



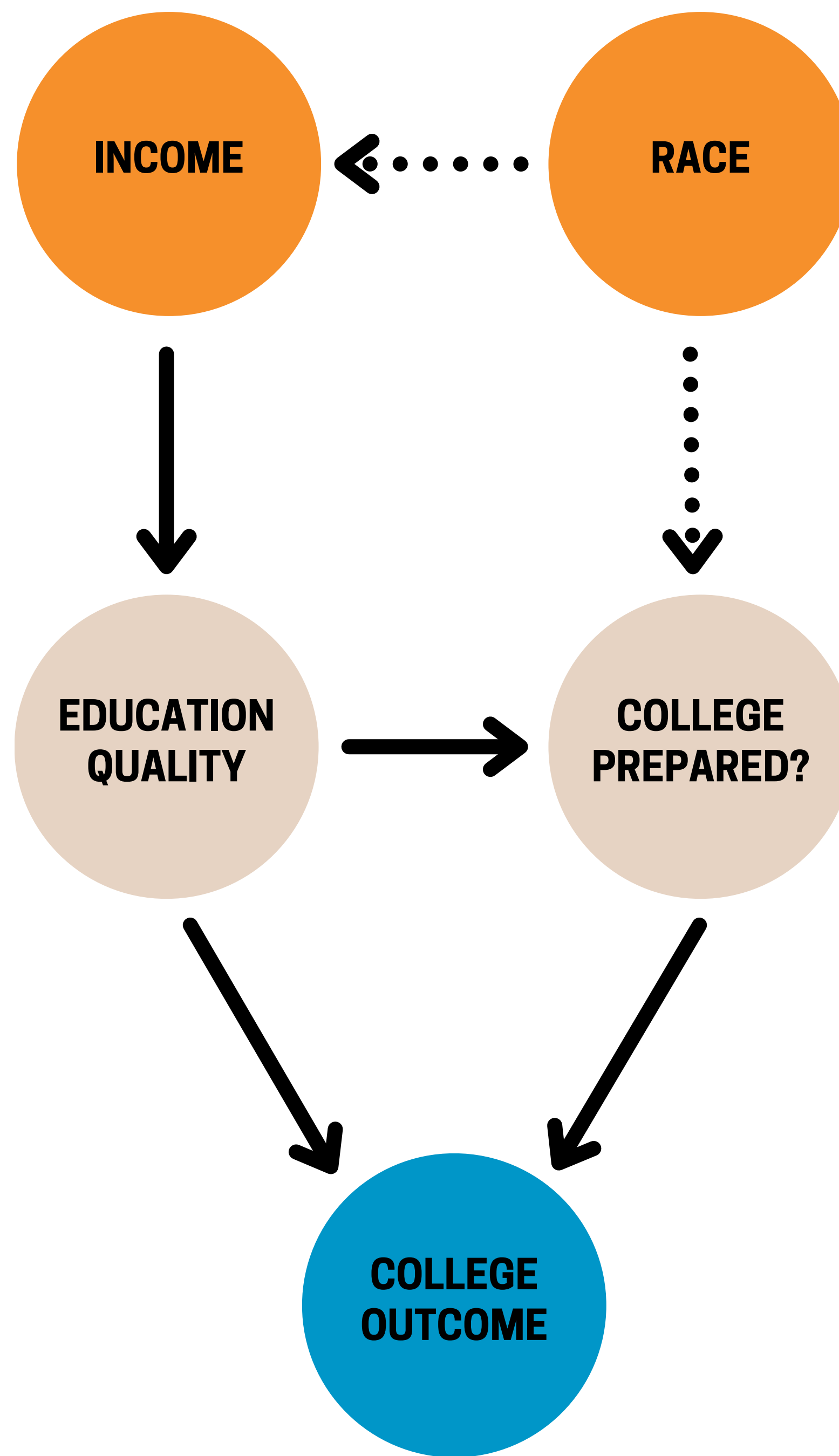
# ON THE DISPARATE IMPACT OF CAUSAL DISCOVERY

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## RESEARCH QUESTION

Causality purports to improve fairness, but there are issues when one does **not already have a causal model**.



