Is Rationalism Necessitates Dualism?

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Abstract

In this essay, I will show why the answer to the title above is a 'yes'. However the proof that I am about to give is based on the probability between mind-body dualism and physicalism. To make sense of such statement, I will briefly review some of the views held in the philosophy of mind. Later I will present the statement in an analogy, putting a pressure on epistemic quality on affirming or denying the existence of the "mind", and followed by a logical analysis on the question in title.

Key words: rationalism, body-mind dualism, intuitionistic logic, modal logic, idealism, philosophy of mind

1. Introduction

There are two main school of thoughts in the tradition of Western philosophy concerning how do humans (we) can gain knowledge? One school of thought is rationalism and the other is empiricism. Empiricists believe that we gain knowledge by experiences. Rationalists on the other hand believe that knowledge is innate. However the differences amid the definitions as given, is not that simple or straight forward. The concept of innate knowledge must be properly understood, if not the distinction to be made between empiricism and rationalism cannot be established. By "innate knowledge" according to the rationalists, is not that we already have knowledge of everything in our mind without experiencing it. Instead, by the term "innate knowledge" the rationalists understood it that there is an innate system which we build our knowledge on. Depends on the philosopher's worldview, for examples, this system could be spiritual for Plato, or biological for Noam Chomsky.

A priori knowledge suggests that, before we can know anything, there are innate ideas which we use them to interpret, analyse or knowing an object. For example, Rene Descartes argues that we have the idea of the perfect triangle in our mind, without experiencing it. In fact, because of that innate idea, we able to recognize objects in the imperfect shape of triangles. This line of argument, at least we can trace it back all the way to Plato's *Phadeo*. The world are like shadows, according to Socrates' pupil, to the ideal form. As we already knew the ideal form and forgotten about it due to the nature of our body, we can know and learn to judge the quality of our external world. Therefore for Plato, "knowing" is actually "recollection". However, empiricists would disagree with this kind of argument. David Hume argues that, our knowledge is the result of our experience and our expectation (Hume's fork) (Morris, 2020). With this idea in mind, A. J. Ayer argues that, *a priori* is simply a tautology (2001: 119). For example, our past experience may be translated to a logical position in our memory, and in a

new situation, such logical proposition is applicable to the new situation. Therefore, we able to know or predict the new situation without really experiencing it to make a judgement.

If the logical positivists like Ayer were correct, then the concept of "innate idea" would be irrelevant in theory and just a *myth* in real life. Therefore, empiricist Analytic philosophers, argue that 'language' is a social construction. These philosophers and linguists would put the study of language under social science. Noam Chomsky would disagree with this. He would argue that the study of language must not be under social science, instead, the study of language must be made like how one would study physics, or chemistry. Chomsky believes that the study of language must be a branch under biology. If Chomsky is correct on the other hand, that language is not a social construction, then the word "mind" is not an empty metaphysical term or a tautology, because innate knowledge (innate system) for language which is biological to Chomsky, is a part of the "system of the mind".

Hence, if a rationalism depends on the idea of "innate knowledge", and "innate knowledge" as a part of the mind (see e.g. McGilvray, 2013: 64), then it follows that, a rationalist by necessary would be a dualist too. However, is this argument convincing? It is good to have a scepticism that not everyone will agree with this line of reasoning. The concept of "mind" is an interesting question for contemporary debates. According to (Al-Khalil & McFadden, 2014 :48) the concept of "soul" is irrelevant in modern science. Since Descartes associated the "mind" with the "immortal soul" (Ibid, 51), then "mind" would not be relevant too in that sense. Chomsky on the other hand will not delve into such question as we will briefly review in the next section. Nonetheless, I think, for some people, as the discourse on the "mind" (supposing that it does exist) will lead to the discussion of the "soul" and consequently, "theology" too, would be problematic. "Theology" for them, appeared to be in many aspects to be irrational and unscientific. For that reason, it is better for them to dismiss the "mind" and hope that science will be able to explain how "consciousness" and "reason" are possible via the organic organ known as the brain alone (*physicalism*).

This essay is not to argue that such is the case or not.[1] This essay aims at showing that rationalism do necessitate dualism. Before that, there must be some relevance to claim for "dualism". Let's reduce current philosophical discourse to our immediate experience, which is now. We do have consciousness and we do have a physical body. At this moment, we are *assuming* that we do not know either this consciousness can be independent of the body, or actually it is the working of the body. Nonetheless, we can clearly define them distinctly from each other, as reflected in the puzzle we just mentioned. Based on this definition alone, we can say that there is a "mind" and there is a "body" on conditional basis of our ignorance on its further nature. Such approach is an epistemic judgement because it demands an immediate answer that is relevant which is based on reason and by being pragmatic. I will demonstrate such event in an analogy in "The Case of Bob, the Key and the Safe" which intended to show to us, what is the best judgment in the midst of we do not have the complete answer. But before that, we will review briefly on the philosophy of mind on the purpose that in what sense we understand by the "mind" in this paper. On such subject, I will review the philosophy of mind, ranging from Aristotle to Descartes and Chomsky. After "The Case of Bob", we will logically

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[1] Although its author personally believes in the existence of the "mind" which is part of the "human soul" in the Aristotelian sense.

analysis the question-title of this essay and show that in what way does, rationalism necessitates dualism.

