Not Even Wrong - a view of current science of the mind

Abstract: Present progress in mind science is racing away in the direction of denying the existence of human freewill and animal and human sentience. This brief paper attempts to summarise a few brief reasons why areas of present work by prominent authors have departed from fact to the realms of folk psychology and summarises some of the ways in which present work can be put right. An experiment is described and carried out in an attempt to breach a little more of the present gap between experimental fact and the outmoded theory which others have tried to apply blindly.

"We, the Party, control all records, and therefore we control all memories. Then we control the past, do we not ?" Big Brother (from George Orwell, "1984"). "Myths which are believed in tend to become true", George Orwell.

“Think for yourselves and ensure others enjoy the privilege to do so, too”, Voltaire.

Introduction

Firstly, three basic aspects of mind and consciousness problems are briefly discussed and conclusions given as to measures to be adopted[(Note 1)].

(1) Overall philosophy of approach

Whilst many general descriptions of what goes on in the mind would appear to assume mathematics is the key to understanding the workings of the mind, this seems to be based at least in part on the assumption of some form of Platonism or something of the same stripe. In summary James Jeans said "the universe appeared to have been designed by a pure mathematician", and that it is "more like a great thought than a great machine".

This sort of thing is simply naive folk psychology.

There are many reasons why this variety of Platonism is simply folk psychology. I will not try to give all of them, as general statements of Jeans's sort have to have the relevance of their meaning proved, and this has not been done. Feynman [(4)] bluntly pointed out "We come across these mathematical relationships but they apply to the universe, so the problem of where they came from is doubly confusing....Those are philosophical problems I don't know how to answer".

Another simple and related reason is that if the universe has limits - and if it is assumed to be infinite this brings a further host of queries which certainly do not propose to support the above Jeans type folk psychology[(Note 3)] - and if the speed of light is finite, then our horizon only supports a limited number of particles, often computed as about 10^{80} . So even if the whole universe were to act as some kind of cosmic computer, it is only of a defined size. And because the universe is believed to be expanding, the resources inside our horizon are time-dependent and limited, ruling out various large numbers calculations as unpredictable. And mathematics containing an infinite number of steps could never be carried out. Further, mathematical results are time-dependent because of the variation in the number of particles. Indeed if there were a 'big bang' at the start , there would have been only a small number of particles then with a tiny computing power[(49)].

As Kant pointed out in a similar context "if we look through rose-tinted spectacles it is no wonder the world looks rosy". That is to say, to use concepts obtained through mathematics and

computers as a groundwork for contemporary physical reasoning is simply current folk psychology, just as "ghoulies and ghosties and long-legged beasties, and things that go BOOMP in the night" helped to give us the Christian Litany of yesteryear. I even used to have a prayer book where God was seriously asked to deliver us from those things. Now people try to use mathematics in the same way as primitive people used God.

If mathematics works, up to a point, by analogy it only gives us the map and not the country.

Now there are serious wannabe 'new Platonists' like Roger Penrose[18] and their ideas are certainly worth examining. In substance they seem to claim that there is some deep underlying accord between Plato's world and the true physical world[50].

Their problem is that they never define that accord in useful detail, and they cannot do so. But there seems no reason why we cannot consider that mathematics does give us some kind of map, and this would also explain psychologically the reason for the firmness of the views of those such as Penrose. Certainly, mathematics works, but whether it works 'surprisingly well', or simply works up to a point is purely a matter of conjecture and a social scientist or a biologist might well hold a different view to that of a physicist. For example in serious considerations of life itself, current mathematics has always appeared to be insufficient, as shown historically by Rashevsky and Rosen [5] for example.

Our present methods use the McTaggart B series for some of the mathematics, and use the A series as well for some parts of the work. B series mathematics alone does not describe the human situation completely and adequately and therefore is insufficient.

(2) Physical Problems for a B series only approach

Callender[6] points out, particularly in section 4 of his paper, that special relativity is inconsistent with any philosophically interesting conception of tense. In fact any notion of 'becoming' remotely similar to that found among advocates of the tensed view of time is not compatible with Minkowski spacetime. In my opinion that is exactly the sort of thing McTaggart's paradox is all about anyway. Since special relativity is necessary for the appropriate B series descriptions, the B series description alone will not suffice. Indeed to introduce the ideas like those of 'becoming' we would also need a further set of results and the A series falls into that category. In earlier works I repeatedly pointed out that an A series model is most unlikely, if not impossible, to be completely compatible with appropriate the B series model. Nonetheless both models can exist and a B series representation of the A series model can also be created.

It really depends on whether we want to give a complete description of time. Philosophers and scientists who do not, are like cartographers who claim that a two dimensional flat map shows heights adequately. Those who do want to provide complete descriptions and to describe time as completely as they currently can, can use the A series as well as the B series, thus hopefully obtaining more information and enlightenment.

If 'becoming' and such ideas are truly not necessary in some parts of a particular program, fortunately they do not have to be included but it is unreasonable to leave them out at the start. Other views on the McTaggart Paradox are of course currently common, and they are discussed in probably enough more detail for the present program in Appendices 2 and 3 and in the body of this work. Appendix 3 is a brief discussion with Tim Maudlin, who is perhaps the foremost expert on the McTaggart Paradox today.

