Gaps in the Evidence

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§0 The Question

Disputes about matters of fact in trial proceedings should be adjudicated in light of the evidence presented by the litigants. But, should the fact that some evidence was *not* presented also—at least in some circumstances—guide trial decisions? If so, how? This is the problem of gaps in the evidence or the problem of missing evidence.[1]

To illustrate, consider this scenario:

> Target: A customer trips and falls in a Target store. They suffer a serious injury. They sue Target and seek to recover medical costs. They claim the floor was slippery. Target denies the allegation. Video surveillance footage is only preserved in part. The rest is deleted. It is impossible to reconstruct what happened before the incident. The plaintiff—the customer—seeks an adverse inference jury instruction against Target for failing to preserve the full recording.[2]

Plan for the talk: dismissive responses to the problem of missing evidence (§1); the legal framework (§2); prejudice and reliability as two competing criteria (§3); epistemic and policy considerations in formualating remedies for missing evidence (§4); reliability and fortuitousness as key guiding criteria (§5).

[1] By "missing evidence" I shall usually mean the known fact that some evidence is missing whose content is unknown.

[2] The facts of this example follow (roughly) Decker v. Target Corp., No. 1:16-cv-00171-JNP-BCW (D. Utah Oct. 10, 2018). The adverse inference jury instruction would tell the jury to presume that the floor was slippery.

§1 Dismissive Responses

Some might claim that the problem of missing evidence is not a difficult problem and can be easily addressed: either (1) missing evidence is irrelevant and thus should play no role in trial decisions, or (2) if it is relevant, it is just like any other evidence so it poses no peculiar problem. Let's consider each of these in turn.

(1) *Missing evidence is not relevant evidence*

Missing evidence could be in favor or against either party. The two possibilities cancel each other out. So missing evidence is irrelevant:

> [I]f the evidence is missing it cannot be known which way it points. It appears equally possible that the missing evidence would confirm the current factual conclusion as contradict it. The competing possibilities cancel each other out. There is no warrant for the assumption that the missing evidence will point one way rather than the other.[3]

This claim, however, cannot be right in general. For consider the Target example from the beginning. Presumably, Target would be

[3] Hamer, D. (2012). Probability, Anti-resilience, and the Weight of Expectation. *Law, Probability and Risk*, 11(2-3), 135–158, 139.

more likely to delete the video if the floor was slippery than if it was not. They have a reason to delete the recording in the former but not in the latter case. Thus, taking into account the fact the recording is missing should raise the probability that the floor was slippery. This shows that missing evidence can very well be relevant evidence.

The missing recording would have null value only if it were just as likely that Target would attempt to remove the recording when the floor was slippery as when it was not.

(2) *Missing evidence is just any other kind of evidence*

Let E_p the evidence presented at trial and let E_m describe known facts about missing evidence, for example, that the video recording is missing. The overall body of evidence should consist of $E_p \wedge E_m$. In making decisions about a hypothesis H, we should consider $Pr(H|E_p \wedge E_m)$ rather than simply $Pr(H|E_p)$.[4]

If missing evidence is relevant evidence, $Pr(H|E_p \wedge E_m) \neq Pr(H|E_p)$.[5] But can this be the whole story? Likely not. To see why not, let's take a look at the legal framework for handling missing evidence.

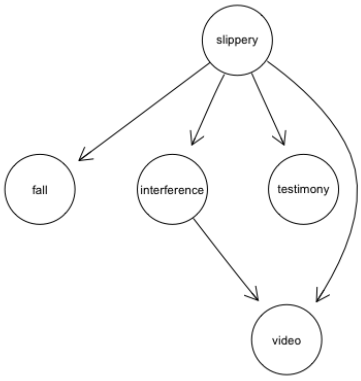

Figure 1: DAG of the Target case.

[4] Kaye, D. H. (1986). Do we Need a Calculus of Weight to Understand Proof Beyond a Reasonable Doubt? *Boston University Law Review*, 66, 657–672.

[5] The only hard question here would be, how should one assess $Pr(H|E_p \wedge E_m)$ as opposed to $Pr(H|E_p)$, for example, following the causal graph in Figure 1?

§2 Legal Framework

The legal framework for handling missing evidence is three-tiered:[6]

> First, ask about the *prejudicial effects* of the missing evidence. Could the missing evidence have made a difference to the verdict?[7]
>
> Second, examine the *circumstances* that caused the evidence to be missing. Was it an accident or misconduct? Did one of the parties have a duty to preserve the missing evidence?
>
> Third, devise a *remedy* (such as an adverse jury instruction) to be granted to the litigant disadvantaged by the missing evidence.

