Progress with Foresight
Regress with Hindsight

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Michael Dilich
Vice President, Director of Research

FORESIGHT reconstruction, inc.
Morton Grove, Illinois

• Education: Mechanical Engineering, IL Institute of Tech - 1966
• Investigation, Reconstruction and Analysis of major loss accidents involving commercial and private vehicles - 1982
• Applied Research since 2000:
  - Driver behavior during sudden emergencies.
  - Foreseeability of harm in transportation accidents.
  - Judgmental biases in causal analysis of accidents.
"Those who know how things turned out have trouble believing others didn’t see what was coming."

*Baruch Fischhoff, 1975*
Hindsight: Thinking Backward
Dr. Baruch Fischhoff
1975

“The Hindsight Bias”
and
the 1814 war between
The British and the Gurkas of Nepal
5 groups of test subjects
1 foresight group & 4 hindsight groups

1. Foresight Group not told how the war ended.

2. Hindsight Group told war ended in a military stalemate with a peace treaty.

3. Hindsight Group told war ended in a military stalemate without a peace treaty.

4. Hindsight Group told war ended with a British victory.

5. Hindsight Group told war ended with a Gurka victory.
For some years after the arrival of Hastings as governor-general of India, the consolidation of British power involved serious wars. The first of these wars took place on the northern frontier of Bengal where the British were faced with the plundering raids of the Gurkas of Nepal. Attempts had been made to stop the raids by an exchange of lands, but the Gurkas would not give up their claims to land under British control, and Hastings decided to deal with them once and for all. The campaign began in November, 1814. It was not glorious. The Gurkas were only some 12,000 strong: but they were brave fighters, fighting in territory well-suited to their raiding tactics. The older British commandeers were used to war in the plains where the enemy ran away from a resolute attack. In the mountains of Nepal it was not easy even to find the enemy. The troops and transport animals suffered from the extremes of heat and cold, and the officers learned caution only after sharp reverses. Major-General Sir D. Ochterlony was the one commander to escape from these minor defeats.
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Fischhoff (1975) - The Hindsight Bias

Told British Won
- Expected British Victory
- Expected Gurka Victory

Told Gurkas Won
- Expected British Victory
- Expected Gurka Victory
Knowing that something had happened roughly doubled the perceived odds that it was going to occur.
Anchoring
Fischhoff found that hindsight bias is not deliberate. His test subjects had no vested interest in the outcome of his test.
FISCHHOFF’S CONCLUSION

Finding out that something happened increases its perceived inevitability.

We are unaware of this effect of outcome knowledge and believe that the inevitability was largely apparent in foresight, without the benefit of knowing what happened.

thus

The Hindsight Bias
“Those who know how things turned out have trouble believing others didn’t see what was coming.”

*Baruch Fischhoff, 1975*
“The Knew It All Along Effect”
“Magical Thinking”

H. Bursztajn, et al., 1988
Harvard Medical School
American Academy of Psychiatry & the Law
Hindsight bias is hard to recognize and hard to “feel” it happening. Since it is natural for people to use outcome knowledge when looking at the past, people may react with puzzlement to concerns about this bias and falsely believe that they are immune to its influence.
Hindsight bias is like an optical illusion, it deceives our perceptions and fools us all. None are immune!

Profession
Education
Intellect
Race
Gender

Judges
Lawyers
Scientists
Engineers
Psychologists
Current dictionary definitions:

**HINDSIGHT:** perception of the significance and nature of events after they have occurred.

**FORESIGHT:** perception of the significance and nature of events before they have occurred.
Hindsight is concerned with a certain past.

Foresight is concerned with an uncertain future.
Hindsight involves explanation of one outcome …… the one that actually occurred.

Foresight involves consideration of many possible outcomes.
Hindsight and Foresight differ in regards to the information available to the observer:

The **hindsightful** observer knows what happened.

