A Challenge for Humean Everettians

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Abstract

I show that recent attempts to develop Humean Everettianism are inconsistent with the Principal Principle. Wilhelm (2022) develops an account of probability in Everettian Quantum Mechanics that purports to solve the incoherence, quantitative, practical, and epistemic problems of probability faced by the Everett interpretation; he does so by linking probabilities to a Lewis-style Best System Analysis of the outcomes along branches, resulting in 'centered chances'. Unfortunately, this approach cannot work: it implies that intrinsic duplicates will have distinct credences at any time, and provides no account of which credence in particular any specific agent should adopt. As such, this view of probability does not provide a guide to action and severs the credence-chance link; I suggest general reasons that views of this ilk cannot provide a solution to the practical or epistemic problems. I develop this worry and argue that it stems from a conflation of two types of probability that come apart in many world settings. This distinction also helps explain where branch-counting approaches go wrong.

Keywords: Everettian probability; centered chances; Best System; Everettian Quantum Mechanics; Principal Principle

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1 Introduction

Acolytes of David Lewis's account of probability face a serious problem when it comes to Everettian Quantum Mechanics. According to Lewis, probabilities supervene on the distribution of events in the actual world, and yet the Everettian is committed to the view that there are branches/worlds in which events are distributed in such a way that a branch-relative Lewisian Best System Analysis would result in probabilities in radical disagreement with the Born rule and the predictions of Orthodox Quantum Mechanics. The standard response, defended by Papineau (2010) and Wallace (2012), is to rule out the Lewisian option; though Wilson (2020) offers a distinct defence of Lewis's approach in the Everett context. But a recent alternative has been defended by Isaac Wilhelm (2022); this approach seeks to retain the advantages of a Lewisian approach to probability – that frequencies and chances are closely linked – and it's the goal of this article to show that this is too good to be true.

Wilhelm claims that on Maverick branches – those where the distribution of events radically differs from that predicted by the Born rule, see DeWitt (1970) – the probabilities just are different, and, by applying the Principal Principle, agents should expect to see different outcomes. But the problem is that it's a straightforward consequence of the theory that some of my successors will experience outcomes that wildly differ from those predicted by the Born rule. Even if one accepts the so-called 'divergence' picture – where individuals are identified with distinct four-dimensional spacetime worms at all times i.e. there is no splitting – there are countless individuals that share a qualitatively identical timeslice in me right now; and on Wilhelm's proposal many of those individuals should have different credences from one another and from the Born rule. The issue is that it's not possible for qualitatively identical timeslices of individuals to have distinct credences at a time unless one also opts for a view in the philosophy of mind (e.g. certain dualist theories) that's both at odds with Wilhelm's explicit aims and the reductionist sympathies of many of those motivated by Everettian solutions to the quantum measurement problem.

Moreover Wilhelm's account does not allow for any predictions or confirmations made on the basis of Everettian Quantum Mechanics – that's because, in principle, I have no way of distinguishing between the current intrinsic duplicates who will see the outcomes predicted by the Born rule, and those who will see Maverick outcomes. What then should *I* expect?

How should I choose between the many radically different credences putatively assigned to the many individuals with identical past histories to me right now? This leaves the pressing questions about probability in Everett – if all outcomes occur why should I expect to see those with higher Born rule weight? – unsettled: if all outcomes occur why should I assign my credences according to those of the intrinsic physical duplicate with a high Born weight future? Despite the fact that Wilhelm claims to solve the practical and epistemic problems (see Wilhelm (2022, §3)) faced by probability in Everettian quantum mechanics, Wilhelm's approach cannot tell us how to set our credences.

In the remainder, I'll go through that argument in a more detail, respond to putative counter-arguments and attempt a diagnosis of the mistake – in short, that there are two ways of thinking about probability and possibility that coincide in single-world contexts but that come apart in many world contexts. Wilhelm's mistake is to assume that in an Everettian setting one can import down-branch considerations, relevant to observed frequencies, into practical contexts where cross-branch probabilities are relevant.

2 Centred Everettian Probability

Wilhelm's project is, in my view, very well motivated. He aims to develop an account of chances/objective probabilities in the Everett interpretation that is fully objective insofar as it does not essentially rely on decision theory or self-locating uncertainty. However, unfortunately, I do not think that this aim is met, at least unless one ends up rejecting the claim that objective probability is a guide to action (a link that Wilhelm is keen to retain), for his account still leaves it entirely open what to expect or how to set one's credences. On that basis his account, if it's to be accepted, requires supplementation with a decision-theoretic type strategy and the rejection of the Principal Principle. This contradicts Wilhelm's claim (p. 1026) that "centered chances are those objective, worldly states which constrain rational centered credences".

