

EVIDENCE, NEW DATA, AND THE GETTIER PROBLEM

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I.

If knowledge was defined in terms of deductive certainty, there would be no Gettier problem. There would also be little, if any, knowledge. Those of us who look to science, history, good journalism, and the like, are forced to concede that knowledge is in Peirce's jargon ampliative, and consequently inherently puzzling.

All our reasonings are of two kinds: 1. *Explicative, analytic, or deductive*; 2. *Ampliative, synthetic, or (loosely speaking) inductive*. ... "How are any synthetic judgments at all possible?" How is it that a man can observe one fact and straightway pronounce judgment concerning another different fact not involved in the first? ... Abbe Gratry says it is a miracle, and that every true induction is an immediate inspiration from on high. I respect this explanation ... because it shows an appreciation of the depth of the problem ... I do not accept this explanation, because an explanation should tell *how* a thing is done, and to assert a perpetual miracle seems to be an abandonment of all hope of doing that, without sufficient justification.¹

Let me tell you of three (alleged) cases of knowledge. In the first case Smith believes that Jones will get a (desired) job. He also believes that Jones has ten coins in his pocket. These are not unfounded or arbitrary beliefs. He has good evidence in their support.

[T]he president of the company assured him that Jones would in the end be selected, and that he, Smith had counted the coins in Jones's pocket ten minutes ago.²

Initially these beliefs seem pretty independent of one another, though the both, of course, involve Jones. We might schematize Smith's first bit of evidence as two simple inferences³ – one to the sincerity of the president,

e₁. The president of the company stated that Jones would get the job.

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t₀. The president of the company believes that Jones will get the job.

and one to his competence to make such a judgment.

e₂. The president of the company believes that Jones will get the job.

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t'₀. The president of the company knows what he's talking about – Jones will get the job.

The evidence for his for his second belief is more straightforward.

e₃. Smith counted the number of coins in Jones's pocket ten minutes ago.

e₄. Smith counted ten coins.

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t''₀. Smith has ten coins in his pocket.

Each these little inferences count as, in Harman's influential jargon, an inference to the best explanation.

In making this inference one infers, from the fact that a certain hypothesis would explain the evidence, to the truth of that hypothesis. In general, there will be several hypotheses which might explain the evidence, so one must be able to reject all such alternative hypotheses before one is warranted in making the inference. Thus one infers, from the premise that a given hypothesis would provide a "better" explanation for the evidence than would any other hypothesis, to the conclusion that the given hypothesis is true.⁴

The sincerity hypothesis nicely explains why the president said what he said, and the competence hypothesis explains why he believes as he believes. The correct counting hypothesis explains the results of Smith's ticking off the coins he finds in Jones's pocket just ten minutes ago. Now Harman is certainly right in noticing that other rival accounts could also explain the relevant data. The president's telling a joke could explain what he said. His having mistaken Smith for Jones could explain why he believes who will get the job. And, of course, miscounting explains Smith's

incorrect result of ten, when actually there were only nine coins in Jones's pocket. Since these examples are offered in the literature candidates for knowledge, we will assume that the original explanations are not only the best, but so far out ahead of their rivals, that the inferences count, not just as instances of evidence that is not just good, but so good that they *justify* Smith in believing them.

Now our friend Smith has a kind of cognitive/articulatory tick. He always seems to need to demonstrate his logical acumen. Instead of just saying that he believes Jones will get the job, and that Jones has ten coins in his pocket, he expresses his conviction in the following convoluted hypothesis.

t*₀. The man who will get the job has ten coins in his pocket.

However obtuse Smith's phraseology, this hypothesis too seems to have excellent evidence in its support.

e₁. The president of the company stated that Jones would get the job.

e₂. The president of the company believes that Jones will get the job.

e₃. Smith counted the number of coins in Jones's pocket ten minutes ago.

e₄. Smith counted ten coins.

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t*₀. The man who will get the job has ten coins in his pocket.

And this assembled evidence is also an inference to the best explanation.

Our second case also involves Smith and Jones. He now has come to believe that Jones owns a Ford. And once again he has good evidence for this belief.

Jones has at all times in the past within Smith's memory owned a car, and always a Ford, and that Jones has just offered Smith a ride while driving a Ford.⁵

Sadly, though, Smith's weird speech habits again manifest themselves. Instead of just presenting his evidence, he concocts a random list of places where another friend, Brown, might be including Barcelona. He then presents his evidential case as follows.

- e₅. Jones has at all times in the past within Smith's memory owned a car, and always a Ford.
 - e₆. Jones has just offered Smith a ride while driving a Ford.
- =====
- t**₀. Either Jones owns a Ford, or Brown is in Barcelona.

