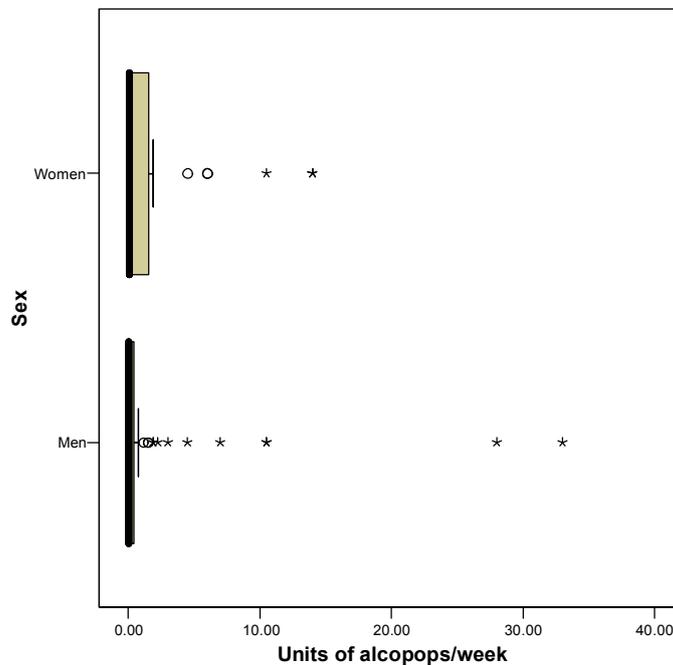


MANN WHITNEY U TEST

The Health Survey for England (2000) provides information on the consumption of alcohol in the form of alcopops. One item of information recorded was the number of units of alcohol consumed in the form of alcopops in the previous week. Here we look at the intakes of men and women aged 16.

The box plot below compares the distribution of the number of units of alcohol consumed in the form of alcopops between men and women.



With two independent samples and a continuous dependent variable (units of alcopops), the two-sample t-test might seem the best choice of test, however the large numbers of both men and women with zero consumption of alcopops in the previous week, combined with small numbers of people with very high consumption, generate distributions for both men and women that are highly skewed. This means that the data is not suitable for analysis using a test based on the assumption of Normality.

The Mann Whitney U test could be used because:

- (1) two independent samples are being compared (men vs women)
- (2) although the measurement being compared (units of alcopops consumed) is quantitative it does not meet the assumptions required by a parametric test

The test hypotheses are:

Null (H_0): median alcopops units are the same for men and women

Alternative (H_1): median alcopops units are not the same for men and women

The test output from SPSS is shown below:

	Units of alcopops/week
Mann-Whitney U	921.000
Wilcoxon W	3001.000
Z	-1.782
Asymp. Sig. (2-tailed)	.075

a. Grouping Variable: Sex

Three variations on the test statistic are provided, but the best one to report is the z value which has the advantage of being expressed on the standard Normal scale which many people understand. Although there appear to be three different test results, these simply express the same information on different scales (a bit like changing currency!) and all three share the same P-value and hence the same conclusion.

In this case, $P=0.075$ is greater than 0.05 hence the null hypothesis is not rejected.

The hypothesis test allows you to say:

The data does not provide statistically significant evidence that median units of alcohol consumed in the form of alcopops differs between men and women aged 16 (Mann Whitney U test, $z = -1.782$, $P = 0.075$).

Note. Alternative use of Mann Whitney U test

Another situation in which the Mann Whitney U test can be used is for comparing two independent samples when the variable being compared between samples (dependent variable) is ordinal.