(3) Human and nonhuman requirements

Most people believe that they have free will. The B series as usually devised does not allow free will to feature. In fact earlier writings in this series[7] make it plain that actual physical measurements[8, 15,16] using normal B series physics show that it certainly seems impossible to represent freewill properly in B series physics. It is not assumed here that people do have freewill, but the existence of the A series and its use, make free will a possibility in a universe world-view. If the possibility does not exist, the universe model does not allow free will to be confirmed or denied, making the model a very incomplete one. That is clearly true even if individuals choose to deny free will. For to permanently deny free will to every creature in the universe - probably including any potential Gods, extraterrestrials or any truly high powered intelligence - seems to run against Occam's razor and indeed normal common sense[Note 4].

Further, recent studies[19] suggest that undermining our everyday concept of free will can alter our ethical behaviour, a very serious consequence indeed.

Interim Conclusions: As a result of many considerations including (1), (2) and (3) above, in further studies and particularly the present study, both the A series and the B series are considered. Hopefully the present approach will also be able to eventually heal the gap between the theories of Metzinger[11] and Noe[12], whose ideas in part seem almost diametrically opposed to one another but who use much the same experimental data[Note 2].

Introduction to Details of Experiment

From a practical point of view, the article in Wikipedia[63] suggests a number of philosophical, religious and other ways of approaching the problem of freewill. I do not consider this essay to be tied irretrievably to any of these, nor bound by any of them ! In short I propose not to meander in a purposeless philosophical jungle but simply to deal with the facts in a way as presented herein.

We use experimental philosophy techniques developed from the work of Marcia Johnson[2] and using similar and often identical queries to hers. The general philosophy of approach, though importantly not necessarily the specific assumptions, which we try to adopt is that of the very early work of Trope and Burnstein[64].

Construal Level Theory (CLT)[1] suggests that thinking about events that are far into the future or the past or considering any events which are remote, either psychologically or in some sense physically, and particularly events which seem unlikely or alternatives to reality, triggers a more global brain processing style. In analogue, it is like seeing the forest per se, and not the trees.

Rohrer[13] discusses how both our neural and developmental embodiment shape both our mental and linguistic categorizations. The degree of thought abstraction has been found to be associated with physical distance which then affects associated ideas and perception of risk.

Work like that of Grenander[14] on pattern theory can possibly be used eventually in a somewhat similar approach to ours, but we retain our earlier Berkeley Madonna models such as **N003b**[7] for the moment. Our models seem as if they could do with extending in ways which either use the A series directly, or a further extension within an A series model within the B series, the former perhaps becoming more and more necessary as further electrophysiological results become available. At all times we need to bear in mind less than optimistic appraisals like those of Hacker[32],Vul[33]. and nowadays many others. The difficult zone is probably the much over-

hyped 'neuroeconomics' idea and psychological results on such work as the 'prisoner's dilemma'[34] and the like, which have to be more carefully evaluated than they have been. Looking carefully at popular books[35] like "The Newtonian casino" where the bulk of the hard work in experimentation seems to have been to disguise results from casino staff rather than to use such important new quantum methods as those of Doyne Farmer and Norman Packard[36], and indeed the caustic comments of Dan Ariely [37] on the psychology of the recent banking crisis and the situation in banking as known to myself and many others for years, we can easily notice that so many modern methods are used in a way which are unfortunately self-serving mostly for the benefit of non scientific persons involved rather than precisely scientific in nature. This has to mean, at the very least, that a lot of care is necessary as self-serving practices can easily and even unintentionally obscure the scientific results and that is of nobody's interest in the long term.

For the moment, use of just the A series can only be done somewhat indirectly by using modern psychological techniques like Construal level theory and being careful not to insist - especially unintentionally by implication - on the direct and necessary ultimate involvement of B series physics, probably as distinct from normal statistical methods such as Bayesian statistics.

Predicting the hedonic effect of a future event can be done by simulating it [3] and such facts immediately suggest bringing in the methods of CLT.

Olaf Blanke[10] wrote a very interesting paper on mental time travel (MTT), and Gilbert[17] wrote a review on a similar theme. It is certainly thought provoking and certain aspects of it mirror my own ideas. But Blanke, in his work on 'near death experience' for example, has been noted to jump to rather too obvious conclusions of the sort which seem he may well have missed a few steps in order to obtain credibility, and must examine his work fairly closely, not taking conclusions from correct experimental results necessarily on face value.

Our earlier experiments[20] on the examination[22, 69] of dreams do generally fit in with Construal level theory, especially in that the dreams contained unexpected elements of the future in an abstract form more often than in a very concrete form, although both occurred.

Clearly if we plan to invoke the A-series, it is easy to see how the elements of the future construed or envisaged in the mind of the present, have a good deal in common with the elements of the past. Rhyming philosopher/psychologist Alexander Pope many years ago stated "Remembrance and reflection - how allied ! What thin partitions sense from thought divide". Our understanding of memory today tries to stress "thick partitions" that divide sensory experience and thoughts or memories. This view considers that processing of sensory information and later cognitive activity can change thoughts and experienced memories. If one is prepared to accept at least the possibility of subscribing, at least up to a point, to this well researched and frequently accepted view, then if we look at contemplations of future events, the partitions between thoughts of past events and thoughts of future events seem as if they could be a lot thinner than many people nowadays try to suggest. A common approach in considering thoughts of the future is to revert to B-series physics and look for simple causal relationships between events as they occur. But this is simply an interpretation of what is being noticed. We are concerning ourselves with facts. The basic standpoint might be rather to take as first starting point a WYSIWYG viewpoint, in that we are measuring mental phenomena and there appears on the face of it, little basic difference in the state of mind of the individual between memory and forecast, though there is a tendency to pull down the shutters of the mind,as it were, and assume that "we cannot see the future" and so forth. I do not claim anything as simple as that, rather that we should thrust aside the shibboleth that only the B-series of Newton, Leibniz and