Wilhelm (2022) argues that physics leaves out a set of facts relevant to probabilities in many worlds – those are the centred facts, which describe the branch-relative evolution of an individual. He says that once we include these facts we observe that, despite fundamental determinism, there are many branches that exhibit various outcomes.

For Wilhelm (ibid. p. 1021-2): "branches are infinitely extended towards the past and the future. Branches do not come into existence when a split occurs. Rather, a split separates two branches which had always existed. Those branches were just exact physical duplicates of one another, before the split".

In the high Born weight branches agents will observe a randomly distributed sequence of events with proportions in accordance with the Born rule. This follows from an important result due to Everett himself, whose analysis is summarised by Barrett (2023) as follows (for proof, see Barrett (1999, pp. 100–107)):

> Everett argued that in the limit as the number of measurements gets large, almost all branches in measure m will describe sequences of measurement records that are randomly distributed with the standard quantum statistics. While he just sketched the corresponding results, one can show that:
>
> **Relative Frequency:** For any $\delta > 0$ and $\epsilon > 0$, there exists a k such that after k measurements the sum of the norm-squared of the amplitude associated with each branch where the distribution of spin-up results is within ϵ of $|\alpha|^2$ and the distribution of spin-down results is within ϵ of $|\beta|^2$ is within δ of one. and
>
> **Randomness:** The sum of the norm-squared of the amplitude associated with each branch where the sequence of relative records satisfies any standard criterion for being random goes to one as the number of measurements gets large. This result holds for any criterion of randomness that classifies at most a countable number of ω-length binary sequences as nonrandom.

Let's (tendentiously) call worlds/branches with relatively high measure m 'typical† worlds/branches' (where the dagger steps back slightly from the tendentiousness). The Everett/Barrett analysis tells us that in typical† branches stable relative frequencies with appropriately randomly distributed outcomes emerge from fundamental determinism.

Thus, we have as good a reason as we can ever have for thinking there are objective probabilities in typical† branches, assuming that somehow probabilities are related to such relative frequencies. One might expect that probabilities are fundamental in quantum mechanics, but this is not compatible with the view that sets probabilities equal to mod-squared amplitudes. On the contrary, we may not regard fundamental amplitudes as corresponding to probabilities before decoherence because such amplitudes interfere. If one were, for example, to regard the amplitudes half way between the double slit and the screen as probabilities in the double slit experiment, one would end up with the wrong predictions. It's only once decoherence has ensured effective non-interference that mod-squared amplitudes behave as probabilities.

An interesting feature of emergent probability is that, just as with other instances of emergence, one must specify a level, or spatiotemporal domain, in order to identify the dependency/probability. So, rather than asking in any particular case what the chance of some outcome is, we evaluate the chance relative to a sequence or history – in Wilhelm's terms a 'branch'. If one is in a typical[†] branch, then the probabilities will conform to the standard predictions of quantum mechanics.

Assuming we have stable relative frequencies in each branch, are these chances? Hoefer (2019) argues (in other contexts) that they are – following David Lewis's account of fundamental chance, he claims that one can identify chances with higher-level distributions of events that have stable frequencies and are appropriately randomly distributed. The chances follow from the best systematisation of those events at that level. This follows from the well-established deterministic chance tradition (see e.g. Glynn (2010)). And Wilhelm endorses an analysis of this kind.

However, what should we make of the Maverick branches?

It's certainly the case that there are some branches in which the long-run sequences of outcomes do not correspond to the Born rule expectations and there are even branches in which there are no well-defined relative frequencies at all, but the Lewis/Hoefer style analysis of these branches makes the determination of the chances in such branches somewhat more complex. On such accounts probabilities supervene on the 'best systematisation' of the distribution of events.

What goes into that systematisation is of course contested. But one might think that *some* not-too-Maverick branches will still give rise to Born rule probabilities on systematisation. That's because the Born rule measure also plays a more fundamental dynamical role pre-decoherence. For example, higher amplitude terms are dynamically privileged within quantum physics – they make more of a difference to quantities with which they interact. And due to Gleason's theorem (see Brown and Ben Porath (2020) and Earman (2022) for discussions) the Born rule measure is uniquely specified by certain theoretical constraints. As such, there may be some branches for which the statistics deviate from those expected according to the Born rule but for which the Best Systematisation still delivers the Born rule as the account of probability. That's because the Best Systematisation is relatively flexible: it may just be simpler on some account of simplicity to take the more fundamental dynamical role that the Born rule measure plays as reason to accept the Born rule as the prescription for chance in some Maverick branches. A Humean of this sort should not regard *all* branches with deviant statistics as having non-Born rule probabilities.

