

Gettier and the Problem of Induction

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Introduction

Fifty-four years have passed since Edmund Gettier's short treatise undercut philosophers' complacent confidence in the justified true belief (JTB) definition of knowledge. Subsequent attempts to redeem, modify, or replace JTB have made progress towards these goals but are still inadequate. I propose that the reason for these deficiencies lies in an overestimation of the human capacity to possess propositional knowledge. Accordingly, a theory of knowledge not subject to Gettier problems must assume a more limited scope of knowledge than usually considered. Specifically, it is necessary to reconsider our implicit trust in the possibility and accessibility of inductive knowledge.

Gettier's Dilemma

Though I will present several scenarios for consideration in this paper, we ought to keep in mind the original two Gettier cases, or the Smith-Jones-Brown (SJB) cases (Gettier, 1963). In Case I, Smith and Jones apply for the same job, and Smith believes the proposition:

- (1) Jones is the man who will get the job, and Jones has ten coins in his pocket.

This leads him to the conclusion:

- (2) The man who will get the job has ten coins in his pocket.

Gettier assures us that Smith's evidence for believing (1) is sound, so Smith is justified in believing (1). However, as the example goes, Smith is hired instead of Jones, yet Smith has ten coins in his pocket as well. So, did Smith actually have knowledge of (2)? Gettier and many JTB revisionists answer negatively, but differ on the reasons for why Smith does not know (2).

In Case II, Smith once again finds himself in an epistemic mire when he believes with "strong evidence" the proposition:

- (3) Jones owns a Ford.

Smith then arbitrarily draws the conclusion:

- (4) Either Jones owns a Ford, or Brown is in Barcelona.

Let us ignore the fact that the "either...or" formulation seems to neglect the possibility that Jones could own a Ford and Brown could be in Boston, as we could easily reformulate (4) to account for this. Gettier tells us that Smith is mistaken that Jones owns a Ford, but in fact Brown is in Barcelona.

The SJB cases reveal that the JTB model fails to account for "epistemic luck," instances where a conclusion is true for purely coincidental reasons not initially considered by the subject (or at least not believed to exist). These reasons in the SJB Cases are, respectively, that Smith has ten coins in his pocket and that Brown is in Barcelona. Though the obvious option for amending the JTB model is to explicitly exclude epistemically lucky cases from being considered instances of knowledge, this seems a rather *ad hoc* approach.¹ Thus, we might with more intellectual integrity look for more fundamental problems inherent to JTB.

Necessary Conditions for Justification

The truth and belief conditions of the JTB model seem *prima facie* conditions for knowledge and unable to be further differentiated. By definition, "knowledge" concerns propositions that correspond to reality, i.e., are true. Furthermore, "knowledge" denotes propositional material that a subject epistemically possesses and considers true, i.e., is believed. If one of the conditions of the model is controversial or needs to be further elaborated, it must be justification. What is required, then, is a movement from JTB to (J')TB. I propose that the (J') condition concerns the property of veracity. By veracity, I mean a "no-false grounds/premises" condition, an idea Goldman associates with Michael

¹The *Stanford Encyclopedia of Philosophy* article, "The Analysis of Knowledge," creatively refers to this as "degettiering" (Ichikawa & Steup, 2016).

Clark (1967, p. 358).² If we could have empirical knowledge, a causality condition would arise as well. Goldman famously proposes a “causal theory of knowing,” which holds that for a proposition to be considered knowledge, a “causal connection” must exist between what makes the proposition in question true and a subject’s belief in that proposition (1967, p. 358). However, causality is not a necessary condition for deductive or *a priori* knowledge, as these beliefs cannot rightly be said to be ultimately caused by anything other than their *a priori* status.

Especially in light of Levin’s paper (2006), which identifies false premises even in examples claimed to be “non-false,” the veracity condition seems highly useful in resolving Gettier-type problems. Causality remains an important factor in analyzing empirical knowledge, however, because of the close link between causality and induction based on sense data. For example, the belief that a cup of coffee sits on my desk is based on my seeing it, which is presumably caused by the presence of the cup in my field of vision. In other words—and as considered by Goldman—a causal connection exists between objective facts and sense data, which is the grounds for empirical belief (1967). Although causality can be represented as a special instance of the veracity condition—we can consider the former as a set of propositions about causal relations, perception, and belief³—it seems much simpler to consider the two conditions separately for many cases.

