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Why do philosophers disagree on how the sciences relate? A meta-philosophical analysis

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Abstract

How the natural sciences relate and what these relations tell us about the world have been examined in philosophy for a long time. Yet despite the enormous advances in the natural sciences and the growing consensus among scientists about which theories are reliable, philosophers starkly disagree on how the sciences relate to each other. I identify the main reasons for this disagreement and argue that philosophers will never agree on how the sciences relate. I support this by invoking van Fraassen's idea of stances. Specifically, I show that positions on inter-theory relations are motivated by philosophers' stances towards methodological, normative and existential considerations. As such, disagreements among positions don't admit to adjudication, thus explaining why they persist. I then examine whether philosophical disagreement is something to be worried about and argue that there are in principle and pragmatic reasons that prompt such a worry. To overcome this, an explicit identification of the stances that motivate differing views is required within this debate.

Keywords: inter-theory relations, methodology of philosophy, philosophical disagreement, stances, van Fraassen

Ultimately, emergentists and reductionists are divided by a deeply held philosophical or aesthetic preference that neither will relinquish easily. (Silberstein 2002: 102)

1. Introduction

How the natural sciences relate and what these relations tell us about the world have been examined in philosophy for a long time, prompting many views. From materialism and reductionism to dualism, pluralism, unity and disunity, the list is quite long.[2] Under the umbrella of reductionism, one finds views such as type and token-identity, explanatory reduction, eliminativism, functional reduction and other positions (e.g. Kemeny and Oppenheim 1956; Nagel 1961; Sklar 1967).[3] Within the context of unity (in which reductionism is taken to fall under) there is also supervenience-based physicalism, reductive and non-reductive physicalism, unity-without-reduction, reductive and non-reductive realisation, etc. (see Tahko 2021 for an overview). Similarly with disunity theses. One option is emergence which -as reduction- comes in different forms: weak and strong, epistemic and metaphysical, synchronic and diachronic, contextual and so forth (e.g. Bedau 1997; Humphreys 1997; O'Connor and Wong 2005; Silberstein and McGeever 1999; Wilson 2015). Within the pluralist spectrum there is integrative pluralism, methodological pluralism, ontological pluralism, integration-without-unification and other forms (e.g. Chang 2004; Dupré 1993; Kellert et. al 2006; Mitchell 2020). And the list goes on.

Someone outside philosophy may find this proliferation of views quite surprising. Why is there not a minimal consensus about how genetics relates to molecular biology, chemistry to physics, neuroscience to folk psychology, or thermodynamics to statistical mechanics? After all, philosophers can gain access to all aspects of scientific research and theorising via textbooks, journals, and by collaborating with scientists. Information about how scientists work; the theories and models they use

[2] I don't offer a complete presentation of the literature; I enumerate some positions to emphasise the proliferation of accounts.

[3] This classification is merely suggestive.

(or have abandoned); the technology and instruments they employ; the experiments with which they scrutinise their results, is available to philosophers. So why do philosophers draw such diverse conclusions about how the sciences relate?

This is even more surprising if we consider the degree of consensus that currently exists within science itself. Presently, there is wide agreement among scientists about which theories should be regarded as correctly describing phenomena and the limits within which they do so.[4] This doesn't imply that there aren't phenomena for which scientists strongly disagree on how to explain.[5] However, there is a disanalogy in the degree of disagreement that exists in science about the validity of scientific theories, and that which exists in philosophy about the relations that hold between those theories. This disanalogy isn't a new worry, nor does it appear exclusively with respect to inter-theory relations (e.g. Chalmers 2015; Gerber 1973). Van Inwagen has expressed it as follows:

> There is almost no thesis in philosophy about which philosophers agree. (..) That isn't how things are in the physical sciences. I concede that the "cutting edge" of elementary-particle physics looks a lot like philosophy in point of pervasive and fundamental disagreement among its respected practitioners. But there is in physics a large body of settled, usable, uncontroversial theory and of measurements known to be accurate within limits that have been specified. The cutting edge of philosophy, however, is pretty much the whole of it. (2004: 332)[6]

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[4] Whether these theories are correct is irrelevant. What is relevant here is that a large part of physics, chemistry and biology are uncontestedly taken by scientists to be accurate descriptions of some set of phenomena.

[5] For example, see the debate around dark matter.

[6] By this quote I don't suggest that there aren't any features of inter-theory relations that philosophers haven't fruitfully illuminated or found consensus on (see section 5).