Nonetheless there are certainly some branches which, according to the Lewis/Hoefer/Wilhelm approach will feature non-Born rule chances or no chances at all. This is what motivates Papineau (2010) and Wallace (2012) to rule out Humean accounts of probability.

On the other hand, Wilhelm (2022) argues that, not only are probabilities different in Maverick branches, but that rational observers in such branches should expect different results. Likewise Brown and Ben Porath (2020) argue that in Maverick branches observers should have different credences – though for Brown and Ben Porath this is a serious problem for such an account.

Wilhelm (2022, p. 1027): "On other branches, however, the Born rule probabilities get the frequency facts wrong ... different branches have different best systems, and so different branches have different laws". He goes on to claim that (p. 1029) "God gives the centered Born rule to *you*. God would not give the centered Born rule to individuals who (i) temporarily look exactly like you, but (ii) belong to branches where the centered frequency facts deviate from the Born rule probabilities. To help guide those individuals' guesses as to where they might be, God would give them different chancy rules."

But this must be wrong. Unless Wilhelm is endorsing a rather extraordinary position in the philosophy of mind, he would agree that exact physical duplicates at a time cannot have distinct beliefs at that time.[1] And yet,

[1]Of course, someone (see references in Robinson (2023)) might wish to endorse a form of dualism in which the mental fails to supervene on the physical, or in which beliefs at a time depend on an individual's entire future, but this coupled with a Humean and an Everettian

according to the divergence metaphysics on which the worm view that Wilhelm advocates depends, there are a great many versions of me writing text identical to this right now. All share the same history, thoughts, and experiences, but will have different futures. It's a straightforward consequence of the Everett interpretation that some of the folks who are intrinsic physical duplicates of me right now will experience radically different futures with outcomes radically divergent from those predicted by the Born rule. So, even if it's the case that different laws are associated with each of us, how could it be that we have different credences?

Exact physical duplicates at a time are widely assumed to have the same beliefs. Given that some of my duplicates will experience different futures, which will on Wilhelm's account have different probabilities associated with them, when I am asked what to expect I cannot answer. Perhaps one could develop a view where my credence at a time is determined by all my future experiences, but this would completely sever the link between my beliefs and the evidence available to me. Moreover, if my beliefs are to supervene on my future rather than present evidence, then why use probabilities at all? One could simply say that I ought to expect to observe the precise sequence of events that I will observe, which may be right in a sense, but not at all practically relevant in the way that the Lewisian approach to probability is meant to be. The salient question is: 'what should I expect right now?' and Wilhelm's account does not help at all in answering that question.

As noted above, it's an attractive feature of this account that one can have objective probabilities in Everettian branches, but if these bear *no* relation to the credences (and they can't because one set of credences and all the same evidence is shared by individuals with different futures who consequently have many numerically distinct chances), then it violates the Principal Principle – the idea that chances, credences, and evidence are intimately related. According to Lewis "this principle seems to me to capture all we know about chance" (Lewis (1986, p. 86)). Of course one could argue that what's claimed is about what credences an individual *ought* to have. One response to this would be to argue that 'ought implies can' or some variant, and if such a principle were accepted then the Principal Principle would be undermined.

But the issue is more pressing as Wilhelm (2022, §3) claims to have solved the epistemic and practical problems faced by Everettian proba-

view would be a remarkable metaphysical package and notable as such.

bility. To explain his solution he considers two cases – the first being for 'our world' and worlds like ours: in such worlds he suggests that the Born rule is satisfied and that we can therefore rest easy. 'Our' predictions are claimed to be such that they will be confirmed so long as they satisfy the Born rule and in our world we are thus licenced in making practical decisions on the basis of such probabilities. He says: "the outcomes of experiments confirm quantum theory because on our branch, the main ingredients of that theory – namely, the Schrödinger equation and the Born rule probabilities – can be used to make accurate predictions" (ibid. pp. 1032-3). The other world considered is a world in which every x-spin measurement of a particle prepared in the z-spin-up state comes out as 'up'. In such a Maverick world, agents should follow a different rule, and thus have different credences, and confirm a variant of quantum mechanics with different probability rules.

