

Episode 129: Summary

Episode name: Grasping Causation: A Data Science Explanation of Causal Inference and the Role of Counterfactuals

Guest(s): Hans Weemaes

What area(s) of law does this episode consider?

Litigation; understanding causal inference and effect through a data science lens.

Why is this topic relevant?

Understanding causal inferences is a fundamental aspect of litigation, as how these inferences are established can significantly impact the outcome of a case. Causation is not only relevant in proving liability; but also in calculating damages and organising the overall strategy of proceedings. The ability to present accurate and well-supported inferences can significantly strengthen a case, while weak or erroneous ones can undermine it. As such, lawyers must be able to navigate the complexities of causation to build strong arguments and present compelling cases. This must be done with care and consideration, as treating causal inferences with a casual attitude can result in inaccurate conclusions being made.

The legal industry often relies on experts to assist in addressing causal questions, who may rely on simple before-and-after comparisons or correlations when refuting causal claims. Being able to effectively identify and assess the assumptions at hand when dealing with causal inferences, will place lawyers in a better position to both advocate for their clients and fulfil their duty to the court. As such, developing a data driven understanding of causation is an immensely useful tool to add to your litigation toolbelt.

What legislation is considered in this episode?

[Evidence Act 1995 \(NSW\)](#)

[Uniform Civil Procedure Rules 2005 \(NSW\)](#)

What cases are considered in this episode?

[R v Mason \(2003\) 140 A Crim R 274](#)

- The document discusses a case where the defendant was accused of multiple robberies. The main issue was the admissibility of tendency and coincidence evidence under ss 97(1)(a), 98(1)(a), and 101(2) of the *Evidence Act 1995* (NSW). The court had to determine whether the similarities across the events, such as the description of the robber, the getaway vehicle, and the method of robbery, were distinct enough to provide significant probative value. The court found that when these features were considered together, they demonstrated substantial and relevant similarity across the events. The court concluded that the probative value of the evidence substantially outweighed any prejudicial effect it may have had on the defendant.

[R v Milenkovic \(2005\) 158 A Crim R 4](#)

- The accused was charged with the armed robbery of a Westpac Bank, and the Crown presented evidence linking him to a subsequent, similar robbery. Both

robberies involved men dressed in dark clothing, armed with a shotgun and sledgehammers, and driving stolen vehicles. A key point was the use of the same changeover vehicle, owned by the father of one of the other men involved, in both robberies. DNA evidence connected the accused to the second robbery. Despite these similarities, the trial judge dismissed the connections as typical of armed robberies, and the Court of Criminal Appeal upheld the decision, finding that while the shared changeover vehicle gave the evidence some probative value, it was not significant enough to be deemed statistically meaningful in proving the accused's involvement.

What are the main points?

- Causal inference is the study of cause and effect relationships among variables and involves two main aspects: discovery, which focuses on identifying causal relationships between variables, and measurement of causal effects, which examines the size of causal effects.
- To determine a true causal effect, one would need to compare outcomes in different scenarios but whilst holding all other factors constant.
- The human brain is a predictive machine that relies on pattern recognition, leading to potential biases in causal inference.
- Counterfactual analysis is essential for establishing causal inference as data without a counterfactual can only provide observational insights. It is necessary to have a counterfactual to make better causal claims.
- Regardless of the assignment, an expert must understand the nature of the question being asked of them, especially if it is causal. It is crucial for the expert to acknowledge and address causal questions appropriately rather than ignoring them.
- Randomisation in creating groups for a study ensures balance not only in observable characteristics like gender and age but also in hidden factors like preferences and attitudes. This balancing act through randomisation leads to the elimination of potential influences, making it an efficient and effective method for achieving causal inference.
- In litigation, most data is backward-looking and observational, with some exceptions in areas like intellectual property or misleading advertising where experiments can be conducted. The key is often considered as finding situations with random events, called natural experiments, where the assignment of a treatment is external or random.
- Various causal inference techniques exist but the choice of technique depends on the specific circumstances of the case and the available data structure.

What are the practical takeaways?

- It is essential that practitioners distinguish between correlation and causation. Where there are limits or invisible data at play, practitioners should address these as potential influences on any assertions made.
- When conducting research or analysis, it is essential to control for numerous factors to ensure the validity and reliability of the results. This requires a significant amount of variability in the data being used, as having diverse data

points allows for a more comprehensive understanding of the phenomenon under study.

- It is important to ask questions early on in the research process, considering the available data sources and their potential value for exploration as a strong form of evidence.
- Practitioners should map out the causal structure by identifying variables and influences and then envisioning ideal settings for causal inference. By proactively thinking about data early on in the case and considering all possible variables and scenarios, one can prevent overlooking crucial information that could enhance the analysis and decision-making process.
- Lawyers should be conscious of biases and not projecting aspirations onto data when analysing it.
- Learning the basics of data analytics can help in asking the right questions, and ultimately making stronger claims.

Show notes

[Weemaes, Hans, and Joshua Arnold, 'Litigation Insights – Causation and Counterfactuals in Litigation' \(2024\)](#)

[Seven Up! \(1964\)](#)

[Council of Chief Justices Australia and New Zealand, 'Harmonised Expert Witnesses Code of Conduct' \(2024\)](#)