

Physicalism, Scientific Realism, and Scientific Foundationalism

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“The aim of philosophy, abstractly formulated, is to understand how things in the broadest possible sense of the term hang together in the broadest possible sense of the term.”

(Wilfrid Sellars(1963), “Philosophy and the Scientific Image of Man”)

“Every era has its *Weltanschauung* and in much contemporary philosophy the doctrine of ‘physicalism’ plays this role.”

(Gillett and Lower(2001), “Introduction” to *Physicalism and Its Discontents*)

“You, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules.”

(Francis Crick(1994), *The Astonishing Hypothesis: The Scientific Search for the Soul*)

1. Introduction

Thesis of Physicalism

- Thesis: Everything in the world is fundamentally physical.
- Terminological matter 1: Introduction of the term 'physicalism'
 - Introduction of the term 'physicalism' in philosophy: Otto Neurath and Rudolf Carnap in the 1930s
 - Neurath and Carnap understood physicalism as the following *linguistic* thesis:
Every statement is synonymous with (=is equivalent in meaning with) some physical statement.
 - Nowadays, however, physicalism is widely understood as a *metaphysical* thesis, namely a thesis about the nature of the world.
- Terminological matter 2: 'physicalism' v.s. 'materialism'

1. Introduction

History of Physicalism(Materialism) in the Western philosophy

- Atomists in the Ancient Period: Leucippus, Democritus, Epicurus
- Materialists in the Early Modern Period: Hobbes, La Metrie
- Materialism in the late 19th century
- ‘Historical Materialism’ and ‘Dialectical Materialism’ in the late 19th century~20th century
- Contemporary Physicalism from 1960s~Present: Quine, Smart, Lewis, Armstrong, Fodor, Jackson, Jaegwon Kim(almost)

Why Physicalism Was So Unpopular in the Western Philosophy

- It seemed impossible to give a *physicalistic* explanation of human thoughts and behaviors given that they are apparently *teleological* and *rational*.

Why Physicalism is So Popular in Contemporary Philosophy

- Spectacular Successes of physical sciences since 17th century
- Possibility of giving a physicalistic explanation of teleological and rational features of human thoughts and behaviors by Darwin’s theory of evolution and Turing’s theory of computability, respectively. (‘Cognitive Darwinism’)

1. Introduction

'Placement Problems' as Central Problems in Contemporary Philosophy

- Apparent Clash between 'Manifest' Image and 'Scientific' Image' of the World
 - We tend to think that the following facts are all genuine facts. On further reflection, however, none of them seem to be fundamentally physical facts.

(*Morality*) It is wrong to abuse a child.

The captain ought to have saved the passengers.

(*Mind*) I decided to study philosophy out of my own free will.

I feel pain when I stub my toe against the chair.

Mr. Obama believes that he is President of the United States.

(*Meaning*) The German word 'Gegenstand' means object.

Chulsoo means *rabbit* by 'rabbit'.

(*Math*) $2+2=4$

(*Modality*) It is necessary that George Orwell is Eric Blair.

- Placement Problems: How to find a place for these problematic facts and entities in the fundamentally physical world?

1. Introduction

Outlines of the Presentation

- I will spell out in more detail what physicalism means
- I will discuss whether we should accept physicalism. In particular, I will consider two arguments for physicalism.
 - (1) 'Realist' argument for physicalism
 - (2) 'Pragmatic' argument for physicalism
- In order to accept the 'realist' argument, we have to accept *scientific realism*. I will argue that scientific realism has a number of problems.
- On the other hand, in order to accept the 'pragmatic' argument, we need not accept scientific realism. This argument is based on weaker premises.

1. Introduction

Outlines of the Presentation

- Since the 'pragmatic' argument is enough to establish physicalism, we can conclude that, contrary to a popular belief among many philosophers and scientists, we do *not* need to accept scientific realism in order to defend physicalism. One can be a physicalist without being a scientific realist.
- Finally, however, I will suggest that there may be a reason not to accept even the 'pragmatic' argument for physicalism. For the argument is based on what I call *weak scientific foundationalism*. It may be that even this thesis turns out to be wrong.

