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What are the chief problems that philosophers have confronted in providing a definition of knowledge that would stand firm against the threat of skeptical doubt?

The distinction between appearance and reality has been at the core of the Western philosophy starting with the Greek philosophers. Questions concerning how we acquire knowledge, the nature of knowledge, how beliefs are justified have played a dominant role and have established epistemology as its own branch of philosophy. This paper, will present a history on the issue of definition of knowledge, as well as, attempt to establish that there is a connection between the problem of induction, as presented by Hume, and the later Gettier cases, showing that justified, true, belief is not sufficient conditions for knowledge, not only because of the Gettier cases, but more broadly because of the problem of induction.

Plato was among the first philosophers to establish a divide between abstract thinking and sensory experience as forms of knowing. Plato claimed that what distinguish and makes philosophers superior to non-philosophers is precisely their ability to understand the primacy of abstract theory, whereas non-philosophers simply understand the world via sensory experience¹. Plato argues that ordinary experience cannot lead to knowledge, at best it will lead to opinions, only Forms can lead to true knowledge. This is based on his view that particulars are objects of opinion and as such do not represent true knowledge. In the Republic, he argues that the lovers of beautiful particulars do not see "the beauty itself", they know the particular object and, can identify it as being beautiful, in comparison to something else but they are ignorant of the Form of beauty. Socrates states: "Those who love looking and listening are delighted by beautiful sounds and colours and shapes, and the works of art which make use of them, but their minds are incapable of seeing and delighting in the essential nature of beauty itself"². They can only speak of particulars, hence only can have opinions about objects that they have experienced via the senses but they do not have true knowledge about the Form of beauty itself. Focusing on the individual things that have that property will not lead to knowledge of the property itself. A Form on the other hand is a pure exemplar showing the nature of those properties without needing to make comparisons. Moreover, Plato builds on the tradition of the pre-Socratics by calling our attention to the problem of change. This worldview of constant change was largely associated with Heraclitus and it could lead to the idea that true knowledge is impossible since things are constantly changing, in flux, what exist today doesn't exist tomorrow³. This constant change of the particulars cannot lead to true knowledge, hence, the problem of particulars. Whereas, the Forms are unchangeable and as such provide true knowledge unlike the instability of natural phenomena. However, Plato does recognize the importance of the senses and the differences that emerge between knowledge, belief and opinion. The allegories of the Divided Line and the Allegory of the Cave, are some of the first arguments to be developed to create the divide on, what will later become a larger debate, between empiricism and rationalism.

¹ Pappas, Nickolas. *Plato and the Republic* (London: Routledge, 1995), ch.7, 'Metaphysics and Epistemology'

² Plato, *The Republic*, Book V, Part 7, 476b, translated Desmond Lee, London; Penguin Classics, 2007

³ Pappas, Nickolas. *Plato and the Republic* (London: Routledge, 1995), ch.7, 'Metaphysics and Epistemology'

Good. Insert page numbers too.

knowledge which is logically independent of experience, in the sense that experience cannot prove it, is yet elicited and caused by experience. It is on occasion of particular experiences that we become aware of the general laws which their connections exemplify. It would certainly be absurd to suppose that there are innate principles in the sense that babies are born with a knowledge of everything which men know and which cannot be deduced from what is experienced"⁸. Russell is asserting that there is a different way to arrive at general concepts via experience and logic. Therefore, there is no need to postulate the existence of a separate world of ideas, when the experience of this world combined with human's ability to reason can give rise to the same concepts. In this way both the problems raised by Plato, that of flux and that of particulars, are synthesized into a coherent explanation without unnecessarily requiring the world to be unchanging and fixed in nature in order to obtain knowledge, as Plato does. In this manner, Plato and later philosophers, while disagreeing on how we arrive at knowledge, are in agreement at the three necessary conditions for knowledge: truth, belief and justification. The idea that a justified true belief constitutes knowledge is a notion agreed upon by Western philosophers of different camps and was more generally expressed, by Gettier, as⁹:

(A) S knows that p if and only if...

(i) p is true

(ii) S believes that p, and

(iii) S is justified in believing that p.