for that matter Einstein is going to provide simplistic explanations of the universe. To immediately use fMRI results to justify the results of such as Leibniz, Newton and Einstein is really a circular argument. Most certainly, we should, as Addis[66] and many others have done, learn all we can about the brain, but it is important to take into account the conclusions of such people as Hacker[32] and Vul[33] . In fact we must go further and know that careful interpretation of fMRI results and so on may fall outside the realm of Newtonian physics. It seems probable that even in a fairly accurate A-series representation, the so-called 'future' and the 'past' have somewhat different configurations, but they certainly seem like each other. Differences have to be considered, but the most obvious problem is with ourselves, that most people always feel somewhat assured that we remember the past, and are less clear on the future. This of course tends to be borne out when we check but is possibly not part of the initial mental process. It is possible to think of mystical contemplation and other alleged things of this sort which often regard the human position in the universe as in some way timeless, but this idea tends to be a red herring in our present lucubrations, except insofar that these alleged phenomena at least provide a clue to the fact that modern (essentially Western) ways of thinking are a limited and very restricted way of looking at the world. The idea of assuming that any other approach simply requires oddball stimuli[70] (which are themselves an important consideration of course) or some such special situation, restricts current thinking of real phenomena too much.

The present experiment, therefore, looks to see if the results we obtain for an experiment somewhat like Johnson's are like those of Johnson[2] in waking time with similar or the same subjects as we previously used, and we bear in mind the fact that with modern CLT[21], increased temporal distance should increase the overall attractiveness of a high-level construal value relative to a low-level construal value. To quote[21] "A common assumption in the behavioural sciences is that the value of an outcome diminishes as temporal distance from the outcome increases - positive outcomes seem less positive when removed in time (intertemporal discounting). The prediction from CLT, however, is that increased temporal distance, as with any psychological distance, should shift the overall attractiveness of an outcome closer to its high level construal value and away from its low-level construal value. When the low-level value of an outcome is more positive than its high-level value, temporal discounting would obtain, so that the outcome would be less attractive in the more distant future. When the high-level value of an outcome is more positive, however, the outcome should be more attractive in the distant future .... thinking of trees may prompt us to think of tomorrow, whereas thinking of the forest may prompt us to think of next year. The link between distance and construal has important implications for perception, categorization, and inference".

Experimental Procedure and Results

The aim was not to produce important new confirmatory material in a sort of analogy to the Millikan oil drop experiment, which itself raised a great deal of controversy[72], but instead to see if and how any experiment in the A series could be designed. Hopefully, it may be even possible to allow such an experiment to begin to act as a prototype. Any useful result would simply be regarded as a plus point and a minor assistance as a minor proof of concept and to be a step on a way to provide an A series format. In the event, that is approximately what happened. Some confirmatory material is of course already available[20].

Details are given in Appendices 1a and 1b.

20 subjects, from the same group as was used for earlier experimentation[20], were used for 30 interviews using a total of approximately 24,000 queries.

The results agree with those of Trope[1] and many others, in that the degree of abstraction seems to increase with the time differential between the moment of the test and when the event is to conceived to take place.

We used the 1 to 7 scaling procedure of Johnson[2] and scoring was found accurate to about $\pm$ 1 at the 80% confidence level and $\pm$ 2 at the 98% confidence level. The percentage of results which could be construed as 'abstract', by occurring in the first quartile of an abstract-concrete scale were as follows. Distant Past 40% abstract, Past 17% abstract, Present/fantasy 33% abstract, Future 1% abstract, Distant Future 25% abstract. Also the correlation coefficient of degree of abstraction at the time of testing with both level of perceived detail and the level of personal involvement was high in the near past and distant future but lower in the distant past and near future .

Conclusions

Clearly this is only a beginning. It seems to me that a major difference in the present experiments is where we included future events as retaining a right to some kind of reality, as well as past events, present events and merely imagined events in our very simple survey, and we even attempted to begin to clearly distinguish presently imagined events from real past and future events. Reality monitoring[2] is of course essential as a guide to the relevance of such results.

We need many more experiments in experimental philosophy and it may need a survey device somewhat similar to the Amazon Mechanical Turk[65] and other such ideas to get a lot of results. Though such experiments might be inexpensive and realistic, they must at all times be hands-on, carefully planned and not mindlessly computerised.

A further consideration or lemma is implied that not just the neural basis of memory and future must be considered in the way of Addis[66] , nor as the investigations of Trope[1] imply, but neural computation using neural computers of essentially an analog kind may be needed. I used analog computers in my very earliest experiments[67] and their use is in essence different to that of digital computers. After the many years of work by Minsky and many others on AI , it has become certain that simplistic digital computers are unlikely to do the whole job or even impossible to use effectively in the area. At least B-Z computers and similar devices may enhance progress[68].