2. A Brief Review on the Philosophy of Mind

If one studies the terms used in Western philosophy, the word "mind" was not used in ancient Greek philosophy, but rather the word "soul" and "intellect" assuming the role of the "mind" as used in modern philosphy discourses. Perhaps, the term "mind" became more prevalent in early Modern philosophy as the organ for consciousness, whilst terms such as "soul" and "intellect" taken to be irrelevant. According to observers, such changes is known as the secularization of process of the Scholastic philosophy.

For Aristotle, the soul is the power for our movement in our physical growth, desire, anger and reason. Putting the physical growth aside, for Aristotle and his followers, ethics is about finding the right balance of desire, anger and reason. If desire is lacking then, we will be indifference or unmotivated. If desire is excessive, greed and avarice would be our traits. If it is balance, then we have virtues in our traits such as having discipline, being motivated and self-control. Likewise, if anger is lacking, then we would be cowards and indifferent to injustice. If anger is excessive, violence would be our trait. If anger is balance, then we would have virtue in our traits such as courageous and patience. In the same fashion, if our reason is weak, we would be gullible, idiot and imbecile. If our reason is too strong, we would be cunning, manipulative and 'dishonest psychopath'. If it is balance, traits such as wisdom, insightful, and reflective, should be expected.

In Aristotelian or Scholastic epistemology, "reason" is one entity itself and the other is the "intellect". There are two types of intellect; "passive intellect" and "active intellect". "Reason" (or *ratio*) being power of the soul is under the "passive intellect" which we are conscious of and perhaps it is located in the regions of the brain. The "active intellect" on the hand is still a thing we conscious of, as it is part of us, but its location is not in the brain.[2] Aristotle made an analogy of the relation of the eye and light in explaining the relation of the "passive intellect" and the "active intellect". The eye ball has the potential to see, but sight remain a potential so until with the presence of light, sight is actualized and we be able to see. Likewise, with the presence of the "active intellect", the "passive intellect" will be able to perceive intelligible things to reason.

By the 17th century onwards in Europe, Scholastic philosophy was already the standard worldview in formal education of philosophy. Some of the philosophy students were not happy with the Scholastic worldview. One of them being is Rene Descartes. Inspired by the mechanical philosophy of Galileo, Descartes viewed that the "Unmoved Mover" initiated chain (or Aristotelian cosmology) as irrelevant in explaining the physical world. However Descartes realized that mechanical philosophy is not applicable to the human mind. The reason is, 'thought' according to Descartes is perceived without a body – a justification for the existence of the mind (Hatfield, 2018).

Nonetheless, Cartesian dualism do faced with criticism. John Locke insisted that human was born as a clean slate and experiences are filled on it – an idea known as empiricism. David

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[2] Aristotle's argument for the immortality of the human soul. See his *Metaphysics* and *De Anima* (on the Soul).

Hume expanded the empirical idea with "Hume's fork" which influenced empirical philosophers of the Analytic tradition by the turn of the 20th century. "Hume's Fork" suggests knowledge can be divided into a relation of two, one is analytical and the other is facts. These ideas further developed into the idea of relation between logic and experience by the Analytic philosophers (e.g. Ayer, 2001). For instance, Bertrand Russell argues that a case of experience of the world can be reflected in logical proposition (e.g. 2009: 22). In the case of the "mind", since there is no empirical evidence of it, it is a tautology to a more complicated proposition (e.g. Ayer, 2001: 119). Hence for Analytic empiricists, metaphysical terms such as the "mind" is just a tautology to other things that can be proven empirically. Such understanding, is taken by some philosophers as the answer to the "mind-body" problem. As example, for Gilbert Rye, the concept of "mind" is just a categorical problem in language use (Thomson, 2011: Location 621-630).

As much as the "mind" is dismissed by empiricists, Noam Chomsky argues that the study of language is the window to the study of the mind, hence an insight into human nature (e.g. 2006 & 2015). For Chomsky, surprisingly unlike his contemporaries, does not hold a view that there is a "mind-body" problem. According to Chomsky, Isaac Newton changed our understanding of the physical world by disproving mechanical philosophy in understanding nature. With the 'discovery' of gravity, Newton showed that mass can impact another mass without contact. Hence, from the assumption that the world works in a mechanical manner, Newton changed our understanding of nature by return it back to occultism. Therefore, Chomsky reasoned that, the "mind-body" problem was not a problem at the first place, because "body" itself is still a mystery. (McGilvray, 2013: 30)