If these were the only two possible cases, or even if all possible observers might only face a sequence of observations that exhibits a relatively high degree of temporal homogeneity, the practical and epistemic problems may well be solved. There would be many worlds, each with different probability rules. Note that in many such worlds there would be oddities because of the sense in which the Born rule measure plays a more fundamental role in the theory, and so the dynamically preferred Born rule measure would deviate from the observed statistics, but that kind of oddity may be a bullet we are prepared to bite.

However, the problem with probability in Everett is far more profound: there are many (far too many to count!) worlds that have the Born rule up to each and every time t and yet radically deviate from that for their entire future. And the sense in which they deviate may, in some cases, exhibit uniformity but in general will not. So Wilhelm's two examples are special cases and rather misleading as a result. The practical and epistemic problems are not resolved for the other worlds just mentioned because when Wilhelm refers to 'us', unless this is intended circularly to refer just to those in Born rule satisfying (high Born rule weight) worlds then it must refer to all the readers of his paper, and there are many readers – intrinsic duplicates of me – who should, according to Wilhelm's prescription, expect a different future from me because their wildly divergent future observations subvene statistics that correspond to different facts about chance. How do I know which of these futures I will have? How should I know what to expect? How can I confirm/disconfirm the theory if all results are possible and expected by some duplicate of me for all experiments? These are the practical and epistemic problems which Wilhelm claims to resolve but remain unanswered.

One way of thinking about the problem is that in general we presume we have licence to infer future regularities from past regularities; this is an inductive leap, but scientific predictions all must make such leaps as a matter of course. In the case of the individual Everettian branches on the divergence picture we have no such justification available. There is no inductive warrant. That's because for any given history there are many intrinsic duplicates up to some time t that differ beyond that time. And no reason is offered to presume that the futures will be similar to the past. No reason whatsoever is given for presuming that e.g. there will be the same relative frequencies of x-spin-up to x-spin-down measurements for a given quantum state preparation as there has previously been.

One might worry that the charge pressed against Humean accounts holds these to a higher standard than is achievable by any Everettian approach. But the more traditional Everettian can do better: their response would be to note that not all branches are equivalent, that high weight branches (according to the Born rule measure) are those that we should expect to see, and that we should not expect to see low weight branches. That warrants the expectation that induction should hold – that the past should resemble the future for us – given that our observations thus far have roughly been in line with the Born rule; but that the observers who have seen x-spin-up every time for an equal amplitude state preparation should expect induction to be violated in that case: they should also expect to see future observations in line with the Born rule. It seems that Wilhelm disagrees in that case: he thinks that observers with such a low weight history should expect their history to continue to be low weight, that they should expect to see further x-spin-up outcomes when they measure. But the theory tells us that some observers with a x-spin-up history will, towards the future, see x-spin-down. What could justify the expectation that history will continue as it has gone thus far? No story is told about this and in the absence of any story no guide is provided as to how to set one's credences.

If in fact I should expect to see outcomes distributed according to the Born rule – as I'd advise everyone to bet unless they *know* their future to be different – then either Wilhelm's account is entirely to be denied, or, at least, the Principal Principle is false. That's because my credences would not accord to the objective probabilities plus available evidence for the duplicates of me with Maverick futures. Whatever one's history, there are futures that accord to the Born rule, and futures that don't – and the centred chance analysis does not help at all in deciding how to set one's credences among those options.

Even if one accepts that Wilhelm's solutions to the practical and epistemic problems are inadequate, the account offered is still somewhat strange. That's because epistemically normative statements of the kind 'S should believe that the probability of event E is x' don't seem to play the right functional role within our systems of inquiry if there are no circumstances in which S could in fact come to know that this is what they should believe (see Wallace (2012) for a defence of functionalism about probability). While there's nothing inconsistent about denying this, it seems out of keeping with standard ways of speaking. Usually it's reasonable to suppose that if someone ought to do some action or believe some proposition then they are in some sense culpable or blameworthy for their failure to do that action or update their beliefs accordingly.

The present situation differs from that: S cannot know which of the various possibilities corresponds to their future, and since on Wilhelm's proposal, the chances supervene on the entire (future and past) history of each world, they cannot know what their chances are, and they have no way on this prescription of inferring or guessing. This makes epistemic norms such as the Principal Principle impossible to satisfy.