The creation of such definition for knowledge raises the necessity of examining the processes by which an argument is valid or invalid and fundamentally by what process do we know (i) the truth of p? Just as importantly by what process is (iii) justification established? The intermediate step (ii) belief is more of a concept that can be established via argument once we know that (i) and (iii) are valid then belief in something that one thinks is true becomes a necessity.

From the above it becomes import to discuss Analytic and Synthetic prepositions and deduction and induction as two types of reasoning used to establish arguments in favor or against a certain view. Kant's approach was to define Necessary Truths as two types; Analytic and Synthetic. Moore in the article 'Rationalism, Empiricism and the A Priori' states: "Analytic Truths relate to atomism and are true of things-in-themselves and do not make any connection of different facts. Synthetic truths on the other hand do assert connections between different facts and, as such, are making claims about phenomena in the world"¹⁰. An analytic proposition is true by virtue of its definition. Examples of analytic propositions include 'All triangles have three sides'. The truth-value can be determined a priori by examining the meaning of the words without needing to observe the outside world for empirical data to validate such statements. Per Moore above, a proposition is synthetic if it is true or false not by virtue of its meaning, but by virtue of how that proposition relates to matters of fact and the way the world is. Typically, when we have to address matters of fact via experience, we are said to have a posteriori knowledge.

⁸ Russell, Bertrand. *The Problems of Philosophy*, "Chapter VII. On Our Knowledge of General Principles", pp. 52

⁹ Gettier, Edmund. "Is Justified True Belief Knowledge?", in *Analysis*, Jun. 1963, Vol. 23, No. 6, pp. 121-123

¹⁰ Moore, Asher. "Rationalism, Empiricism and the A Priori", in *Philosophical Quarterly*, Vol. 9, No. 36 (Jul., 1959), pp. 250-58.

⊛ Use first name & surname in first mention of an author in an essay.
For 'the greats', like Plato & Descartes, etc, no need to follow this rule.

From Rebekah Humphreys' Lecture Notes 3, as an example: "the truth or falsity of the proposition 'All swans are white' can only be established through experience. We may think that the above distinctions map onto one another, so that a priori knowledge is always knowledge of analytic propositions, and a posteriori knowledge is always knowledge of synthetic propositions. But although all analytic statements are known a priori, it is far from clear, according to rationalists, that all synthetic statements are known a posteriori"¹¹. Kant provided some examples of what he would consider a priori synthetic statements mostly derived from mathematics like $5+7=12$ ¹². These types of examples are what motivated Kant to bridge these two schools of thought, by providing a critique of rationalism while maintaining that there is necessary a priori judgment. However, according to Moore: "Contemporary empiricists differ from Kant in that they believe that, the world whose truths are about matters of fact, is independent of the mind. Therefore, modern empiricists reject Kant's idea that synthetic a priori is possible. Likewise, they hold that no analytic proposition could be about independent reality. Therefore, both a priori synthetic and analytic truths cannot possibly tell us anything about matters of fact, independent reality. Instead, modern empiricists hold that a priori propositions could be about ideas, language or even be empty but they for sure are not about matters of fact"¹³.

This time, this is actually my voice, so no need to say anything.

This distinction that matters of fact belong to a special category not accessible to thought or logic except for by experience was cemented by Hume, who recognized two types of reasoning; Demonstrative reasoning (deduction), which concerns relations of ideas, and reasoning concerning matters of fact of how the world is. In *Enquiry Concerning Human Understanding* (1748) he distinguishes 'relations of ideas' and 'matters of fact', claiming: "Relations of Ideas are discoverable by the mere operation of thought, without dependence on what is anywhere existent in the universe"¹⁴. For Hume, deductive knowledge would include knowledge of mathematics and of logical propositions. He saw these arguments as self-contained in that as long as the underlying premises are true then the conclusion is also necessarily true. However, Hume's further points out that such deductive truths do not tell us anything new about "matters of fact" or how the world is. To make statement about the world or matters of fact one needs experience and sense data hence all such knowledge is necessarily a posteriori. He further states: "All reasonings about matters of fact seem to be based on the relation of cause and effect, which is the only relation that can take us beyond the evidence of our memory and senses."¹⁵. Knowledge that goes beyond the senses and memory depends on inference, which in turn depends on our knowledge of cause and effect. Hume took this concept one step further by raising fundamental questions about how is it that cause and effect are related when we have no way of connecting two events except by the mere fact that one follows the other. Hume gives the example of billiard balls: "Suppose for example that I see one billiard ball moving in a straight line towards another: even if the contact between them should happen to suggest to me the idea of motion in the second ball, aren't there a hundred different events that I can conceive might follow from that cause? May not both balls remain still? May not the first bounce straight back the way it came, or bounce off in some other direction? All these suppositions are consistent and conceivable. Why then should we prefer just one, which is no more