2. What Is Physicalism?

(P1) Everything in the world is fundamentally physical.

- Three Questions

- (1) What does 'everything' mean here?

- (2) What does 'fundamentally' mean here?

- (3) What does 'physical' mean here?

- 'Everything' → Distinction between objects and properties

- 'Fundamentally' → Every object is necessarily *composed of* physical objects.
Every (instantiated) property is necessarily *dependent upon* the (instantiations of) physical properties.

- 'Physical' → ?

(P2) Every object in the world is composed of physical objects.

→ *Problem*: It may be that an object entirely composed of physical objects may nevertheless have some *non-physical* properties.

2. What Is Physicalism?

(P3) Every object in the world is necessarily composed of physical objects and every property in the world is necessarily dependent upon physical properties.

→ *Comment:* If every property in the world is necessarily dependent upon physical properties, then it seems to imply that every object in the world is necessarily composed of physical objects. So the first part of (P3) is superfluous.

(P4) Every property in the world is necessarily dependent upon physical properties.

→ *Question:* What does 'dependent upon' mean here?

→ *Answer:* Every property in the world is *grounded in* physical properties.

→ *Problem:* The relation $\langle x \text{ is grounded in } y \rangle$ seems as obscure as the relation $\langle x \text{ is dependent upon } y \rangle$!

2. What Is Physicalism?

Dependence as Supervenience

- Main idea: If M-properties are necessarily dependent upon P-properties, the following co-variance relation must hold: If there is a change in M-properties, then there must be a change in P-properties.

(Proof) Suppose M-properties are necessarily dependent upon P-properties. Then any change in M-properties must take place in virtue of a change in P-properties. Therefore, if there is a change in M-properties, there must also be a change in P-properties.

- Therefore, if there is no change in P-properties, then there must be no change in M-properties either. That is to say, if two objects x and y share exactly the same P-properties, then x and y must share exactly the same M-properties.

Rough Definition of Supervenience

- M-properties supervene on P-properties = If two entities x and y are identical in P-properties, then x and y must be identical in M-properties, too.

2. What Is Physicalism?

Varieties of Supervenience: Weak, Strong, and Global

- *M*-properties *weakly supervene* on *P*-properties = for any possible world *w* and any individuals *x* and *y* in *w*, if *x* and *y* are identical in *P*-properties then they are identical in *M*-properties.

$$(\forall w)(\forall x)(\forall y)((x \text{ is in } w \ \& \ y \text{ is in } w) \rightarrow ((\forall P)(Px \leftrightarrow Py) \rightarrow (\forall M)(Mx \leftrightarrow My)))$$

- *M*-properties *strongly supervene* on *P*-properties = for any possible worlds *w*₁ and *w*₂ and any individuals *x* in *w*₁ and *y* in *w*₂, if *x* and *y* are identical in *P*-properties then they are identical in *M*-properties.

$$(\forall w_1)(\forall w_2)(\forall x)(\forall y)((x \text{ is in } w_1 \ \& \ y \text{ is in } w_2) \rightarrow ((\forall P)(Px \leftrightarrow Py) \rightarrow (\forall M)(Mx \leftrightarrow My)))$$

- *M*-properties *globally supervene* on *P*-properties = for any possible worlds *w*₁ and *w*₂, if *w*₁ and *w*₂ are identical in *P*-properties then *w*₁ and *w*₂ are identical in *M*-properties.

$$(\forall w_1)(\forall w_2)((\forall P)(P \text{ is in } w_1 \leftrightarrow P \text{ is in } w_2) \rightarrow (\forall M)(M \text{ is in } w_1 \leftrightarrow M \text{ is in } w_2))$$

2. What Is Physicalism?

Formulation of Physicalism in Terms of Global Supervenience

(P) Every property in the world *globally supervenes* on physical properties
= For any possible worlds w_1 and w_2 , if w_1 and w_2 are identical in their physical properties, then w_1 and w_2 are identical in all properties of them.

Why Global Supervenience?

- Some properties of an *object* may be *relational* properties in such a way that they are *not completely* fixed by the physical properties of that object. In that case, we must also consider the properties *outside* the object, and in some cases it may be that we must consider the properties of the entire world.