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**(65) In Wikipedia, the free encyclopedia. Retrieved Jan 8, 2010, from http://en.wikipedia.org/wiki/Amazon_Mechanical_Turk ; The original "Amazon Mechanical Turk" was devised by Amazon for commercial purposes and can be found on the internet at https://www.mturk.com/mturk/welcome . Further such ideas are at http://polldaddy.com/ , http://www.surveymonkey.com/ , http://lifehacker.com/5451352/become-a-gmail-master-redux?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+lifehacker%2Ffull+%28Lifehacker%29
and elswhere.**

(66) Addis D.R. , Pan L,, Vu M. , Laiser N., Schacter D.L., "Constructive episodic simulation of the future and the past: Distinct subsystems of a core brain network mediate imagining and remembering", Neuropsychologia, 47 (2009) 2222–2238 ; and much other work at http://www.psych.auckland.ac.nz/people/donna/donna.htm

(67) Yates J., Patent Number:GB2051465 Publication date:1981-01-14 . I also mention and apply Gott's comment to this patent in http://philpapers.org/archive/YATASO.1.pdf

(68) In Wikipedia, the free encyclopedia. Retrieved Jan 8, 2010, from http://en.wikipedia.org/wiki/Chemical_computer ; Adamatzky A., De Lacy Costello B., Asai T. , Reaction Diffusion Computers, Eslevier, 2005 ; also http://web.mit.edu/newsoffice/2009/ai-overview-1207.html , http://www.physorg.com/news179400180.html and ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/chemit-02_en.pdf

(69) Yates J., (2008) , "Towards a Science of Consciousness", p147-8, April 8-12, 2008, Tucson Convention Centre, Tucson, Arizona, Center for Consciousness Studies, University of Arizona. Copy of poster at http://www.scribd.com/doc/2677404/TSC2008 . This also describes the use of the MBI ("Many Bubble Interpretation") to finally resolve the Schrodinger cat paradox.

(70) Ferrari V., Bradley M.M, Codispoti M., Lang P.J.," Detecting Novelty and Significance", Journal of Cognitive Neuroscience, February 2010, Vol. 22, No. 2, Pages 404-411 (doi:10.1162/jocn.2009.21244)

(71) http://dictionary.die.net/pragma suggests that a 'pragma' is a comment which usually conveys non-essential information, often intended to help the compiler to optimise the program. This usage is only barely metaphorical for SUAC as the 'compiler' there is almost the intelligent human in charge, rather than simply a digital computer ; but as part of a more general argument in the present connection one can see also Frans H. Van Eemeren, Rob Grootendorst, "The Pragma-Dialectical Approach to Fallacies", in "Fallacies: Classical and Contemporary Readings", edited by Hans V. Hansen and Robert C. Pinto (1995).

(72) "Oil -drop experiment", (2010). In Wikipedia, the free encyclopedia. Retrieved February 19, 2010 from http://en.wikipedia.org/wiki/Oil-drop_experiment

(73) Gale R.M., (1968), "The Philosophy of Time, 69 et seq, MacMillan. This is an old reference but covers much work up till 1968. The

recent survey by Chalmers (2010), for example, also attempts to imply the traditional theory subdivisions into A-theory and B-theory. My earliest work was based many years ago, partly on communications with the late Arthur Prior, who urged me to work with Robin Gandy, then a Professor of Mathematics at Manchester University, which I did. Arthur Prior might be said to be a 'presentist' and seemed to hold the work of J.N. Findlay in high regard. Indeed in my opinion Findlay's paper[74] provides a nice summary of much important work up to its time of writing.

(74) ibid, p143

(75) Callender C., Edney, F, (2002), especially p66, p109, "Introducing Time", Allen and Unwin, ISBN 1 84046 592 1

Note 1

The title of the present paper ("Not Even Wrong") is of course the same title as that of a recent book by Woit[38] and apparently derives from a catch phrase by Pauli, to the approximate effect that certain theoretical results did not lead to conclusions with respect to substantial and known physical fact. Woit's book is of course about modern string theory and I would add that it is a historical fact that, whilst I was Editor-in-Chief of the "International Journal of Theoretical Physics" for very many years, comments of a somewhat similar nature were often being made to me about string theory (old version). I suppose it is a matter of "O tempora, O mores !" but the world may not have changed much since Cicero's day. Woit's current views on string theory seems to be summarised in an amusing popular video on Bloggingheads[39] by Woit and Callender. Readers may be relieved to find that a detailed knowledge of string theory is not required to read the present peroration, but somewhat less than relieved at finding that the author's view is that, from the viewpoint of enlightened neuroscience, the whole of modern physics suffers the fate that string theory does from Woit's perspective. To start with, modern physics appears have no clear way to even describe let alone deny, prove or delimit human or animal free will and I spend much of the paper dealing with that matter in various ways. The so-called "grandfather paradox", a moderately obvious possible paradox since the days of Godel right up to the modern work of Visser and Thorne, is also confounded, denied and misunderstood in modern physics, even to the point where we are asked to even believe that the denial of even the possibility of human freewill is essential to an understanding of modern physics. I've tried to deal with matters like the "grandfather paradox" briefly in Appendix 2, which in particular discusses the ideas of Maudlin, whose views are actually much more reasonable than those of many other people, though still pretty farfetched.

Note 2

In fact Metzinger in http://socrates.berkeley.edu/~noe/commentaries/NCC-Metzinger.rtf does come surprisingly close to reaching a meaningful compromise, but at the end of the day the required result is completely outside of his frame of reference and he reverts to what amounts to a naive B series or 'flat time' approach.

Note 3

We have a similar sort of objection at the very least. For example, Rucker[(52)] says "If the Mindscape *(mental space of mathematical objects)* is a One, then it is a member of itself, and thus can only be known through a flash of mystical vision. No rational thought is a member of itself, and so no rational thought can turn the Mindscape into itself". Davies[(51)] , Tegmark[(53)] and many others concur to somewhat similar points.

Furthermore, we must bear in mind, as already stated here, that this rather Platonist view of such people as Jeans and Penrose is really a supposition, pure folk psychology and they have

no proof of it. It also is becoming a very shaky view and we really do not know of any good proof or justification for the rather complicated arguments needed to bolster it up by now. It could almost be said to be a modern version of epicycle theory.

