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Methodological Issues for Interdisciplinary Research

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Much of the apparent difficulty of interdisciplinary research stems from the nature of the methods adopted by different disciplines. This paper will outline some of the reasons and sources of these problems, and argue that this is a more pressing problem for the prospect of interdisciplinary research than the oft-quoted translation problem. I wish to stress here that my focus will primarily be the problems facing interdisciplinary research between the humanities and sciences[1] as this form of research has more methodological issues than interdisciplinary research between two scientific disciplines, or between two humanities disciplines. In section 1 I will define both multidisciplinary and interdisciplinary, and highlight some crucial differences between the two. In section 2 I will discuss what features a body of work requires in order to be called a 'theory', commenting on the methodologies used within different disciplines. Section 3 will argue that the differences in methodological practices are a primary cause of the apparent difficulty in interdisciplinary research.

1 – Interdisciplinary vs. Multidisciplinary

A first point must be noted when we are considering how to go about interdisciplinary research; namely that no discipline stands alone. As Youngblood (2007) puts it, 'No discipline is an island entire in itself'. This is true for all disciplines and arguably even more the case when we are talking about the humanities and the social sciences. History, English, Politics, Anthropology, Geography (the list could go on and indeed could most probably include all disciplines) all have 'boundaries' that blur at the edges where other disciplines begin to become involved. Speaking from a background in Philosophy, I have often been asked what it is that philosophers study, and what a purely

philosophical question is, and to this day I am yet to think of a question that comes within the scope of philosophy that does not have some links to another discipline, whether that discipline is a science, social science, or a humanity. However, the blurred edges between disciplines do not necessarily constitute interdisciplinary research.

There is an important distinction to be made between multidisciplinary work and interdisciplinary work. The blurred edges between nominally separate disciplines[2] - the blurred edges that result in no discipline standing alone – constitute multidisciplinary research. Youngblood (2007) defines multidisciplinary research as 'what happens when members of two or more disciplines cooperate, using the tools and knowledge of their disciplines in new ways to consider multifaceted problems that have at least one tentacle in another area of study'. This then stands in contrast to a definition of interdisciplinary studies as 'what happens when researchers go beyond establishing a common meeting place to developing new method and theory crafted to transcend the disciplines in order to solve problems'[3].

Broadly, I will accept these definitions here though with a few comments. I do not see the need for a definition of multidisciplinary research to include a requirement that it involves members from different disciplines, or indeed more than one researcher. Any research that involves a method, result, or knowledge that has previously (or is standardly) taken to be specific to another discipline than the researcher's 'home' discipline could constitute multidisciplinary research so long as it makes use of tools, expertise, or knowledge developed in a different discipline. Taking an example from philosophy (as my 'home' discipline, and thus the one I am most familiar with): a discussion of the metaphysics of time that includes a detailed understanding of the conceptual ramifications of the general and special theories of relativity, would constitute multidisciplinary research. This satisfies the condition of multidisciplinary research of having 'tentacle[s] in another area of study' as given by Youngblood in that the philosophical discussions may impact upon the standard accepted interpretations within physics.

Thus a single researcher from one discipline (though admittedly one that has done specific and focussed research on an area within another discipline) may still be engaging in multidisciplinary work.

I see the crucial point here to be that the question being *primarily* addressed was a metaphysical one, and thus philosophical nature. The research may use the tools, expertise, and knowledge developed by physics but it would be to solve problems *primarily* located in the discipline of philosophy. I take the use of tools, expertise or knowledge from one discipline as applies to a question within another discipline as a necessary condition for something to be called multidisciplinary research.

Highlighting this necessary condition allows us to easily approach the difference between multidisciplinary and interdisciplinary research. Whilst multidisciplinary work calls upon sources from different disciplines towards the goal of solving a question posed within one discipline; interdisciplinary work calls upon sources from different disciplines towards the goal of solving questions posed *within multiple disciplines*. These questions are often likely to be those within the previously mentioned 'blurred edges' of disciplines, wherein either discipline on their own cannot solve the complex question being posed. I take complex here only to indicate that a question will require elements from multiple disciplines in order to be solved satisfactorily. Complex therefore indicates that the putative answer to a question and the scope of the research crosses domains of research. Thus whereas multidisciplinary research will primarily aim to advance knowledge in one discipline, the aim of interdisciplinary research will be to advance knowledge in multiple disciplines, often to do with issues that 'transcend' discipline boundaries.