(e.g.) w (our world): Feynman is a famous American physicist. The only thing Chulsoo knows about Feynman is that he is called 'Feynman' and that he is a famous physicist. Chulsoo *believes that Feynman is a scientist*.

w^* (possible world): Feynman is a famous German physicist. The only thing Chulsoo knows about Feynman is that he is called 'Feynman' and that he is a famous physicist. Chulsoo *believes that Feynman is a scientist*.

2. What Is Physicalism?

What Does 'Physical' Mean?

- *Answer:* Physical properties are whatever properties posited by the physical theory.
- *Question:* Which physical theory? Our current theory? Or some ideal theory in the future?

'Hempel's Dilemma'

(Step 1) If physical properties are the properties posited by the current physical theory, then it is likely that physicalism is false. For it is highly likely that the current physical theory is incomplete and (at least partly) incorrect.

(Step 2) However, if physical properties are the properties posited by some ideal physical theory in the future, we do not know what physicalism says.

(Step 3) Therefore, *either* physicalism is false *or* we do not know what it says.

2. What Is Physicalism?

Comments

- I have a great sympathy for the conclusion of Hempel's Dilemma.
- Still, I think that physicalism is a significant thesis and not an empty one.
- For if physicalism is correct, we can prove this much: no properties in the world can be autonomous from physical properties, whatever the latter turn out to be.
- This shows, for example, that the only way for a moral property such as *being right* to be a genuine property is *either* it supervenes on physical properties *or* it is itself a physical property, where the latter means that it should play an explanatory role in the ideal physical theory.
- This sort of requirement for a moral property being a genuine property is *not* a trivial requirement, and to this extent physicalism can still be a significant philosophical Thesis.

3. Why Should We Accept Physicalism? – Two Arguments

The 'Realist' Argument for Physicalism

- (Premise 1) Physics provides *true* or at least *approximately true* descriptions of observable and unobservable physical phenomena of the world that exists independently of our minds. (→ *Scientific Realism*)
- (Premise 2) Among various theories of the world we have, it is physics that provides the *ontological foundations* for all true or at least approximately true theories of the world. (→ *Strong Scientific Foundationalism*)
- (Conclusion) Therefore, every property in the world must be fundamentally physical properties.

3. Why Should We Accept Physicalism? - Two Arguments

The 'Pragmatic' Argument for Physicalism

- (Premise 1) Physics is the *most successful* theory about observable physical phenomena of the world in terms of its explanatory and predictive power.
- (Premise 2) Among various theories of the world we have, it is physics that provides the *ontological foundations* for all successful theories of the world.
(→ *Weak Scientific Foundationalism*)
- (Premise 3) *Every* property in the world is simply a property posited by *some* successful theory of the world, including our common-sense theory of the world.
(→ *Denial of the existence of theory-independent property*)
- (Conclusion) Therefore, every property in the world must be fundamentally physical properties.

4. Problems of Realist' Argument for Physicalism

Main Problem

- Scientific Realism is committed to *Correspondence Theory of Truth*. That is, if Scientific Realism is right, then statements in the physical theory must *correspond with* relevant physical facts when they are true. If physicalism is right, however, then the correspondence relation holding between a true statement of the physical theory and the relevant physical fact must be itself a *physical* relation. But it turns out to be very difficult, if not impossible, to regard correspondence relation as a physical relation.

Analysis of Correspondence Relation

- The sentence 'There is a rabbit running' corresponds with the fact that there is a rabbit running iff
 - (1) The sentence 'There is a rabbit running' *means* that there is a rabbit running.
 - (2) There is a rabbit running.
- It is plausible to assume that (2) is fundamentally a physical fact. So we have to show that (1) is fundamentally a physical fact.