Note 4

Voltaire's satire is perhaps too bold for today's more thin skinned scientists so I have to refrain from further comment. I have certainly no inclination to emulate the likes of Richard Dawkins or Colin McGinn in satire or disagreement particularly as misunderstanding has made the present topic even more controversial than their own views.Indeed, just as Voltaire[9] lampooned the possible initiator of all our problems - Leibniz - as Mr. Pangloss, so too we today could lampoon the large Roger Penrose style crowd of du Sautoys, and all the rest of them. The name Pangloss translates to English as "all tongue" and "windbag" and one can easily be as exasperated today by such persons - even more exasperated than Richard Dawkins is by Christians and other religious people, since the views of Christians and the like are so different from those of scientists that the difference is usually easy to tell, whereas with neoPanglossians there is the unfortunate fact that they are still leading science astray, as it could be said Leibniz and Newton did, though at least those pair were somewhere near the right course. In effect this motley neoPanglossian rabble comprises most of the mathematically inclined mind theorists today, a few of those who even, like Roger Penrose, seem to be prepared to believe for the sake of their beloved 'B series only mathematics' that conditions in the brain bear resemblance to conditions not too far from absolute zero, and who are quite prepared to cast away freewill so as not to lose even a fraction of the charisma of their precious 'B-series only mathematics'. Like Voltaire we can say "if the applied mindless robot style mathematics of today gives us the best of all possible worlds, then what must the rest of them be like?" The 'many worlds' scientists of today have not been able to avoid this problem either, though I suppose it could be argued that more abstract ideas like complex system theory may have striven to do so, but probably ultimately failed to do so completely. We are truly analog people and have created a digital world of our own. Just as the painter Lowry knew a matchstick world of poverty and starvation, we know a digital world of effective computer science. Lowry at least had the sense to realise that there was also a real world out there and not just his matchstick world of art. In the manner of Thomas Huxley's alleged phraseology where 'Archbishop' is modernised to 'Mathematician', we can say "I would rather be descended from an ape than from a computer". Voltaire says that if people truly wish to think, they should not cling to old and obviously incorrect ideas, but should form their opinions based on experiential knowledge. Voltaire's view should probably also be one of the cornerstones of experimental philosophy.

In very lay terms, modern scientists simply insist that the collection of some scientific data is more real than people's thoughts. It is possibly wrong to insist on this, and a bad early assumption. DT-MRI results, for example, in the way they are produced and calculated, will seem to have some sort of eventual one to one correlation with an updated Leibnizian or Newtonian type of reality. Even Bohm and Einstein, in a way, strove to continually cede first place to Newton or Leibniz and certainly the same is true even with modern string theorists and cosmologists. That fact, whatever the eventual achievements or otherwise of modern string theory and indeed cosmology, has become very true.

Even modern philosophers seem to tend to readily kowtow to this rather notorious idea by effectively putting the heavy horse of philosophy behind the agile and profitable cart of science, whether or not they choose to admit it.

All this is in no way to say that we must put aside the theories of Bohr or Einstein, for example,

but we must remember to trim any recognition of their relevance. In a way, for example, the "shut-up-and-calculate" pragma[71] tries to trim that relevance, but clearly leads to puzzlement and to a physics that only relatively primitive entities like a dog can understand[45]. Of course it is important to realise that we are not aiming here to solve philosophical problems created by Bohr's physics - though in a sense we may do so - rather embracing modern physics in its entirety and then, like Oliver Twist, 'asking for more'.

Appendix 1a

Experimental Procedure

1. Subjects were asked to remember events like a social occasion, a trip to the library, or a visit to the dentist. Perceived events were selected because they were likely to differ in many ways, for example, degree of social interaction and type and intensity of emotional tone.

2. Subjects were asked to visualise events like a real future social occasion, a real trip to the library, or a real visit to the dentist. Perceived events were selected because they were likely to differ in many ways, for example, degree of social interaction and type and intensity of emotional tone.

3. Subjects were also asked to imagine (at the time of the experiment) the occurrence of events like a dream, a fantasy, or an unfulfilled intention. These imagined events differed in degree of conscious construction and degree of potential realization. Thus we attempted to include a relatively broad representation of events of each type.

Examples of Social occasion: "Think of a recent (or for 2, future) social occasion-party, dinner, or a gathering of some sort that involved more than two people including yourself."
Visit to a library: "Think of a recent (or for 2, future) time you spent in a library."
Trip to dentist: "Think of a recent (or for 2, future) time you visit the dentist."

Now in cases 1 and 2, these are genuine cases which either did happen or will possibly/probably happen, like going to school last week or next week. In fact we include cases like. "Think of when you went to school last week and again last year" and "Think of when you go to school next week and again next year".

For case 3:
Dream: "Think of a recent dream-any dream you think you can remember fairly well."
Fantasy: "Think of a recent fantasy-that is, something you made up and imagined while you were awake-any current fantasy you can remember fairly well."
Unfulfilled intention: "Think of a recent time you intended to do or thought about doing something, but then you never got around to doing it. It should be something you actually might have done but did not."