However, as much as Chomsky dismisses the "mind-body" problem, it does not mean that he rejects the "mind-body" notion. Chomsky divides language into two domain; one is E-language and the other is I-language (E-language for being external, extension and engagement etc. hence elements associated with the body, whilst I-language is for internal, individual and intention etc. elements associated with the mind).[3] For Chomsky, to study language is to study the I-language. E-language is relevant for the study of social sciences, but to study human nature, it would be the study of the I-language. (see Chomsky, 2014 & McGilvray, 2013)

I-language suggests that there is *Universal Grammar* which makes language possible. Universal Grammar is thought to be a biological property. Its mechanism is unique which is to be studied under the *minimalist program*. The program suggests that, humans use language in the most minimal way possible. To achieve this objective, there is a mechanism known as *internal merge* – meanings are merged within the semantic without compromising the syntax for lesser words to be used when they are expressed. This 'amazing' feat of the human language is a part of the mechanism of the human mind. Therefore, if Chomsky is correct, as a rationalist, *a priori* knowledge, or "innate knowledge" to him is the system of the human mind. Therefore for Chomsky, unlike the other empiricist Analytic philosophers, "meaning" is not a social construction. But rather, a relation within the system of the human mind (see McGilvary, 2013: 59).

For some, the "mind" is still a problematic term. Physicalists argue that consciousness is nothing but billions of neurone passing electrical signals across the brain regions. For example,

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[3] Neither Chomsky nor his followers explicitly stated that, as far as I am aware of. Therefore, it is my assumption from Chomsky's own philosophy that he does not reject the notion of "mind-body" dualism.

Daniel Dennett argues that our consciousness is the result of evolution (as oppose to Chomsky, who argued that what could be was a mutation). Roger Penrose, on the other hand argues that quantum physics can explain the mysteriousness of consciousness. Be as it is so, John Searle does not accept Penrose's view. He argues that Penrose just add another mystery (quantum physics) on another mystery (consciousness). Nonetheless he appreciates Penrose's effort, for he believes that consciousness is a biological object (Searle, 2006: 81-84).

Dennett, according to Searle, argues that "consciousness" (naturally translated as the "mind") is just an illusion – a behaviourist approach in the philosophy of mind. For him (Dennett), our "consciousness" as we feel it, is the result of complex computation occurring in the brain. Dennett is a supporter of Strong AI Thesis – a thesis that suggests that the "mind" can be expressed by machines, thus arguing that it is computation of the brain that resulted "consciousness". Searle on the other hand disagrees with the thesis because in the end, it is humans that interprets the analyzation made by the machines. He however, is a supporter of Weak AI Thesis – a thesis that allows a computer model to be used for the study of the "human mind" (not trying to imitate the "human mind") (2006: 17, 102, 106,110).

3. The Case of Bob, the Key and the Safe: An Analogy

The section above shows that argument for the existence of "mind" is still not universally approved amongst academicians and philosophers, for many arguments that I have briefly listed above. Nonetheless, there is an epistemic quality that we have to consider if we choose to reject the existence of the "mind" or not. To illustrate, we will create an analogy.

Imagine,

> There is a safe and there is some money in it. The holder of the key to safe is Bob. He is the ONLY one who has the key and the key is UNIQUE – it cannot be replicated. Thus, the safe is only can be opened by Bob.
>
> One day, the safe was opened and the money is lost. Naturally, Bob would be the suspect, but Bob is not found to be around. Furthermore, there is no evidence that Bob stole the money from the safe. On the day itself, you are the judge and you have to give a verdict immediately.
>
> Solicitor A said that, although there is no any sort evidences to implicate Bob as the thief, we do know that ONLY Bob can open the safe. Therefore, Bob must be charged.
>
> Solicitor B on the other hand argued that, there is no evidence that indicates Bob stole the money. Furthermore, Bob is nowhere to be found right now. Therefore Bob must not be pressed charges.
>
> Now, you as the judge have to decide, should you charge Bob or not. If you charge Bob, Bob still can appeal to overturn the charge. If you don't, you just dismiss Bob because of absence of evidence.

The dilemma of the judge as above reflects the position you are in to accept the existence of the mind or not. The idea of Bob committing the theft may represent the idea of the existence

of the mind, whilst solicitor A is a dualist and solicitor B is a physicalist. Solicitor A chose not to dismiss Bob because he fits the description of the suspected criminal. Solicitor B dismissed Bob, because there is no evidence to convict Bob. If Solicitor A gets his way, Bob will be in custody and the case can be developed as Bob can have the chance to plead innocence. If solicitor B gets his way, then Bob will be out of the equation.

You may accept the existence of the mind because you recognize that thought is perceived without a body. However, you cannot empirically prove the existence of the mind. Nonetheless, you know by accepting the existence of the mind, does not mean the study of the mind should be eliminated.

If you reject the existence of the mind, simply based on no empirical evidence for it although reason for it to exist is available, your judgement merits a re-thinking. Like solicitor B, you are dismissing Bob because lack of evidence, yet you hoping to prove it someone else although Bob has the possibility to steal it. In other words, you are dismissing the "mind" although by the definition of what is happening on you (your consciousness etc.) do suggest the existence of the mind.