## KEY FINDING

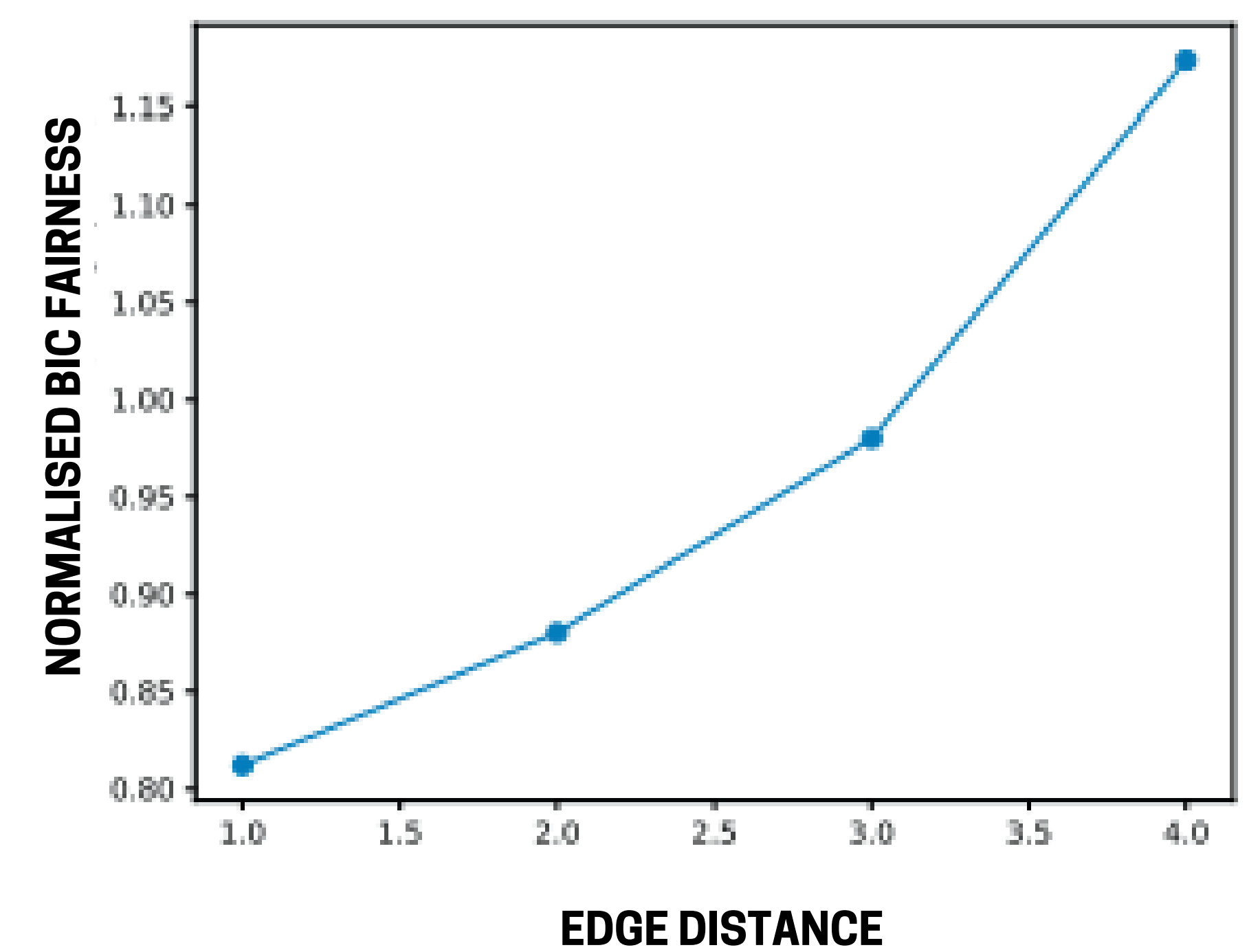