I examine the role of philosophical disagreement in the debate about inter-theory relations. I show that philosophers disagree on this topic largely due to methodological, normative and existential considerations. The ways in which philosophers respond to these considerations represent their attitude towards the world and their place in it- what van Fraassen calls "stances". I argue that due to the nature of these considerations, philosophers will never reach agreement on how the sciences relate. Moreover, I claim that extensive disagreement on this topic undermines genuine progress into this topic. Therefore, an explicit identification and discussion of the stances that motivate different views, is required.

Note that the points made here can be generalised or applied to other philosophical topics. Nevertheless, there is value in investigating disagreement from the perspective of inter-theory relations, for three reasons. First, inter-theory relations is one of the most central issues in philosophy of science which has drawn the attention of philosophers and scientists alike, thus deserving separate investigation. Secondly, it is an issue which- unlike other philosophical topics, and largely due to its very strong reliance on the sciences- looks prima facie open to adjudication (at least with respect to some pair of well-established scientific theories). This renders the existence of such stark disagreements particularly puzzling. Thirdly, it is often assumed that the question of how natural sciences relate is an empirical matter, decided solely on relevant available empirical evidence. However, this paper reveals that the methodology of investigating inter-theory relations does not simply amount to the evaluation of empirical evidence. This is a conclusion which- if accepted- revises radically how we understand the investigation of inter-theory relations.

Note that the discussion is restricted to disagreements about the relations between the natural sciences; i.e. physics, chemistry, and biology, including all the theories that are contained in their sub-disciplines. Also, I don't consider disagreements that are prompted by a scepticism towards knowledge claims or scientific facts. Most views on inter-theory relations are developed under the

(implicit) assumption that there is a matter of fact about whether a relation between scientific theories or between entities exists.[7] So I assume this here too.

Section 2 explains why there is a proliferation of views on how the natural sciences relate. Section 3 investigates whether one should expect consensus and argues that one shouldn't. Section 4 examines whether philosophers should be worried about this and argues that they should. Section 5 explicates how philosophers can find common ground and overcome the worries that are prompted by their disagreements.

2. Why are there so many views?

One need to only read an introduction on inter-theory relations to see the variety of views that are under discussion. The list of views is overwhelmingly long and while philosophers often claim that some views subsume others or just label them differently, it is sensible to wonder why there is such a variety of theses. This section presents the main reasons for this abundance of views on inter-theory relations.

2.1 'Innocent' Reasons

Initially, there are innocent reasons behind this proliferation of views; namely reasons that don't reflect genuine disagreements among philosophers, but rather explain why there are different views subsumed within the topic of inter-theory relations. Let me be more specific.

First, the topic itself subsumes more than one question, thus warranting different answers under each reading of it. For example, understood epistemically, the topic concerns the nature of scientific theories and the relations that obtain between them. In this context, philosophers focus on the state of

[7] The methodology and appropriate justificatory means to discover such relations, is debatable (section 2.3).

our knowledge about the world. Understood metaphysically, the focus shifts from how the world is described to how the world is and, specifically, to how the entities that are postulated by distinct scientific theories relate to each other.

Secondly, philosophical accounts are usually applied to and supported by specific pairs of theories. For example, Nagel's account of inter-theoretic reduction (1961) was spelled out in the context of the relation between equilibrium statistical mechanics and thermodynamics. Kitcher (1984) argues against reduction by looking at the relation between classical and molecular genetics, and Hendry (2010) argues for strong emergence with respect to chemistry's relation with quantum mechanics.

Thirdly, views often differ because philosophers focus on different phenomena or invoke different empirical evidence to support their claims. For example, Knox defends a form of reduction between biology and neurophysiology by examining "the stomatogastric ganglion of a lobster" (2017: 124), whereas Hendry defends strong emergence by examining molecular structure (2010).

Furthermore, philosophers renew their views because of some change or revision in the sciences, or because they shift attention to phenomena they hadn't previously considered. For example, the advent of quantum mechanics, with its subsequent explanation of chemical bonding in terms of electromagnetic interactions among subatomic particles, as well as the advances in molecular biology concerning DNA's identification of molecular structure, both contributed to the abandonment of British Emergentism (McLaughlin 2019: 23). Similarly, phenomena that may not have previously gained the attention of philosophers, may later shed new light on the topic. For example, the relation of chemistry with quantum mechanics was primarily examined with respect to how they each describe elements and the periodic table (Scerri 1991). Later on, philosophers shifted attention to descriptions of molecules, chemical bonds and chemical reactions (Hendry 2008; Hettema 2017).