The **foresightful** observer does not.
Hindsight is cheap and easy. We all partake in hindsight routinely and we’re all good at it. It’s easy to be wise after-the-fact.

Foresight is expensive. People with good foresight are valuable. Foresightful people sense what’s coming and prepare for it.
Does sharper hindsight improve our foresight?
Does history teach us lessons that will improve our future?
“Historians begin by looking backward. They often end by thinking backward.”

Friedrich Wilhelm Nietzsche, 1800’s
An example of recent history…the weather

What was the chance of rain yesterday?
Predicting the Weather

• Most everyday foreseeability judgments apply to future events.

• Trying to foresee the chance of rain tomorrow makes sense and is certainly useful.

• We do it all the time.
Predicting the Weather (2)

• But did you ever try to foresee the chance of rain yesterday?

• It sounds senseless and certainly not very useful. Why would anyone do that?

• If it rained, it rained for sure, not with a probability of 30% or 60%.

• Even if we try, we find we’re not very good at it.
Predicting the Weather (3)

- Those who were asked yesterday before it rained might have estimated a 30% chance of rain.

- But those who now know it rained for sure, know too much and will estimate much higher, like 60%.

- That ratio of 2:1 of those with outcome knowledge to those without outcome knowledge is:

  “The Hindsight Bias”
Misfortune occurs,
A potential culprit is identified,
His decision second-guessed in hindsight,
He is chastised for his lack of foresight.
Hindsight analysis highlights the actual path that led to the tragic outcome, making the path appear so obvious that we have trouble believing those involved didn’t see what was coming next.
“Those who know how things turned out have trouble believing others didn’t see what was coming.”

Baruch Fischhoff, 1975
In a negligence law:

“The actor’s conduct must be judged in the light of the possibilities apparent to him at the time and not by looking backward….

‘with wisdom born of the event’ ”
“The standard is one of **conduct**, rather than of **consequences**. It is not enough that everyone can see now that the risk was great, if it was not apparent when the conduct occurred.”

*Prosser and Keeton on Torts*
“unfortunately people always judge conduct on its consequences”

*******WARNING*********
An overwhelming problem when investigating what went wrong and who was a fault.
In determining whether the actor should recognize the risks which are involved in his conduct, either of act or omission, only those circumstances which the actor perceives or should perceive at the time of his action or inaction are to be considered. Circumstances which occur after the conduct which is alleged to be negligent are as immaterial as are those circumstances which exist at the time of his action or inaction, but of which the actor neither knows nor should know, although known to third persons. Thus the rule here stated has reference to the reasonable probability that harm will ensue, but not to its extent, so long as the harm itself is unreasonable.
“In determining whether the actor should recognize the risks which are involved in his conduct, either of act or omission, only those circumstances which the actor perceives or should perceive at the time of his action or inaction are to be considered.
Circumstances which occur after the conduct which is alleged to be negligent are as immaterial as are those circumstances which exist at the time of his action or inaction, but of which the actor neither knows nor should know, although known to third persons.”
Counterfactual means literally, contrary to fact. Counterfactual thoughts are thoughts of what did not happen, but could have happened, had some detail or action been different.
~ Flip a coin in the air.
~ There are two possible outcomes, heads or tails.
~ The moment it comes to rest the possibilities vanish.
~ It lands heads up.
~ With absolute certainty, heads is the outcome.
~ Heads becomes the factual outcome.
~ It could have landed tails up, but it didn’t.
~ Tails becomes a counterfactual outcome.
Judgmental:

They failed to zag

They should have zigged

Actual outcome
The outcome of a sequence of events is the starting point of your work as investigator. Otherwise you wouldn’t actually be there.

This puts you at a remarkable disadvantage when it comes to understanding the point of view of the people you’re investigating.
Tracing back from the outcome you will come across joints where people had opportunities to “zig” instead of “zag” where they could have directed the events away from failure.

