

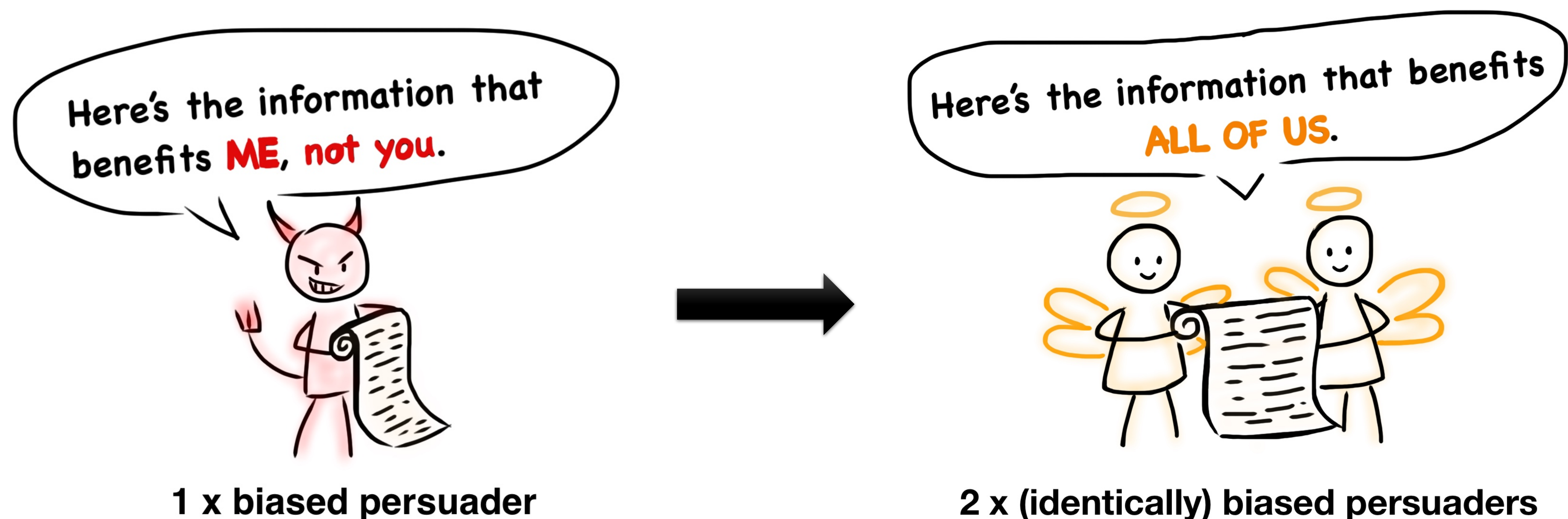
Benefits of non-competing persuaders

Jiemai Wu, University of Sydney

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Abstract

This paper shows that biased persuaders can provide better information to a decision maker due to cooperative, and not competitive, motives. I study Bayesian persuasion games with persuaders who all want a decision maker to take the same action unconditionally. While the optimal information policy from a unique persuader never benefits the decision maker, I show that this is not the case when there are multiple persuaders who share the same goal. These non-competing persuaders provide extra information in order to help offset their colleagues' potential negative news. This leads to highly informative equilibria that benefit both the decision maker and the persuaders.



A basic example

- A patient is choosing between surgery and a more conservative treatment for her condition. She prefers the surgery if and only if the probability that her current condition is severe is at least $p > 0.5$. Without additional information, her current condition is equally likely to be severe or not severe.
- The patient seeks advice from doctors. The doctors have a different preference from the patient: they all prefer the surgery regardless of the current severity.
- To give credible advice, the doctors design independent medical tests with endogenous type I and type II errors. The patient makes a final decision after observing the test designs as well as the positive/negative test results (positive results suggest that the current condition is severe).

Persuader x 1 = useless information...

- If the patient seeks advice from only one doctor, the doctor will design a test with a high false-positive rate to maximize the chance of a surgery.
- In equilibrium, the patient is indifferent between the two treatments when the test result is positive. She chooses the surgery to break the tie, but her expected payoff is the same as that if she completely ignores the doctor's information and always chooses the conservative treatment.

Persuader x 2 = best information!

- If the patient seeks advice from two doctors, there always exists an almost fully-revealing strict equilibrium in which each doctor's unique best response is to design a test with type I and II errors ≈ 0 .

Q: The doctors share identical preferences and they are not competing. Why do they stop being "useless"? Why do they reveal this much information?

A: When there are two doctors, they cannot guarantee perfect synchronization of their test results. The highly revealing test design is the doctors' "defense mechanism" to make sure that the patient will still choose the surgery even when one out of two tests yields a negative result. For the "defense mechanism" to work, the false-positive rates have to be low enough so that a positive result can outweigh a negative result.

Q: What happens if "almost fully-revealing" test designs are unavailable because all medical tests are intrinsically noisy?

A: There are still equilibria in which the doctors design very informative tests that benefit the patient!

Moreover, these informative test designs can maximize the doctors' utility, too. This is because unsynchronized negative results are very common when tests are noisy. Therefore, it's particularly helpful to lower false-positive rates so that the positive results can offset a few negative results.

Q: How general are these results?

A: The same results hold when the game has arbitrarily many independent persuaders. These results are also robust when the state and the test results are non-binary.