And once again, since the example is constructed as a serious candidate for knowledge, even though the specific hypothesis is as obtuse as could be imagined, we will assume that Smith is epistemically justified in believing t**₀. It is an inference to the best explanation because Jones's owning a Ford best explains his past pattern of ownership, and the car he is currently driving as he offers Smith a ride, even though other rival explanations are possible.

Fortunately in the third case our protagonist, Henry, speaks in a normal enough way as he teaches his son about the countryside.

Henry is driving with his son in the countryside. For the boy's edification Henry identifies various objects on the landscape as they come into view. "That is a cow," says Henry, "That's a tractor," "That's a silo," "That's a barn."⁶

Henry probably just thinks he sees these things, but it won't be that artificial to reconstruct his thinking as evidence in support of his beliefs – in particular his belief that that object right there is a barn. And he has darn good evidence for this belief.

Each of the identified objects has features characteristic of its type. Moreover, each object is fully in view, Henry has excellent eyesight, and has enough time to look at them reasonably carefully, since there is little traffic to distract him.⁷

Following out earlier protocol we will schematize his evidence as follows.

- e₇. Henry is driving with his son.
 - e₈. Henry is pointing out objects in the country to his son.
 - e₉. Henry observes and consciously articulates to his son what he is confident is a barn.
 - e₁₀. The barn object has features characteristic of its type.
 - e₁₁. The object is fully in view.
 - e₁₂. Henry has excellent eyesight.
 - e₁₃. Henry has time to observe the object carefully.
 - e₁₄. There is little traffic to distract him.
- =====
- t[@]₀. The observed object is a barn.

All of the above conditions apply. The barn hypothesis explains the conditions of the observation. It so well explains them that the example is again taken as complete epistemic justification for Henry's belief. And, as is always the case with inference to the best explanation, rival accounts are possible.

II.

All of the above examples, of course, were constructed to challenge the so called standard analysis of knowledge.

- S** knows **P** iff:
- i. **S** believes **P**
 - ii. **S** is justified in believing **P**
 - iii. **P** is true

Given my treatment above of these famous examples, it should come as no big surprise that I would rewrite (ii) as:

- ii*. **S** has exceedingly good evidence in support of **P**

and, that I would unpack the standard of exceedingly good evidence in terms of inference to the best explanation. The so-called Gettier counter-examples are designed to show that the standard analysis fails because cases can be imagined where all three of the conditions of knowledge are

satisfied but we are reluctant to say that **S** knows **P**. This, of course, is taken to show that whether or not the three conditions are necessary for knowledge, they are not jointly sufficient.

I think it's fair to say that the Gettier problem severely complicated contemporary epistemology. Things were bad enough when philosophers had to deal with problems like skepticism, the foundation of knowledge, and the problem of induction. Now it seemed necessary to discover some fourth (or fifth, or sixth?) condition that somehow provided a set of logically sufficient conditions for knowledge.⁸ The whole notion of epistemic defeat or defeasibility entered the literature.⁹ I think much of this was a needless distraction. I believe that the good old standard analysis of knowledge does just fine with the Gettier examples, particularly if I am granted my reformulation of condition (iii).

Assessments of evidence are always time and context dependent. When we judge an explanation to be the best, or even exceedingly good, this is must always remain an appraisal based on what we know at present. This is the main reason why inductive, or ampliative, reasoning can assemble facts that provide strong evidence for a theory that ultimately proves false. But, new information can change everything. Newton's evidence about the nature of gravity was once a paradigm of good scientific evidence. Things changed, however, new data was introduced about fields, and an entirely new paradigm of relativity entered the picture. When all of this new information is added to what Newton knew, his theory no longer seems the best explanation. None of this means, of course, that Newton's evidence wasn't extremely strong at the time he was making his case. He can hardly be held accountable for not knowing things that no one knew, nor for failing to think in ways no one had ever thought before.

Assessments of knowledge claims are also time and context dependent. The verb, to know, is defeasible. We can grant that *S* knows *P* today, yet retract that assessment tomorrow. This need not imply some form of radical relativism. According to the standard analysis all three conditions are required for knowledge. It's certainly conceivable that a scientist knows the truth of evolution by natural selection today because she believes in evolution, has exceedingly good evidence in support of the theory, and evolution is true. It could also happen that tomorrow she undergoes a religious conversion, buys into some fundamentalist dogma, and actively comes to doubt evolution. The theory remains true, and the evidence, at least to us, continues to be very strong, but it would still be a mistake to claim that our scientist still knows evolution to be true.