Both Goldman’s and Clark’s assessments can be viewed as diagnoses of what goes wrong in the SJB cases to prevent Smith from having knowledge. Though Goldman (1967) and Clark (1963) interpret their conditions as being in addition to the three proposed by JTB (thus making the working model JTB+X), I argue that they should be considered specific components of justification.⁴ Both SJB

cases can be explained in terms of causality and/or veracity.

SJB-1 fails to be causally coherent because the fact that Smith has ten coins in his pocket does not cause him to believe (2). It fails the veracity condition because (1) is false; Jones will not get the job. SJB-2 fails in similar ways because Brown’s location is not causally linked to Smith’s believing (4), and because (3) is a false premise.⁵

Strange Knowledge and the Problem of Induction

Though adding veracity to JTB improves the model immensely, a fundamental problem remains: the *problem of strange knowledge*. What strange knowledge shows is the weakness of “knowing” by induction. An instance of strange knowledge can be seen in the following example, call it SK-1.⁶ Erin wakes up one morning and, looking out the window, sees that the ground is covered in snow. She infers that it snowed last night—an inference that Goldman would call “highly warranted” (1967, p. 361). However, though it did in fact snow last night, the snow all melted before she woke that morning. The reason for the snow on the ground is actually that her husband, Gary, who owns a chain of snow cone shops, had decided to dispose of a truckload of extra crushed ice by dumping it on their front lawn between the time the snow melted and when his wife woke up. Though Erin’s conclusion that it snowed the previous night is true, she cannot be said to have knowledge of this, since, like in the Gettier cases, her inference is true purely by luck. Yet, imagine that the snow had not melted and Gary had not dumped a truckload of powdered ice on their lawn. In that case, if she had drawn the same conclusion, many would say that she had knowledge that it had snowed the previous night. Is it not strange that from the same sense data—the presence of powdery ice crystals on the lawn—and the same inference—that if the lawn is covered with powdery ice, it must have snowed recently—there can be one case in which Erin is said to have knowledge and one in which she is not?

² Goldman at least seems to consider justification to mean that the move from premise to conclusion is warranted or reasonable. Also see Clark’s “Knowledge and Grounds: A Comment on Mr. Gettier’s Paper.”

³ We might hold the propositions “X causes Y, therefore when X, then Y” and “When P(X), then X,” where P(X) represents that a subject perceives X.

⁴ Clark states that his condition goes beyond “no-false grounds,” but I believe that the simplification is adequate for my purposes (1963, pp. 46-47).

⁵ The only of these conclusions explicitly addressed is Goldman’s interpretation of SJB-2 (1967).

⁶ Based on an example given by Goldman (1967, pp. 361-62).

Another example, call it SK-2.⁷ Ellen goes in to work one morning and sees keys for new cars on the desks of her friends Greg and Grover. She infers that Greg and Grover have both recently bought new cars. Greg and Grover have indeed bought new cars recently, but Grover's new car is still at his house. He had driven his old car to work and has a different reason for his new key. He had lost his old car key, and the one Ellen saw on his desk is merely a replacement key, albeit one identical to a new car key. Is it not strange to say that Ellen can have knowledge from inferring that Greg has a new car, but not from inferring that Grover does? The same sense data and the same inference is again present in both cases.

Goldman would claim via his causal theory that in SK-1, Erin does have knowledge in the instance where the snow does not melt and does not in the instance where it melts (1967). Furthermore, in case SK-2, the veracity condition allows for Ellen to have knowledge of Greg's owning a new car, but not Grover's based on the following premise: If G has a new car key, G has a new car. This premise is true in Greg's case, but not in Grover's.⁸ But in this lies the strangeness. It seems very odd to base knowledge on a premise that is only *sometimes* true.

In both SK-1 and SK-2, subjects reach their conclusions via an inductive premise. They are, respectively:

(SK-1) If there is snow on the ground, then it has snowed recently.

(SK-2) If someone has a new car key, then they have a new car.

Both these premises are shown by the examples to be less than infallible. They really ought to be stated as:

(SK-1') Probably, if there is snow on the ground, then it has snowed recently.

(SK-2') Probably, if someone has a new car key, then they have a new car.

