PRINCIPIA **30**(1): 195–215 (2026) doi: 10.5007/1808-1711.2026.e106055
Published by NEL — Epistemology and Logic Research Group, Federal University of Santa Catarina (UFSC), Brazil.

PHILOSOPHY AND NEUROSCIENCE: TANGO OR SOLO DANCING?

STEVEN S. GOUVEIA
University of Porto, PORTUGAL
Andrés Bello University, CHILE
stevensequeira92@hotmail.com
https://orcid.org/0000-0003-4176-7040

ÂNGELA LEITE
Portuguese Catholic University, PORTUGAL
angelamtleite@gmail.com
https://orcid.org/0000-0003-0560-1756

Abstract. In this paper, we want to briefly introduce how four approaches that relate (or not) philosophical investigation with the neuroscientific research can be considered in order to achieve a methodology that can effectively investigate the phenomenon of the conscious mind and its relationship with the brain. The traditional way of defining philosophical work seems to be clearly opposed to the traditional way of conceiving neuroscientific work. That raises the question that serves as the title of the paper: should we conceive the relationship between philosophy and neuroscience as a kind of "solo dancing", that is, isolated without any kind of interaction? Or should we conceive that relationship as a "tango", that is, an actively continuous relationship that complements each other? The Isolationist Approach argues for a "solo dancing" relationship, denying any kind of interaction. Next, rejecting this "solo dancing" approach, the Reductionist Approach (RA) will focus on specifying how philosophical work can be reduced to neuroscientific work. Arguing against the reductive aspect of (RA), but maintain a "tango" relationship, the Neurophenomenological Approach (NA) will demonstrate the importance of an embodied approach to the study of the conscious mind. Finally, the Non-Reductive Neurophilosophical Approach (NRNA) will expose a particular methodology that conceives the epistemic utility of both philosophical and neuroscientific work to investigate the conscious brain. After this brief reflection, we will provide some experimental philosophy data collected on how experts in neurophilosophy (broadly considered) judge this relationship, showing that there is a preference for approaches that interconnect both disciplines (even if the specific kind of interconnections is not particular)

Keywords: philosophy • neuroscience • relationship • metaphilosophy • experimental philosophy

RECEIVED: 06/04/2025 ACCEPTED: 11/09/2025

© 2026 The author(s). Open access under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License.

1. Introduction

Any academic discipline has its own method or set of methods that can share a specific property that distinguishes it from other particular methods. In this sense, philosophy, as a generic area that studies certain particular problems — such as "what is knowledge?"— and neuroscience, as an equally general area that studies other problems — such as the neurological mechanisms in schizophrenia — are no exception to this rule.

Traditionally, philosophy shares several methods that seem to be reduced to what we will call "*a priori* methodologies": philosophy seems to involve the investigation of specific problems through *a priori* methodologies and approaches, that is, that kind of particular knowledge whose justification is totally independent of experience or any *a posteriori* consideration, such as, for example, T = 'All singles are unmarried'. Galen Strawson stated that an *a priori* argument is that type of argument that "we can see that it is true just by lying on the couch" (cf. Sommers 2003).

This more or less humorous explanation has a very important clarification that must to be highlighted: the presence on the couch — pure thinking without any requirement to go to the external world — is a sufficient condition to analyze an argument *a priori* exactly because any other kind of information — for example, leaving the couch and looking in the world if 'All singles are unmarried' — are at the very least, superfluous, and at most, epistemically irrelevant: it will suffice to analyze the meaning of each concept to understand the truth value of T.

Regarding neuroscience, the opposite seems to be commonly claimed. Neuroscience, as a specific science that studies a series of particular objects, makes use of *a posteriori* methodologies, that is, the basis of its investigation requires inquiring the physical world through experimentation and controlled research. If philosophy can really be done simply on our couch, no researcher in neuroscience would be successful if she/he did the same: she/he would not have any kind of results to present and would be quickly fired.

But is this way of conceiving traditionally philosophy and neuroscience sound? Does it make sense to consider a specific relationship between the two disciplines? We will now analyze a negative answer to this question.

2. Approaches between Philosophy and Neuroscience

2.1. Isolationist Approach (IA)

A first answer to the idea that neuroscience and philosophy should work together is the isolationist approach, which can also be called "parallelism approach" (Northoff

2014, p.144). Its name offers some clues: it is "isolationist" because its main statement is to assert that philosophy and neuroscience cannot work together since they are two dissimilar disciplines and, therefore, isolated. The first deals with logical possibilities and rigorous analysis of arguments and propositions — an essentially *a priori* methodology. The second deals with empirical research and data — an essentially *a posteriori* methodology.

Thus, it is simply incorrect, according to this approach, to consider that two disciplines so distinct in terms of methods and goals can work together to deal with the hard problems that the conscious mind poses to contemporary science. Both are mutually independent and should not be confused:

> The isolationist projects are based on the assumption that the findings of the natural sciences, neuroscience included, do not influence directly the practice of philosophy, as at least some aspects of philosophical reflection are independent of empirical facts investigated by scientists (Brozek, Stelmach and Kurk 2013, p.16).

A perfect example of this kind of approach is presented by Peter Hacker and Max Bennett in the acclaimed book *Philosophical Foundations of Neuroscience* (2003). There, they presented an analysis of the language used by several cognitive neuroscientists to describe their investigations and experiments. This work, considered by many to be one of the most "significant contribution to philosophy of mind in recent years" by examining "thoroughly and carefully the pretensions of cognitive science to have superannuated philosophical psychology" (Kenny 2013, p.xvii) will seek to be an explicit defense of (IA).