The truth condition in the standard analysis is by universal acknowledgment the most difficult. All three of the examples discussed make confident judgments about the truth or falsity of what is believed. Gettier simply stipulates the truth of Smith actually getting the job, the falsity of Jones currently owning a Ford, and the truth of Brown being in Barcelona.¹⁰ Goldman stipulates the truth of the object Henry sees being a barn.¹¹ These philosophers are not cheating, but rather simply articulating quick and dirty thought experiments. But this way of talking does disguise the inevitable indirectness of truth. Consider Peter Kosso's melding of the correspondence and coherence theories of truth.

Though truth *is* correspondence with the facts it cannot be *recognized* by its correspondence. We cannot rely on the facts to guide proofs of scientific theories since the facts are irretrievably at the outer end of the correspondence relation. ... So any indicators of truth must be internal. ... The process of justifying, then, is a process of comparing aspects of the system, and the accomplishment of justification is the demonstration of coherence among the aspects.¹²

Evidence is perhaps not our only portal to truth, but it is certainly our main one, and Smith, Henry, as well as the rest of us, dear readers, must rely on it for judgments about jobs, Fords, and barns. All of this, then, brings us back to my revised second necessary condition for knowledge.

ii*. **S** has exceedingly good evidence in support of **P**

The only way we can know something is the truth, which is just another way of saying that the only way we can know something, is by assessing the quality of evidence we have for this something. And this assessment can only be made in the context of other things we know and believe.

It's easy enough to imagine both of Smith's knowledge claims being "defeated" by new data. Jones doesn't get the job, but Smith does, and Smith has only nine coins in his pocket. Jones has sold his Ford, and Brown is in San Francisco. The same is true for Henry. We discover that the object is really a brand new five bedroom house in the newly popular barn motif shown in last month's *Rural Living*. None of this in any way challenges the standard analysis. They are just more reminders that evidence, even the strongest evidence, can never guarantee truth, and for that reason can never guarantee knowledge.

III.

Alvin Goldman explicitly articulate his Gettier example in terms of new data.

Given this information, would we say that that Henry *knows* that the object is a barn? Most of us would have little hesitation in saying this, so long as we were not in a certain philosophical frame of mind. Contrast our inclination here with the inclination we would have if we were given some additional information. Suppose we are told that, unknown to Henry, the district is he has entered is full of papier-mâché facsimiles of barns. These facsimiles look from the road exactly like barns, but are just facades, without back walls or interiors, quite incapable of being used as barns. They are so cleverly constructed that travelers invariably mistake them for

barns. Having just entered the district, Henry has not encountered any facsimiles; the object is a genuine barn. Given this new information, we would strongly be inclined to withdraw the claim that Henry *knows* the object is a barn.¹³

The counter-example seems beautifully constructed.

- i. **Henry** believes *that the object is a barn*
- ii. **Henry** has exceedingly good evidence *that the object is a barn*
- iii. **The object is a barn**

But are conditions (i) through (iii) not sufficient for saying that **Henry** knows *that the object is a barn*? Henry sincerely believes that the object is a barn so condition (i) is satisfied. And as noted above Goldman simply stipulates that condition (iii) is satisfied. The only room for quarrel seems to be condition (ii).

Let's review Henry's evidence.

- e₇. Henry is driving with his son.
- e₈. Henry is pointing out objects in the country to his son.
- e₉. Henry observes and consciously articulates to his son what he is confident is a barn.
- e₁₀. The barn object has features characteristic of its type.
- e₁₁. The object is fully in view.
- e₁₂. Henry has excellent eyesight.
- e₁₃. Henry has time to observe the object carefully.
- e₁₄. There is little traffic to distract him.

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t[@]₀. The observed object is a barn.

When this is all we, or Henry, knows t₀ seems clearly the best explanation, so much better than it's nearest rival that we grant the evidence the honorific title of exceedingly good. But like the punch line in a good joke, Goldman hits us with the unexpected new information.

- e₁₅. Henry is unaware of the facts to follow.
- e₁₆. Henry and his son have entered a district full of papier-mâché facsimiles of barns.
- e₁₇. These facsimiles look from the road exactly like barns.

- e₁₈. These facsimiles are just facades, without back walls or interiors, quite incapable of being used as barns.
- e₁₉. Travelers invariably mistake them for barns.

This should hardly come as a surprise. Ask any good researcher, diagnostician, or car mechanic, and you will discover that initial hypotheses often must be reevaluated in light of new information. Henry is blissfully ignorant of the problems to follow. He probably goes to his grave thinking he knew that object was a barn. But that is not the position in which we find ourselves.