As will become clear, the difference between multidisciplinary and interdisciplinary research that I have sketched here will be crucial in section 3 when discussing the extra methodological issues confronting interdisciplinary research that are not prevalent in multidisciplinary research. The majority of

multidisciplinary research proceeds without problem or issue (indeed as commented previously, much of the research carried out within the humanities and social sciences can *at least* be deemed to be multidisciplinary); however there are often greater difficulties in the production of effective and useful interdisciplinary research.

2 What is a Theory?

Before discussing why interdisciplinary research faces issues that do not trouble multidisciplinary research, it will be useful to first consider what features we expect from a theory, in part to tell whether this in any way changes from one discipline to another.

Chomsky, when discussing what it is that we should expect from a theory of human language in the introduction to his book *New Horizons in the Study of Language and Mind* (2000), makes some remarks as to the nature of a theory that I feel can be viewed informatively in a broader context. Chomsky remarks that human languages have over time been viewed as initially simple to explain, with little complexity; followed by an increasing realisation of the complexity present. This to some extent mirrors other disciplines which have also followed this broadly conceived path. Newtonian physics was thought to explain the physical make up of the world, only for a greater level of complexity to be realised and hence the formulation of the more complex theories we see within physics currently. The realisation of complexity that was inspired by Chomsky's writings at the start of the Generative Grammar program in linguistics came about in part through a desire to explain the nature of human language at a deeper level than had previously been studied. Discussions of the grammar of particular languages were 'descriptively adequate' in that they gave a 'full and accurate account of the properties of the language, of what the speaker of the language knows' (2000:7); generative grammar set out to study the underlying similarities, deep within the complex variety present within languages, and through that go beyond 'explanatory adequacy' (2000:7). This placed the complexity and the variation between languages at the margins of the theory, and hoped to discover the

invariant rules across all languages. In a similar vein, the development of physics since the 'fall' of Newtonian physics has sought to discover the universals; those laws that explain all the phenomena we can measure. Newtonian physics was unable to do this, and so was dropped. The realisation of complexity (and the interrelated desire to discover the underlying similarities and rules) demanded a change in the nature of the theories being developed. What then was the difference in the later theories compared the earlier ones?

The difference comes down to three criteria for a theory to satisfy: description of the phenomena, explanation of why the phenomena occur, and predictions of future phenomena. A purely descriptive theory will merely attempt to list what phenomena have occurred. As such, it is the simplest aspect of a theory. The explanatory criterion of a theory is satisfied through an account of why the phenomena should be viewed together and an initial account that attempts to provide an account of why one phenomenon occurs rather than another. I take description and explanation as the absolute minimal criteria that need to be fulfilled for something to count as a theory. These criteria can be seen within theories from across the full spectrum of human academic disciplines. These criteria differentiate academic theories from 'folk theories' or 'common sense theories'. These are often theories that are passed down from one generation to another, with more of a teleological aim to them than standard academic theories which seek to explain why rather than produce a specific outcome. As such, 'folk theories' will often fail to meet the explanation criteria as they are not concerned with *why* phenomena occur, nor with providing an account of why one phenomena occurred rather than another.

The last criteria I have highlighted for a theory is predictive power. It is the predictive aspect of a theory that allows it to go beyond explanatory adequacy. In order to predict future phenomena a greater level of understanding of the underlying similarities in the set of phenomena must be realised, thus allowing the theory to consider more directly the heart of the issues. This criterion however has been embraced to a greater degree by the sciences traditionally, perhaps with

those disciplines more suited to being able to make claims about the nature of future phenomena. Indeed the predictive power of a theory within the sciences is taken to be one of the key judges by which we can gauge the value of a theory[4]. The sciences (broadly speaking) deal with more discrete sets of phenomena than is available to a piece of research within the humanities. This is a key difference between the notion of a theory within the sciences and the humanities, and is not one that should be quickly overlooked. I will return to this in section 3, but first it will be useful to consider the notion of complexity in a theory as introduced by Newall (2001) as it will help to illustrate the nature of interdisciplinary research, also tying into the criteria for a theory to fulfil; and will be useful when in section 3 when I focus on the methodological issues that face interdisciplinary research.

Newall's discussion of interdisciplinary research centres on the notion of complexity. He argues that for research to be called interdisciplinary then 'it draws insights from disciplines and that it integrates their insights' (2001). This aligns with my previous discussion of the difference between interdisciplinary and multidisciplinary research; in that interdisciplinary research requires integrated insights from different disciplines that seek to solve issues for a whole *complex* system. Conversely, multidisciplinary research requires only that the research is multifaceted but without the need to integrate the approaches from different disciplines as a single perspective will suffice for the research question at hand. The questions being answered need not cross into different disciplines.