Its main goal is to demonstrate the countless conceptual confusions that have influenced neuroscience, from its foundation to the present. Briefly, it is argued that neuroscientific concepts are, by definition, different from philosophical concepts. The latter are purely logical, they are about sense and meaning. Neuroscientific concepts, by contrast, are about truth and reality. For example, the concept of prefrontal cortex activity has no sense or meaning in itself: it is a pure fact that can be observed and measured. This is fundamentally different from philosophical concepts: for instance, the concept of free will has a meaning and a semantic context. Thus, there is a difference in principle, and therefore we cannot unite the two concepts.

In this (IA), neuroscience must deal with problems as if a certain statement about the human mind is true or false. Philosophy, on the other hand, should focus on the meaning (or lack of meaning) of that same proposition. Conceptual analysis determines not what is true or false, but what does or does not make sense (cf. Bennett & Hacker, 2003, p.6). The following argument sums up the isolationist intuition:

(1) Philosophy is methodologically based on the *a priori*;

(2) Neuroscience is methodologically based on the *a posteriori*;

(3) *A priori* and *a posteriori* methodologies are incompatible;

(4) Therefore, philosophy and neuroscience are methodologically incompatible.

With this formulation, we perceive the fundamental structure of (IA): as (3) is presumed, that is, that different methodologies are incompatible with each other, and since (1) philosophy is based on a type of methodology, the *a priori* and (2) neuroscience is based on the a posteriori, it is concluded the isolationist thesis (4): philosophy and neuroscience are methodologically irreconcilable. The argument makes clear that, for (IA), any kind of "tango" between the two disciplines is not possible.

But does this argument make sense? We will argue that the metaphilosophical assumption presented in (1) and (2) that traditionally defines both philosophy and neuroscience may be wrong. Dan Dennett, following W. O. Quine, rejects this view by claiming that "philosophy is linked to the physical sciences and is effectively its continuation" (Dennett 1987, p.5). Dennett, by rejecting (IA), will argue for a different metaphilosophical view: a soft version of metaphilosophical naturalism that argues for the use of empirical science as an aid to solve philosophical problems. The main intuition behind this soft naturalism thesis is the following: although conceptual analysis is a methodology used by many philosophers, it doesn't need to be conceived as purely *a priori*.

Consider the following example raised by Hacker and Bennett: many neuroscientists argue that the brain is the logical subject of many predicates (e.g. sees, thinks, considers, etc.) but, for the authors, that is to commit a specific fallacy, the mereological fallacy of neuroscience (MFN):

> (MFN) The principle that psychological predicates that only apply to human beings (or other animals) as a whole cannot intelligently apply to their parts (Bennett & Hacker 2003, p.73)

Hacker and Bennett's position is to assume that we can investigate the limits of meaning through careful examination of the use of words: neuroscientists should not claim that "the brain decides" (Damásio, 1996, p.173) or "the brain categorizes and discriminates" (Edelman, 1994, p.109) because that would be to commit (MFN). Why? Because claiming that the "brain does x" is to go against the rules of use of that concept and by going against the rules of use, one can only commit the fallacy in question.

The problem with this assumption — which was also famously used by Gilbert Ryle in identifying "categorical errors" — is that no one has found these rules of meaning yet. Dennett even claims that Ryle was bluffing! — the philosopher did not have a logic of ordinary or folk expressions to support his argument (cf. Dennett 2007, p.83). Since we don't know these "rules" and, by contrast, the "limits", one cannot argue soundly that neuroscientists are just using fallacies to describe their

experiments and results instead of claiming, for instance, that the meaning of words is not static and can evolve in an interchange between the conceptual, on the one hand, and the empirical, on the other hand. Dennett ends up claiming that the analysis of the use of words is not an *a priori* investigation but an empirical one, that produces truth or falsehood that are subject to corrections and objections (cf. Dennett 2007, p.80).

Thus, the simple description that "the philosopher's job is to analyze the use of words and the transgressions of the limits of meaning" is just a useless declarative statement of prescriptive character that, as we will see, does not do any help to think about the normativity of the nature of philosophical work *per se*.

We can use the work of Ludwig Wittgenstein — ironically, since Hacker makes use of the same Wittgenstein to argue in favour of his (IA) — to argue against (IA). The author of *Philosophical Investigations* presented the concept of "language games" with the aim of showing that words cannot be understood outside the context in which they are used. It may well be the case, following Crane (2015), that in fact it may make sense to attribute psychological predicates to the brain if we consider that we are facing a language game different from the game of common language or, in the Dennettian framework, we can extend to the sub-personal level the pragmatic application of terms and concepts ordinarily made at the personal level (cf. Crane 2015, p.256).

For Dennett, Hacker and Bennett's central argument commits a *petitio principii* fallacy: if they had revealed these rules always named, but never presented, and had shown exactly how certain expressions made by neuroscientists get into conflict with those rules, we could be in a position where we could agree or disagree with them. But as these rules are philosophical chimeras, Hacker may be doing the very same mistake that he seems to point out to neuroscientists, superimposing his language game on the language game of neuroscience (cf. Dennett 2007, p.83). If that's the case, is there another way to consider the relationship between philosophy and neuroscience? We will analyze briefly different ways of arguing against (IA).