Let's look at all **our** evidence, now.

- e₇. Henry is driving with his son.
- e₈. Henry is pointing out objects in the country to his son.
- e₉. Henry observes and consciously articulates to his son what he is confident is a barn.
- e₁₀. The barn object has features characteristic of its type.
- e₁₁. The object is fully in view.
- e₁₂. Henry has excellent eyesight.
- e₁₃. Henry has time to observe the object carefully.
- e₁₄. There is little traffic to distract him.
- e₁₅. Henry is unaware of the facts to follow.
- e₁₆. Henry and his son have entered a district full of papier-mâché facsimiles of barns.
- e₁₇. These facsimiles look from the road exactly like barns.
- e₁₈. These facsimiles are just facades, without back walls or interiors, quite incapable of being used as barns.
- e₁₉. Travelers invariably mistake them for barns.

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 t[@]₀. The observed object is a barn.

It's easy to see why we are now reluctant to ascribe knowledge to Henry's belief about the object.

A new, and very unexpected, rival explanation of the data has presented itself.

t[@]₁. The observed object is a papier-mâché facsimile of a barn.

We need not concern ourselves with deciding whether t[@]₀ is a better explanation than t[@]₁, or whether t[@]₁ is superior to t[@]₀. However this determination comes out, there is absolutely no

doubt that they are close enough that neither emerges as so superior as to warrant the status of exceedingly good.

Though we may be disappointed, we are not that conceptually surprised when new data forces us to reconsider the knowledge status of a theory because all of the sudden the evidence points to the theory, which we originally thought was true, turning out to be false. Henry's son is really curious about barns, so they stop, leave the car, and discover that the object they have been talking about has the texture of papier-mâché, and is only a facade, without back walls or interiors, quite incapable of being used as a barn. Oops. Henry had exceedingly good evidence that his barn hypothesis was true, but now must concede that the further investigation provides very good evidence that it is, in fact (notice that expression!) false. A strong looking candidate for knowledge has been defeated by relevant new data.

Something very similar occurs in the Gettier cases. New data can also provide us with reason to withdraw an earlier judgment of knowledge, not because we discover that our theory no longer seems true, but because our evidence no longer seems exceedingly good. I have to be very careful, here. I don't intend to deny my earlier claim that evidence evaluation is always a time and context dependent process. Henry's evidence passed every conceivable test for being good when he was in the car tutoring his son. The evidence for the barn hypothesis collapsed, however, when they went to further investigate. What I think is going on is that the concept of the "best explanation" works very similar to Kosso's concept of truth.

Consider an early articulation of inference to the best explanation from Russell Hanson.

Before Peirce treated retrodution as an inference logicians had recognized that the reasonable proposal of an explanatory hypothesis was subject to certain conditions. The hypothesis cannot be admitted, even as a tentative conjecture, unless it would

account for the phenomena posing the difficulty—or at least some of them. ... The form of the inference is this:

1. Some surprising phenomenon P is observed.
2. P would be explicable as a matter of course if H were true.
3. Hence there is reason to think that H is true.¹⁴

The marshalling of evidence, as with presenting an argument, making a case, etc., is something that human beings do. Being persuaded by the evidence, convinced by an argument, and won over by the case are things that happen to human beings. This strongly suggests that psychology is the place to start an investigation of the concepts of evidence and good evidence. What goes on in human minds and brains when evidence is assembled, laid out, and ultimately succeeds or fails in affecting other human minds and brains in the desired way? This approach to evidence is candidly subjective – it is after all individual subjects who produce and consume evidence. It invites insights and discoveries from, cognitive psychology, computer science, cognitive neuroscience, as well as sociology and anthropology.¹⁵ Countering this treatment of evidence are the notions of facts, knowledge, and truth; none of which are immediately psychological or relativistic. This suggests that the proper home for an analysis of evidence and good evidence are the age old pursuits of epistemology and metaphysics. Good evidence consists of true facts (perhaps a redundancy) that lead us to (new?) true knowledge (almost certainly a redundancy).

Russell Hanson's exposition mixes the psychological approach to evidence with the realist/metaphysical treatment. The psychological presentation emphasizes something like the following. **Surprising** phenomena, P_1, P_2, P_n , are **observed**. H renders the phenomena **explicable (as a matter of course)**. Thus, there is **reason to think** H is true. Evidence is observations that are explained by a hypothesis that explains the observations.

Internal Model

Evidence	P_1 P_2 P_n	Observations
Evidential connection	===	Justificatory reason to think
Hypothesis (theory, etc.)	H	Explanation of observations

In the metaphysical presentation the **phenomena** (in the sense of facts, events, objects, etc.) are **true** parts of the “real world.” H is a complicated model (usually causal) of the **true** arrangement of the relevant facts, events and objects. Evidence is now facts that are collected into a (causal) arrangement.