4. Problems of 'Realist' Argument for Physicalism

Lewis' Analysis of Sentence Meaning

- The sentence 'There is a rabbit running' means that there is a rabbit running because there is a *convention* governing how to *use* this sentence between the speaker and the hearer.
- That is, there is a *specific kind of regularities* in action and belief of speaker and hearer in such a way that the speaker *expects* his hearer to *believe* that there is indeed a rabbit running whenever speaker utters the sentence 'there is a rabbit running', and that the hearer *expects* the speaker to *try* to utter the sentence 'there is a rabbit running' only if there is a rabbit running.
- According to Lewis' analysis, then, the meaning of a sentence is based on the *contents* of mental states such as beliefs, expectations, and intentions.
- Therefore, if we can give a physicalistic explanation of how a mental state such as a belief can have content, then we will be able to give a physicalist explanation of how a sentence can have a meaning, and accordingly of how a sentence can correspond with a fact, and accordingly of how a sentence can be true.

4. Problems for 'Realist' Argument for Physicalism

The Language of Thought (LOT) Hypothesis

- (1) Thought and thinking take place in a mental language, or the 'language of thought'(LOT).
- (2) LOT consists of a system of representations that is physically realized in the brain of thinkers.
- (3) LOT has a combinatorial *syntax* such that operations on representations are causally sensitive *only* to the *syntactic* properties of representations.
- (4) Thought is the tokening of a representation that has a syntactic structure with an appropriate semantics.
- (5) Thinking consists in syntactic operations defined over such representations.

4. Problems for 'Realist' Argument for Physicalism

How Can Language of Thought Have Content?

- *Question:* How can my belief that there is a rabbit running, understood as a combination of representations physically realized in my brain, have a content <There is a rabbit running> and not, for example, <There is a frog running>?
- *Answer:* My belief, understood as the combination of mental representations realized in my brain, *represents* the fact that there is a rabbit running. And it is in virtue of this relation of *representation* that my belief has a content <There is a rabbit running>.
- *Question:* In virtue of what does this 'representation' relation hold?
- *Answer:* A belief represents a fact in virtue of *each element* of it *referring to* an entity (object or property) in the world.

4. Problems for 'Realist' Argument for Physicalism

Can the Relation of Referring Be a Physical Relation?

- *Question*: What is this 'referring' relation holding between each simple representation and the relevant entity in the world?
- (*Answer 1*) A Crude Causal Theory
A representation C refers to a property F if Cs are *caused* by and only by Fs.
- (*Answer 2*) Dretske's Information Theory
A belief B has a content *p* if B carries the *information* that *p*.
(⊗ A state type S carries *information* of type *p* iff
there is a nomological or counterfactual regularity to the effect that
if a token of S occurs then an instance of *p* obtains.)

4. Problems for 'Realist' Argument for Physicalism

Two Problems for Causal or Informational Theory

(1) The Problem of Misrepresentation

- If a representation C refers to whatever causes the tokening of C, then how could there be such thing as *misrepresentation*?

(e.g.) I believe that there is a rabbit running. However, I made a *mistake* and it turns out that there was in fact a rabbit-robot that is running. According to the causal theory, however, if the fact <there is a rabbit-robot running> caused my belief, my belief must have <there is a rabbit-robot running> as its content, for content is whatever caused my belief. So misrepresentation becomes impossible!

(2) The Problem of Indeterminacy

- If a representation C refers to whatever causes the tokening of C, then how could it be determined that my representation <rabbit> refers to *rabbit* and not, for example, to *the time-slice of four-dimensional rabbit* or *the incarnation of the rabbithood*?

4. Problems for 'Realist' Argument for Physicalism

The 'Miracle Argument' for Scientific Realism?

- Putnam's 'Miracle Argument'
 - Scientific Realism is the only plausible (empirical) hypothesis that does *not* make the success of science a miracle.