Hence, above is the illustration to illustrate the difference of epistemic quality in accepting "mind" or rejecting it. I leave it to the readers to decide which judgment has better epistemic quality. Nonetheless, in my judgment (and for the purpose of this essay), it is the position of the dualists that is sounder in comparison to the physicalists. The reason is, there is a reason to suppose the existence of the mind (a teleology argument). To suppose such existence does not mean that *cognitive science* would be over. Far from it as there would be more reasons to investigate the behaviour of the brain and the sublimity of consciousness that is evident to our current state. If we dismiss the "mind", we are dismissing the element that we are consciously feel; like if we dismiss Bob from the case, are dismissing the only one who fits the description of the criminal.

Hence in this essay, we take the position of the dualist. Following this, in the section below, we will use philosophical logic to answer the question as given as the title.

4. A Logical Analysis

Before we attempt to analyse the question in title, some questions must be considered to make it more sensible.

(i)   Can a dualist be an empiricist too?
(ii)   Can a rationalist be a physicalist?
(iii)   Is an empiricist necessary be a physicalist?

Question (i) suggests that the mind is an empty slate. In other words, innate knowledge would not be possible. If that is the case so, then to have the "mind" is a redundant. One may suggest, if the body perceives perceptions and mind perceives thoughts, then why should "mind" is a redundant to the body if the mind is a clean slate? If such question occurred, then it shows why it is important what we really mean by "innate knowledge" or "*a priori* knowledge". The body, as much it can perceive sensible things has its limitation. For example the eye can perceive light, but it cannot perceive sound. Likewise, the ear perceives sound, but not light. Furthermore our sight is limited too. For example, we cannot see things in their microscopic

details nor we can see things thousands miles away with our naked eye. If our eye is damaged, we have a blurry vision and needs the aid of glasses. All these are the limitation of the eye – and they serve a purpose for survival too. For example, a balance peripheral vision is needed to drive – or even to walk. Thus, the same kind of principle we have to argue for the "mind", that it must have limits. If there is no limit to our mind, then there is a good chance the amount of thoughts that a mind can perceive is not ideal for our survival. Therefore, if this argument is accepted that there is limits on the mind, then such limitation of the mind is the "system of the mind" which we understood as the system for "innate knowledge". Therefore, a dualist cannot be an empiricist.

On question (ii), in reference to our answer on question (i), I believe the answer to it would be a negative one, unless – rationalism is understood, as which *a priori knowledge* is just a tautology to experiences. In this essay, we do not adopt this kind of understanding of "rationalism" as we are insisting the existence of the "mind" based on the epistemic weight we discussed in the analogy in the previous section. Thus, within the worldview, our answer to question (iii) is a 'yes'.

Now we will turn back to our intended main question.

On the question "is rationalism necessitates dualism?" we translate it in the form of the following logical propositions for:

There is rationalism: $\exists e Re$ when "e" is for "epistemology" and "R" is "rationalism".

There is empiricism: $\exists e Ee$ when "e" is for "epistemology" and "E" is for "empiricism".

There is mind: $\exists x Mx$ when "x" is for "entity" and "M" is for "mind".

There is body: $\exists x Bx$ when "x" is for "entity" and "B" is for "body".

There is innate knowledge: $\exists k Ik$ when "k" is for "knowledge" and "I" is for "innate".

There is experience: $\exists k Ek$ when "k" is for "knowledge" and "E" is for "empirical".

There is dualism: $\exists s Ds$ when "s" is for "substance" and "D" is for "dualism". A negation of it will be known as "physicalism".

Thus, in the terms above, dualism is defined as follow: $\exists x \exists s [Ds \leftrightarrow (Mx \wedge Bx)]$

Whilst rationalism is defined as $\exists e \exists k [Re \leftrightarrow (Ik \wedge Ek)]$

Therefore, the question form (as titled) will be as such: $\exists s \exists e [Re \leftrightarrow (Ds \vee \neg Ds)]$

To achieve our objective, we ought to analyse the relation of "e" with "s". But before we can do that, we have to go through in establish the relation of "x" and "k". For this we will get two propositions:

(i) $\exists x \exists k [(Mx \wedge Ik) \wedge (Bx \wedge Ek)]$ and
(ii) $\exists x \exists k [(Mx \leftrightarrow Bx) \rightarrow (Ek \wedge \neg Ik)]$

Thus the question form of "Re" in relate to "k" and "x" will be:

$\exists x \exists k \{ [(Mx \wedge Ik) \wedge (Bx \wedge Ek)] \vee [(Mx \leftrightarrow Bx) \rightarrow (Ek \wedge \neg Ik)] \}$

In order to solve the puzzle above, we will apply intuitionistic logic which aim to eliminate disjunction, "v" and implication "→". In our analysis, we measure our assertion of the propositions based on the "Truth" value.[4] To do this, each of the left and right-side of a proposition shares the same truth value as "true" for each logical atoms. This method is applicable if the proposition is long enough that it includes more than one of the same logical atoms in each left and right side of the proposition. In other words, the proposition is long enough to be a theorem or a statement that it can be tested with "Truth" values.