2.2. Against (IA): Reductive Approach

Following the conclusion of the preview section, the main mistake of (IA) is its metaphilosophical conception of philosophy and neuroscience. The Reductive Approach (RA) will raise this objection by arguing that, on the shoulders of W. O. Quine, since philosophy is merely the continuation of science — although more general and abstract — both enterprises can work together to solve philosophical problems (cf. Quine 1969, p.83).

For (RA), philosophical concepts like mind or consciousness are concepts that may be outdated and that need to be replaced by scientific counterparts. Its main

metaphilosophical claim is to consider ways of replacing philosophical concepts by scientific concepts through a specific mechanism: the intertheoretical reduction. Instead of starting an investigation with an *a priori* definition of a concept, scientists should first use an operational definition of the concept and, then, update that concept in relation to the experimental data that is achieved by the investigation per se in order to replace the initial concept.

Patricia Churchland (1986) is a main advocate of (RA). She argues that most philosophical concepts of the mind will be replaced by an equivalent brain-reduced concept. So, for example, the concept of perception will be replaced by specific neuronal mechanisms in particular regions of the brain. More importantly, the reduction of philosophical concepts will eventually result in the elimination of those concepts in favour of scientific notions.

The metaphilosophical relationship between philosophy and neuroscience is clear in (RA): the first will be gradually reduced — and mostly eliminated — with the development of a co-theory based on neuroscience and cognitive psychology. In a nutshell (RA) can be identified as a tango-kind of relationship between the two disciplines. However, neuroscience is the dominant dancer of the pair of two and will end up dancing alone. Is this plausible? Is the reduction of mind-based concepts to brain-reduced concepts sound? We will present another approach that agrees with this anti-isolationist intuition, but that does not agree with the reductionism of (RA).

2.3. Against (IA): Neurophenomenological Approach

The Neurophenomenological Approach (NA) agrees with the "tango" kind of relationship between philosophy and neuroscience. However, it disagrees that philosophy should be gradually replaced by neuroscience and that the reduction of the mind to the brain is a philosophical mistake that cannot be committed. On the shoulders of E. Husserl, M. Merleau-Ponty and M. Heidegger, (NA) argues that the solution for the problem caused by the conscious minds is the acceptance that the body, and not only the brain, is relevant to fully understand how mental processes occur in human beings.

For (NA), analyzing the conscious mind in the brain — as argued by (RA) — would be like looking for the value of the euro on a five-euro banknote: we can magnify under the microscope any part of it that we will not find its value. Rather, the value is in the entire note and in its interaction with specific economic and financial rules of the market, and it only possesses any kind of value if inserted in the right economic environment: likewise, consciousness is not something we have in a specific part of our brain, but something we do. It's more like dancing, and less like digestion (cf. Noë 2009, p.3–4).

Through an 4E's approach — arguing that the mind is embodied, embebbed, en-

active and extended — Francisco Varela, a main advocate of (NA), claims that neurophenomenology is "a quest to marry modern cognitive science and a disciplined approach to human experience" (Varela 1996, p.330). This approach will combine methods of neuroscience by using the phenomenological insights in order to achieve better results. We are, again, in a "tango" way of conceiving the relationship between neuroscience and a relevant part of philosophy, phenomenology. However, this approach does not seem to have a clear and sound metaphilosophical account regarding both disciplines.

First, at its basis we are confronted with a dependence of the concept of introspection that may be problematic (cf. Dennett 1991, p.81-94). Secondly, phenomenology has "failed to find a single, settled method that everyone could agree upon" (Dennett 1991, p.44): according to Varela, neurophenomenology should not be seen only as a "heuristic" of neuroscience, given that it offers much more than such a mere complement. Other proponents of this approach — such as Antonio Lutz — argue in the opposite direction, that the advantage of this proposal is precisely its heuristic capacity to guide empirical research to achieve new results (cf. Lutz 2002). We are, at the end, presented with an approach that is metaphilosophically inconclusive. Because of that, we will present a final approach.

2.4. Against (IA): Non-Reductive Neurophilosophical Approach

The final approach builds on and compile some of the intuitions of the previous approaches. It denies (IA) clearly, by making use of a "cooperative naturalism" (cf. Goldman 1999, p.24-50): the relationship between philosophy and neuroscience must be seen as an intermethodological cooperation between the two disciplines (Huaping & Xiaoming 2007). This position is also in the opposite direction of (RA) (cf. Northoff 2014, p.64-66).

In (NRNA), the scientific inquiry, especially in interdisciplinary domains like neuroscience and philosophy of mind, frequently starts with foundational philosophical concepts: these provisional ideas propose an abstract framework for understanding a phenomenon that is not yet entirely accessible to empirical investigation (e.g. mind, self, consciousness, etc). These notions, while firstly speculative, provide a way to meaningful be considered in the scientific investigation.

From this abstract philosophical step, we focus on a particular phenomenon that the research wants to explore: for example, the concept of conscious visual perception. This concept becomes the focus of investigation, and researchers attempt to translate its philosophical implications into testable scientific questions. At this stage, researchers generate a concrete neuroscientific hypothesis: for example, it may be hypothesized that conscious visual experience rises from precise patterns of neural activity in the prefrontal cortex, connecting the abstract concept into an observable

phenomenon.