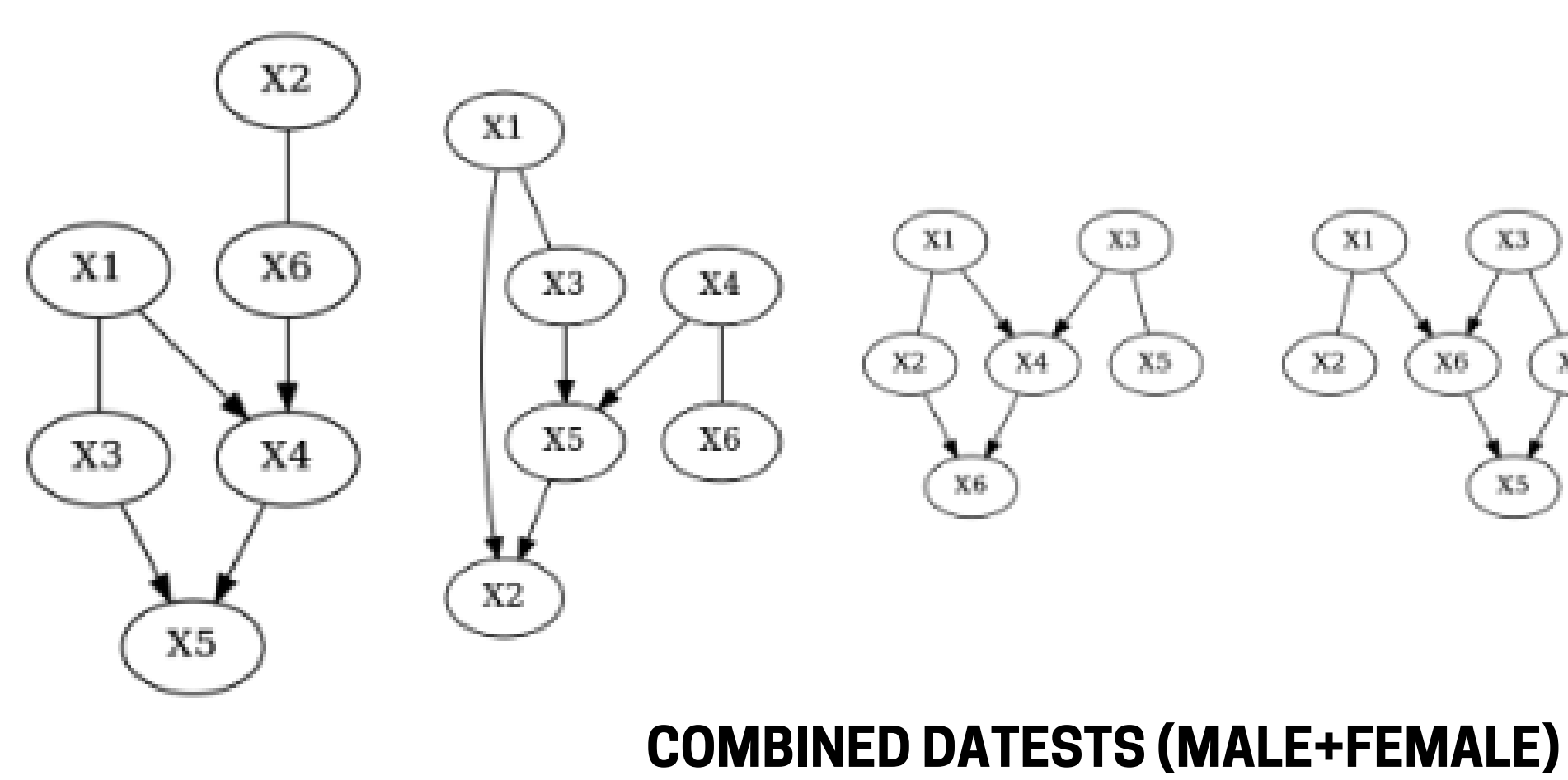
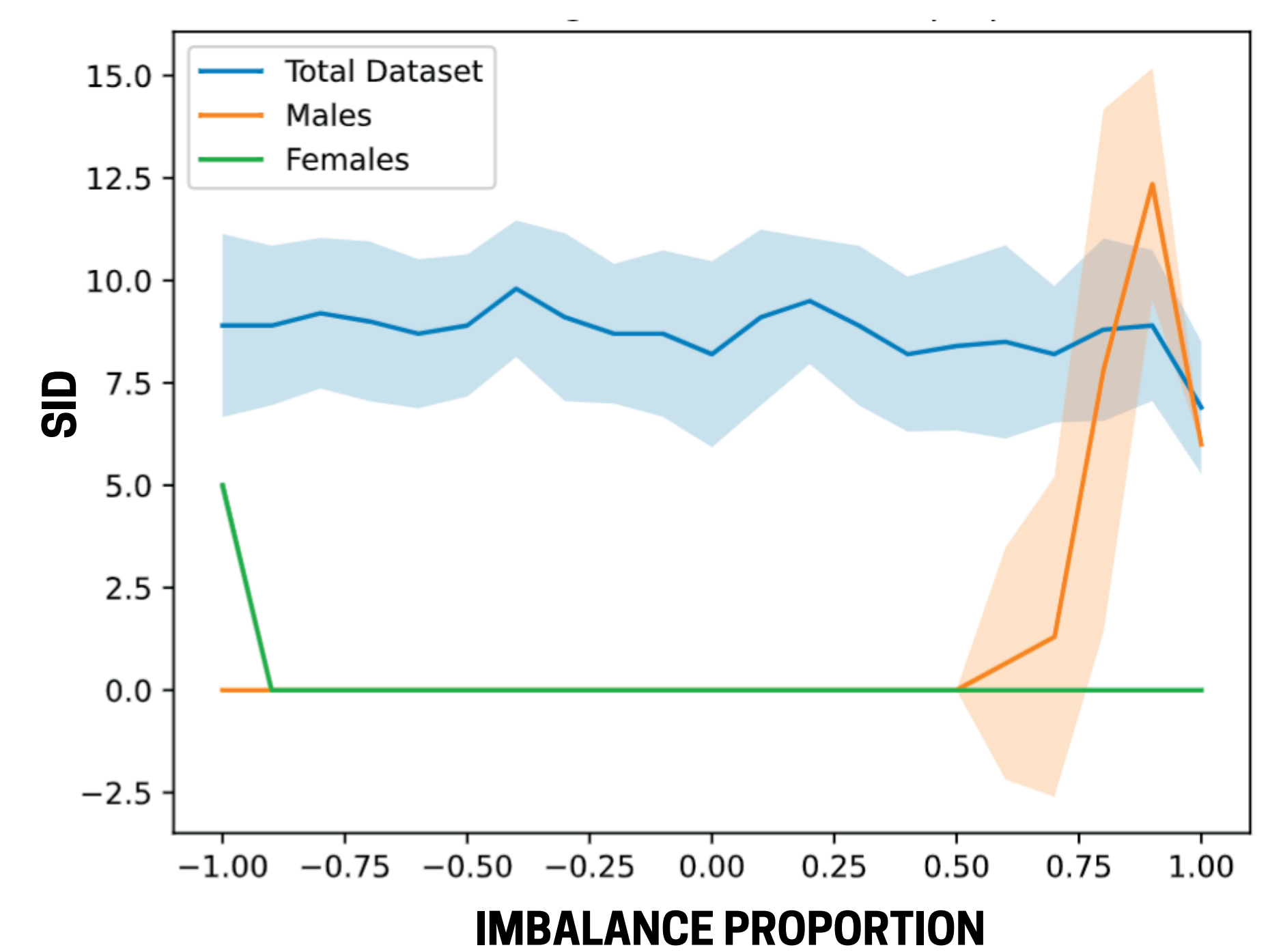
