

## Study #2

A team of experienced epidemiologists suspect, based upon past published findings and well-established theory in their literature, that a certain drug might cure a novel life-threatening disease caused by a new virus. They secure funding from the National Institutes of Health, quickly recruit 100 patients from across the United States, and launch an experimental trial where half of the subjects are given the drug and half serve as controls. After two years of study, the results reveal a correlation of .10 between the treatment and survival, which, with this sample size, is not statistically significant.

One of the researchers notes to others that she is disappointed because she knows one woman in the eastern region where this researcher worked who was cured by the treatment. Another researcher chimes in and notes that she knew a woman in her region in the south who was also cured. When the third researcher from the north reported the exact same observation, no one waits for the fourth researcher from the west to tell his story—they are already reanalyzing the data. The results indicate that when analyzed separately by gender, the effect size for men is .00 and the effect size for women is .20, which, with this sample size, is still not statistically significant.

Disappointed, but not deterred, a discussion that lasts for days ensues regarding all the many different physiological differences between women and men that might explain this result. All of these speculations are based upon the researchers' implicit knowledge of existing theory and empirical evidence in this area and are truly deductive in origin and a priori in spirit. Some of these are explored empirically with no luck. Eventually, this discussion focuses on how the drug might interact with estrogen levels due to its chemical composition, and the research team deductively arrives at a hypothesis aimed at testing the moderating effects of this variable. Because estrogen in women peaks at specific ages, the team goes back and reanalyzes the data broken down by age. They find that among women who are the peak age for estrogen levels, the correlation between the treatment and being cured is .50, which, even with this reduced sample size, is statistically significant. The authors immediately write these results up for publication as a short note in order to get these findings into the literature as soon as possible. In the short note, they write up the results for the age-by-gender interaction in the Discussion Section of their manuscript, noting that these were the result of an exploratory analysis of the data that was conducted after the main effects for the drug were found to be nonsignificant. They also schedule speaking tours at conferences, universities, and other laboratories in order to disseminate their results.