Next, this particular hypothesis is operationalized: researchers might decide to use brain imaging techniques (like fMRI or EEG) to measure prefrontal cortex activation in response to visual stimuli, comparing activity when a subject is aware of the stimulus versus when they are not (e.g. during visual masking experiments). These allows to identify specific variables that can be then assessed by experimental procedures: an experiment can be designed, data is collected, and the experimental data is analyzed.

Now suppose the data shows a correlation between conscious perception and activity in a specific brain region: with these results, scientists begin the process of conceptual feedback, by comparing the empirical findings with the original neuroscientific hypothesis, on one hand, and with the broader philosophical assumptions, on the other hand. If the hypothesis is supported, the result reinforces the neuroscientific concept (e.g. the idea that consciousness involves recurrent processing between cortical areas).

This new concept is transformed into a new, more refined neurophilosophical concept: for example, into a Global Workspace Theory (GWT) framework of conscious visual perception, which proposes that conscious experience arises when information is globally available across multiple brain systems. This transformed concept, which is now supported by empirical results, can then, in a second stage, influence broader philosophical debates about the nature of consciousness, the unity of experience, or the mind-body connection.

The important aspect of this example is that this process should be continuous, dynamical, and cyclical: philosophical reflection integrates new empirical insights, which may reshape prior metaphysical positions and can lead to more refined theoretical concepts. In turn, this will guide the next generation of hypotheses and experiments.

This new strategy will require, therefore, a continuous iterative exchange between concepts and data that are continuously affecting, modifying, and redefining the concept to be investigated. This continuous "tango" between concepts — and their conceptual plausibility — and empirical facts — and their empirical plausibility — is the hallmark of (NRNA). In its favour, this last approach advances with a precise and clear methodology that ends up by relating philosophy and neuroscience in an interactive and continuous way.

We conclude this section with a sum up of the approaches introduced (detailed analyzes of each approach can be found in Gouveia 2022):

- Isolation: the two disciplines work separately, following the Isolationist Approach (Section 2.1).
- Relation: they are connected, which can take two forms:

- Unilateral: neuroscience influences philosophy or vice versa in a one-way direction, reflecting the Reductive Approach (Section 2.2).
- Bilateral: there is mutual influence, seen in:
    - The Neurophenomenological Approach (Section 2.3), integrating subjective experience with brain science.
    - The Non-Reductive Neurophilosophy (Section 2.4), maintaining both disciplines' autonomy while engaging in cyclical dialogue.

Our main finding is to claim that (IA) is the wrong way to go and, as claimed by Bence Nanay, "it should be the job of philosophy to try to engage on what is happening in the world" (Nanay 2020) by considering the relationship between philosophy and neuroscience as a tango and not as a solo dancing.

But what do experts in neurophilosophy really think about this issue? What kind of methodological assumptions specialist in neurophilosophy have? In the last section of the paper, we will provide some empirical data of the first experimental philosophy study in the world on this question.

3. What Experts think about the Relationship between Philosophy and Neuroscience?

3.1. The Study

The study[1] conducted both descriptive analyses (frequencies and percentages) and inferential statistical tests (Chi-square test to evaluate differences in data distribution), having gathered data from specialize platforms of philosophy, neuroscience and its connection.

The research included 230 participants, consisting of 152 men (66.1%) and 78 women (33.9%), with an average age of 42.53 years (SD = 14.86; age range between 20 and 81 years). The majority of participants held a doctoral degree (68.3%), followed by a master's degree (28.7%) and a bachelor's degree (3.0%). The predominant fields of expertise were Philosophy (65.7%), Neuroscience (13.5%), and Psychology (8.7%), with other scientific fields being also represented. Regarding philosophical orientation, most participants identified as "Empirically Inclined Philosophers" (53.5%), followed by "Philosophically Inclined Neuroscientists" (15.2%), "Traditional Philosophers" (13.9%), "Traditional Neuroscientists" (6.1%), and others (11.3%).

The following questions and results were part of the study:

1. Philosophy-Neuroscience Cooperation

- 71.7% favor indirect cooperation (philosophers use neuroscientific results).
- 23% support direct collaboration (philosophers conduct experiments).
- 1.7% replied that philosophy and neuroscience should not cooperate, while 3.5% did not provide an answer.

2. Philosophy-Neuroscience Relationship

   - 70.9% support a non-reductionist approach (equal collaboration).
   - 20.4% endorse neurophenomenology (integrating first-person experience into empirical science).
   - 3.0% choose the reductive option.
   - 3.0% recommend the isolationist option.

3. Nature of Philosophy

   - 57.4% support an anti-cognitivist view (philosophy focuses on understanding, different from science that focus on what is true or false).
   - 26.1% align with cognitivism (philosophy has the same aim as sciences, with what is true or false).
   - 16.5% did not provide an answer.

4. Relationship between Philosophy and Science

   - 85.7% favored naturalism.
   - 6.1% voted non-naturalism.
   - 8.3% did not provide an answer.

5. Metaphysics of Mind

   - 26.1% favor functionalism.
   - 22.6% prefer non-reductionism.
   - Other views: neurophenomenology (14.8%), panpsychism (5.2%), dualism (both substance or properties) (6.9%); reductionism (6.1%);
   - Another theory: 18.3%.