Relatedly, features of scientific theories or practice that weren't previously considered are later picked up by philosophers who as a result offer novel views. For example, inter-theoretic reduction, as

proposed by Kemeny and Oppenheim (1956) or by Nagel (1979), was based on an understanding of scientific theories as sets of statements that can be logically connected via deduction. However, objections on reduction were later raised because the sciences were no longer understood as just sets of statements but rather as involving (among other things) practices, methods, models, approximations, and idealisations (see Cartwright 1999; Kitcher 1984).

All in all, examining how the sciences relate involves addressing various questions, looking at different features of scientific practice, and considering different case-studies. Also, when new evidence emerges or scientific changes occur, philosophers revise or refine their views. These features of philosophical practice don't indicate particularly insurmountable disagreements, even though they partially explain why one finds a large pool of views in the literature. The next subsections show that there are other considerations which prompt genuine disagreements.

2.2 Normative considerations

Philosophers sometimes evaluate views on the basis of how these views contribute to normative concerns. There are various normative concerns that can figure in this debate; I present two examples as a case in point.[8] The first concerns achieving progress in science and the second concerns the putative tension between the primacy of physics and the autonomy of the special sciences.

First, let's turn to scientific progress. Philosophers sometimes evaluate views on inter-theory relations based on how such views impact the progress of science. However, what constitutes progress, how it can be achieved, and what are the criteria for assessing it, often lead to disagreements (e.g. Kuhn 2012; van Fraassen 1980). So it isn't surprising that when examining how views on inter-theory relations affect scientific progress, this prompts analogous disagreements.

[8] Other normative considerations revolve around research funding, theory choice, public policies and science education (Cat 2021).

An example of this can be found in the discussion of reductionism. Kemeny and Oppenheim claim that reductionism- as a research program- contributes to the progress of science because it encourages the development of simpler, more universal theories, with larger explanatory power (1956: 7). On the other hand, Dupré argues that reductionism hinders progress because it "tends rather to exclude or to delegitimise lines of investigation that don't meet the exacting conditions of scientific knowledge presupposed by the reductionist program" (1993: 254).

In a similar way, philosophers evaluate inter-theory relations on the basis of how they affect one's views on the primacy of physics and the autonomy of the special sciences. Some philosophers argue that reductionist theses should be resisted because they undermine the autonomy of the special sciences (for example Chang 2015: 193).[9] This is explicitly stated for instance when debating chemistry's relation with quantum mechanics:

> This traditional assumption (of reduction) not only deprives the philosophy of chemistry of legitimacy as a field of philosophical inquiry, but also counts against the autonomy of chemistry as a scientific discipline. (Lombardi and Labarca 2005: 126)

On the other hand, philosophers who wish to maintain the primacy of physics over the special science express contrasting normative preferences. Most notably, the idea that physics is primary or more fundamental is often presupposed by reductionist and physicalist accounts (e.g. Ladyman and Ross 2007: section 1.4; Loewer 2009; Papineau 2001). For example, Ladyman and Ross set this assumption in the form of the Primacy of Physics constraint, according to which "(s)pecial science hypotheses that conflict with fundamental physics, (..) should be rejected for that reason alone" (2017: 44).[10]

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[9] Philosophers may also be motivated to defend antireductionism due to political and sociological considerations. For example, such a case is made for biology in Levins and Lewontin 1985.

[10] Note that they claim this normative constraint to be empirically justified (Ladyman and Ross 2007: 44).

All in all, normative considerations about issues such as scientific progress and the primacy of physics, are often explicitly stated in this debate and partially explain the ubiquity of views on inter-theory relations.

2.3 The relation of science with philosophy

In the context of epistemic questions about inter-theory relations, it is fairly uncontroversial that examining the sciences plays an important role in evaluating how they relate. However, when it comes to investigating metaphysical questions on inter-theory relations, there is no wide agreement about how science should inform metaphysical claims.

This disagreement is based on a more general debate in the metaphysics of science; namely that between analytic metaphysics and naturalism (see McKenzie 2019). There are different views about what analytic metaphysics and naturalism posit, as well as alternative proposals that lie within these two extremes (see Morganti and Tahko 2017; Soto 2015). Very broadly, analytic metaphysics is the view that one should or at least can look beyond the sciences in order to make claims about the world (Chakravartty 2010; Mumford 2012). Naturalism is the view that science is the ultimate guide to metaphysical claims (Ney 2012; Ladyman et al. 2007).