¹¹ Humphreys, Rebekah. Lecture Notes 3, HPPH7010 "Knowledge, Reason and Reality", UWSTD ✓

¹² Moore, Asher. "Rationalism, Empiricism and the A Priori", in *Philosophical Quarterly*, Vol.9, No.36, pp.250-58. ✓

¹³ Ibid.

¹⁴ Hume. *An Enquiry Concerning Human Understanding*, Sec. 4, Part 1, page 11. ✓

¹⁵ Ibid. page 12. ✓

consistent or conceivable than the rest? Our a priori reasonings will never reveal any basis for this preference”¹⁶. Therefore, for Hume, causation is a product of our mind due to repeated exposure (or habit) of us observing one action following another. Such events are not proof of causation but rather simply proof of two events being conjoint with the ultimate power or necessary connexion behind such events being hidden from us. He states: “there appears not... any one instance of connection which is conceivable by us... One event follows another; but we never can observe any tie between them. They seem *conjoined*, but never *connected*. And as we can have no idea of anything which never appeared to our outward sense or inward sentiment, the necessary conclusion *seems* to be that we have no idea of connection or power at all.”¹⁷.

I think that Hume lays the ground for what it could be a more generalized form of Gettier cases in Justified, True, Belief theory of knowledge and makes it necessary to analyze the Gettier cases in light of inductive evidence. Some Gettier cases arise when inductive arguments are either stated or implied when establishing the truth of p without giving the correct probable weight to the inductive evidence used in the argument. To illustrate the general point let's use two contrasting examples, of natural sciences and social sciences both of which can rely on induction as a method for arriving at truth. I would argue that the success of natural science relying on induction to arrive at knowledge is exactly because the probability of the induction clause being true is very high due to the probability of the course of nature changing being low. In these cases, one can establish a law, like the law of planetary motion, with an assumed probability close to 100% of nature remaining the same, absent a catastrophic event, which would be a case of low probability but high impact event. In these cases where laws of nature in sciences are established with high probability via the induction process, then subsequently one could use deduction from these established laws to make statements of the form “if this is true, and this implies that, then that is true” to form arguments and derive conclusions. However, one should never lose sight of the fact the general law or principle has been established via induction and therefore there always is an ever so slight chance of it not being true in all instances. By contrast, in social sciences, where the probability of establishing causation via induction is prone to more error, due to the course of nature in human endeavors being more prone to change, then all the arguments of inductive nature are only as reliable as the probability of the event in question occurring. Therefore, it's much harder to establish general laws out of particulars in situation where the probability of change is relatively high. In general, if the probability for an event happening is x% then the probability of that event not happening is 1-x%, with 100% being the highest probability implying certainty. For an event with probability of x%, the process of induction leads to knowledge x% of time and to “no knowledge” 1-x% of time. Being that error is part of this process then one cannot talk of certain truth.