The reason I adopt such approach is because, by assuming each logical atoms to be "true", we will be analysing the validity of the logical flow/structure of the argument. For example, if you insist that the London is not Jakarta, you will write "London ↔ ¬ Jakarta". If you assign the same truth value for each atom, you will get a "false" statement – which you know, is incorrect. However, if you make a longer statement such as "John is in London and Paul in is Jakarta. London and Jakarta is not the same city, thus John and Paul are not the same person" which translated as

{ [(John ∧ London) ∧ (Paul ∧ Jakarta)] ∧ (London ↔ ¬ Jakarta) } ↔ (John ↔ ¬ Paul)

and you assign each atom as "true" you will get a "true" statement. Hence the logical flow (or structure) is valid. This is where, our method is applicable, because the logical measurement is not on the individual atoms, but the structure of the argument.

Turning back to our object of our study, in simplifying the proposition

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[4] To review,

Symbols used in propositions	Ordinary Language
∧	Conjunction ('and' etc.)
¬	Negation ('not' etc.)
v	Disjunction ('or' etc.)
→	Implication ('if…then' etc.)
↔	Equivalent ('is' etc.)

The syntax of the proposition if bracketed will be read in the following order; ( ), [ ] and { } with negation '¬' ought to be read first.

Below is the results of simple propositions with two atoms in a Truth Table;

Atoms		Propositions					
p	q	p ∧ q	p v q	p ↔ q	p → q	¬ p	¬ q
T	T	T	T	T	T	F	F
T	F	F	T	F	F	F	T
F	T	F	T	F	T	T	F
F	F	F	F	T	T	T	T

∃x ∃k { [(Mx ∧ Ik) ∧ (Bx ∧ Ek)] ∨ [(Mx ↔ Bx) → (Ek ∧ ¬ Ik)] }

as sets A[x] and B[k], we will get

[(A ∧ B) ∧ (A ∧ B)] ∨ [(A ↔ A) → (B ∧ ¬ B)]

By applying intuitionistic logic, we ought to remove the implication "→". By applying this way of reasoning[5]:

X → Y

X ↔ (Y ∨ ¬ Y)

X ↔ (Y ∧ ¬ ¬ Y)

X ↔ Y

We will get

[(A ∧ B) ∧ (A ∧ B)] ∨ [(A ↔ A) ↔ (B ∧ ¬ B)]

Taking the left hand-side of the proposition after the disjunction, (A ↔ A) ↔ (B ∧ ¬ B), we can simplify it to be [A ↔ (B ∨ B)]. Thus it is (A ↔ B). After the simplification, we will get

 [(A ∧ B) ∧ (A ∧ B)] ∨ (A ↔ B)

Hence, from the statement above, we know that

 [(A ∧ B) ∧ (A ∧ B)] ↔ ¬ (A ↔ B), which means, A is not a tautology to B. The significant of such conclusion is that, we know that "x" is not a tautology of "k", hence, we are saying that the medium for knowledge, be it either the brain or the mind, is not a tautology to the type of knowledge or epistemology, being either innate or empirical. Therefore, from this outlook, we can give possibility of the validity to the dualism of the body and the mind. We say a "possibility" because negating the left hand-side possible in favour of the "A ↔ B". Nonetheless to prove there is a possibility of "¬ (A ↔ B)" serves our current purpose. Readers have to remember that neither A nor B at this stage is a logical atom for us to assert a truth value for analyzation. Instead, they are sets.

With the possibility of dualism in mind, we will start to analyse our intended logical proposition in its logical atoms. For recollection, the proposition in question is

∃x ∃k { [(Mx ∧ Ik) ∧ (Bx ∧ Ek)] ∨ [(Mx ↔ Bx) → (Ek ∧ ¬ Ik)] }

For our convenience, reducing each proposition in "( )" brackets to a simple variable, we will get

(A ∧ B) ∨ (C → D)

Given that it is a disjunction, only one of the propositions would be true. By negating one of them we will get the equivalence of the other. Therefore, by removing the disjunction we will have two possible propositions:

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[5] We remove unnecessary redundancy.

i.   (A ∧ B) ↔ ¬ (C → D)
ii.   ¬ (A ∧ B) ↔ (C → D)

However, to analyse the above proposition in the form of intuitionistic logic, implication "→" must be removed. Thus it is naturally replaced with equivalent "↔".[6] Thus we will get,

i.   (A ∧ B) ↔ ¬ (C ↔ D)
ii.   ¬ (A ∧ B) ↔ (C ↔ D)

In each propositions, if we assign "true" to each atoms, we will get "false" for each propositions. However, the analysis does not stop here. Take not the negation of a bracket can mean more than a proposition. For example, "¬ (C ↔ D)" can mean as "(¬ C ↔ D)" or "(¬ C ↔ ¬ D)" or "(C ↔ ¬ D)". Therefore the propositions can be analysed as in the table below, by asserting that each atom as "true".