Complex systems for Newall are the subject matter for interdisciplinary research. However he comments that 'while the notion that interdisciplinarians study complex systems tends to resonate well with natural and social scientists, it tends to sound strange to humanists' (2001). Newall is arguing that the nature of humanities in such that often is seeks 'contextualization' only, whilst the sciences engage in contextualization and then seek to further this into a study of the features of the system as a whole. It is this reason that Newall claims that the sciences are more suited to interdisciplinary research. Whilst Newall's discussion and definition of 'complex systems' is often vague, or possibly even in danger of

being trivial when he describes *all* systems as complex[5], I feel my reading of him here is fair to his overall view. Thus a similarity can be drawn between his ideas of multifaceted problems that seek to give insights to the whole system as opposed to placing questions in context (which would come under the scope of multidisciplinary research); and the criteria for theories of predictive power that I have taken from Chomsky.

Predictive power has been taken to be the key feature that allows a theory to go beyond explanation, beyond an account to why phenomena are connected towards a more systematic account of the phenomena. Complex systems in Newall's sense are the subject matter of interdisciplinary research because it integrates insights from across disciplines. The two points are intricately connected, hence the comparative discussion that I have given to Chomsky and Newall. I take these two features of theories to indicate the biggest differences in methodologies between the standard theories within science and the humanities, a point I will discuss in section 3.

3 Difficulties Due to Methodologies

I now, finally, come to the main question of this paper – that is where do the difficulties for interdisciplinary research stem from?

Firstly, a note to say that often it seems especially in conversations that I have had with those engaged with research in the humanities that the main difficulty is taken to be a terminological problem across disciplines. The 'translation' problem is meant to hold that the terms used in each discipline mean such different things that problems arise due to disagreements over those definitions and how to use the terms. I however think this is a pseudo problem, or at least one that is not a *substantive* block to interdisciplinary research. I see no principled reason as to why a researcher in one discipline cannot do sufficient study into the way that terms are used in another which will then allow researchers from the different disciplines to discuss issues appropriately. At the very least a conversation would be able to provide a middle ground or a minimal initial definition which would be

sufficient for research to get underway. If the translation problem was a substantial problem then we would expect to see two consequences. Firstly, it would not only affect interdisciplinary research but also multidisciplinary research. If I, as a philosopher, could not grasp the way that a term such as 'time' or 'present' as they are used within physics, or terms such as 'language' or 'fictional' as used within literary research, then this would mean that various parts of each of those subjects mentioned would be impossible. But this is clearly not the case. Terms can be understood cross-disciplines. The largest problem that this would cause is some initial disagreement or confusion (which I would hope could be solved quickly through conversation). Further to this, if the translation problem was substantial, we would expect to see it stopping effective research *within the same disciplines* too. Within one discipline a term could have any number of different meanings, some of which could vary widely. However, again we do not see this supposed consequence of the translation problem. In fact it does not make research difficult, but instead would seem to in some cases encourage further research and refinement of the terms of the debate. The translation problem then, whilst it does comment upon an issue that we should be aware of, it does not pose a *substantial* problem to any form of research.

With the translation problem covered, though admittedly probably far too briefly, I wish to argue that the problems that interdisciplinary research faces stem instead primarily from methodological issues, and in particular from the nature of the answers that different *sorts of disciplines* are looking for and the different sort of questions that are being asked. I have so far painted a picture of the different criteria that a theory can try to fill, and the nature of scientific theories in comparison to those within the humanities. Broadly, the humanities do not lend itself to predictive aspects within a theory. This is in part because all of the phenomena are often already available to the researcher and so there is little else left to make predictions about. This is turn also results in a sometimes less than systematic nature of theories within the humanities wherein there is little attempt to go beyond explanatory adequacy, and thus no attempt to account for the

underlying rules, settling instead for an account that explains each phenomena, but does not necessarily tie them together in the way that a scientific theory will attempt to do.

