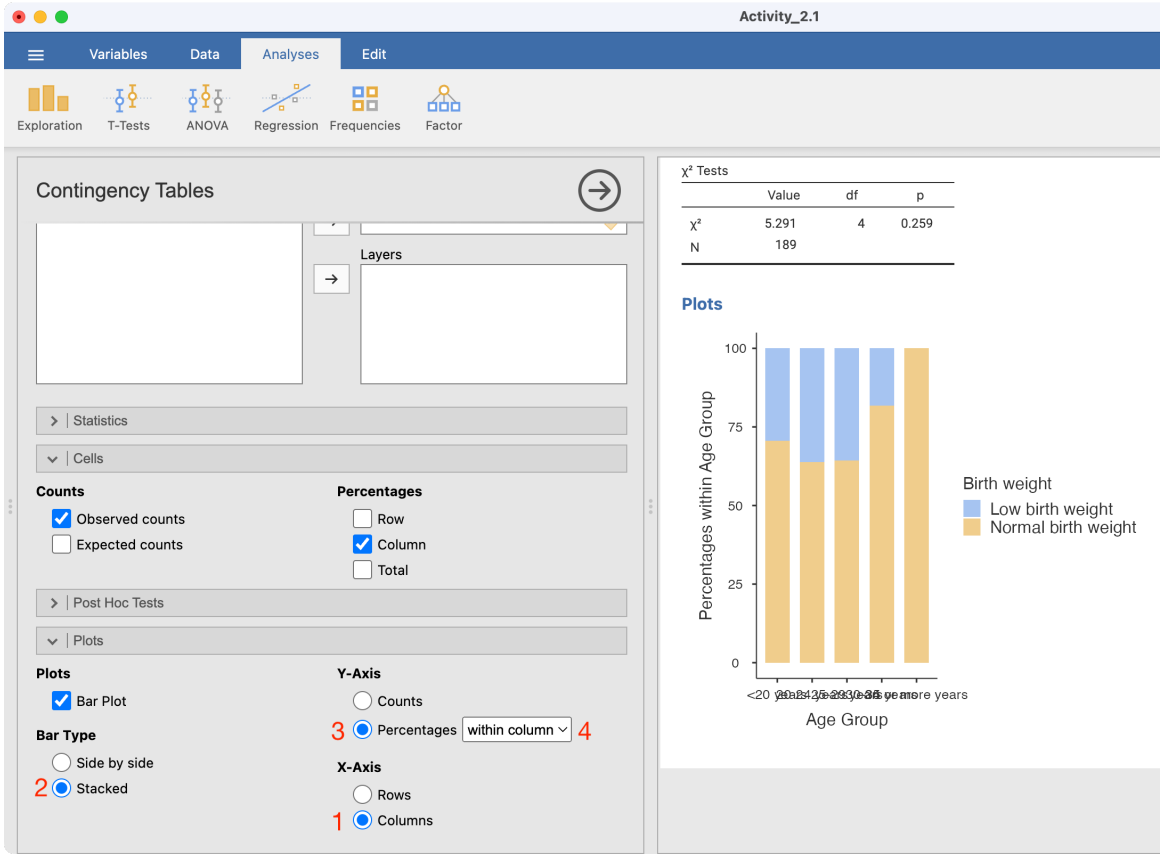


Figure 1 was also created using the `contTables` function, and is based on thinking of constructing a two-way table consisting of `Age group` and `Low birth weight`, and requesting percents within each age group:



We can request a bar-chart in the **Plots** section, where the x-axis of the plot is `Age group` (i.e. the columns; [1]), and we want the bars to be stacked [2]. We request the y-axis to be percentages [3], and the percentages to be the column percents [4]:



The final figure is shown below. Note that the x-axis on this figure is not ideal. jamovi currently does not allow editing of figures, so we are stuck with this version.

Figure 2: Relative frequency of low birth weight by mother's age group