BIOLOGY AND HOMOSEXUALITY

14. Final Comments

The goal of the study is to examine the relationship between sexual orientation and volume of INAH3. The researcher hypothesized that INAH3 is large in individuals sexually oriented toward women (heterosexual men and homosexual women) and small in individuals sexually oriented toward men (heterosexual women and homosexual men).

In order to test the hypothesis, the volumes of one cell cluster (INAH3) of the anterior hypothalamus in post-mortem tissue from 41 subjects at autopsy were measured. The 41 subjects were divided into five groups based on their sex (male or female), sexual orientation (heterosexual and homosexual), and cause of death (AIDS and non-AIDS).

The answers to the following three questions were sought: Do heterosexual males tend to differ from homosexual males in the volume of INAH3? Do heterosexual males tend to differ from heterosexual females in the volume of INAH3? Do heterosexual females tend to differ from homosexual males in the volume of INAH3?

The side-by-side boxplots of the data show that there is some skewness in some of the groups, but the scale of volume, untransformed, appears best (although not ideal). An appropriate statistical technique to determine whether the observed differences among the five groups are statistically significant is one-way ANOVA. The p-value of the F-test equal to 0.0079 indicates strong evidence of differences among the group means.

In order to answer the above questions, we look at the contrasts. The analysis of contrasts has showed there is no evidence of any effect of cause of death on volumes for heterosexual females and males. Therefore, it is reasonable to pool over causes of death.

The analysis of contrasts (contrast 9) showed that there is convincing evidence of the differences in volumes between heterosexual and homosexual males. There is also convincing evidence of the differences in volumes between heterosexual males and heterosexual females (contrast 8). The analysis showed also that there is no evidence that heterosexual females differed from homosexual males (contrast 11).

As none of the factors was decided by the investigator for each of the 41 subjects, the case study is an example of an observational study. In other words, allocation of the subjects to the five groups was not determined by any chance mechanism.

As the study is an observational study, we are not able to draw any causal conclusions from the statistical analysis alone. It is possible that some confounding variables are responsible for the disparity in the volumes of INAH3 between heterosexual and homosexual males. For example, as all homosexual males in the study died of AIDS, there is the possibility that the small size of INAH3 in the homosexual men is the result of AIDS or its complications and is not related to the men's sexual orientation.

Until tissue from homosexual men dying of other causes becomes available, the possibility cannot be rigorously excluded. The results do not allow us to decide if the size of INAH3 in an individual is the cause or consequence of that individual's sexual orientation.

Notice that the 41 subjects at autopsy in the five groups were not selected from any well-defined populations. Therefore, the observed pattern cannot be inferred to hold in some general populations, for example the population of all homosexual men unless we assume that the homosexual men in the study are representative of the population. However, all homosexual men in the study had AIDS. There is a possibility that AIDS patients constitute an unrepresentative subset of gay men.

The existence of exceptions in the data (that is, presumed heterosexual men with small INAH3 nuclei, and homosexual men with large ones) hints at the possibility that sexual orientation, although an important variable, may not be the sole determinant of INAH3 size. It is also possible, however, that these exceptions are due to technical shortcomings or to misassignment of subjects to their subject groups.

Summarizing, the analysis indicates that INAH3 is dimorphic with sexual orientation, at least in men, and suggests that sexual orientation has a biological substrate.