6. Mary, the Brilliant Neuroscientist

   - 61.3% believe Mary learns something new.
   - 11.7% believe Mary does not learn something new.
   - 27.0% did not provide and answer

7. Philosopher that you are most related with
    - 35.2% relates with other experts.
    - 19.6% relates more to Ludwig Wittgenstein
    - 19.1% relates more to Franciso Varela
    - 13.0% relates more to Patricia Churchland.
    - 10.4% relates more to Willard Quine.
    - 2.6% relates to Georg Northoff.
8. Qualia
    - 49.1% believe that qualia exist (ontologically).
    - 23.9% believe that qualia do not exist (ontologically).
    - 27.0% did not reply.
9. How Mental Functions are related to the Brain?
    - 73.0% think a globalist approach (mental functions are not localized in specific parts of the brain, but are dynamical and holistic)
    - 12.2% think a localizationist approach is correct.
    - 14.8% did not provide an answer.
10. What is the relationship between Time and Brain
    - 67.0% choose the Dynamic View
    - 8.7% choose the Block View
    - 24.3% did not reply.
11. Mind/Brain Problem
    - 46.1% favored that the mind is reduced to brain, body and environment
    - 29.1% favored that the mind is not reduced to the brain.
    - 7.4% favored that the mind is reduced to the brain only.
    - 7.4% favored that the mind is reduced to brain and body.
    - 0.4% favored that the mind is reduced to the brain and environment.
    - 9.6% did not provide an answer.
12. Mereological Fallacy of Neuroscience
    - 53.0% support the mereological fallacy of neuroscience
    - 21.7% believe it does not make sense.

- 25.2% did not provide an answer.

13. Free-Will and Determinism
    - 74.8% believe that philosophy and neuroscience should cooperate together to solve the free-will problem.
    - 15.2% believe that philosophy alone is sufficient to solve the free-will problem.
    - 0.9% believe that neuroscience alone is sufficient to solve the free-will problem.
    - 9.1% did not provide an answer.
14. What kind of Intertheoretical Reduction (if any)?
    - 34.3% supported Reduction as Explanation.
    - 23.9% supported no Reduction at all.
    - 6.5% supported Reduction as Translation.
    - 3.9% supported Reduction as Derivation.
    - 31.3% did not provide an answer.
15. Is Folk Psychology relevant?
    - 73.0% believe it is a useful concept.
    - 14.3% believe it is not a useful concept.
    - 12.6% did not provide an answer
16. Which Theory for Consciousness?
    - 50.9% voted Illusionism Theory.
    - 14.8% voted Predictive Processing Theory.
    - 12.2% voted Integrated Information Theory.
    - 11.7% voted Global Workspace Theory.
    - 6.5% voted Orchestrated Objective Reduction Theory.
    - 3.9% voted Temporo-Spatial Theory.

3.2. Analyses of the Study

The survey[2] results indicate that most respondents support indirect cooperation between philosophy and neuroscience, where philosophers use neuroscientific findings, while a smaller percentage advocate for direct collaboration. A significant majority

favor a non-reductionist approach to the relationship between the two fields, emphasizing equal collaboration.

Regarding the nature of philosophy, most participants view it as a pursuit of understanding distinct from science, though a substantial portion aligns it with scientific inquiry. The relationship between philosophy and science is largely seen through a naturalist lens, with only a small minority endorsing non-naturalism.

In the metaphysics of mind, functionalism and non-reductionism are the most supported views, followed by neurophenomenology, panpsychism, and dualism. The thought experiment involving Mary, the brilliant neuroscientist, finds most respondents agreeing that she learns something new upon experiencing color.

When asked which philosopher they most relate to, the highest percentages are associated with Ludwig Wittgenstein, Francisco Varela, Patricia Churchland, and Willard Quine. On the topic of qualia, nearly half of the respondents affirm their existence, while a smaller group denies their ontological reality.

The majority of participants endorse a globalist perspective on the relationship between mental functions and the brain, rejecting strict localization. Similarly, most support a dynamic view of time, where it is co-constructed by the brain and the external world.

On the mind-brain problem, the most favored position is that the mind is a product of the brain, body, and environment, while a smaller portion rejects reductionism entirely. A majority agree with the mereological fallacy of neuroscience, suggesting that attributing mental properties to the brain alone is misguided.

When addressing free will and determinism, most participants believe the problem should be tackled through a cooperation between philosophy and neuroscience, rather than relying on either discipline alone. The concept of intertheoretical reduction is mostly viewed in terms of explanation, though a notable portion rejects reductionism outright.

Folk psychology is generally considered useful, though a minority finds it irrelevant. Among theories of consciousness, illusionism is the most favored, followed by predictive processing, integrated information theory, and global workspace theory.

Overall, the survey results highlight a preference for interdisciplinary approaches, dynamic models of cognition, and a rejection of strict reductionism in the study of the mind and consciousness.

Moreover, some statistically significant differences were found between responses to question 1 and philosophical orientation ($p = 0.004$), indicating that traditional philosophers and neuroscientists tend to choose "yes, but indirectly", while philosophically inclined neuroscientists favor "yes, but directly". Question 1 was also associated with question 2 ($\chi^2 = 95.943$; $p < 0.001$), showing that those who reject cooperation tend to choose "isolationism", whereas those who support cooperation (either direct or indirect) prefer "non-reductionism". Question 3 was linked to the

previous ones ($\chi^2 = 40.603$; $p < 0.001$), as participants in favor of cooperation were more likely to choose "naturalism".