Each view implies a different method of investigating metaphysical questions. They differ with respect to (a) the weight that should be assigned to scientific evidence when evaluating the tenability and coherence of a metaphysical position; and (b) the way in which conceptual analysis should be performed.

These methodological differences inevitably apply to how the metaphysical relation between the sciences is investigated, and partially explain the diversity of views about it. For example, one of the most explicit declarations of the methodology to be followed in the metaphysical investigation of

inter-theory relations can be found in *Everything must Go*, where Ladyman and Ross state that their proposed account of unity is constrained by the Principle of Naturalistic Closure (2007: 37- 38).[11]

2.4 Existential considerations

One last consideration which is rarely mentioned but plays a substantial role in prompting disagreements, is the following. Thinking about how the sciences relate inevitably draws us to considerations about our own nature as human beings. What are we made of; are we only an aggregate of physical stuff? Existential considerations were present since the very beginning of discussions pertaining to what we call today 'inter-theory relations'. Since (at least) the time of the pre-Socratics, views on this topic were explicitly associated with considerations around the supernatural, the relation of the soul with the body, and the existence of god (Brown and Ladyman 2019: 21-26).

The most characteristic example of this can be found in early forms of materialism. Materialism is the precursor of reductionism and physicalism, and broadly refers to the view that everything is made out of material stuff. Materialism was (and still is) associated with atheism as it is taken to imply the rejection of immaterial beings, including but not restricted to, souls and gods. Such connections can be found throughout the history of materialism, as advocated within the Indian philosophical tradition, the ancient greeks (such as Democritus and the atomists) and up to the western philosophical tradition (Brown and Ladyman 2019: 21-26).

Currently, philosophers have attempted to secularise talk of inter-theory relations and indeed one will rarely find explicit mention of souls, gods, and religion in the literature (an exception to this is Rosenberg 2011). However, this doesn't mean that existential worries have been disconnected from

[11] This principle requires that a metaphysical claim is "motivated by, and only by, the service it would perform, if true, in showing how two or more specific scientific hypotheses jointly explain more than the sum of what is explained by the two hypotheses taken separately" (Ladyman et al. 2007: 30).

the topic. Even when talk of inter-theory relations is dissociated from discussion of religion or souls, the existential worry persists. It is just instantiated in a different form; namely in the form of the hard problem of consciousness.

The hard problem is about how and whether consciousness is the result of physical processes occurring in the brain. In a sense, the hard problem is just one of the many case studies one can examine with respect to inter-theory relations. Just as one considers how genes are related to DNA, temperature to mean kinetic energy, and molecular structure to electrons and nuclei, so one examines how mental states relate to the brain. In fact, the spectrum of positions that are available on inter-theory relations in general are also applied and considered as candidate solutions to the hard problem (see Fodor 1989; Kim 1997).

However, viewing the hard problem as just another case study on inter-theory relations misses an important point. The hard problem - just like questions about gods and souls- strikes a very personal cord. It is connected to one's need to understand her existence as a conscious human being, which in turn is connected to how one settles with her mortality and deals with the fear of death. As a result, replies to existential concerns prompt different and sometimes even passionate responses, as an answer to whether we are anything more than just a lump of physical stuff inevitably affects how we deal with our own finitude.[12]

Of course this takes us into issues that extend the scope of this paper and surpass the expertise of the author. Nevertheless, it is fair to claim that considerations of our own finitude affect in different ways and degrees everyone (including philosophers), and influence how we respond to issues that are related to such concerns.

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[12] Existentialists (such as Husserl, Sartre and Heidegger) have discussed this with much more nuance within continental philosophy and often refer to this as the "existential angst" (see Crowel 2020).

A possible response to this is the following. One might admit that responses to the hard problem are affected by existential concerns, but nevertheless maintain that how we understand the relation of -say- temperature to mean kinetic energy isn't similarly affected by such concerns. I believe this would amount to overlooking the effect of the hard problem of consciousness on how we think of inter-theory relations more generally. Even though the hard problem doesn't usually emerge when discussing- say- the relation of physics with chemistry, or of thermodynamics with statistical mechanics, conclusions drawn from the analysis of the latter can influence one's view on the hard problem, and vice versa. More generally, views concerning the relation between any set of entities can and often does influence one's views on the relation between the mind and the brain (and vice versa), regardless of whether philosophers explicitly acknowledge this in their work.