Romagosa (n.d.) has recently pushed a similar line to that developed above. Unlike Romagosa, I'm not worried about the applicability of the notion of uncertainty. However, I agree with and endorse Romagosa's third objection and I develop that worry above. However, I go further in providing an argument that this will generalise to any attempt to follow Lewis in relating the probabilities to frequencies as the Humean does, and crucially, in the next section I diagnose the source of this issue and demonstrate that this has implications for branch counting accounts of Everettian probability.

3 Diagnosis

What's the source of this incompatibility between Everettian probabilities and branch-relative Humean chances? Greaves (2007), Papineau (2010), Saunders et al. (2010), Sebens and Carroll (2018), Vaidman (2011), Wallace (2012), and Wilson (2020), and others put forward a range of arguments that rational observers should assign credences in accordance with the Born rule.[2] I will not rehearse such arguments here. However, I will note a crucial feature – that such arguments are based on symmetries and other relevant features of the range of possible outcomes consequent upon branches splitting or diverging from one another.

Of course there are those who question the specific details of the decision theoretic arguments, but I won't respond to these arguments here. My goal is not to provide a full-throated defence of probability in Everett, rather to suggest a diagnosis for the issues discussed above.

To that end at this point I want to note a common feature of all analyses of practical/epistemic probability: that they are across-branch (horizontal in figure 1)! That is, they are based on the reasoning of an observer facing a number of futures, when, in retrospect, they will only have observed a single outcome. This is in contrast to down-branch probabilities (vertical/diagonal in figure 1) that relate to the four-dimensional spacetime worm, branch, history, or sequence of unique outcomes of experiments.

In the ordinary one-world metaphysics to which we're habituated, this doesn't bear mentioning: that's because down-world frequencies are what inform our sense of across-world possibilities. But in the Everettian case these come apart. All the epistemic/practical arguments just cited, of necessity, are built upon an analysis that is indirectly related to what we observe.

Why think that across-world possibilities and down-world frequencies are intimately related in single-world but come apart in many world contexts? And why think that's relevant to the question of the relationship between epistemic/practical probability and objective probability?

I'll respond to the second question first. There's a sense in which it's up

[2]Alastair Wilson's account builds on Lewis's work and so might seem oddly placed in this list, however for Wilson the chance of some outcome corresponds to the chance that an individual's world is amongst the set of worlds that feature that outcome. Thus, we can see that he takes the across-world possibilities as the basis for his analysis.

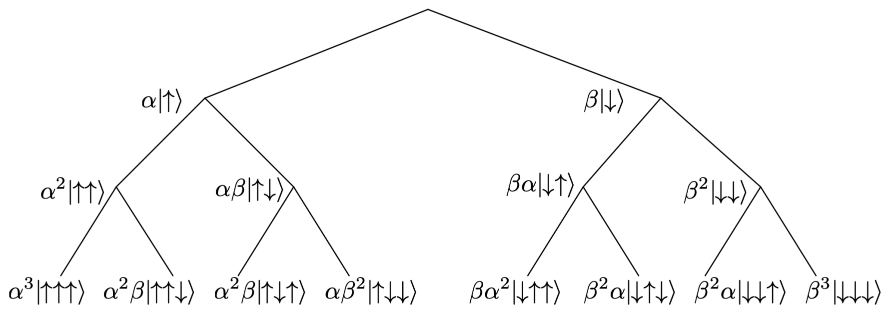

Figure 1: From Barrett (2019, p. 152).

to us quite what meaning we assign to the concept ‘probability’, especially in a setting so alien to that in which we assumed we were located when our concepts developed. However it shouldn’t be controversial that practical/epistemic probabilities accord to the range of possibilities available to a given observer at a given time: decisions are made at a time, and so it makes sense to think of the range of possible futures at that time when making decisions.

On the other hand there’s an obvious connection between down-world frequencies – observed frequencies – and probabilities. Probabilities are used to explain what we observe, and predict what we are going to observe (Elliott (2021)). Humean theories of probability (such as Glynn (2010) and Hoefer (2019)) as well as Sober (2010)’s no-theory theory make this connection almost analytic. That’s why down-world and across-world may be taken, respectively, to relate to objective probabilities and practical/epistemic probabilities.

