\*\*(a) State the null and alternative hypotheses for this test.\*\*

The null hypothesis (\(H\_0\)) is that there is no association between the average number of hours students work part-time and their perception of the effect of part-time work on academic achievement. The alternative hypothesis (\(H\_a\)) is that there is an association between the average number of hours students work part-time and their perception of the effect of part-time work on academic achievement.

\*\*(b) Discuss whether the conditions for a chi-square inference procedure are met for these data.\*\*

For a chi-square test to be valid, the following conditions must be met:

1. The data must be from a simple random sample, which the problem states is the case.

2. The variables should be categorical, which they are: hours worked and perception of effect.

3. Expected cell counts should be at least 5 for the approximation to the chi-square distribution to be valid. The expected counts in the table are all above 5, meeting this condition.

Therefore, the conditions for conducting a chi-square test are adequately met.

\*\*(c) Given the results from the chi-square test, what should the advisory board conclude?\*\*

With a chi-square statistic of 13.938 and a \(p\)-value of 0.007, which is less than the common significance level of 0.05, we reject the null hypothesis. The advisory board should conclude that there is a statistically significant association between the average number of hours that students work part-time and their perception of the effect of part-time work on academic achievement.

\*\*(d) Based on your conclusion in part (c), which type of error (Type I or Type II) might the advisory board have made? Describe this error in the context of the question.\*\*

By rejecting the null hypothesis, the advisory board risks making a Type I error. A Type I error occurs when the null hypothesis is true, but we incorrectly reject it. In this context, it would mean concluding that there is an association between the number of hours students work part-time and their perception of its effect on academic achievement when, in reality, no such association exists.