Appendix 1b

Experimental Procedure, further details of questioning

Scoring chart

1. This event is 1 = *dim;* 7 = *sharp/clear*
2. This event is 1 = *black and white;* 7 = *entirely color*

3. This event involves visual detail 1 = *little or none;* 7 = *a lot*
4. This event involves sound 1 = *little or none;* 7 = *a lot*
5. This event involves smell **1** = *little or none;* 7 = *a lot*
6. This event involves touch 1 = *little or none;* 7 = *a lot*
7. This event involves taste 1 = *little or none;* 7 = *a lot*
8. Overall vividness is 1 = *vague;* 7 = *very vzvid*
9. The event is 1 = *sketchy;* 7 = *very detailed*
10. Order of events is 1 = *confusing;* 7 = *comprehensible*
I I. Story line is 1 = *simple;* 7 = *complex*
12. Story line is 1 = *bizarre;* 7 = *realistic*
13. The location where the event takes place is 1 = *vague;* 7 = *clear/dzstinct*
14. General setting is 1 = *unfamiliar;* 7 =*familiar*
15. Relative spatial arrangement of objects in my memory for the event is I = *vague;* 7 = *clear/distinct*
16. Relative spatial arrangement of people in event is 1 = *vague;* 7 = *clear/distinct*
17. Where the event takes place is 1 = *vague;* 7 = *clear/distznct*
18. the year is I = *vague;* 7 = *clear/distinct*
19. the season is 1 = *vague;* 7 = *clear/dzstinct*
20. the day is 1 = *vague;* 7 = *clear/distinct*
21. the hour is 1 = *vague;* 7 = *clear/distinct*
22. The event seems 1 = *short;* 7 = *long*
23. The overall tone of the memory is 1 = *negative;* 7 =*positive*
24. In this event I was 1 = *a spectator;* 7 = *a participant*
25. At the time the event seemed like it would have serious implications: 1 = *not at all;* 7 = *definitely*
26. The event does have serious implications: 1 = *not at all;* 7 = *definitely*
27. Any feelings at the time: 1 = *not at all;* 7 = *definitely*
28. Feelings at the time were 1 = *negative;* 7 = *positive*
29. Feelings at the time were 1 = *not intense;* 7 = *very intense*
30. As I am remembering now, my feelings are 1 = *not intense;* 7 = *very intense*
3 1. I remember what I thought at the time: **1** = *not at all;* 7 = *clearly*
32. This memory reveals or says about me: 1 = *not much;* 7 = *a lot*
33. Overall, I remember this event: 1 = *hardly;* 7 = *very well*
34. I remember events relating to this memory that took place: in advance of the event: 1 = *not at all;* 7 = *yes, clearly*
35. after the event: 1 = *not at all;* 7 = *yes, clearly*
36. Do you have any doubts about the accuracy of your memory for this event? I = *a great deal of doubt;* 7 = *no doubt whatsoever*
37. Since it happened, I have thought about this event: 1 = *not at all;* 7 = *many times*
38. Since it happened, I have talked about it: 1 = *not at all;* 7 = *marry times*
39. About when did this event happen? Circle one: just today yesterday few days ago last week few weeks ago last

Appendix 2

The "Grandfather Paradox" and similar matters

Now a common word used in physics in such circumstances as the "grandfather paradox" is to say that cases like that are 'unphysical'. Popular encylopedias[41] tend to define 'unphysical' in cases like singularities in general relativity as simply meaning (in the GR case) that general relativity ultimately ceases to be an accurate description of gravity somewhere in the vincinity of what would otherwise be a singularity. Alternatively, encylopedias[42] tend to define "a non-physical entity" as "an entity that lacks a physical or material body or material or physical characteristics. Non-physical entities may be considered hypothetical, e.g. deities of religions no longer conventionally believed in, and used as an example of an imaginary being in analytical philosophy, or they may refer to concepts whose existence is considered in philosophical argument, such as qualia. Or in esotericism they may refer to devas, gods, spirits, and so on, which either lack a body, or possess a subtle body only, and are generally considered belonging to a supra-physical plane of existence. Or in philosophy of mathematics, many people consider numbers, spaces, sets, and so forth to be existent and yet not physical".

Surely all this is simply begging the question or petitio principii, "assuming the initial point", if we intend to try to regard modern physics as a fair description of modern observable phenomena.....

According to Herrick[43] "'seldom is anyone going to simply place the conclusion word-for-word into the premises .... Rather, an arguer might use phraseology that conceals the fact that the conclusion is masquerading as a premise. The conclusion is rephrased to look different and is then placed in the premises".

Maudlin[40] states specifically in his current (2010) update of the Stanford Encylopedia entry on the possibility of time travel that "conceptual and logical “possibility” do not entail possibility in a full-blooded sense. What exactly such a full-blooded sense would be in case of time travel, and whether one could have reason to believe it to obtain, remain to us obscure". So he is not explicit about what, if any restrictions would have to be placed on, for example, general relativity notions, if he cannot find a way round, in real and practical terms, the problems arising from paradoxes like the "grandfather paradox".

But we know that formulations like those of Godel, Thorne or Visser could apparently lead to an unsolved "grandfather paradox" and if we are to believe modern physics, we are left with the fact that, from Maudlin's recent comments at least, they are in no way resolved in it. So modern physics is in fact, as currently formulated, apparently inconsistent and/or incomplete in quite serious ways.

Maudlin's book,"The Metaphysics Within Physics", which basically consists of a ten year collection of some of his essays, has already been reviewed, often very kindly, by many other researchers. But to me, though it is somewhat confusing it must nonetheless be considered, even if there is the feeling that throughout this work that Maudlin may be acting on a very different set of basic premises to myself. I basically have the feeling, which I do not necessarily hold as a philosophy, that the gaps in present day physics are of what one might call a 'Kuhnian' nature, and modern physics and its background of philosophy, psychology and metaphysical what-have-you has gaps which even Thomas Kuhn at his strongest might not have envisaged. For example, even when Maudlin criticises Earman, he does so within a framework of implicit acceptance of a large blob of B series physics, as he seems to make strong arguments invoking general relativity, or at least of some pattern containing general relativity. I will have none of this. The B series is the B series, and acceptable as such up to a point, with its faults, but from the present standpoint we must also consider some version of the A series or at least some partial or restricted mapping or some such thing of the A series.

