THE FAILURE OF BOONGALING'S DISPROOF OF THE JTB+S DEFINITION OF KNOWLEDGE

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ABSTRACT: Recently, Boongaling argued in *Logos & Episteme* 16 (3), 351-355 (2025) that the JTB+S definition of knowledge, introduced as a solution to the Gettier problem in *Logos & Episteme* 15 (4), 385-387 (2024), neither solves the Gettier problem nor provides an acceptable account of knowledge. We show that Boongaling's counterargument, while logically correct, fails by showing that it is based on false premises.

KEYWORDS: knowledge, JTB analysis, Gettier's problem, fourth condition approach

The JTB+S definition of knowledge extends the familiar JTB definition with a fourth condition (Cabbolet, 2024). Accordingly, *S* knows that *p* if and only if

(i) *S* believes *p*;

(ii) *p* is true;

(iii) *S* has a justification for his belief in *p*;

(iv) S's justification is sufficient to exclude ¬*p*.

From this perspective, knowledge is *strongly justified true belief*. It has been shown that this solves the Gettier Problem: it cannot be the case that *S* has a strongly justified belief that *p* while *S* does not know that *p*. In addition, it has been shown that the opposite problem cannot occur: it cannot be the case that *S* knows that *p* while *S* does not have a strongly justified belief that *p*.

Recently, however, Boongaling argued that the JTB+S definition fails to provide a satisfactory account of knowledge, and fails to provide a correct solution to the Gettier Problem (2025). This final conclusion has been obtained from three intermediate conclusions:

(IC_1) the JTB+S definition does not eliminate Gettier cases;

(IC_2) the JTB+S definition leads to either skepticism or triviality;

(IC_3) the JTB+S definition suffers from internal inconsistency.

Although Boongaling's final conclusion is logically correctly derived from these intermediate conclusions, below be will show that it is nevertheless false by showing that each of the intermediate conclusions is false as they lean on false premises.

To derive IC_1, Boongaling starts with the following premise:

> (P1) Empirical propositions are propositions whose truth values depend on contingent facts about the world.

This premise P_1, however, is not true: an empirical proposition is a proposition whose truth value can be empirically determined—by observation, sensory experience, or experimentation—but that truth value is not necessarily contingent. Of course a proposition like 'Donald Trump has a coin in his pocket' may be true today and false tomorrow, but here are three examples from the natural sciences of true empirical propositions:

- Under standard laboratory conditions, liquid portions of ethanol (C_2H_5OH) and water (H_2O) mix in any ratio into a homogenous liquid.
- Under the condition that an object with mass m moves freely and non-relativistically in a predominantly gravitational field $\vec{g}$ that's weak and uniform, there is for any relative error of measurement $0 < \epsilon \ll 1$ a small enough measurable time interval δt such that the difference $\delta(\delta\vec{x})$ between consecutive spatial displacements $\delta\vec{x}$ measured over regular time intervals δt obeys the law

  $$d(m\frac{\delta(\delta\vec{x})}{\delta t^2}, m\vec{g}) \leq \epsilon \parallel m\vec{g} \parallel \quad (1)$$

  where $d(\,.\,,\,.\,)$ and $\parallel . \parallel$ are, for vectors in $\mathbb{R}^3$, respectively the Euclidian distance and the Euclidian norm.[1]
- In the spatiotemporal environment limited to earth in the 21st century, bacteria exist.

These are examples of empirical propositions from chemistry, physics, and biology, whose truth value *has already been empirically established* to be 'true'.

Boongaling then continues with the following premise:

[1] The values of the gravitational field $\vec{g}$, the spatial displacement $\delta\vec{x}$, and the time interval δt cannot be determined with infinite precision: there is always a measurement error. Consequently, the identity $m\frac{\delta(\delta\vec{x})}{\delta t^2} = m\vec{g}$, which is obtained from inequality (1) when $\epsilon = 0$, may not hold *mathematically* exact with real measurements. However, let ϵ be the sum of the relative errors for the values of $\vec{g}$, $\delta\vec{x}$, and δt; then regardless of how small ϵ is—note that this is *technologically* determined, so ϵ cannot become *arbitrarily small*—there is always a δt small enough such that inequality (1) holds.

(P_2) For any empirical proposition *p*, it is always possible that new evidence could arise which could falsify *p*.

But this premise P_2 is not true either: in the natural sciences there are empirical propositions that *have already been established to be true* in an area of application—the above ones are examples, but we could write down literally millions more. These true empirical propositions then all have the form 'if the condition C is satisfied, then *p*'. Such an area of application, i.e. the area in which the condition C is true, comes with a set of parameters, each of which can vary within a well-defined range: the propositions have then been verified for all values of the parameters in their respective ranges. Consider the first of the above examples: water and ethanol may not mix into a homogenous liquid phase under extreme pressures and temperatures, but in the pressure and temperature ranges that fall under 'standard laboratory conditions' it is a certainty that they do—there is not going to be any new evidence that falsifies this proposition, because it has already been tested for the entire range of these parameters. As to the second of the above examples, inequality (1) may not hold for an object that is not moving freely or that is moving relativistically, or for strong gravitational fields, but it does hold in the Newtonian limit—there is not going to be any new evidence that falsifies the proposition as stated, because it has already been tested for the entire range of velocities and gravitational field values in the Newtonian limit. As to the last example, bacteria may not exist in the millionth century on earth or in the 21th century on Venus, but there is not going to be any new evidence that falsifies the proposition as stated. That establishes that premise P_2 is false.