Propositions			
(i)	Truth value	(ii)	Truth value
(A ∧ B) ↔ ¬ (C ↔ D)	F	¬ (A ∧ B) ↔ (C ↔ D)	F
(A ∧ B) ↔ (¬ C ↔ D)	F	(¬ A ∧ B) ↔ (C ↔ D)	F
(A ∧ B) ↔ (C ↔ ¬ D)	F	(A ∧ ¬ B) ↔ (C ↔ D)	F
(A ∧ B) ↔ (¬ C ↔ ¬ D)	T	(¬ A ∧ ¬ B) ↔ (C ↔ D)	F

From the table above, only one proposition that have a "true" value, and that is "(A ∧ B) ↔ (¬ C ↔ ¬ D)". Reverting it back to its original variables, the proposition with a "true" value is expressed as

∃x ∃k { [(Mx ∧ Ik) ∧ (Bx ∧ Ek)] ↔ [¬ (Mx ↔ Bx) ↔ ¬ (Ek ∧ ¬ Ik)] }[7]

To take the new 'modification' which is

∃x ∃k [¬ (Mx ↔ Bx) ↔ ¬ (Ek ∧ ¬ Ik)]

From that proposition, the truth value is "false" if all atoms are "true". The left-hand side of the proposition is clear which means "the mind is not the body", but the right one is not so clear. If one may try, it means "it is not true that empirical knowledge is without innate knowledge" – but how can it relate to the statement "the mind is not body"? Therefore, we will analyse the alternatives to it that will make the proposition "true" and clearer for our understanding.[8] To simplify, we may adopt the form ¬ (M ↔ B) ↔ ¬ (E ∧ ¬ I) for our analysis;

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[6] Recall:

X → Y

X ↔ (Y ∨ ¬ Y)

X ↔ (Y ∧ ¬ ¬ Y)

X ↔ Y
[7] The "Truth" value for this proposition is "true" when all the atoms are "true".
[8] It is important to have a clear proposition to establish a sound theorem.

Proposition	Truth value
¬ (M ↔ B) ↔ ¬ (E ∧ ¬ I)	F
¬ (M ↔ B) ↔ (¬ E ∧ ¬ I)	T
¬ (M ↔ B) ↔ (¬ E ∧ I)	T
¬ (M ↔ B) ↔ (E ∧ I)	F

From the table above, there are two propositions with a "true" value; "¬ (M ↔ B) ↔ (¬ E ∧ ¬ I)" and "¬ (M ↔ B) ↔ (¬ E ∧ I)". We may disregard the former for it will lead us 'nowhere' considering the 'bigger proposition' that we are in currently. Thus, we only take the latter one.

Therefore, we have

∃x ∃k [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)]

which means "the mind is not the body means it is innate knowledge". Of course that translation is vague but the idea is presented. It simply showed that the "mind" is not the "body" and this signifies the existence of "innate knowledge". However, we do not stop here yet for we cannot dismiss "empirical knowledge". The relation between "empirical" and "innate" knowledge must be established. Recall, in applying intuitionistic logic we turn implication "→" onto equivalent "↔". Therefore, the most recent proposition above in part of the bigger logical theorem in its initial logical status is

∃x ∃k [¬ (Mx ↔ Bx) → (¬ Ek ∧ Ik)]

The proposition above in simplified variables will be in this form:

¬ A → B

Thus under intuitionistic logic, we will get

¬ A → B

¬ A ↔ (B ∨ ¬ B)

(¬ A ↔ B) ∨ (¬ A ↔ ¬ B)

Hence, the proposition would be as

∃x ∃k { [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)] ∨ [¬ (Mx ↔ Bx) ↔ ¬ (¬ Ek ∧ Ik)] }

Connected by a disjunction "∨", the left-hand side of the proposition is clear to us. We already analysed it and by itself, if all the atoms are "true", it is a "true" proposition. The right-hand side on the other hand is 'new' to us, and by itself, if all the atoms are "true", it is a "false" proposition. Thus, we will analyse it further. To simplify the proposition above we will get

[¬ (M ↔ B) ↔ (¬ E ∧ I)] ∨ [¬ (M ↔ B) ↔ ¬ (¬ E ∧ I)]

Thus the right-hand side is

¬ (M ↔ B) ↔ ¬ (¬ E ∧ I)

Again, in a similar fashion we have discussed, we shall leave "¬ (M ↔ B)" as it is, for it is a clear proposition. Indeed, we will analyse "¬ (¬ E ∧ I)" because it is unclear. Thus, we get this table

Proposition	Truth value
¬ (M ↔ B) ↔ ¬ (¬ E ∧ I)	F
¬ (M ↔ B) ↔ (E ∧ I)	F
¬ (M ↔ B) ↔ (¬ E ∧ ¬ I)	T
¬ (M ↔ B) ↔ (E ∧ ¬ I)	T

From the table, we know there are two T's and two F's. Therefore, to move forward from here, we take that the table above suggests to us, the logical chances of "¬ (M ↔ B) ↔ ¬ (¬ E ∧ I)" to be "true" is 2/4 (two-over-four).