By the above I don't suggest that existential worries necessarily or even strongly influence the formulation and defence of a particular relation between the natural sciences. I merely point out that existential considerations lie in the background and sometimes influence substantially how we think of these relations. Put differently, there exists an indirect yet substantive connection between a person's existential worries and her views on inter-theory relations. If that weren't the case, then why do religiously-conscious organisations (such as the John Templeton Foundation) fund projects that develop dualist, pluralist and emergentist positions for understanding the relations of the natural sciences?

3. Should we ever expect consensus?

In this section I argue that one shouldn't expect philosophers to ever agree on inter-theory relations. I support this by adopting van Fraassen's idea of stances. I show that the answer one gives to the aforementioned methodological, normative, and existential considerations represent her unique stance towards the world, which in turn motivates her position on how the sciences relate. However,

contra van Fraassen, I argue that stances aren't things on which philosophers typically agree on, so I conclude that there will never be agreement on inter-theory relations.[13]

Van Fraassen claims that philosophical positions such as empiricism, materialism and secularism, represent stances towards the world. He proposes the following:

> a philosophical position can consist in something other than a belief in what the world is like. (…) A philosophical position can consist in a stance (attitude, commitment, approach, a cluster of such- possibly including some propositional attitudes such as beliefs as well). Such a stance can of course be expressed, and may involve or presuppose some beliefs as well, but cannot be simply equated with having beliefs or making assertions about what there is. (2008: 47-48)

Having a specific stance isn't the same as defending a certain doctrine, or holding a belief about the world. As Ladyman puts it:

> To have such a stance is to engage in certain forms of life and not others; to have various attitudes, commitments, and values; and to adhere to certain norms. The concept of a stance is a much richer one than the concept of a belief or doctrine. The appraisal of beliefs takes place from the point of view of a stance, and the methods and background beliefs associated with different stances may differ. (2018: 111)

Note that one shouldn't conflate van Fraassen's idea of stances with his empiricism, nor conclude that the defence of a position from the perspective of a stance implies some form of antirealism, relativism or scepticism. Any and all philosophical positions can be motivated by one's stance towards the world. This doesn't apply exclusively to empiricist or sceptical views of the world, but to realist

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[13] As is explicated below, this is a pragmatic and not an in principle claim. I don't argue that philosophers *cannot* reach agreement on inter-theory relations; but that in practice they never do.

positions too. It is perfectly coherent that one's background assumptions, beliefs, attitudes and commitments motivate and prompt her to believe in the existence of an objective mind-independent reality.

This also applies to positions on inter-theory relations. Van Fraassen himself offers materialism as a case in point. He claims that materialism is neither a factual statement nor an empirically verified theory about the world. This is because whenever scientific changes occurred that prima facie undermined materialism (e.g. changes that involved postulating immaterial fields and forces), materialists would amend their thesis so as to accommodate these scientific changes. From this he concludes that:

> (materialism) isn't identifiable with a theory about what there is but only with an attitude or cluster of attitudes. These attitudes include strong deference to the current content of science in matters of opinion about what there is. They include also an inclination (and perhaps a commitment, at least an intention) to accept (approximative) completeness claims for science as actually constituted at any given time. (2008: 59-60)

Other philosophers also acknowledge that positions on inter-theory relations are motivated by stances. For example, Ney argues that physicalism ought to be understood as "nothing more than an attitude, a commitment to form one's ontology according to whatever the physics of the day says exists" (2008: 3).

One needn't look at the specifics of each view on inter-theory relations in order to argue that every view is motivated by the stance of the philosopher that proposes it. Instead, one can consider the issues that persistently motivate disagreements. As mentioned above, many disagreements are prompted by methodological, existential and normative concerns. These concerns reflect the values and commitments philosophers hold and take to be relevant to the topic of inter-theory relations. The methodological considerations about how science supports philosophical claims; the normative

considerations about - say- the progress and autonomy of science; and the existential considerations, largely determine the attitude one holds towards inter-theory relations. The different ways one deals with these considerations shape her stance towards the world, thus motivating a unique view on the relations between the sciences.

Granting that stances motivate views on inter-theory relations, does this imply that there will never be agreement? Stances seem to suggest some form of irresolvable subjectivity, and the fact that they involve value-judgements is surely not a good sign that agreement can be reached. However, van Fraassen takes stances to be amenable and open to adjudication. He claims that in many aspects of life there are debates which revolve around value-judgements and are motivated by certain commitments and attitudes. The fact that value-judgements are involved in philosophical debates doesn't imply that rational grounds cannot be found that could consequently result to agreement (2008: 62).

