Supplemental Material

Examples for study design:

Example 1 A research scientist could distribute both sexes in equal numbers into each treatment and control group keeping the total number of animals in each group and the overall experiment the same. For example, if an investigator typically uses 8 animals on one sex per level of the independent variable, he or she could place 4 of each sex into each level of the independent variable to maintain the group number at 8.

The action serves to address the need to control the variance due to the confounding variable (an identifiable one), which spreads any variance due to sex across the entire experiment. Had the researcher placed all or most of the females in one group and all or most of the males in another group, the variance due to sex could substantially impact the outcome on the dependent variable, rendering a biased statistical outcome and interpretation.

Key points: Includes both sexes; distributes variance across entire experiment; allows for reporting of outcome by sex in the literature; outcomes from including both sexes are generalizable to the entire population. Does not allow for adequately powered test of the sex variable; does not address how sex influences the outcome on the dependent measures.

Example 2 A research scientist could add additional animals of both sexes to each treatment or control group, increasing the total number of animals in each group and the overall experiment. For example, an investigator may choose to increase the individual group size to 12, and include 6 male and 6 female animals, for a total increase in the group numbers and the overall experiment.

This action serves to add additional animals to the experiment that *may* provide sufficient power to detect a statistical difference between males and females, while also spreading the influence of sex on the independent variable across all treatment and control groups. Furthermore, the increase of the overall experiment subject numbers may result in a greater likelihood of finding a statistically significant outcome on the independent variable due to control of variance due to sex and the control of Type II error(when null hypothesis is false, yet accepted)(1, 2).

Key points: Allows for direct control of variance due to sex; allows for statistical test of sex; allows for publication of outcomes by sex in the literature.

Example 3 A research scientist could incorporate sex as a factor in an experiment by using a factorial design, whereby the independent variable of interest is crossed with both sexes to evaluate statistically the impact of sex on the outcome measures based on each level of the variable of interest. In this case, sex is evaluated in the same manner as all other independent variables in a statistically meaningful manner to demonstrate the extent of influence of sex on outcome measures in relation to the other independent variables. This design may provide clear answers due to the powerful control over variance and systematic testing.

Key points: allows for direct control of variance due to sex; allows for statistical test of sex; allows for publication of outcomes by sex in the literature; allows for interaction of sex with other independent variable of interest.

References

1. Ray WJ. (2000). *Methods: Toward a Science of Behavior and Experience*. Wadsworth Belmont, CA.
2. Howell DC (2007) *Statistical Methods for Psychology, 6th Ed*. Wadsworth: Belmont, CA.