Therefore from

[¬ (M ↔ B) ↔ (¬ E ∧ I)] ∨ [¬ (M ↔ B) ↔ ¬ (¬ E ∧ I)]

we have seen that in disjunction, the left-hand proposition is a "true" sentence whereas right-hand side proposition has 2/4 possibility of to be "true". To manifest that possibility in the proposition, the disjunction "∨" has to be turned to conjunction "∧". Hence the proposition will be expressed as follow

∃x ∃k { □ [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)] ∧ ◊ [¬ (Mx ↔ Bx) ↔ ¬ (¬ Ek ∧ Ik)] }

This proposition suggests to us that, "it is certain that mind is not the body means there is innate knowledge and the possibility of there is no innate knowledge". In fact that proposition itself is "false" when all the atoms are "true". Hence it is a vague line of argument. But philosophy of mind already tells us that, knowledge if it is not innate, it is empirical. Thus, the proposition should tell us that "it is certain that mind is not the body means there is innate knowledge and the possibility of empirical knowledge". Referring back to recent table above, amongst the two "true" propositions, "there is empirical knowledge" is satisfied with "¬ (M ↔ B) ↔ (E ∧ ¬ I)". With this proposition in place, the whole proposition above will be "true". Thus a more accurate proposition will be expressed as

∃x ∃k { □ [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)] ∧ ◊ [¬ (Mx ↔ Bx) ↔ (Ek ∧ ¬ Ik)] }

To conclude our logical analysis, from the question "is rationalism necessitates dualism?" which is in formal language (logical proposition) in terms of "x" and "k" as

∃x ∃k { [(Mx ∧ Ik) ∧ (Bx ∧ Ek)] ∨ [(Mx ↔ Bx) → (Ek ∧ ¬ Ik)] }

we applied intuitionistic logic and modal logic to get the answer by removing disjunction "∨" and implication "→" added with accuracy of probability ("□" means "necessary" and "◊" "means "possible"). Our answer to the question in formal language is

∃x ∃k { □ [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)] ∧ ◊ [¬ (Mx ↔ Bx) ↔ (Ek ∧ ¬ Ik)] }

which means "when mind is not the body, innate knowledge is necessary and empirical knowledge is a possibility". In other words, rationalism do necessitates dualism, because innate knowledge, which is the basis rationalism, is necessary to mind-body dualism, yet with the possibility of physicalism (non-dualism) because empiricism is a possibility to mind-body dualism. Thus referring back to one of the earliest logical propositions written down in this essay (which is in its original form in terms of '"e" and "s"), the question form to "is rationalism necessitates dualism",

∃s ∃e [Re ↔ (Ds v ¬ Ds)]

is answered in the form of

∃s ∃e [Re ↔ (□ Ds ∧ ◊ ¬ Ds)]

which means "rationalism necessitates dualism with the possibility of non-dualism (physicalism)."

5. Commentary and Conclusion

The definition that we gave to rationalism is it is on the basis of "innate knowledge", which we defined it as a part of the system of the mind. Accepting this definition then, by default we accept the existence of the mind. Of course, not all philosophers, thinkers and writers accept this, but we have to be somewhere to make a statement.

In this essay, through our logical analysis on weather rationalism necessitates dualism, we found that it does with the possibility of physicalism (non-dualism). But readers have to remember that the logical analysis is not a method to prove existence. Instead, the purpose of logical analysis is to show that the argument to claim that rationalism necessitates dualism does not contradict the principle of each terms in the definition of the terms in a theorem. Therefore, in applying the *Socratic method*, we questioned our claim to perform an effective analyzation.

To prove the existence of the mind is possible when the existence of mind can be verified. There is no empirical evidence for the mind, because the mind, even as defined by Descartes, is not for us to observe with bodily perceptions. As Descartes put it

> "[..] we cannot conceive figure unless in something extended, nor motion unless in extended space, nor imagination, sensation, or will, unless in a thinking thing. But, on the other hand, we can conceive extension without figure or motion, and thought without imagination or sensation, and so of the others; as is clear to any one who attends to these matters."[9]

Nonetheless, if a logical proposition for the existence of the mind can be proven, then ontologically it is possible. But the 'philosophy of mind' is at the heart of this 'possibility'. Therefore, the key to understand philosophy of mind is to know that the debates revolve around the existence of the logical atoms that made up the logical theorems for the existence of the mind, like "innate knowledge" especially. Therefore, it is important (either it is relevant or not, it cannot be easily dismissed) a rationalist would be necessary a mind-body dualist too.

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[9] Rene Descartes, *Selections from The Principles of Philosophy*, John Veitch (trans.) (Kindle e-book edition) (2011) page 21

From our logical analysis above, we showed that a rationalist must be a mind-body dualist with "the possibility of being a physicalist". This "possibility" is important because it signifies the distinction of the "mind and body". If we satisfied only with logical proof (or ontological possibility) for "innate knowledge" only, then we could fall into extreme "idealism" that beget "pantheism". For some people, this would be fine – but if there is a way out, why not try to be out of it?

