

## A non-significant dialogue

"I found that the estimated risk ratio (RR=2.5) is not statistically significant."

"Great. What does that mean?"

"It means (for most people) that the  $p$ -value was greater than 0.05"

"And what was its value?"

" $p=0.87$ "

"What does that mean?"

"It means that the probability of observing this result, or more extreme results, if the null is true, is 0.87"

"Right. So what does *that* mean?"

"That we don't have much evidence against the null (RR=1)."

"Right. So what do we infer about the value of RR?"

"That RR=1"

"Nope."

"That our estimate should have been 1, but happened to be 2.5 due to chance."

"Nope."

"That the results support the null (RR=1)."

"Nope."

"I give up. What do we infer?"

"Nothing."

"Nothing?"

"Yes, nothing. The lack of evidence against the null is not evidence for the null. It is evidence for nothing."

"If we infer nothing, then the study was useless—from the  $p$ -value viewpoint."

"Right."

"So why do people imply that a large  $p$ -value supports the null? Why do they write statements such as 'E was not associated with D ( $p=0.87$ )', or 'Q did not modify the effect of E on D ( $p=0.87$ )'."

"I have no idea. They must have missed that lecture in statistics."

Forthcoming: A confident dialogue