- Two Criticisms
 - (1) Why should we think that the success of science must be *explained*? It might be that successful scientific theories are analogous to well-adapted organisms – since only successful theories (organisms) survive, it is hardly surprising that our theories are successful, and therefore, there is no demand here for an explanation! (Van Fraassen)

 - (2) Why should we think that *truth* is the only property by appealing to which we can explain the success of science? In fact, the history of science furnishes vast evidence of *empirically successful theories* that were later rejected; from subsequent perspectives, their unobservable terms were judged *not* to refer and thus, they cannot be regarded as true or even approximately true. (Laudan)

5. 'Pragmatic' Argument for Physicalism

The 'Pragmatic' Argument for Physicalism

- (Premise 1) Physics is the *most successful* theory about observable physical phenomena of the world in terms of its explanatory and predictive power.
- (Premise 2) Among various theories of the world we have, it is physics that provides the *ontological foundations* for all successful theories of the world.
(→ *Weak Scientific Foundationalism*)
- (Premise 3) *Every* property in the world is simply a property posited by *some* successful theory of the world, including our common-sense theory of the world.
(→ *Denial of the existence of theory-independent property*)
- (Conclusion) Therefore, every property in the world must be fundamentally physical properties.

5. 'Pragmatic' Argument for Physicalism

Quine's Pragmatic Defense of Physicalism

- (Step 1) We can never settle the philosophical question “Does physics provide a *really* true description of the world?” It is meaningless *both* to answer to this question in a positive way *and* to answer to it in a negative way.
- (Step 2) However, whether physics provides a really true description of the world or not, we *cannot but* talk about the world from the perspectives of the theories we have about the world.
- (Step 3) Every property we are talking about in the world, therefore, is a property posited by some theory of the world.
- (Step 4) Physics is the most successful, comprehensive and foundational theory of the world we have. So we must use this theory to talk about the world.
- (Step 5) Since physics is the most foundational theory of the world we have, every property posited by some theory of the world, if it is successful, must be fundamentally a physical property.

5. 'Pragmatic' Argument for Physicalism

“Why, Goodman asks, this special deference to physical theory? This is a good question, and part of its merit is that it admits of a good answer. . .[N]othing happens in the world, not the flutter of an eyelid, not the flicker of a thought, without some redistribution of microphysical states. . .If the physicist suspected there was any event that did not consist in a redistribution of the elementary states allowed for by his physical theory, he would seek a way of supplementing his theory. Full coverage in this sense is the very business of physics, and *only* of physics . . . *Anyone* who will say, “Physics is all very well in its place” – and who will not? – is then *already* committed to a physicalism of at least the nonreductive, nontranslational sort stated above. Hence my special deference to physical theory as a world vision, and to the physical world as *the* world.”

(Quine, “Goodman’s *Ways of Worldmaking*”, p.98)

5. 'Pragmatic' Argument for Physicalism

Interim Conclusions

- (1) The 'pragmatic' argument for physicalism provides a better ground for accepting physicalism than the 'realist' argument.
- (2) This implies that one need *not* accept scientific realism to be a physicalist.
- (3) Therefore, one cannot criticize physicalism *merely* based on a criticism of scientific realism, or on a criticism of the notion of correspondence theory of truth.

6. Scientific Foundationalism and 'Placement Problems'

Placement Problems Revisited

- (*Morality*) It is wrong to abuse a child.
The captain ought to have saved the passengers.
- (*Mind*) I decided to study philosophy out of my own free will.
I feel pain when I stub my toe against the chair.
Mr. Obama believes that he is President of the United States.
- (*Meaning*) The German word 'Gegenstand' means object.
Chulsoo means *rabbit* by 'rabbit.
- (*Mathematics*) $2+2=4$
- (*Modality*) It is possible that the Korean soccer team advances to 2014 World Cup quarter-final.
It is necessary that George Orwell is Eric Blair.

6. Scientific Foundationalism and 'Placement Problems'



6. Scientific Foundationalism and 'Placement Problems'

Frege on 'Three Realms' of the World

- Physical world: objective and actual (physical objects and properties)
- Mental world: actual but subjective (sensations, ideas)
- Abstract world: objective but non-actual (numbers, 'concepts', 'thoughts', senses, truth-values)

Kantian Perspectivalism?

- There are more than one *standpoints* from which we investigate the world.
- The 'theories' we develop from one standpoint are autonomous from the 'theories' we develop from another standpoint. Even the global supervenience relation does *not* hold among the properties posited by two theories from two different standpoints.
- In particular, *no* supervenience relation holds between properties posited by *ordinary language* and those by *scientific languages*.
(→ The status of *vague properties* and *context-dependent* properties)