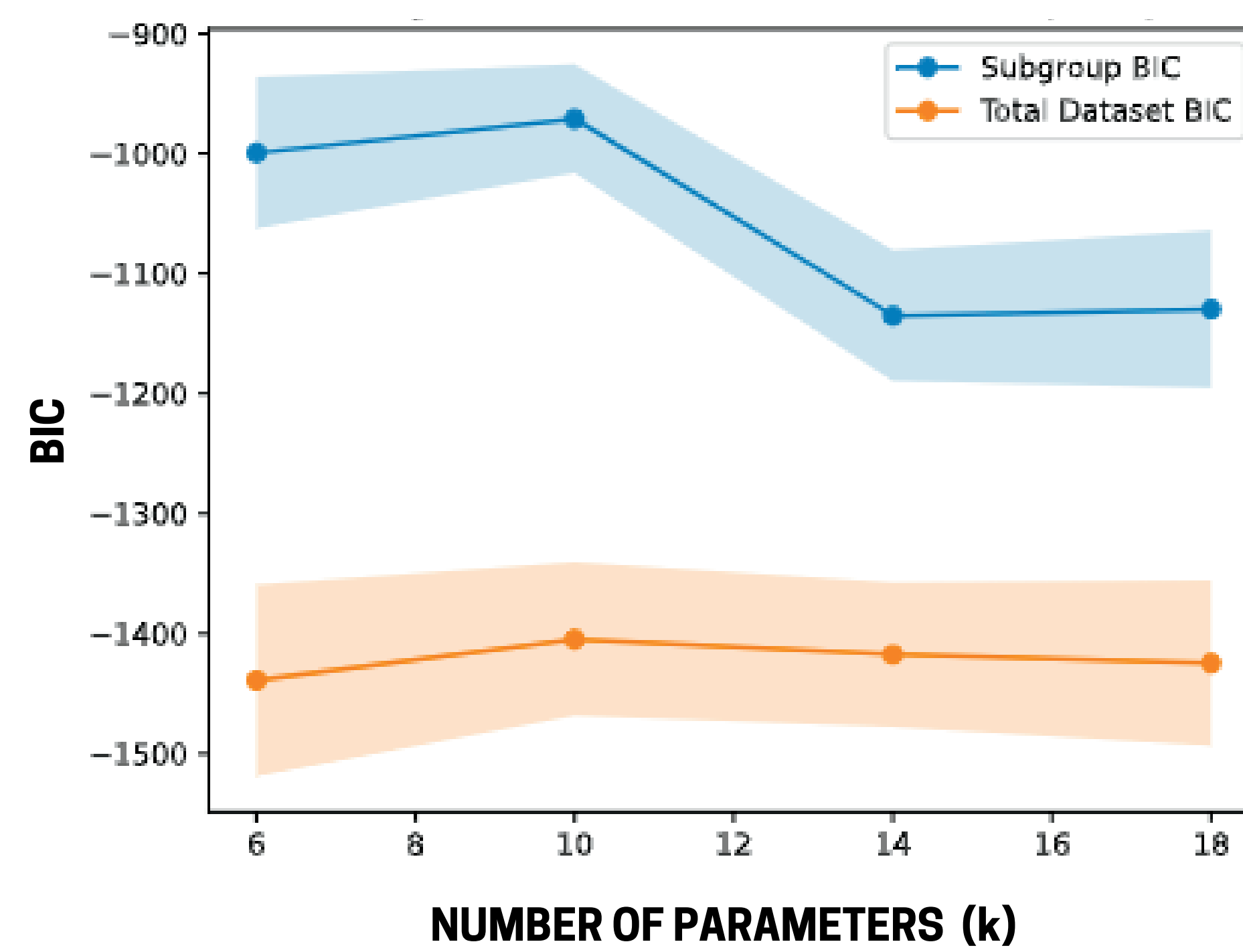