[6] The case law in the United States often follows this framework. See e.g. Decker v. Target Corp., No. 1:16-cv-00171-JNP-BCW (D. Utah Oct. 10, 2018) or Howard v. United States, No. 18-CF-15, (District of Columbia Court of Appeals, Nov. 19, 2020).

[7] A related question concerns what we might call *would-be-relevance*: would the missing evidence if presented be relevant? This question can be subsumed under the question of prejudice.

§3 Prejudice (or Reliability?)

To better understand the notion of prejudice, below is an example from the case law about missing evidence not regarded as prejudicial:

> Firearm: Defendant is charged with illegal possession of firearm. The police legally searched the defendant's vehicle and found a firearm. The defendant had no permit. The police searched the rest of the car and found a backpack, but did not retain all the items in the backpack: keys, pieces of paper, trash. The defense complains that the evidence is incomplete: information about the contents of the backpack is missing. In particular, defense argues that the keys could be exculpatory evidence: if they did not belong to the defendant, the backpack did not either, and neither did the firearm.[8]

[8] Howard v. United States, No. 18-CF-15, (District of Columbia Court of Appeals, Nov. 19, 2020).

The Court reasoned that the inferences to be drawn from the missing evidence—for example, the missing keys—were 'wholly speculative' and thus the missing evidence was not prejudicial.[9]

But, is prejudice the right criterion to focus on? Even if adding the missing evidence could have changed the verdict (prejudice), this addition could have also lowered the reliability of the decision-making process.[10] In a slogan, the claim "More Evidence, Fewer Errors" is not true in general.[11] For consider this example:[12]

> More Evidence More Errors: Reliable match evidence links the defendant to the crime scene in a murder case. There is no evidence, however, about the defendant's whereabouts before or after the crime nor about who else visited the crime scene. Compare this case with one in which the same evidence is presented but—in addition—a neighbor testifies that another person visited the victim's house before the defendant did. This additional evidence has a much lower reliability than the match evidence: the neighbor is an elderly man whose memory has proven incorrect in other circumstances. This testimony, if added, could change the verdict (prejudice) but would also make the decision process less reliabile than a decision based on just match evidence.[13]

Instead of focusing on prejudice, the question of reliability can become primary in deciding what to do about missing evidence:

> **Reliability First**: If the missing evidence, once added to the existing body of evidence, would have lowered the reliability of the decision—say because the missing evidence had lower reliability than the other evidence–it should be disregarded. So, in cases of missing evidence, the question of reliability is primary. In procedural terms, absent any clear reason for thinking the missing evidence would enhance reliability, the missing evidence should be disregarded; otherwise, it should be taken into account.[14]

Some might object that evidence is routinely presented at trial that could be misleading or could lower the reliability of the decision-making process. So reliability cannot be the key criterion for deciding whether further evidence should be taken into account.

But there is an important difference. When evidence is *actually* presented in trial proceedings, it is subject to adversarial scrutiny and cross-examination. This process is intended to detect sources of unreliability in the evidence. Instead, missing evidence cannot be subject to adversarial testing since its content is unknown. This difference is well-understood in the case law:

> A primary function of jury instructions, as well as the rules of procedure and evidence, is to confine the jury's attention to firsthand testimony ... which may be probed on cross-examination, thereby excluding conjecture ... The risk is always present that the jury will give undue weight to the presumed content of testimony not presented, and insufficient weight to that which was presented.[15]

[9] This conclusion seems sensible. It would be odd if any missing piece of information—given a broad enough interpretation—could alter the balance of the evidence and thus be prejudicial.

[10] Define reliability as the weighted average of the sensitivity and specificity of a binary decision-making process (say, a gain in specificity can be valued twice as much as a gain in sensitivity).

[11] This is a challenge to the principle of total evidence. See, for example, Good, I. J. (1967). On the principle of total evidence. *British Journal for the Philosophy of Science*, 17(4), 319–321.

[12] This example is liberally inspired by Lee Johnson v. Jeff Premo (2021 Oregon App. Ct.), Marion County Circuit Courto8C11553 - A159635.