Levin, however, points out a variety of problems that remain, foremost among them that a "Probably X" statement does not seem to be something that can be believed at all, since it does not have a truth value if construed as something like "Maybe X;" however,

both Levin and I believe that "Probably X" is most usefully stated as something like, "In most cases X" (2006, p. 388). Construed as such, both (SK-1') and (SK-2') are usually good grounds for justification. However, we lack a way to determine whether they can provide sound justification in any particular situation. If we accept that these—and in fact all— inferences are essentially probabilistic, then in any real-world scenario involving empirical knowledge, the strongest claim we can reasonably make is one of the following:

(5a) S knows probably X.

OR

(5b) S probably knows X.

Probably true or probably justified belief seems like a weak sort of knowledge, yet I can imagine no empirical cases that do not reduce to it. The only reason theoretical cases might is that we accept *a priori* whether a subject's conclusion is true or false based on what the creator of the case tells us.

A second concern about strange knowledge cases concerns the concept of knowing as a *consciousness state*. The problem is that the strange knowledge cases have been interpreted in ways that make the conditions for this consciousness state dependent on external facts. Though knowledge must depend on the truth of a given proposition, it cannot be grounded in any more specific external conditions. To clarify this point, I provide the following case: Consider a traveler who sees a lake that may or may not be a mirage. If we want to know whether the traveler has knowledge of the existence of a lake, we might break down the case into the external and internal components. No problem exists in the external elements; either the lake exists or it does not, regardless of what the traveler thinks. Independently of external conditions, the traveler has a definite sight perception. He really does *see* something. Whether this perception corresponds to reality is still at question, but the traveler can be certain of the existence and quality of the perception itself. The weakness seems to be somewhere in the middle, in the conversion of information from the external to internal domains. I will examine this conversion process in more detail later, but it is not hard to see that it proceeds via the production of sense data. Thus, the challenge in analyzing knowledge arises when sense data is introduced as grounds.

⁷ Based on an example given by Levin (2006, pp. 384-85).

⁸ Levin considers the implications of a similar proposition (2006, p. 385).

What we have reached at this point is the Humean problem of induction. As he famously wrote, when it comes to “matters of fact”—which I have referred to as empirical—we generally must be ignorant (Hume, 2016, p. 214). No matter how likely it is that the Sun will rise tomorrow, even if we are 99.99999999999999% sure, we cannot know that it will. We are always subject to perceptual error, lack of relevant data, deception, and hidden variables, of which we are very often unaware. Simply put, it is very hard to know what we do not know. Because of this, drawing a correct conclusion in SK-1, SK-2, and any other inductive scenario will always be subject to some sort of epistemic luck. If our sense data corresponds to reality and the conclusions we draw from it correspond to reality, it is indeed lucky that we were not subject to a perceptual error, lack of data, deception, or hidden variables. This is especially clear with regards to SK-2, where it seems purely by chance that Erin can be right in one conclusion and wrong in the other.

False Lemmas and Inductive Knowledge

A further consideration against the possibility of inductive knowledge arises from the condition of veracity. In all cases of empirical, inductive, matter of fact, or sense data-based knowledge, one crucial assumption is made at some level. This premise takes two forms that are intrinsically linked:

(6a) Premises derived from sense data are (always or in this case) true.

(6b) If something is probably true, it is true.

I argue that both these assumptions count as false premises and that accepting them has caused many to vastly overestimate the range of beliefs that can be considered knowledge. Although this view may seem like an unwarranted descent into skepticism, both the consideration of “strange knowledge” cases and the fallacious nature of moving from “X seems to be” to “X is” show the necessity of such a conclusion.

Take any scenario of the following type. S perceives X (P(X)) and assumes,

(P1) $P(X) \Rightarrow X$.

(C1) $\therefore X$ obtains.

This line of reasoning breaks down by assuming (6a) or (6b). First, in (P1) S assumes (6a). If S assumes that premises derived from sense data are *always* true, S certainly has adopted a false premise. No process of

empirical perception possessed by human beings is free from all possibility of error. If S assumes that *in this case* (P1) must be true, S still must show how S knows his or her perceptive faculties are not deceived in this case, which I argue cannot be done with the certainty necessary for knowledge. This is consistent with Wykstra’s condition of reasonable epistemic access (CORNEA), which he states as,

On the basis on cognized situation *s*, human H is entitled to claim “It appears that *p*” only if it is reasonable for H to believe that, given her cognitive faculties and the use she has made of them, if *p* were not the case, *s* would likely be different than it is in some way discernible by her. (1984, p. 85)

According to CORNEA, in our context, S cannot claim “It appears that X,” unless S can reasonably believe that if X does not obtain, $P(\text{not } X)$ will imply not X. Even then, license to claim, “It appears that X,” is different from being entitled to make the claim, “X obtains.” I argue that unless S can make the claim “X obtains,” S does not have knowledge of the proposition, “X obtains.” So let us consider a stricter sense of CORNEA pertaining to claims of knowledge. This condition, CORNEA+, consists of two parts:

(+1) We are entitled to the claim “S knows X” only if S is entitled to claim “X obtains.”