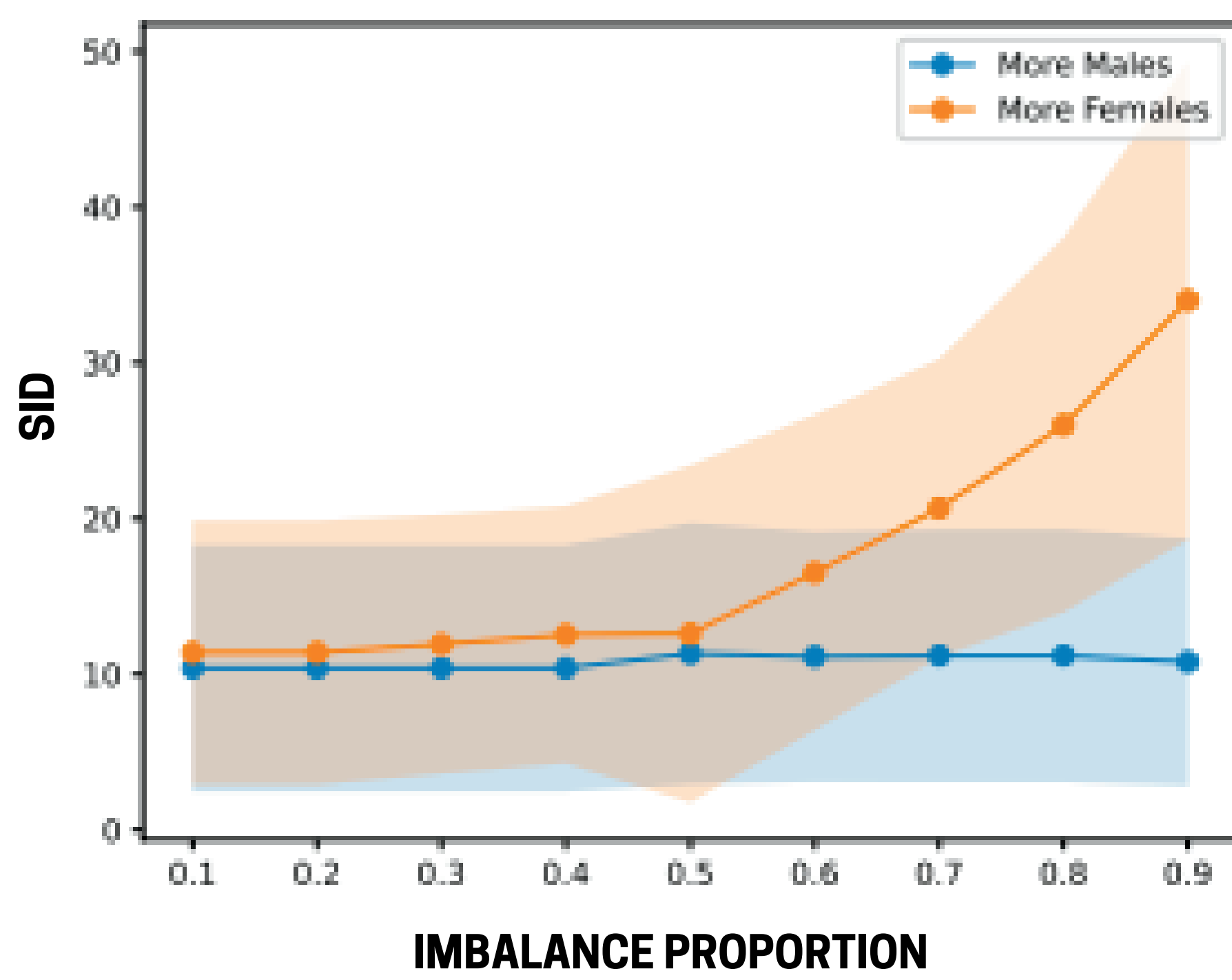
Causal discovery can **induce bias** and lead to structurally unfair decision making pipelines.