External Model

Evidence	P_1 P_2 P_n	Facts
Evidential connection	===	Causal arrangement between facts
Hypothesis (theory, etc.)	H	New fact(s)

The external model is our goal, but our only cognitive access is through the internal model.

IV.

Knowledge claims, depending as they do on the notion of good evidence, are always open to reassessment on the basis of new data. Henry’s claim about the object being a barn seemed potentially strong enough to count as knowledge when his evidence consisted of e_7 through e_{14} . In the spirit of Peirce and Hanson, he might have seen this abduction, or retrodution, as a model of his logic of discovery. He might have seen himself as having an epistemic, or perhaps scientific, obligation to perform an experiment. Tutoring his son, not just about drives in the country, but the “scientific method,” he might explain to the boy his expected experimental result if they stop the car and go in for a closer look.

The experiment may be a success. They approach the object, smell the aroma of old wood and hey, enter an enclosure, with walls, a roof, and doors. Obviously we have relevant new data:

e₂₀₊. New facts about smells and the object in question.

What does Henry say? “I knew it! That sucker had to be a barn!” But we’ve already imagined the negative experimental result.

e₂₀₋. The object they have been talking about has the texture of papier-mâché, and is only a facade, without back walls or interiors, quite incapable of being used as a barn.

And Henry’s response? “Son, you’ve just learned a valuable lesson. We thought we knew it was a barn; we were so sure. But look, nothing but a papier-mâché trick!”

But not all new discoveries are the product of careful experimental design. Whether it’s Holmes solving a murder, or Semmelweis figuring out the cause of childbed fever, sometimes relevant new data presents itself in unexpected ways. Late one insomniac night, Henry is surfing the web, and stumbles on a piece about this weird district in the country with papier-mâché “barns.” Pretty surprising, but obviously relevant to last weekend with his son. More new data. And Henry’s comeback now? “Son we’ve got a drive to take next weekend, back to the countryside. You remember that barn I pointed out to you? Well, I was sure it was a barn, I was convinced I knew it. But now I’m not so sure. We need to do some further checking. I wonder what the heck we’ll find out.”

ENDNOTES

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- ¹ Charles S. Peirce, *Essays in the Philosophy of Science*, edited by Vincent Tomas (Indianapolis: Bobbs-Merril, 1957), pp. 93-102.
- ² Edmund L. Gettier, "Is Justified True Belief Knowledge?" *Analysis* 23.6, June 1963, p. 122.
- ³ The original dual treatment of testimony within the inference to the best explanation paradigm is contained in Gilbert Harman, "The Inference to the Best Explanation," *The Philosophical Review* 74:1 (1965). A very helpful expansion of this model is found in Larry Wright, *Better Reasoning* (New York: Holt, Rinehart and Winston, 1982), pp. 110-7.
- ⁴ Harman, *op. cit.*, p. 89.
- ⁵ Gettier, *op. cit.*, pp. 112-3.
- ⁶ Alvin I. Goldman, "Discrimination and Perceptual Knowledge," *The Journal of Philosophy*, Vol. 73, No. 20 (November 18, 1976), pp. 772-3.
- ⁷ *Ibid.*
- ⁸ See, for example, Lehrer, K., and Paxson, T. D. (1969). "Knowledge: Undefeated Justified True Belief." *Journal of Philosophy* 66: 225-37, and Lehrer, K. (1965). "Knowledge, Truth and Evidence." *Analysis* 25: 168-75, and Feldman, R. (1974). "An Alleged Defect in Gettier Counterexamples." *Australasian Journal of Philosophy* 52: 68-9.
- ⁹ See, for example, Goldman, A. I. (1967). "A Causal Theory of Knowing." *Journal of Philosophy* 64: 357-72, and Lehrer, K., and Paxson, T. D. (1969). "Knowledge: Undefeated Justified True Belief." *Journal of Philosophy* 66: 225-37.
- ¹⁰ Gettier, *op. cit.*
- ¹¹ Goldman
- ¹² Peter Kosso, *Reading the Book of Nature* (Cambridge: Cambridge University Press, 1992), p. 136.
- ¹³ Goldman, *op. cit.*
- ¹⁴ Norwood Russell Hanson, *Patterns of Discovery* (London: Cambridge University Press, 1969), p. 86.
- ¹⁵ See, Paul Thagard, *The Brain and the Meaning of Life* (Princeton: Princeton University Press, 2012).