Judgmental:

They failed to zag

They should have zigged

Actual outcome
As investigator you come out on the other end of the sequence of events wondering how people could have missed those opportunities to steer away from failure.
IMPORTANT TO NOTE!

For those involved, there were no counterfactuals of what could have happened instead

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only possibilities of what might happen next
The Field Guide to Human Error Investigations

SIDNEY DEKKER
As the situation is (not was) unfolding, the point of view of those involved matters...

...our point of view as after-event observers, with “the wisdom born of the event” is immaterial to the reasonableness of the conduct of those involved when the conduct occurred.
# POINT OF VIEW

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<thead>
<tr>
<th>Pre-accident</th>
<th>versus</th>
<th>Post-accident</th>
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<tbody>
<tr>
<td>Three Seconds Before</td>
<td>Hours, Days &amp; Years After</td>
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<tr>
<td>Driver’s Point of View</td>
<td>Observer’s Points of View</td>
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<tr>
<td>Before-the-Fact Information</td>
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<td>What is Happening</td>
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<td>Several Attentional Demands</td>
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<td>Routine Traffic Flow</td>
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<tr>
<td>No injuries</td>
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<td>Forward Looking</td>
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<td>Forward Thinking</td>
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<tr>
<td>Analog Analysis</td>
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<tr>
<td>No Second Chance</td>
<td>Mentally Undo Accident and Try Again</td>
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<td>Precursors are Ambiguous</td>
<td>Precursors are Clear</td>
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The danger of hindsight bias in accident analysis is that:

- It is natural for people to be biased by hindsight.
- It is caused by a deeply ingrained cognitive process that cannot be easily eliminated or even moderated.
- It is not intentional or deliberate.
- It is difficult to feel it happening.
- People are not aware of it happening to them.
• It is universal, regardless of profession or intellect.

• Hindsight judgments are easier to make than foresight judgments.

• Hindsight involves one explanation, whereas foresight considers many possible alternatives.

• People cannot be debiased merely by warning them to guard against it.
State-of-the-Art-Report

Behind Human Error: Cognitive Systems, Computers, and Hindsight

David D. Woods, Ph.D.
Leila J. Johannesen
Richard I. Cook, M.D.
Nadine B. Sarter
The Ohio State University
Columbus, Ohio

December 1994
Most traces of causality begin with the outcome and trace backwards in time until they encounter a human whose actions appear to be, in hindsight, inappropriate or suboptimal.

The dilemmas facing the practitioner in situ, the uncertainties, trade-offs, and attentional demands all may be underemphasized when an incident is viewed in hindsight.

It was clear from their studies of large system failures that hindsight bias remains the greatest obstacle to evaluating the performance of humans in complex systems.

“Knowledge of the outcome makes it seem that events leading to the outcome should have appeared more obvious than was actually the case.”
“This outcome knowledge poisons the ability of after accident observers to recreate the view of the situation before the accident.”

Richard Cook, 1998
Cognitive Technologies Laboratory
“When blessed with both uninvolvement and hindsight, there is a great temptation for retrospective observers to slip into a censorious frame of mind and to wonder at how people could have been so blind, stupid, arrogant, ignorant or reckless.”

James Reason on Human Error, 1990
“Before judging too harshly the human failings that concatenate to cause a disaster, we need to make a clear distinction between the way the precursors appear now, given knowledge of the unhappy outcome, and the way they seemed at the time.”

James Reason on Human Error, 1990
WARNING

“Unless we appreciate the potency of these retroactive distortions, we will never truly understand the realities of the past, nor learn the appropriate remedial lessons.”

Reason, 1990
“Failure to appreciate the effects of outcome knowledge can seriously prejudice the evaluation of decisions made in the past and limit what is learned from experience.”

Baruch Fischhoff, 1975
Hindsight: Thinking Backward
“Before beholding the mote [the speck]
in his brother’s eye,
the retrospective observer
should be aware of the beam
of hindsight bias in his own!”