If we look back at the logical flow we had in our analysis, there were four steps that we took:

(i)   We started from the perspective of realism as shown by a disjunction "v" in our initial proposition. The proposition was "∃s ∃e [Re ↔ (Ds v ¬ Ds)]" and also translated as "∃x ∃k { [(Mx ∧ Ik) ∧ (Bx ∧ Ek)] v [(Mx ↔ Bx) → (Ek ∧ ¬ Ik)] }"

(ii)   Then we apply intuitionistic logic on the proposition which became "∃x ∃k [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)]", which is a perspective of idealism.

(iii) We revised the proposition in (ii) in its initial implication form which is "∃x ∃k [¬ (Mx ↔ Bx) → (¬ Ek ∧ Ik)]". This put us back in the perspective of realism and subtle philosophical question caused by implication "→".

(iv)   We removed the implication "→" by turn the proposition with disjunction "v". This helps us to apply modal logic which we will get "∃x ∃k { □ [¬ (Mx ↔ Bx) ↔ (¬ Ek ∧ Ik)] ∧ ◊ [¬ (Mx ↔ Bx) ↔ (Ek ∧ ¬ Ik)] }". Thus our final theorem is "∃s ∃e [Re ↔ (□ Ds ∧ ◊ ¬ Ds)]".

If we look at the four steps above, we see that we started from realism and 'dived into' idealism. We 'emerged out from it' and established a new metaphysical perspective. This 'new metaphysical perspective' is our philosophy of the mind and epistemology.

Classical logic, which is mathematical in nature is from the perspective of realism. Mathematics allow disjunction in theorems as shown in algebra, which means that, a variable can be two different numbers (see e.g. Burgess, 2009: 121). Such notion of existence is in align with realism. The realists believe that existence is independent from the mind, and since the mind cannot know everything, there are things which is beyond our comprehension. Therefore for a realist, there is always a place for doubt and mysterianism. But not everyone agrees with this. The idealists adopt intuitionistic logic to remove the disjunction and implication of a proposition. This is because the idealists believe that reality is the projection of the mind. Therefore, intuitionistic logic provides the tools on how the idealists should arrive to their conclusion by eliminating any imprecision (Burgess, 2009: 121, 120). However, error is still possible on them if they do not consider the other alterative. This is where modal logic comes in. It gives projection of reality which realism and idealism fail to provide. Modal logic lays out possibilities of what is known could be a contradiction. Metaphysically speaking, the ontology which is reflected from modal logic is more practical for philosophy of science, so we may know what to expect and design our methodology in scientific endeavour more effectively.

Since we concluded that "rationalism necessitates dualism with the possibility of physicalism", we affirm that innate knowledge is perpetual and empirical knowledge is applicable where necessary. Innate knowledge is which is part of the system of the human mind will always be

in used in our process of knowing things, whilst empirical experiences, in its own places, give us reasons to know things respectively. According to Descartes

> "[I]n order to study the acquisition of it[10] (which is properly called philosophizing), we must commence with the investigation of those first causes which are called PRINCIPLES. Now these principles must possess TWO CONDITIONS: in the first place, they must be so clear and evident that the human mind, when it attentively considers them, cannot doubt of their truth; in the second place, the knowledge of other things must be so dependent on them as that though the principles themselves may indeed be known apart from what depends on them, the latter cannot nevertheless be known apart from the former."[11]

It is clear to anyone that within the framework of this essay that the first principle in Descartes' quote above is "innate knowledge" whilst the second principle is "empirical knowledge". For example, because we have the innate idea of a triangle[12] we can perceive a piece of pizza (even for the first time). Assuming that we do not have innate knowledge of a triangle, then we could not perceive that piece of pizza! This example is a bit over-stretched but it serves a purpose here. For Chomsky, "innate knowledge" which is part of the system of the mind is biological. Like any biological faculty, there is a limit to the mind (McGilvray, 2013: 85). Therefore there are two types of unknowns for Chomsky. One is a "puzzle" which is within our cognitive boundaries, and the other is "mystery" which falls beyond our cognitive capabilities. Therefore, if there is no innate knowledge on a particular thing in us, that particular thing will remain unknown to us. Let's take some biological examples. Say, the case of "bees" and "beavers". Supposing "natural instinct" to animals are like "innate knowledge" to humans, beavers are known for their construction of their beaver dam. We do not however, to expect bees to construct a dam as much as we do not expect beavers to construct a beehive. Bees uniquely known to construct the beehive with cells in the shape of hexagon. Again, we do not expect beehives to construct a dam in the shape of hexagon.

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[10] In a letter to the French translator of his *Principle of Philosophy*, Descartes explained what 'philosophy' is. The word "it" in the quote cited, is referring to "philosophy".

[11] *Principles of Philosophy* by Rene Descartes as found in *Anthology of Philosophy*, Kindle e-book edition, location (30308/188334)

[12] Geometry is innate knowledge.

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