I grant that it is possible to develop rational arguments regardless of the values and commitments that are involved in forming different stances. However, the possibility of rational argumentation doesn't suffice to expect agreement on this topic. This is for two reasons. First, even if people jointly agree on some set of values, their commitment to these values is dynamic and contingent on the context in which they are formed. Their commitment changes relatively to the changing political, cultural, sociological and historical background in which it is formed. Consider for instance Mitchell's presidential address at the Philosophy of Science Association biennial meeting in 2020, where she calls for a pluralist approach towards philosophy based on the period's extraordinary socio-political landscape in the United States:

> The theme of my address is that diversity and pluralism in science are not just ethically and-politically valuable, but they are required for science to be epistemically effective. Moreover, there are lessons I will draw from these arguments for best practices for philosophers of science. (…) I will argue that there are situations in which perspectival diversity and model pluralism are required for making science an effective epistemic enterprise. (2020: 771- 772)

This example shows how a particular socio-political context determines the normative and methodological considerations that are taken as relevant in the evaluation of philosophical positions. Moreover, it shows the lack of stability in maintaining specific commitments as the socio-political contexts in which they are formed change in time and space.

4. Should we be worried if we never agree?

Prima facie, this looks like a grim result (at least for some philosophers). If there is never agreement due to philosophers's stances, what is the point of discussing this topic at all?

Certain philosophers argue that disagreement in philosophy is desirable because it contributes to progress (e.g. Mitchell 2020: 771). This view is largely based on Kuhn's analysis of progress in science. He argues that progress doesn't occur through conceding to a specific scientific theory, but through crises and revolutions in science (2012). More recently, philosophers have argued that specific forms of disagreement (such as perspectival disagreements) are the means by which science progresses (Massimi 2019; Chang 2004). This is taken to indicate that philosophical progress can be similarly achieved by maintaining a plurality of views:

> By embracing diversity, science can increase the accuracy of models of nature and thus their adequacy in solving the problem we pose. That isn't because science has delivered the true model or converges on a single account. It is because by actively integrating -searching for stabilities that go beyond one context and beyond one perspective- science is learning more about what nature is like. Philosophers can and should adopt the same integrative stance. (Mitchell 2020: 788)

Interestingly, this isn't a new idea. Russell believed that philosophy isn't evaluated on the basis of its ability to produce definite answers; instead, its value lies in constantly looking for different ways of investigating a question:

> (..) however slight may be the hope of discovering an answer, it is part of the business of philosophy to continue the consideration of such questions, to make us aware of their importance, to examine all the approaches to them, and to keep alive the speculative interest in the universe which is apt to be killed by confining ourselves to definitely ascertainable knowledge (2001: 90-91)

I don't wish to challenge these views on philosophical progress. Instead I present two problems which undermine progress in this particular topic (i.e. inter-theory relations) even if one accepts that philosophical progress is achieved through disagreement more generally.

The first is an in principle worry. If there is a relation between, say, genes and molecules and if this relation has a specific form which can be in principle discovered, then surely it is problematic that philosophers cannot agree on what that relation is. In this context, the lack of consensus implies that there are certain views about inter-theory relations which are, as a matter of fact, false. Based on what I showed in section 3, the reason why philosophers entertain false views is in large part because of their normative, methodological and existential considerations. However, if one believes in some kind of mind-independent world, then these stances have no effect on the existence and form of inter-theory relations.[14] That is, whether genes are identical or emergent to molecules is in no way dependent on one's existential or normative attitudes towards the world. Isn't this a disappointing situation?[15]

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[14] Unless one is a sceptic or relativist, in which case stances may be viewed as determining the existence and form of the purported inter-theory relations.

[15] A similar worry has been expressed by Chalmers (2015) about philosophical disagreement in general.

One could respond that being disappointed just reflects one's stance. Instead, one should rather accept that this is an inescapable feature of philosophical practice. On this view, the purpose of philosophy isn't so much to discover which inter-theory relations exist and how they look like, but rather to serve other goals altogether (as revealed by the different considerations mentioned in section 2).

However, even if one adheres to such a view of philosophy, another problem persists. Philosophy is not only an intellectual activity, but a professional discipline that aims at having societal impact and which survives due to the financial support of academic and non-academic institutions. In this context, philosophers (now more than ever) are required to show how their work contributes to the standing of the institution in which they produce their work, and explain why their projects should be financially supported.