Later in this discussion I will go into some detail on Maudlin's book where it seems immediately relevant to the matters to hand, but I must pre-empt the comment that my interpretation of the A series is too vague, or that my "Many Bubble Interpretation" is too vague, by pointing out bluntly that B series quantum physics, for example, has had some 80 years to put its house in order since my late colleague Prince Louis de Broglie won his Nobel laureate, and quantum physics has still not succeeded in becoming clear, to the point where the current well-written popular tome[(45)] "How to teach Physics to your Dog" can actually make quantum physics clearer to a dog than it is to a human being. That does not suggest that dogs have superior insight into modern physics than humans, of course, but it probably shows a lot of things about people that there is probably not time to discuss here, and that fact could be left to further papers on X-phi. To summarise my own views on quantum physics, the fact is that many people still accept the Copenhagen Interpretation, which is an interpretation often known to quantum physics students

as the "shut-up-and-calculate" interpretation, and nobody even raises their eyebrows about its popular title any more. Maybe dogs are beginning to acquire more free will than humans have, and humans are dragooning one another into losing their free will. Sartre and the other existentialists of his period may well have thought that to be the present state of affairs.

So quantum physics has had some 80 years to mature to an understandable subject and it has simply got less and less clear. Literally millions of dedicated scientists have had time to clarify it, but problems have got worse and worse to the point of apparently insoluble paradoxes. My position, that we need the A series as well as the B series, has had little work at any time, except by me personally. And I am getting results. I do appreciate the problems of those such as Maudlin with McTaggart's paradox, which is hard to understand and both confused and confusing, and I particularly appreciate Maudlin's points about using the C series rather than the A series, but as a traditionalist I am using the A series as a starter and going on from there. So far I have had success with dreamwork and am in this paper itself carrying out experiments on construal level theory. Further work may relate also to chemical analogue computers, but I see no further quick success so far in that field and a lot more hard work.

To return to Maudlin's book,"The Metaphysics Within Physics". The sections of greatest interest are in Chapter 4, on "The Passing of Time". On p109 he says quite blatantly "I believe in a block universe". But this is not enough, nor is a simple 'moving present' if we want to even properly describe the concept of free will - even if some people then propose to disprove or condemn it. Maudlin also, on p109, admits that his views are 'unusual' and and he also says he does not deny the objective flow of time, presumably within some 4d universe.

Now that admission is important, as if time flows, a proper physics should be able to describe that flow. But he seems to totally miss the point that time does not seem to be easily described as one entity, but consists of two different ones, described as A series and B series say. The fact that McTaggart is somewhat muddled, as Maudlin admits, should not obscure for us the fact that time has to be carefully described, not ,as it were, as it was described in the heavy excitement of Gottingen after World War 1, but in the light of centuries of repeated failure by science to quantify freewill and time and the present muddled state of physics in its dealings in particular with quantum mechanics.Perhaps scientists have 'shut-up-and-calculated' for too long, because of impressive results in the short term in large but nonetheless limited areas of physics.

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Maudlin's arguments about the passing of time at around p112 seem rather vague, along the lines of a philosopher having to cope with nonexistent physics. I would thus take the view that the problem is not with Maudlin, but with physics, and that I am correct in trying to put it right by using the A series in addition to the B series. Perhaps as somewhat of a sop to Maudlin, I would concur that this may not be the only way to solve this problem ! But here I bow to McTaggart, and suggest his thinking, perhaps somewhat crude by today's standards, can be taken as being along the right lines - by following his leads, the existence of freewill is maintained and the work is in producing more physics, which I am showing can be done and is indeed successful in producing results to date[7,20,22], and in the present paper.

On pp 158-8 Maudlin goes on to say "all God did was to fix the physical laws and the initial physical state of the universe, and the rest of the state of the universe has evolved (either deterministically or stochastically) from that". Now we are thus clearly left with a denial of free will in Maudlin's theories. That is somewhat of a shame, as he seems to be renouncing fact for mathematical fiction, even if in practice he seems to try to post enough philosophical provisos so that he can change his mind later if he has to.

The Deutsch 'multiple universe' theory in fact seems at the moment the most likely of many other 'multiverse' approaches, most of which make use of multiple artificially mathematically created univerese without any real known substance of any sort, but clearly the 'block universe' type model leaves such systems or worldviews clearly in the realm of B series physics and so my usual objections still apply in general.

Two wikis[46] and a book[47] sum up the Deutsch "multiverse hypothesis" and even by implication and reference other approaches such as that of Rees or Tegmark, so I will not recapitulate the Deutsch approach. It's pretty hypothetical and the term 'Occam's razor' is frequently used in connection with it for obvious reasons. However the "grandfather paradox" does not seem to apply to the Deutsch multiverse, and this fact relates to the enormous number of postulated worlds. The existence in actual fact of these postulated worlds is a matter of some debate within the theory. And then there are, if you want there to be, the looming dilemmas of all the philosophy attached to such a matter. Maudlin's work cited above[44] is one way such matters can be handled. There's a discussion group[48] about the Deutsch multiverse called "Fabric of Reality" which I read and often contributed to for many years.