(+2) S is entitled to claim “X obtains” only if it is the case that, if X does not obtain, then S would have knowledge of the proposition “X does not obtain.”

Admittedly, these conditions at first glance may seem to be circular, as the knowledge claim in (+2) is subject to condition (+1), which is subject to (+2). Put more simply, the essence of CORNEA+ is that, for S to know a proposition, it must be impossible for S to be mistaken about the truth value of that proposition. If this is not the case, we make knowledge probabilistic. We cannot allow ourselves to say, “There is a 90% (or 99%, or 99.999%) probability that S knows X; therefore, S knows X,” which is a derivative of (6b). This is the very claim implicitly made by anyone accepting inferential conclusions as knowledge.

What Knowing Looks Like

So what does our “knowledge producing” process look like given everything said above? I would represent it by what I call the *functional*

model of knowing. This model is functional because it uses the notation of functions and equations to represent epistemic operations, and because, as in a function, we would like one “input” to correspond to only one possible knowledge “output.” It would be inconsistent with our intuitions about knowledge if a basic scenario—e.g., there is a barn—could produce multiple exclusive knowledge interpretations—there is a barn; there is a gas station. One unit of real, knowable data should only correspond to one unit of known data.

If a subject U could know empirical facts, it would be represented as follows. Let us assume that the empirical fact in question is,

[7] There is a red apple on the table.

This can be represented by the proposition,

(7) There is a red apple on the table.

The process by which [7] is converted into knowledge, assuming it can be, occurs in two steps. First, by the use of the senses, U converts [7] into sense data. In this case, there are three pieces of sense data: the existence of the apple, the color of the apple, and the position of the apple. Next, U assembles the sense data into an epistemic state of belief, i.e., a proposition. This is represented as follows:

(S1) $P[7]=\{7\}$.

(S2) $I\{7\}=(7)$.

The various brackets represent different states in which information can exist. The square brackets represent facts, the squiggly brackets represent sense data, and the parentheses represent propositions. The two “epistemic functions” involved are sense perception ($P\{X\}$) and interpretation of sense data ($I\{X\}$). Thus in (S1), U converts facts into sense data, and in (S2) converts that sense data into a proposition. For U to have knowledge of [7], all information present in [7] must be contained in (7). More explicitly, the process can be represented as,

(S1') $P\{\text{apple; red; on table}\}=\{\text{apple; red; on table}\}$

(S2') $I\{\text{apple; red; on table}\}=(\text{There is a red apple on the table.})$

However, neither of the epistemic operations in the process above are infallible; each carries with it a certain probability that it preserves the information in [7] when it is converted from one form to another. These probabilities can be expressed by the coefficient k_n , where $0 \leq k_n \leq 1$. If $k_n=0$, all the information is not

preserved; if $k_n=1$, all the information is preserved. Intermediate values correspond to a probability between 0 and 1 that all the information is preserved. When multiple conversions occur, as above, the coefficients from each conversion compound multiplicatively. Considering this, the process above becomes,

(S1'') $P[7]=\{k_p\{7\}\}$.

(S2'') $I\{k_p\{7\}\}=(k_p k_i(7))$.

For [7] to be equivalent to $(k_p k_i(7))$, both coefficients must equal 1. But, neither human perceptive nor interpretive faculties are infallible, so U is not entitled to claim knowledge of [7]. Thus, U cannot know (7). Some might point out that there is a difference between being entitled to claim knowledge of something and knowing it, and that the latter could occur without the former. To the contrary, as long as U cannot be certain of (7), (7) lacks full justification as a belief, and therefore cannot be known by U . To claim otherwise requires the introduction of at least one of the false premises (6a) and (6b). It cannot be definitively shown that (6a), the reliability of sense data or interpretation, holds. Even if it did, we could at best only claim probable knowledge, since a variety of factors could prevent knowledge even if the senses do not err (as in example SK-2). Either way, in the end a subject can, at best, probably know a proposition, but, to assume (6b), that “probably X obtains” implies “ X obtains,” is fallacious.⁹

On the other hand, a deductive proposition, for example,

(8) $4+5=9$

would go through like this for a subject S :

(D1) $P(8)=(8)$

(D2) $J(8)=T$

Because in this example, information is not converted from one form to the other, there are no error coefficients. S simply perceives or “calls to mind” the proposition (8), which puts S in a consciousness state. Then S applies a judgement function, $J(8)$, and judges the proposition to be true. This can be represented more explicitly as,

(D1') $P(4+5=9)=(4+5=9)$

(D2'a) $J(4+5=9)=(9=9)$

(D2'b) $J(9=9)=T$

I will take it for granted that my readers agree with S 's conclusion.