The methodological framework that is set up within the sciences strains to go beyond explanatory adequacy, and to make predictions about future phenomena. Indeed, the process of hypothesis, testing, hypothesis, predictions, and then testing of those predictions can be seen as an over-simplified description of the scientific method, with the predictive element as key to the validity of the theory. Every question and piece of research in the sciences strives to ensure that it can take this form of enquiry, and produce systematic results. Herein lays the problem for interdisciplinary research between the sciences and the humanities. The problem emerges when researchers from the sciences and the humanities do not heed the potential pitfalls within a proposed methodology for interdisciplinary research. The humanities do not have such a rigid and well defined methodology. This is not to say that the humanities *lack* methodologically; indeed on occasion the lack of a strict process may aid a more creative way to look at the issues at hand. However when it comes to interdisciplinary research, the differences can cause problems. Methodological issues threaten to mean that not only will research proceed in a disjointed way, but the very questions being addressed could potentially be phrased poorly to then get the most out of such research. It is the potential methodological issues and the varied 'standard' methodologies used within the sciences and the humanities that cause the greatest issue for interdisciplinary research as a tension can emerge between conflicting aims and methodologies and about how to proceed. This tension that can build up is the real problem that can face interdisciplinary research. I have already shown that translation is not a substantive issue, but methodologies affect not only how research is carried out but also the very questions that are asked in the first place. Interdisciplinary research faces serious problems if the initial questions are already plagued by issues as to what we sort of answers we want from the methodologies we adopt.

How thought can we judge my theory about the importance of methodological issues to interdisciplinary research? Following my own criteria for a theory, if methodological issues are the main problem facing interdisciplinary research, then we should expect this theory to satisfy the three criteria I have outlined. I take the descriptive element as given. Interdisciplinary research is difficult, and that is the initial phenomena that my account takes as its starting point. The 'methodological problem' also indicates why there are not such problems for multidisciplinary research. Multidisciplinary research seeks only answers to questions within the researcher's 'home' discipline, and thus they need not try to adapt either the nature of the questions nor the methodology to fit around the demands of different disciplines. This therefore fulfils an explanatory criterion as to why the phenomena are connected in some way, and why a noticed phenomenon is one way rather than another. To satisfy a predictive criterion, we should expect to see greater problems existing in potential research collaborations between a scientific discipline and a humanity discipline than we would see between two sciences or two humanities. That this is the case I think requires little argumentation. A brief scan of research going on at any university shows greater collaboration and interdisciplinary research going on within the broader faculties of science, and the faculty of arts and humanities than it does between the two. I would hope thus that my own theory here can fulfil the predictive criteria, as well as the descriptive and the explanatory.

As with many 'problems' within academia, I am not proposing this is a block to interdisciplinary research in any insurmountable, principled way. Nor am I wishing to push forward one methodology ahead of another. Instead, these issues can be tackled through a greater awareness of the methodological practices within other disciplines. Too often do researchers within the humanities turn away from any discussion of the sciences, seemingly often quoting a hackneyed claim that the sciences wish to reduce the humanities down to neurological or physical descriptions. Likewise, the sciences too seem reluctant often to engage fully with the humanities, seeing them as lacking a rigorous nature that their studies demand

so stringently. Speaking from a humanities standpoint, we should be more willing to consider the criteria that our theories will fulfil, and through this give some ground towards the methodologies used within the sciences. The predictive criteria especially should be seen as something valuable that the humanities should take from the sciences if it is appropriate in any way to the theory under scrutiny. The extra validity of a theory that can make independent predictions as to the nature of future phenomenon should not be dismissed. Returning to interdisciplinary research though, any tension in the methodologies could be solved with careful planning prior to the research beginning and a little more recognition that methodologies matter.

Endnotes

[1] I will continue to use throughout a rough differentiation between the natural and social sciences or one side, and the humanities on the other.

[2] There is I think a separate issue as to why, historically, we have the 'boundaries' between disciplines in the way that we do. However for my purposes it is enough that academic work is divided up in some way – where the actual boundaries lie is not relevant, only that they lie somewhere.

[3] Note that Youngblood reference this definition of interdisciplinary studies to Newall, 2001, and Repko, 2005.

[4] In conversation with a colleague who is studying physics, I learnt that one of the commonly quoted weaknesses of string theory is the lack of testable predictions that it makes for future phenomena. Clearly then prediction is seen as a key part of a theory within physics.

[5] Perhaps begging the question as to what makes some complex systems in need of interdisciplinary research when others do not – a point enhanced by his seeming earlier definition of interdisciplinary research as that which engages in the study of complex systems.

Works Cited

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First Response

This paper performs a useful and focused exercise of conceptual clarification, making a convincing case that it is differences in methodology and underlying methodological assumptions that form the issues of most resistance in attempts to be inter-disciplinary. Maybe something should be said on Gadamer's "Truth and Method" and debates about the status of hermeneutics, which concern these issues, but the paper is succinct in what its modest ambitions. Something on the history and very idea of a discipline (Kant's theory of the university?) would be a possible future direction.