# another introduction to inference

- review simulation based inference
- review hypothesis testing framework

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# remember when…

| | | promotion | | |
|---|---|---|---|---|
| | | promoted | not promoted | total |
| gender | male | 21 | 3 | 24 |
| | female | 14 | 10 | 24 |
| | total | 35 | 13 | 48 |

% of males promoted = 21/24 ≈ 88%

% of females promoted = 14/24 ≈ 58%

# two competing claims…

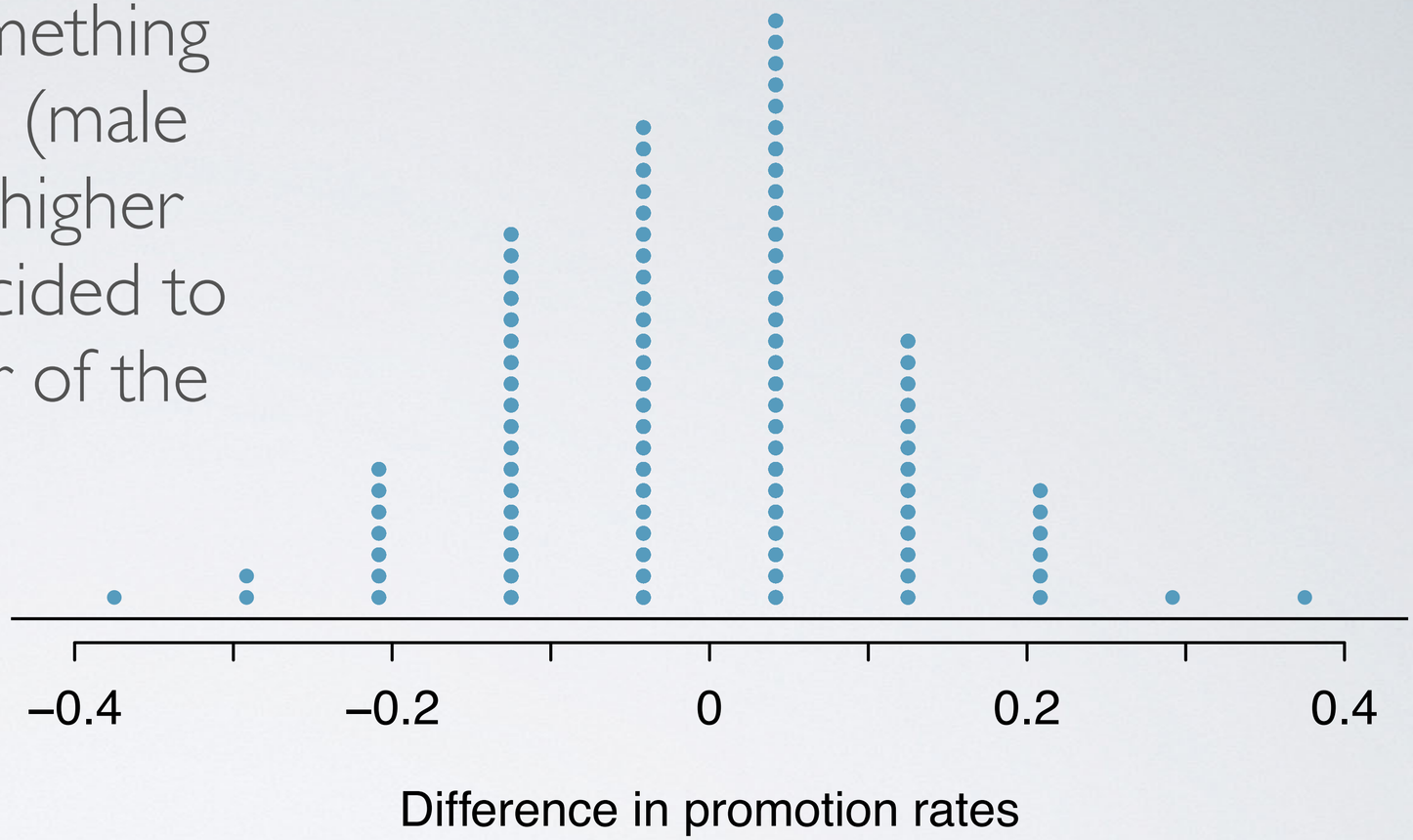
1. *"There is nothing going on."*

Promotion and gender are independent, no gender discrimination, observed difference in proportions is simply due to chance. → Null hypothesis

2. *"There is something going on."*

Promotion and gender are dependent, there is gender discrimination, observed difference in proportions is not due to chance. → Alternative hypothesis

Since it was quite unlikely to obtain results like the actual data or something more extreme in the simulations (male promotions being 30% or more higher than female promotions), we decided to reject the null hypothesis in favor of the alternative.



# recap: hypothesis testing framework

- We start with a null hypothesis ($H_0$) that represents the status quo.
- We also have an alternative hypothesis ($H_A$) that represents our research question, i.e. what we're testing for.
- We conduct a hypothesis test under the assumption that the null hypothesis is true, either via simulation (end of Unit 1) or theoretical methods — methods that rely on the CLT (in this Unit).
- If the test results suggest that the data do not provide convincing evidence for the alternative hypothesis, we stick with the null hypothesis. If they do, then we reject the null hypothesis in favor of the alternative.