This study highlights researchers' perspectives on the interaction between Philosophy and Neuroscience, emphasizing preferences for naturalism and balanced collaboration between disciplines. The findings suggest that while most scholars acknowledge the importance of interdisciplinary cooperation, they tend to favor a non-reductionist approach that respects the autonomy and methodologies of both fields. These results contribute to ongoing discussions about the role of philosophy in scientific inquiry and the extent to which empirical research can inform philosophical debates.

3.3. Critical Reflections

There are some possible discrepancies and limitations in this study that could be addressed in future research to expand its robustness and generalizability. One important limitation is the disparity in participant backgrounds: the majority of respondents come from a philosophical background, with fewer representatives from empirical sciences such as neuroscience and psychology. This asymmetry may have influenced the results, mostly in questions related to reductionism and intertheoretical collaboration.

A more balanced sample that includes a higher number of neuroscientists and cognitive scientists might yield different outcomes, particularly regarding the acceptability of reductionist perspectives. Studies such as Metzinger and Gallese (2003) and Chalmers (2010) have emphasized that philosophical perspectives on how reductionism often differ from those of practicing neuroscientists, who may be more motivated to accept mechanistic explanations of cognition.

Moreover, the study presents an apparent contradiction between responses to naturalism and anti-cognitivism: while 85.7% of respondents endorse naturalism — a stance that aligns philosophy closely with the empirical sciences —, 57.4% simultaneously support an anti-cognitivist view, which suggests that philosophy primarily seeks understanding (what makes sense or not) rather than what is true or false. This tension raises important methodological and epistemological questions about how experts conceptualize the relationship between philosophy and science.

This inconsistency may be part of what was argued in Steven S. Gouveia's *Philosophy and Neuroscience: a Methodological Analysis* book (2020): from the implicit methodological assumptions that many experts in this research field hold uncritically, which can lead to seemingly contradictory views when scrutinized systematically. Similar ambiguities have been noted in studies exploring interdisciplinary perspectives in cognitive science (e.g. Schroeder 2007) where experts with mixed backgrounds often exhibit conflicting views on the mixing of philosophical and scientific

methods.

This issue also reflects broader worries in interdisciplinary research concerning conceptual clarity and methodological self-awareness: when experts work within disciplinary borders, they may not always explicitly scrutinize their underlying methodological commitments. As a result, their perspectives on key philosophical issues may appear inconsistent when analyzed: the present study's findings align with Metzinger's (2003) observations on philosophical inconsistencies in discussions of consciousness, where the lack of explicit methodological inspection leads to divergent conclusions within experts.

Finally, high non-response rates in some key questions introduce further interpretative challenges: for instance, 27.0% of participants did not answer the question regarding the Mary thought experiment, and 31.3% did not respond to the question on intertheoretical reduction. The whys and wherefores for these omissions are unclear: whether due to doubt, lack of strong opinions, or dissatisfaction with the available response options. Similar trends have been reported in philosophical surveys, such as the Bourget and Chalmers (e.g. 2023) survey on philosophical beliefs, which found that some participants struggled to line up their views with predefined categories, leading to high rates of non-response or ambiguous answers.

In light of these restrictions, future studies ought to aim to ensure a more balanced representation of disciplinary perspectives, provide clearer definitions of key philosophical terms, and explore the motives behind participant discrepancies. Expanding the study to include a more varied sample of scholars across philosophy and neuroscience might clarify whether these inconsistencies are genuine epistemological struggles, or only consequences of the sample composition.

Additionally, qualitative methodologies such as in-depth interviews or open-ended responses could provide richer insights on the reasoning behind expert opinions, mitigating the limitations of these kind of survey formats (with a forced-choice structure): addressing these worries in future studies may contribute to a more coherent and unified understanding of the philosophy-neuroscience connection.

4. Conclusion

This paper explored different approaches to the relationship between philosophy and neuroscience, examining whether they should be considered as distinct endeavors or as complementary fields involved in a dynamic interaction. The Isolationist Approach argued for a firm separation, while the Reductionist Approach sees philosophy as ultimately reducible to neuroscientific explanations. Meanwhile, the Neurophenomenological and Non-Reductive Neurophilosophical Approaches offer perspectives that embrace an interactive, yet non-reductive, collaboration between the two disci-

plines. The empirical findings obtained support the preference for a non-reductionist but interactive model, suggesting that most researchers in the field prefer an interdisciplinary relationship without reducing one field to another.

The survey outcomes specify an endorsement of naturalism and a recognition of the value of interdisciplinary cooperation, albeit with significant variations in how this cooperation is conceptualized. Most participants align philosophy with science to some extent, yet many also uphold an anti-cognitivist perspective, showing tensions in how philosophy is perceived in relation to empirical research. The study highlights important methodological and epistemological challenges, such as implicit biases in participants' conceptual frameworks and inconsistencies in how philosophical and scientific methodologies are integrated.

Furthermore, the findings suggest that experts in philosophy and neuroscience recognize the need for cooperation, but they remain divided on the precise nature of this relationship: while the majority discard reductionism, they also resist a purely isolationist stance, and instead advocate for an integrative approach that respects the epistemic contributions of both disciplines.

Despite its contributions, this study has limitations, particularly concerning sample composition and response patterns: the dominance of participants with a philosophical background may have influenced the results, particularly in relation to reductionism and intertheoretical collaboration. Future studies should aim to include a more balanced representation of neuroscientists, cognitive scientists, and philosophers to provide a more complete understanding of the field. Additionally, qualitative methodologies such as in-depth interviews or open-ended surveys may offer deeper detailed insights into how experts' reason about this topic, avoiding the limitations of forced-choice survey formats.