Let’s return to the first question: how are these related in a single world scenario? In that context, one infers possibilities from outcomes: if A and B only ever occur and the observed frequency A:B approximates 1:2 it’s inferred that A and B are the possibilities and that B is more likely to occur than A. The logic of probabilistic inference of course allows that in the future one will only ever observe A, but it seems to Humeans and other empiricists that, if one were never to observe a B again, the probabilities would either have changed, or have always been different from what we’d thought they were.[3]

[3]See Barrett and Chen (2023) for an interesting account of probabilistic laws that would

By contrast, in the Everettian context it's known that some branches will exhibit down-branch frequencies that radically differ from the range of possibilities facing a given observer at a splitting. In some branches, looking backward at a given system's observed history or looking forward by singling out a sequence of descendants' observations, only Bs will be observed, and in other branches only As, and in many further branches the proportion of As to Bs will be such that they don't at all accord with the Born rule or have no stable proportionality.

In a non-Everettian single-world context at least one can say that we *expect* the down-world frequencies to match the across-world (across the set of physically possible worlds at a time) range of possibilities, but in the Everettian context we know that in some cases these radically diverge.

Faced with this observation, many are tempted to dismiss Everettian quantum mechanics as empirically unacceptable.[4] But such claims are often based on the conflation of down-world frequencies with across-world possibilities and positing a close link between practical/epistemic and Hoefer/Lewis objective probabilities as codified in the Principal Principle. If that conflation is resisted, then these unfortunate consequences may be avoided.

It's not that I wish to argue that a close link between these two kinds of probability is unattractive – of course, it is intuitive! However, it's certainly an assumption being made by various analyses of the Everett theory, and if, in certain Maverick branches, these probabilities come apart, it's not clear why that would be such a bad thing. There are still practical/epistemic probabilities that accord to the Born rule because these do rely on across-branch possibilities at a time, and that's true even if one's history is such that those frequencies are not exhibited in one's branch. In other words, we might well grant that, at least on some theories of probability, objective probabilities in Maverick branches deviate from the Born rule, but even in such worlds you'd still do best to bet with Born rule credences, *pace* Wilhelm (2022).[5] So if Wilhelm's account of objective probability as centred chances is to be accepted, he still requires something like the decision theoretic arguments to tell us how to set our credences, and the Principal Principle's link between centred chances and credences will be violated.

avoid these issues.

[4] A related argument motivates Adlam (2014).

[5] Alternatively one may follow Papineau (2010) and argue that only a propensity theory is adequate to the Everettian case.

It's worth noting that precisely this conflation is behind arguments for branch counting in Everett – e.g. Dizadji-Bahmani (2015), Khawaja (forthcoming), and Saunders (2021), (though Saunders is not committed to this as *the* analysis of probability in Everett). The assumption amongst branch counters is that there's some reason to relate across-branch frequency to probability. But what even is across-branch frequency? It's not at all clear that it's a coherent concept, given that branches/worlds are emergent, as Wallace has argued (consider counting clouds). But, more importantly, across-branch/world frequency is certainly not operational or empirical in any way. Down-branch frequencies do have a connection to probability, and if one wants to count anything it's these that should be counted. But it's a straightforward consequence of the Everett interpretation, as developed at length in §2, that down-branch frequencies and across-branch possibilities come apart.

If one wants to try and make sense of some across-branch analysis then it's certainly not clear that this should proceed by any kind of indifference principle – for that's only justified in down-branch contexts if at all. So across-branch analysis requires an entirely different kind of set-up. It's not that I can rule out any particular branch-counting thus – it's that the appeal of branch counting relies on an implicit conflation between down-branch counting which is a perfectly reasonable source for probability inferences, and across-branch counting which, even if coherent, has no relation in the Everett theory to probabilities.

4 Conclusion

Probability in the Everett interpretation of quantum mechanics will, inevitably, lose some of the conceptual associations of probability in single world contexts. That's not at all surprising: the theory is revisionary and probability theory was developed at a time when a multiverse was not taken seriously as a scientific hypothesis. It's most common in the literature to contemplate revising our notion of uncertainty, however, Wilhelm's analysis seems far more radical: it forces us to give up on the relationship between chance and credence known as the 'Principal Principle'. That's because, on his analysis, a single observer at a time with a single set of credences will be a member of many temporally extended branches, to each of which Wilhelm assigns different chances.

I've argued that this is a consequence of the fact that two more basic notions – across-branch possibilities and down-branch frequencies – come apart in many world scenarios.

Overall, it should be clear that one may draw various conclusions about the nature of chance in Everettian Quantum Mechanics, but that the best arguments for making sense of credence assignments are those that depend on across-world probabilities rather than the down-branch distribution of events. Indeed, anyone who wishes to bet otherwise will find many people willing to accept the wager!

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