That this is so becomes apparent when requesting funding for a research project. When submitting a research proposal, funding bodies ask philosophers to explain in detail the impact of their proposed project, and specify how their results will positively affect other disciplines and society more generally (this is often required to be spelled out in terms of deliverables, milestones and outreach activities). In light of this, how can philosophers expect that institutions or funding bodies will support a project on inter-theory relations, if one can never expect the production of definitive results in the same manner as is expected- say- by chemical or biological projects? Even if agreement isn't a requirement for philosophical progress, it is naive to think that -outside philosophy- agreement isn't taken as a factor when evaluating projects.[16]

One could respond to this by proposing a new way of illustrating the value of philosophy to non-philosophers. What needs to be done- one might argue- isn't to amend the way we do philosophy

[16] This becomes especially pressing if we consider that reviewing committees are often comprised of non-philosophers.

(and disagree about issues), but rather explain how philosophy has a positive impact regardless of (or perhaps even due to) its lack of consensus. I wont deny that this may be feasible or even desirable, though admittedly a task which may require changing deeply entrenched assumptions about the idea of progress. However, the next section shows that there is also a different way to tackle this issue.

5. Bringing stances to the fore

Even though philosophers's stances won't allow them to agree on how the natural sciences relate, there are certain features of this debate as a whole on which they *can* and *should* reach agreement.

First, while philosophers may disagree starkly on which philosophical position to accept, it isn't uncommon for them to agree on which positions to reject.[17] This is a form of agreement that may not become immediately apparent due to the vast pool of positions, but is nevertheless present and thus worth highlighting as such. For example, Nagel's proposal of inter-theoretic reduction is now commonly taken to be insufficient with respect to how the special sciences relate to fundamental physics, as the special sciences are not fully formalised in mathematical terms (as is physics) so as to satisfy Nagel's requirement of deductions and bridge laws.

Secondly, there is consensus about which scientific features strongly affect the relations of the sciences, and which ones don't. For example, the length, energy and time scale within which a phenomenon occurs, is now widely taken to play an important role in correctly identifying the relevant relations. It is now accepted that if - say- a gas is under critical thermodynamic conditions then its relation to the molecules that make it up is substantially different compared to when the gas is under normal thermodynamic conditions (a similar point is made about the relations between the wave theory of light and the ray theory of light, as well as between classical and quantum mechanics; Batterman 2001). Of course, the role of scale can be interpreted in different ways so as to support

[17] See also van Inwagen (2004: 332) and Chalmers (2015 :13).

opposing philosophical positions. Nevertheless there is agreement in the literature about which features are more relevant to the topic (e.g. scale), and which ones are not.

Lastly, certain disagreements emerge due to an exclusive focus on the differences between accounts, without acknowledging the features that these accounts may have in common. Compare for instance non-reductive unity (such as by Kincaid 1997) with integrative pluralism (such as by Mitchell 2002). Accounts of non-reductive unity typically argue that the explanatory, confirmational or heuristic interdependence of two sciences illustrates their unity. Such accounts don't deny that the sciences are autonomous: sciences consist of multiple subcultures, investigate their own research questions, and employ distinct concepts and methodologies. On the other hand, integrative pluralism also acknowledges the existence of substantial relations between two sciences in a way consonant to the relations posited by unificatory accounts. Pluralism however doesn't take such relations to suffice for unity; the conceptual, methodological and heuristic differences (which are also accepted by unity theses) are taken to show disunity.

Such disagreements aren't based on substantial differences around the advocated relations, but on the evaluation of how such relations should be called or interpreted. I label these examples 'glass-half-empty versus glass-half-full disputes'. This is because such disputes do not revolve around how much water there is in a glass, but rather on how to call its state. Under this analogy, as a glass-half-empty/full point of view may be motivated by a pessimistic/optimistic attitude towards the world and not by actual matters of fact about the state of the system, similarly philosophical positions are often prompted by one's attitude towards science and the world, rather than by particular empirical facts.

These disagreements are representative of the strong effect stances have when supporting different views, even when prima facie these views accept the same key features of a putative relation. As such, we shouldn't expect that they admit to adjudication. Nevertheless, one can circumvent such disagreements by explicitly acknowledging the stances that motivate them. By doing so, I don't

suggest philosophers attempt to find a common stance, but instead to understand what it is exactly that they disagree about.[18]

6. Is it all stance-relative?

The above prompts a question: If the topic of inter-theory relations involves both empirically investigating matters of fact, but also debating normative, methodological or existential considerations, does this imply that the empirical question ultimately belongs to the jurisdiction of the natural sciences? Put differently, it seems that philosophy's role is restricted to investigating the non-empirical implications different positions can produce. There is no substantial contribution of philosophy to understanding how- say- genes are related to molecules: it is the job of chemistry and biology to provide an answer.