## HOW DOES UNFAIRNESS ARISE?

- Data properties. e.g. Class imbalances.
- Structural properties. e.g. Types of dependencies.
- Functional properties

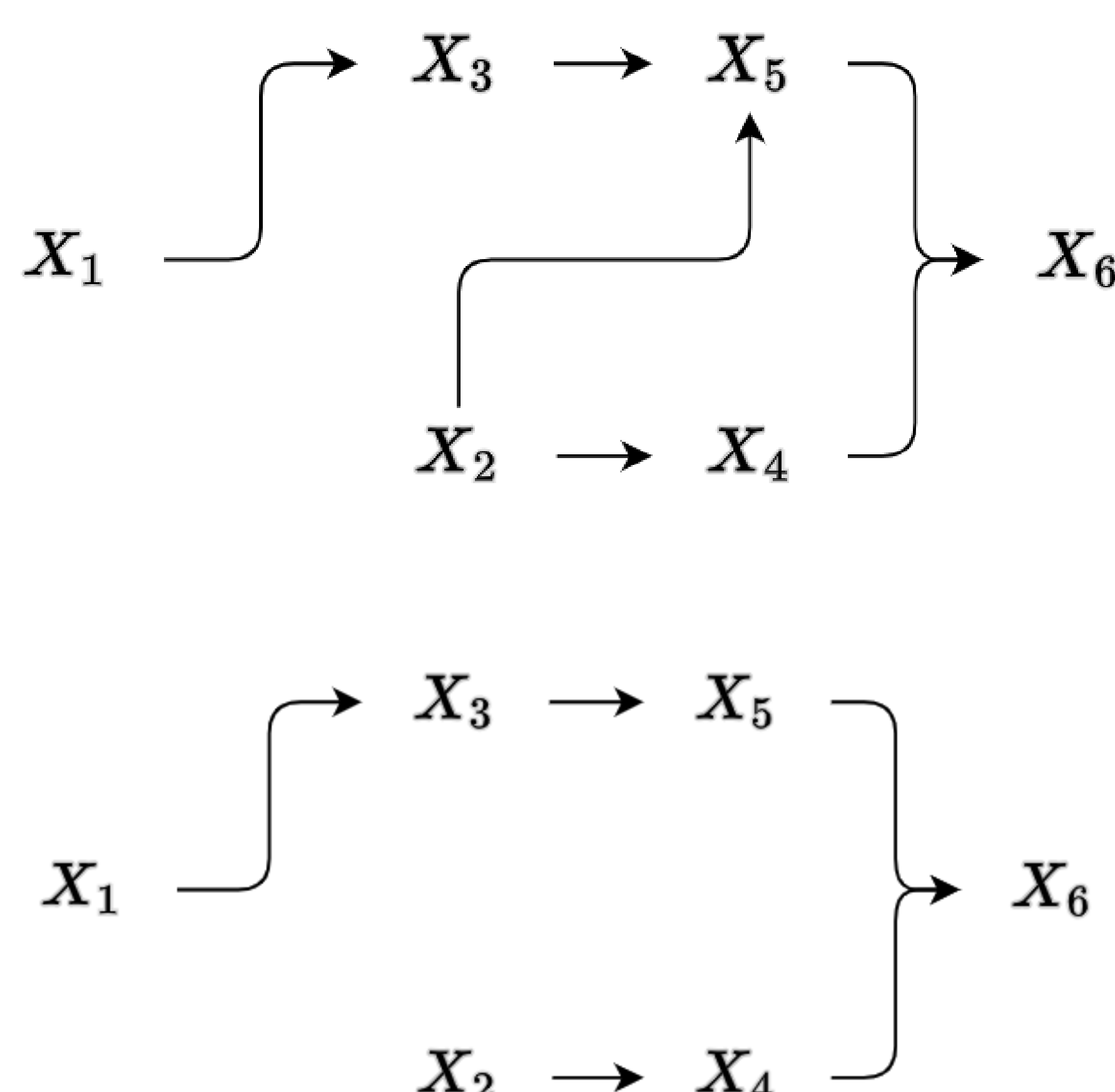
## DATA GENERATION

- Random sampling from causal DAG
- Randomised generation across multiple seeds
- Tested on artificial and real datasets. Artificial preferred for known ground truth.



## CONCLUSIONS

- Show that unfairness can arise even when applying 'fair' causal methods.
- Induced bias can arise due to various factors - both related to structure and data biases.
- Not easily solvable in real domains.



## FUTURE WORK & DIRECTIONS

- Investigate algorithmic ways to resolve common causal discovery induced issues.
- Investigate and recommend a key metric for interventional fairness.
- Focus on modern causal discovery and DL methods.