⁹ X would be something like, “ S knows Y .”

Weak Justification

At this point, I will address a possible objection, namely, that infallibility is not widely considered a necessary condition for justification. Indeed, I am arguing for a stronger form of justification than usually considered. What I have proposed is a set of conditions in which a justified belief will always constitute knowledge (given that it is true). In contrast, Gettier presents the subjects of his SJB scenarios as having justified beliefs even though they do not constitute knowledge (1963). Additionally, though Goldman seems to sometimes equate justification with causality, he considers certain beliefs to meet that condition and constitute knowledge, which I would not.¹⁰ I argue that what Gettier and Goldman consider justification is not. At most, it is a weak form of justification that at best can allow for a weak form of knowledge, “probably” knowledge. And so, I would interpret the first SJB case as such.¹¹

(i.) Smith is told by the CEO of the company at which he and Jones have applied that Jones will be hired. (Weak/no justification, since Smith could have misheard the CEO or the CEO could be lying or mistaken.)

(ii.) Smith concludes that Jones will be hired. (Probably/no knowledge, since based on weak or no justification.)

(iii.) Smith knows that Jones has ten coins in his pocket. (Accepted as given.)

(iv.) Smith concludes that the man who will be hired has ten coins in his pocket. (Probably/no knowledge, since based on weak/no knowledge.)

Thus, the paradigm I have proposed avoids the Gettier problem because it does not claim that Smith has knowledge of (iv.).

What Can We Know?

Though my solution would greatly reduce the range of knowledge, it does not make us completely blind. Though we cannot have direct knowledge of the external world, we can have a sort of meta-knowledge about it. Though I would object to reasoning such as,

(9) I see a flower; therefore, there is a flower.

¹⁰ See Goldman, 1967, p. 361.

¹¹ Gettier suggests a justification similar to that in (i.).

We might still say:

(10) If I see a flower, then I see a flower.

Yes, (10) is in fact a tautology, but it is still knowable. It is true because it takes the form,

(10') If X, then X,

which must be true. (10) meets the justification condition because it relies on no false premises. The only premise (10) requires, (10'), is true.

We might also have knowledge by virtue of some pragmatic assumptions, such as,

(11) Premises derived from sense data are usually/probably true.

Notice that this is different than (6a) in that it makes a far weaker claim. (9) allows for us to make such statements as,

(12) If (11) is true, then, if I see a flower, then there usually/probably is a flower.

Or rather, in terms of a perception operator,

(12') If P(X) probably equals X, then, if P(X), then probably X.

There also exist certain subjectively perceptible states like pain, happiness, sorrow, etc., which a subject cannot help but know that he or she is experiencing. Clark expresses doubt as to whether this “incorrigible” knowledge should be considered knowledge at all (1963, pp. 47-48). Goldman refers to self-knowledge of this type as a “limiting or degenerate case of knowledge” (1967, p. 371). However, I would argue to the contrary. We might rephrase (8') and take the following course:

(13) If S feels X, then S feels X.

(14) If S feels angry, then S feels angry.

At some level, having the “feeling” of an emotional state seems identical to being in that emotional state, so we might conclude,

(15) If S feels angry, then S is angry.

This holds for a variety of subjective states.

Conclusions

The complexities in knowledge elucidated by Gettier reveal fundamental weaknesses in any attempted analysis that seeks to preserve the inductive variety. Human experience of the outside world through sense-data is fundamentally limited, and so no premises derived from that sense-data are necessarily true. Thus, sense data premises rest on inductive grounds and do not represent strong grounds for knowledge. The only viable

candidates for knowledge, then, are premises that can be shown deductively to be true. Furthermore, because inductive knowledge cannot be reduced to a deductive line of reasoning—it would need to include fallacies (6a) or (6b)—claims to knowledge via inductive premises are insubstantial.

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