Such a response reflects an impoverished image of philosophy's role, for two reasons. First, the fact that a question involves invoking empirical evidence doesn't suffice to claim that the question belongs exclusively within the purview of science. A major part of philosophy of science similarly involves the investigation of empirical facts, including topics such as scientific realism, explanation, and theory change. Secondly, one cannot clearly distinguish between the investigation of empirical matters of fact from extra-scientific considerations; the two are intertwined and non-separable. As is well known, scientists themselves make value-driven judgements when theorising and experimenting. This is an inescapable feature of every question that has to do with our understanding of the world through science; regardless of whether it is scientists or philosophers who investigate such questions, these questions will always involve non-empirical elements, thus rendering them philosophical too.

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[18] Elliott and McKaughan make a similar suggestion about scientific disputes. They argue that scientists should become explicit about the 'non-epistemic values' that motivate their assessments of models and theories (2014: 15).

Should one then conclude that there is no matter of fact about how- say- genes are related to molecules? Are all views- such as reduction or emergence- stance-dependent? While this is admittedly a coherent inference, it is not a necessary one. As certain philosophers have convincingly argued, scientific inquiries can be value-laden yet their results can still be objective in that they correctly capture mind-independent facts about the world (Elliott and McKaughan 2014). The same argument applies here too: the answers we offer about inter-theoretic relations may be largely motivated by our stances, but this doesn't mean that these answers cannot be true independent of those stances.

All in all, a careful study of the literature shows that philosophers should identify points on which they can agree on, despite holding different views about inter-theory relations. More importantly, philosophers should acknowledge that disagreements largely emerge due to competing stances. Realising this can help clarify what it is that philosophers actually disagree about, and thus circumvent some of their most persistent disagreements.

7. Conclusion

And if you find her poor, Ithaka won't have fooled you.

Wise as you will have become, so full of experience,

you'll have understood by then what these Ithakas mean.

excerpt from Ithaka by C. Cavafis (Keeley et al. 1992)

According to Cavafis, Ulysses's journey isn't worthwhile because it will eventually lead him to Ithaka, but rather because of all the amazing things he encounters during his search for the island. This poetic interpretation of Ulysses's journey is reminiscent of how philosophers investigate inter-theory relations. The lessons philosophers draw from their investigations are to a large extent valuable, regardless of whether or not their results are correct. There are many different things to discover about the sciences and their relations, and the benefits from finding them are dynamic, they change

throughout generations, and are influenced by the socio-political and cultural context in which they are pursued.

However, this is where the analogy ends. Ulysses not only genuinely searched for Ithaka; he eventually succeeded in arriving there. Philosophers will probably never enjoy a similar result. This isn't only because their stances don't admit to adjudication but also because philosophers aren't always motivated by a genuine interest in identifying inter-theory relations. The normative, methodological and existential considerations show that philosophers often wish to accommodate other purposes altogether.

I don't contest such motivations, nor dismiss the undeniably fruitful results that come through disagreement. Nevertheless, it is important we realise that this is how things are and that we will never reach agreement. While some philosophers are content with this, others have expressed disappointment. I understand the former, but I sympathise with the latter. If there is a specific way in which things in the world relate, it is disappointing that we will never- as a community- discover this. Chalmers puts this nicely:

> Once one has been doing philosophy for a while, one no longer expects arguments to produce agreement, and one deems an argument good when it merely has some dialectical power. But this is an adjustment of expectations in response to a disappointing reality. Antecedently to doing philosophy, one might have hoped for something more. (2015: 22)

Where does this leave us? The growing need to justify philosophy's value presses the community to show the impact of its work. Regardless of whether or not philosophers like it, reaching agreement is an expected feature of this endeavour. This is especially so with respect to philosophical questions that are directly relevant to the natural sciences. To address this challenge, I propose philosophers to pursue meta-agreement about inter-theory relations. This can be achieved by agreeing on which accounts don't work and identifying the scientific features that are most relevant to the topic. More

importantly, by acknowledging that stances motivate different views and specifying the role stances play in their support, philosophers can find additional common ground. This won't ultimately lead to agreement about inter-theory relations. Nevertheless, acknowledging the context in which different accounts are developed, can lead to a deeper understanding and appreciation of philosophers' diverse views.

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