From premises P_1 and P_2 Boongaling then derives that *S*'s justification for an empirical premise *p* cannot ever be sufficient to exclude ¬p (his premise P_3), which then leads to his conclusion C_1 that *S* cannot ever have a strongly justified belief that an empirical premise *p* is true: from there and his additional premise P_6 that Gettier cases involve empirical premises, he arrives at the above intermediate conclusion IC_1—as Boongaling puts it, the JTB+S definition eliminates *all* empirical knowledge, and *therefore* doesn't really eliminate Gettier cases (his footnote 5). However, even though the derivation of IC_1 from its premises is logically correct, it is nevertheless false because the premises P_1 and P_2 are false—as a matter fact, the JTB+S definition actually eliminates the Gettier cases but does not rule out *all* empirical knowledge.

Proceeding with the derivation of IC_2, Boongaling starts from the following two premises:

(P_7) The JTB+S definition requires that knowledge is infallible.

(P_8) If knowledge is required to be infallible, then no empirical knowledge is possible—this leads to skepticism.

The first of these, premise P_7, is true: by the fourth condition of the JTB+S definition, *S* only knows *p* if *p* is a certainty. One should not interpret this fourth condition weakly, as in Boongaling's premise P_9: then it indeed is no different from the standard JTB definition—that indeed leads to triviality of the JTB+S definition, as argued by Boongaling. So compared to the standard JTB definition, in the framework of the JTB+S definition a lot less qualifies as 'knowledge'. It is not true, however, that this excludes us from obtaining empirical knowledge: Boongaling's premise P_8 is false, as shown by the counterexamples given above.

Consequently, Boongaling's intermediate conclusion IC_2 is false although its derivation from its premises is logically correct: because the premises P_8 and P_9 are false, it is not true that the JTB+S definition of knowledge is trivial or leads to skepticism in the sense that no empirical knowledge is possible. What *is* true, however, is that—absent divine intervention—in the framework of the JTB+S definition we cannot ever *know* that laws of physics are true universally. For example, we know that inequality (1) is true in the Newtonian limit, but we also know that it fails under other conditions. We know that its replacement, Einstein's general theory of relativity (GR), is true under all conditions under which it so far has been tested, but we still do not know whether GR is true universally: the crux is that the Planck scale is empirically inaccessible, so we will not ever know whether GR is true universally. So indeed the JTB+S definition does lead to a form of skepticism about universal laws of physics: at best, one can have a justified belief in such a law. So, the JTB+S definition of knowledge cannot exclude that we end up with a *postmodernism in physics*: a scenario in which empirically adequate, universal theories coexist that are mutually inconsistent but experimentally undecidable.

Finally, to derive his intermediate conclusion IC_3, Boongaling starts from the following premise:

> (P_{11}) The JTB+S definition of knowledge as strongly justified true belief implies that justification is strong but not necessarily infallible.

From there, Boongaling argues that in the framework of the JTB+S definition knowledge is both infallible and fallible: he then arrives at his intermediate conclusion IC_3 that the JTB+S definition of knowledge suffers from internal inconsistency. The problem with Boongaling's argument is that his premise P_{11} is false: the falsehood of P_{11} comes about because Boongaling gives a meaning to the word 'strongly' in the name '*strongly* justified true belief' that is not implied by the JTB+S definition of knowledge. The crux is that the JTB+S definition of knowledge is determined by the four conditions (i)-(iv). Due to the fourth condition, the term 'strongly justified true belief' has been suggested as a description of knowledge in

the framework of the JTB+S definition of knowledge, in order to distinguish it from the standard description as justified true belief. But it's just a name: it's methodologically wrong to derive consequences from this name that are not implied by the four clauses of the JTB+S definition, by giving the term `strongly justified true belief' a meaning that is not in line with the JTB+S definition. Yet that is precisely what Boongaling does: his premise P_{11} is a *non sequitur* because it doesn't follow at all from the JTB+S definition of knowledge—P_{11} is false because it rests on an additional assumption about the name `strongly justified true belief' that is not implied by the JTB+S definition of knowledge. Consequently, Boongaling's intermediate conclusion IC_3 is false, even though its derivation from its premises is logically correct.

It is herewith demonstrated that each of the intermediate conclusions of Boongaling is false: it is not the case that the JTB+S definition does not eliminate Gettier cases, nor is it the case that the JTB+S definition leads to either skepticism or triviality, nor is it the case that the JTB+S definition suffers from internal inconsistency. Consequently, Boongaling's final conclusion is false too: it is not the case that the JTB+S definition fails to provide a correct solution to the Gettier Problem, nor is it the case that the JTB+S definition fails to provide a satisfactory account of knowledge. So, to conclude, we maintain that the JTB+S definition solves the Gettier problem and provides a satisfactory account of knowledge.

References

Boongaling, John I.K. 2025. “The failure of Cabbolet's fourth condition for knowledge.” *Logos & Episteme. An International Journal of Epistemology* 16 (3), 351-355.

Cabbolet, Marcoen J.T.F. 2024. “The JTB+S definition of knowledge: solving Gettier's problem.” *Logos & Episteme*. *An International Journal of Epistemology* 15 (4), 385-387.