[13] Suppose match evidence is 99% reliable, so $Pr(M^+|G) = Pr(M^-|I) = .99$. Testimonial evidence in the case, instead, is only 51% reliable, so $Pr(T^+|G) = Pr(T^-|I) = .51$. Decisions based on $M^{+/-}$ will be 99% reliable. Instead, decisions based on $M^{+/-} \wedge T^{+/-}$ will be less reliable. Sensitivity will be much worse than 99%, that is, $P(M^+ \wedge I^+|G) = .99 \times 0.51 \approx .5$. The assumption here is that a conviction is issued only when both items of evidence are incriminating, $M^+ \wedge T^+$. Specificity will be only slightly better than 99%, that is, $P(M^- \wedge I^-|I) + P(M^+ \wedge I^-|I) + P(M^- \wedge I^+|G) \approx .995$.

[14] The alternative is **Prejudice First**: A defendant may benefit from evidence even if it is misleading so long as the evidence, assessed on its face, appears to favor the defendant and tips the overall balance of evidence in their favor. This applies to all defendants. So, in cases of missing evidence, the question of prejudice is primary. In procedural terms, absent any clear reason for thinking the missing evidence could turn the verdict around (prejudice), the missing evidence should be disregarded; otherwise, it should be taken into account.

[15] Thomas v. United States, 447 A.2d 52, 58 (D.C. 1982).

How can this problem (i.e., giving undue weight to evidence not presented) be addressed? One option is to block any appeal to missing evidence since missing evidence cannot be tested via cross-examination. A less extreme option is to require that the missing evidence—despite not being testable adversarially—is shown to likely improve the reliability of the decision-making process should it be added.[16] This is the rationale behind Reliability First.[17]

§4 Circumstances and Remedies: Epistemology or Policy?

We now turn to the question of how remedies for missing evidence should be devised. Two approaches can be identified:

Epistemic aproach: remedies should only follow a conscientiousness assessment of the evidence. That some evidence was not presented can itself be information (evidence) for drawing inferences together with other evidence that was presented. This approach is internal to the logic of evidence evaluation. So the remedy here only consists in adjusting the probability of a hypothesis given missing evidence, that is, $Pr(H|E_p) \neq Pr(H|E_p \wedge E_m)$.[18]

Policy approach: Gaps in the evidence can be the result of objectionable out-of-court behavior that must be sanctioned.

The epistemic approach has limited applicability compared to the policy approach depending on the different circumstances in which gaps in the evidence arise. The two will not always converge:

Bad faith: a party destroyed evidence with intent to benefit from the destruction.[19]

Accident: by fortuitous circumstances, evidence was destroyed.[20]

Negligence: a party had a duty to preserve the evidence, but failed to comply with existing standards.[21]

Systemic patterns: some parties have systemically less access to evidence than others (say, because of imbalances in resources).[22]

§5 Two Guiding Questions

Two questions can guide how to respond to gaps in the evidence:

Reliability: Compare the body of available evidence (with gaps) and the would-be body of evidence (without gaps). Do we have reasons to believe that the would-be body of evidence (without gaps) would be more reliable than the actual body of evidence (with gaps)?

Causes: What is the cause that brought about gaps in the evidence? Is it a fortuitous fact or the result of a systemic pattern that advantages one or the other party in the trial?

[16] An alternative is to focus on *actual* reliability (=does taking into account the fact of missing evidence actually improve reliability?) rather than *would-be* reliability (=would the missing evidence, if added, improve reliability?).

[17] This approach seems to agree with legal practice. For example, the missing evidence in the TARGET case would have clearly enhanced the reliability of the decision-making process. We can conjecture, then, that the law prefers cases in which (it is relatively clear that) the missing evidence, if added, would improve reliability.

[18] The epistemic response aligns with the dismissive response (2) in §1 according to which "Missing evidence is just any other kind of evidence".

[19] Epistemic and policy approach yield the same remedy, say, an adverse inference against one party.

[20] Evidence is missing because of "random error", so no remedy is required.

[21] Consider this case in Dahlman and Nordgaard (2023). Information Economics in the Criminal Standard of Proof. *Law, Probability and Risk*. A man confesses to having stabbed an elderly woman while attempting to stole money from her apartment. He gives a detailed story. The man is tried for murder. The defense argues that the defendant's confession is an attempt to cover for others. The defendant has two sons with a criminal record. But, since the defendant confessed, the police did not think it necessary to analyze the tin box that contained the money for fingerprints. The fact that forensic analyses of the tin box are missing cannot be used to make an inference that they must have been exculpatory. So the epistemic approach would recommend no remedy. Still, even without bad faith intent, there was negligence on the part of the police. The policy approach could recommend the case be decided for the defendant.

[22] Should the value of evidence presented by the party that has better access to evidence be disocunted?