Vlatko Vendral[54] and others try to consider an interesting test for the existence of multiverses of one kind and another. Such results have been considered seriously by those such as Dieter Zeh[55]. Vendral's essay[56] on Maxwell's demons is certainly interesting if viewed in the light of modern quantum computing. Jurgen Schmidhuber[57], Caslav Brukner[58], Bruno Marchal[59], Jacques Vallee[60] and many others have also tried to follow similarly difficult paths and of course much positive comment could be made about their work. Vendral[54], however, suggests that perhaps some of such authors are leaving the mainstream of science for speculation, which is harmless but normally insufficiently rewarding. Arthur C. Clarke, H.G. Wells and other similar writers may well have inspired further research and even have been interesting to scholars, but statements like that of Vallee[61] seem unlikely to become of important use for further immediate research, but are closer to futurology, film scripting or simply science fantasy. To be overambitious can be unhelpful to immediate progress and to seek hostages against posterity in this way can easily overshadow real merit. All this seemingly sends working scientists up a metaphorical Tower of Babel, rather than allowing them, like stout Cortez allegedly did, to "stare with wild surmise" at something new to them, like the Pacific Ocean would have been to Cortez. Or, indeed, to do as Cantor did, and some would say is being done even now in the n-category cafe[62]. However, none of our current investigators in the area, other than myself, seem to even try to use the A series. One reason that their results are so far simply rather hypothetical may well be that they have not dealt with the A series nor even considered people's human characteristics adequately. Instead they tend to grope for ideas like 'human freewill' and 'god' within the rather stultified arena of existing mathematical formalism - or try to create new, and even more stultifying formalism. Cantor and to a lesser extent Godel and Chaitin have shown that the power of mathematics can bring us to a fresh arena of thought, rather than to a metaphorical Tower of Babel as Woit might well claim has now happened with string theory, for example. Towers of Babel may indeed be fascinating, especially to mathematicians, but are off topic here. Such speculation is not to be condemned, of course, but it can be rather a pity.

Appendix 3

Professor Maudlin's comments

There is clearly much too much to comment on, but let me make two brief points:

1: McTaggart's confusion is easy to state: he write as though there is exactly one "A-series", which changes through time. This is incorrect. The A-series consists in the events in the history of the universe categorized as (in the simplest case) "past", "present" and "future". So even from the perspective the physics McTaggart knew (Relativity is not very important here), there are an infinitude of different A-series: on for each moment of time categorized as "present". In sum, given the B-seriese and a single event (or single moment) to count as "present" you can define an A-series, and since there is an infinitude of such events, there is an infinitude of A-series. But each A-series postulates nothing more in reality than one already has in the B-series. As I mentioned, the B-series has an intrinsic direction- the basic asymmteric relation of "earlier than". So "starting with the A-series", you have no more to work with than someone who starts with the B-series and has tken-reflective terms like "now".

2. As a compatibilist, I do not think any issues about time or determinism have any bearing on the issue of free will. Indeed, I do not think there is any such issue. Nothing in physics prevents the description of humans as deliberating about different courses of action, evaluating the foreseen outcomes, or possible outcomes, and acting on that evaluation. As Hume points out, this just is free will, which we have if we are not a prisoner in chains, and are capable of this sort of deliberation.

Reply to Professor Maudlin

1. In effect Professor Maudlin seems to be saying that he thinks that anything useful in the A series can also be conveyed in the B series. I have no argument with that in principle, though it is conjectural until specific cases are established. But equally, we might have well been using pre-Kepler epicycles nowadays to describe planetary motion and might well ultimately have very similar physics to what we have now !

In mental terms, though, the crux of it is that the A series and the B series 'look' different and the physical techniques of modern mathematics seem to describe fairly well the physical movements of physically apparent entities like planets etc. but are shrouded in mystery when it comes to dealing with the human mind.

In my opinion the experimental philosopher must adopt the stand of considering things as they are and not simply on the abstract plane of thought - metaphorically his armchair must burn, to adopt a current phraseology - and he must deal directly with the mind.

Obviously I have done my best to provide a B series mapping of A series concepts, using my Berkeley Madonna models and other models, but there is a long history of cases of persons who are, or claim to be, A-series supporters, B-series supporters, and A and B series supporters. It is clear that believed differences in A and B series have taxed the minds of these, often prominent people. The book of Gale[73] provides many examples of this fact, and Professor Maudlin might well refer rightly to some of these as being due to 'confusion'. The matter is somewhat simplified in the approach in Callender's elementary introduction[75] to time where in common with many, Callender tries to speak of 'tensed' and 'tenseless' theories of time as if these have real differences and each have possibly valuable properties of their own. Then, maybe, we are given the thought fom Callender[75] that one view or the other is superfluous or of less basic merit. Like Professor Maudlin I want to resolve the problems, but am not, at this stage, prepared to cut the Gordian knot but rather prefer to examine the real implications of the ideas associated with the A series as far as mental awareness and understanding are required.

I really have to mention Putnam's comments on 'tensed' time which arise through special

relativity and perhaps in other ways, as they inspire interest and suggest further examination rather than simple dismissal of the A series. In fact, rather than suggesting the abandonment of the A series, they suggest that important differences may exist between A series and B series and may even enforce the idea that the B series describes a simplistically devised "physical" world and the A series is more in concordance with a "mental" world of consciousness but a detailed program would need much thought and a simple approximation might only too easily lapse into naivety.

I believe that the difference or otherwise between A and B series may be one of today's cardinal problems in experimental philosophy, and for once some sort of solution, at least of a currently expedient nature, may be obtainable and even inherent in my present studies. I hope that this is not too weak a statement as I expect actual physical results and appear to be obtaining these gradually.

2. On compatibilism, Professor Maudlin's view seems to be probably a healthy one and ultimately perhaps correct. Indeed, there probably may not be a problem with time, provided we can consider it in the right way. But this may need the A series as well as the B series, at least to be going on with.