Theoretically then it would be possible to devise thought experiments where all the conditions (i),(ii) and (iii) in the definition of knowledge are met but as long as any part of the clauses in the argument is reliant on some form of induction inference then we would end up in a situation of justified true belief and no knowledge, exactly by 1-x% of the times. Per above 1-x% of times we could be wrong or said another way x% of times we would be correct but are correct only because

¹⁶ Ibid, page 13

¹⁷ Hume. *An Enquiry Concerning Human Understanding*, Sec. 7, Part 2, page 74.

of luck. Therefore, the JTB theory of knowledge can be problematic even without the Gettier cases and Hume has already pointed out where the problems lie, especially in cases involving induction as a process to arrive at knowledge. A question arises here if Gettier cases fall under the category of cases that can be grouped as relying on inductive evidence? Gettier notes the two assumptions that are required in his cases:

- (1) 'It is possible for a person, S, to believe in a false proposition'.
- (2) 'For any proposition P, if S is justified in believing P, and P entails Q, and S deduces Q from P and accepts Q as result of this deduction, then S is justified in believing Q'¹⁸

Clause (1) can occur in all cases involving inductive evidence, like for example proposition (P) "every time I have seen a swan it was white". Clause (2) I would be justified in believing (P) and it would entail (Q) that "all swans are white". This however does not lead to knowledge but only to probable knowledge, therefore there will be cases where I will be wrong, as when a swan is black, even though, I have a justified true belief based on all my experience of being acquainted with only white swans.

In the original Gettier case 1, Smith infers that Jones is the man who will get the job based on some information he receives. I would argue that this belief is based on inductive evidence, therefore it can be fallible, and it could lead to a false premise in what is otherwise presented as a deductive argument. Similarly, in Case 2, Smith's belief that Jones owns a Ford is based on inductive evidence and it has some probability of being wrong, even though he is justified in believing it. For deductive arguments if one of the assumptions is false then the conclusion is also false. This is why we end up with no knowledge even though we have justified true belief from (i),(ii)&(iii). In my view, Gettier cases, and therefore the issues with JTB theory of knowledge, were already foreseen by Hume when he raised the problem of induction.

Linda Zagzebski, in *The Inescapability of Gettier Problems*, identifies a twostep process by which Gettier cases arise: "It really does not matter how the particular element of knowledge in addition to true belief is analysed. As long as there is a *small degree of independence* between this other element and the truth, we can construct Gettier cases by using the following procedure: start with a case of justified (or warranted) false belief. Make the element of justification (warrant) strong enough for knowledge, but make the belief false... The falsity of the belief is therefore due to some element of luck. Now emend the case by adding another element of luck, only this time an element which makes the belief true after all. The second element must be *independent* of the element of warrant so that the degree of warrant is unchanged. The situation might be described as one element of luck counteracting another. We now have a case in which the belief is justified (warranted) in a sense strong enough for knowledge, the belief is true, but it is not knowledge. The conclusion is that as long as the concept of knowledge closely connects the justification component and the truth component, but permits *some degree of independence* between them, justified true

¹⁸ Gettier, Edmund. "Is Justified True Belief Knowledge?", in *Analysis*, Jun. 1963, Vol. 23, No. 6, pp. 121-123

belief will never be sufficient for knowledge”¹⁹. The italics are mine to draw attention to the references of “*some degree of independence*” which is just another way of saying probabilistic. If two variables, justification component and truth component, vary independently of each other and some degree of independence exists between the two, I think, this is what Hume would call conjoined but not connected events. *Interesting. Nice link here.*

In my estimation, regardless of how the definition of knowledge is modified by adding additional clauses to (i),(ii) and (iii), as long as any of the clauses is reliant on inductive evidence to establish the knowledge component or the justification component of the argument, then it will always be subject to some degree of error implied in the induction process. Gettier cases would present a more problematic issue for epistemology if all the statements in each clause (i),(ii) &(iii) could be shown to be derived via deduction. The surest way to establish such cases would be by an appeal to mathematics since deduction is embedded in the mathematical realm. If deductive arguments were responsible for Gettier cases, there should be mathematical examples which meet (i),(ii)&(iii) and lead to Gettier problems. I have encountered no such examples in the literature therefore suspect that all Gettier constructed arguments have some part of them that relies on inductive evidence. If Gettier cases can be shown to arise solely via deductive arguments without any reliance on inductive evidence, those examples would truly call into question if we can ever know anything for sure.

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¹⁹ Zagzebski, Linda. “The Inescapability of Gettier Problems”, in *The Philosophical Quarterly*, Jan., 1994, Vol. 44, No. 174 (Jan., 1994), pp. 65-73

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