In sum, this research highlights the intricate (and even obscure) of the philosophy-neuroscience relationship: the preference for interdisciplinary engagement suggests that neither philosophy nor neuroscience operates in a vacuum; rather, they function best when informed by each other's insights. Future research should continue to improve this dialogue, seeking methodologies that allow for a more coherent and integrative understanding of consciousness (as a subjective feature of the world) into empirical sciences (as objective methods of the world). Addressing conceptual clarity, methodological awareness, and epistemological coherence will be crucial in advancing this interdisciplinary discourse, ensuring that both philosophy and neuroscience contribute meaningfully to our understanding of the conscious mind.[3]

References

Bennett, M.; Hacker, P. 2003. *Philosophical Foundations of Neuroscience*. Oxford: Blackwell.

Bourget, D.; Chalmers, D. 2023. Philosophers on Philosophy: The 2020 PhilPapers Survey. *Philosophers' Imprint* 23: 11. https://doi.org/10.3998/phimp.2109

Brozek, B.; Stelmach, J.; Kurk, L. (eds.). 2013. *Philosophy in Neuroscience: Three Modes of Interactions*. Krakow: Copernicus Center Press.

Chalmers, D. J. 2010. *The Character of Consciousness*. Oxford: Oxford University Press.

Churchland, P. S. 1986. *Neurophilosophy: Toward a Unified Science of the Mind/Brain*. Cambridge, MA: The MIT Press.

Crane, T. 2015. The Mental States of Persons and their Brains. In: A. O'Hear (ed.), *Mind, Self and Person*, Supplement 76. Cambridge: Cambridge University Press.

Damásio, A. 1996. *Descartes' Error – Emotion, Reason and the Human Brain*. London: Papermac.

Dennett, D. 1987. *The Intentional Stance*. Cambridge, MA: The MIT Press.

Dennett, D. 1991. *Consciousness Explained*. Boston: Little, Brown, and Co.

Dennett, D. 2007. Philosophy as Naïve Anthropology. In: *Neuroscience & Philosophy: Brain, Mind & Language*. New York: Columbia University Press.

Edelman, G. 1994. *Bright Air, Brilliant Fire – On the Matter of the Mind*. Harmondsworth: Penguin.

Goldman, A. 1999. A Priori Warrant and Naturalistic Epistemology. In: J.E. Tomberlin (ed.) *Philosophical Perspectives* 13, p.1–28. Cambridge, UK: Blackwell.

Gouveia, S. S. 2022. *Philosophy and Neuroscience: a Methodological Analysis*. New York: Palgrave Macmillan.

Huaping, W.; Xiaoming, S. 2007. Cooperative naturalism. *Frontiers of Philosophy in China* 2: 601–613.

Kenny, A. 2013. *History of Cognitive Neuroscience*. Oxford: Wiley-Blackwell.

Lutz, A. 2002. Toward a neurophenomenology as an account of generative passages: A first empirical case study. *Phenomenology and the Cognitive Sciences* 1: 133–167.

Metzinger, T. 2003. *Being No One: The Self-Model Theory of Subjectivity*. Cambridge, MA: The MIT Press.

Metzinger, T.; Gallese, V. 2003. The emergence of a shared action ontology: Building blocks for a theory. *Consciousness and Cognition* 12(4): 549–571.

Nanay, B. (July, 2020) Prof. *Bence Nanay | Part 1 | Objective Perception*. Video file. https://www.youtube.com/watch?v=nGch9m3DYRk. Access 30.06.2025

Noë, A. 2009. *Out of our Heads: Why you are not your Brain, and other Lessons from the Biology of Consciousness*. New York: Hill and Wang.

Northoff, G. 2014. *Minding the Brain: A Guide to Philosophy & Neuroscience*. New York: Palgrave Macmillan.

Quine, W. V. O. 1969. Epistemology Naturalized. In: *Ontological Relativity and Other Essays*, p.69–90. New York: Columbia University Press.

Schroeder, T. 2007. *Moral Psychology with Nietzschean Ingredients*. Oxford: Oxford University Press.

Sommers, T. 2003. An Interview with Galen Strawson. *Believer Magazine*. https://www.thebeliever.net/an-interview-with-galen-strawson/. Access 30.06.2025

Varela, F. J. 1996. Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies* 3(4): 330–349.

Notes

[1]Full data can be found in the Anex I.

[2]An anonymous reviewer suggested a relevant analysis for a future work: to divide the answer of different expertise (philosophers, neuroscientists, others) and see if any relevant correlation comes up from that specification. We agree this can generate interesting insights and we will take into consideration in follow-up publications on this study.

[3]We would like to thank the reviewers of this special issue (and previous ones from previous submissions) for their effort and comments that improved the final argument of the paper. Preliminary talks on the paper were given in different places: at the *30th European Society for Philosophy and Psychology Conference* (Prague), at the *Science of Consciousness Conference* (Taormina), at the *PhenCog Permanent Colloquium on Cognition* (Rio de Janeiro) and more recently at the *Method and Convergence 2025 - International Conference on Methodology of Philosophy* (Helsinki). The Authors would like to thank their audiences for the questions and suggestions that improved the final version of this paper.

Acknowledgments

SG is funded by CEEC Individual Project by FCT 2022.02527.CEECIND, at the Mind, Language and Action Group, Institute of Philosophy, University of Porto (Faculdade de Letras, Via Panorâmica s/n, P-4150-564 Porto, Portugal). AL has been carried out under the research project UIDB/00683/2020 (Center for Philosophical and Humanistic Studies), funded by the Portuguese Foundation for Science and Technology.

Appendix I: Table with the complete results of the study.

Table
Questions' description

	Questions		**Answers' options**	**N**	**%**
1	Should Philosophy cooperate with Neuroscience?	0	Not applicable	8	3.5
		1	No	4	1.7
		2	Yes, but indirectly (philosophers collaborate with neuroscientists using the results of neuroscientific experiments done by the neuroscientists to answer philosophical problems)	165	71.7
		3	Yes, but directly (philosophers do the neuroscientific experiments themselves)	53	23.0

2	How Philosophy should be related with Neuroscience?	0	Not applicable	6	2.6
		1	No Relation (isolationism: philosophy and neuroscience are two different enterprises with two different goals)	7	3.0
		2	Relation I (reductionism: philosophy should tendentially be substituted by neuroscience)	7	3.0
		3	Relation II (neurophenomenology: phenomenology should guide holistically the neuroscientific experiments by incorporating the first-person perspective of subjectivity into the third-person perspective of science)	47	20.4
		4	Relation III (non-reductionism: philosophy and neuroscience should collaborate together in equal measure, by being conceptual and empirical accurate and plausible)	163	70.9
3	Metaphilosophy I: What is Philosophy?	0	Not applicable	38	16.5
		1	Cognitivist approach ((the aim of philosophy is to find what is true or false)	60	26.1
		2	Anti-Cognitivist Approach (the aim of philosophy is what makes or not makes sense, is understanding)	132	57.4
4	Metaphilosophy II: Relationship between Philosophy and Science?	0	Not applicable	19	8.3
		1	Naturalism (connection between philosophy and natural and social sciences)	197	85.7
		2	Non-Naturalism (no connection between philosophy and natural and social sciences)	14	6.1
5	Which Metaphysics for the Mind?	0	Not applicable	42	18.3
		1	Reductionism (identity-type, specimen-type, other);	14	6.1
		2	Functionalism (machine-state, psycho-functionalism, analytic functionalism, other)	60	26.1

		3	Dualism of Properties	12	5.2
		4	Dualism of Substance	4	1.7
		5	Non-reductionism	52	22.6
		6	Panpsychism	12	5.2
		7	Neurophenomenolgy	34	14.8
6	Mary, the brilliant neuroscientist	0	Not applicable	62	27.0
		1	No, she doesn't learn anything new;	27	11.7
		2	Yes, she learns something new that was missing	141	61.3
7	Philosopher that you are most related with...	0	Not applicable	81	35.2
		1	Willard Quine	24	10.4
		2	Ludwig Wittgenstein	45	19.6
		3	Francisco Varela	44	19.1
		4	Georg Northoff	6	2.6
		5	Patricia Churchland	30	13.0
8	Qualia	0	Not applicable	62	27.0
		1	No, they don't exist	55	23.9
		2	Yes, they exist	113	49.1
9	How Mental Functions are related to the Brain?	0	Not applicable	34	14.8
		1	Localizationist approach (mental functions are localized/isolated in specific parts of the brain)	28	12.2
		2	Globalist approach (mental functions are not localized/isolated in specific parts of the brain, but are dynamical and holistic)	168	73.0
10	What is the relationship between Time and Brain?	0	Not applicable	56	24.3
		1	Block or Container View (time as container for world and brain)	20	8.7
		2	Dynamic View (time is constructed in world [outer time] and brain [inner time] and mental features are part of this relational and dynamical interplay between the two)	154	67.0
11	Mind/Brain Problem	0	Not applicable	22	9.6
		1	Mind is not reduced to the brain	67	29.1
		2	Mind is reduced to the brain	17	7.4

		3	Mind is reduced to the brain + body	17	7.4
		4	Mind is reduced to brain + environment	1	0.4
		5	Mind is reduced to brain + body + environment	106	46.1
12	Mereological Fallacy of Neuroscience	0	Not applicable	58	25.2
		1	No, it doesn't make sense	50	21.7
		2	Yes, it makes total sense	122	53.0
13	Free-Will and Determinism	0	Not applicable	21	9.1
		1	Philosophy alone is sufficient to answer the problem	35	15.2
		2	Neuroscience alone is sufficient to answer the problem	2	0.9
		3	Philosophy and Neuroscience should cooperate to answer the problem	172	74.8
14	What kind of Intertheoretical Reduction (if any)?	0	Not applicable	72	31.3
		1	No Reduction	55	23.9
		2	Reduction as Translation	15	6.5
		3	Reduction as Derivation	9	3.9
		4	Reduction as Explanation	79	34.3
15	Is Folk Psychology relevant?	0	Not applicable	29	12.6
		1	Useful	168	73.0
		2	Not useful	33	14.3
16	Which Theory for Consciousness?	0	Other	0	0
		1	1-Integrate Information Theory	28	12.2
		2	2- Global Workspace Theory	27	11.7
		3	3-Temporo-Spatial Theory	9	3.9
		4	4- Predictive Processing Theory	34	14.8
		5	5-Orchestrated Objective Reduction	15	6.5
		6	6- Illusionism Theory	117	50.9
N = frequencies; **%** = percentage					