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Betty Brancher and the Privileged Branch View of Personal Identity

1.0 – Introduction

This paper explores personal identity and persistence through time in the many-worlds framework, governed by the Many Worlds Interpretation (MWI) of quantum mechanics (QM). First, I will motivate our consideration of the MWI in this context. Second, I will introduce endurantism, which is one answer to the puzzle concerning persistence through time. Third, I will explain the foundational physics underlying the MWI that lends itself to branching worlds. In turn, I will explain what exactly a world amounts to in this picture. Then, I will present three views on personal identity and persistence through time: the *bye-bye Betty view*, the *every-branch view*, and the *privileged branch view*. I will argue that the privileged branch view is the most attractive of the bunch for determining the best candidate among close continuers. Finally, I will discuss knowledge, attitudes, and moral responsibility within the privileged branch view.

2.0 – Scope

Some of our most successful physical theories have difficulty explaining the dynamics of the measurement process within QM. This difficulty is popularly known as *the measurement problem*. Loads of work has been done on this subject in both the physics and philosophy of

science literature. The MWI is an increasingly accepted solution among many interpretations of QM. It is beyond the scope of this paper to compare competing interpretations of QM; nor is it the goal of this paper to convince the reader that the MWI is the *best* interpretation on offer.

Further, for this paper, I adopt endurantism simply for the sake of analysis. I do not necessarily endorse endurantism independent of this work. Future versions of this work will extend to other theories of persistence through time.

3.0 – Why Bother?

The MWI is an interesting arena to discuss personal identity and persistence through time. However, admittedly, the provocativeness of engaging in this arena is not immediately obvious. One might naturally question how the MWI is supposed to deliver us unique insight concerning personal identity compared to other arenas in this context. After all, there are historical accounts of personal identity that have devised fission cases in which one person "splits" into many people. These kinds of fission cases examine the metaphysical possibility of a person *splitting or branching* into multiple people, and they do so without appealing to any background physics.

What, then, warrants our consideration of the MWI in the context of personal identity? For starters, many philosophers reject that identity is preserved in fission cases by way of no-branching conditions (Walker, 173). The no-branching condition is used to ground the claim that, in ordinary fission cases, the person pre-split is *not identical* to any of the post-split people. We can sketch such a condition in terms of psychological criterion: "X and Y are the same person if they are psychologically continuous and there is no other person who is contemporary with either and psychologically continuous with the other" (Walker, 181). In ordinary fission cases, this

criterion is violated since the post-split people are contemporaries, and the post-split people are psychologically continuous with the pre-split person. The no-branching condition, then, is used to reject that personal identity is preserved in ordinary fission cases. However, splitting is not a mere metaphysical possibility in the MWI as it is in the fission cases. Rather, splitting is an objectively real physical consequence of the theory. Granted, one might still apply no-branching conditions in the MWI case. But, no-branching conditions are not so straightforwardly applied in that case, given that our intuitions about "splitting" should be quite different in the context of the MWI. (I will discuss branching explicitly in section six.)

Another reason that the MWI warrants our consideration in this context is that, unlike ordinary fission cases, branching is a constant phenomenon. Of course, we can extend ordinary fission cases to account for multiple instances of splitting. For example, Derek Parfit (1971) considers a "tree" of psychological continuity between individuals which involves several instances of splitting. However, as noted earlier, splitting in fission cases is a mere metaphysical possibility used for the sake of analysis. Since constant branching is a physical consequence of the MWI, our judgments about how objects persist through time might be different than our judgments in fission cases.

Lastly, some philosophers dismiss the extraordinary technological and medical practices stipulated in fission cases, such as psychological extraction and brain transplants, as too far-fetched to be taken seriously. Thus, the MWI is a unique arena for exploring personal identity and persistence through time.

4.0 – Endurantism

There is a puzzle in metaphysics concerning how objects persist through time. I do not have the space in this paper to argue in favor of responses to this puzzle. Thus, I'll assume endurantism and move forward with the analysis. Note that endurantism is a view of persistence through time and not of personal identity (though, as we will see, it may be useful in that area). Endurantists hold that an object persists (or endures) through time if and only if "it is *wholly present* at different times" (Haslanger, 317). Thus, enduring objects have spatial parts but not temporal parts (Hawley, 3). A formalization of the endurantist view can be put as follows: an object, O, persists from time t_1 to time t_2 if and only if O is wholly present at both t_1 and t_2 (and presumably in the intervening times) (Haslanger, 318).

5.0 – Many-Worlds Mechanics

The MWI is known for its fascinating and rather controversial conclusion that the world as we know it is constantly branching into many worlds. What motivates physicists and philosophers to accept such a seemingly absurd view? The MWI's attractiveness is in part due to its parsimonious approach to QM, which avoids appealing to ad hoc mechanisms to account for the "strangeness" of measurement. Further, just as the other interpretations of QM, the MWI's predictive power is remarkable. To appreciate these characteristics of the MWI, let's examine its history and formulation.

Hugh Everett originally developed his so-called 'pure wave mechanics' during his PhD in the 1950s. Everett took the underlying physics of QM literally, and, therefore, accepted the theory at face value. He proposed an austere formalism of QM which avoids adding superfluous machinery to the theory, such as collapse mechanisms and hidden variables. He eventually presented a straightforward interpretation of QM that we now know as the MWI.

At the heart of the MWI is the wavefunction, represented by ψ, which is a fundamental mathematical entity that "gives information only concerning the probabilities of the results of various observations that can be made on the system" (Everett, 3). Each possible outcome of an observation is known as an eigenvalue. Eigenvalues correspond to the value of a unique physical observable such as position, momentum, etc. Thus, ψ gives information concerning the probabilities of obtaining an eigenvalue corresponding to a particular physical observable. Before measurement, ψ is said to be in a *superposition* of its eigenstates, which are quantum states that correspond to an eigenvalue, each with a certain probability of being realized upon measurement. That is, ψ is in all its eigenstates *at the same time* rather than a single defined state. In other words, ψ is "smeared" across each of its eigenstates. Thus, questions about the physical observables of the system before measurement are unclear at best. We simply cannot identify values for the physical observables of the system before measurement since ψ is in all states at once.

The evolution of wavefunctions before measurement is smooth since they evolve with time in a linear and deterministic fashion according to the Schrödinger equation. According to Everett, the underlying physics of QM alone provides an informationally complete description of the world. Further, Everett took the deterministic linear dynamics to be a "*complete* as well as accurate description of the time-evolution of every system" (Barrett, 5). Everett extended the validity of wavefunction mechanics beyond microphysical quantum systems. Macroscopic systems, including observers and measuring devices, are subject to the very same wavefunction mechanics (Everett, 8). One can even consider the wavefunction of the entire universe (Everett, 9). Though the evolution of the wavefunction is smooth before measurement, things get complicated once a measurement of the system occurs.

6.0 – Branching Worlds

In short, the measurement process generates alternate quantum worlds. Upon interaction, observers become entangled with the system. This entanglement entails that one world is split into many worlds (Bishop, 28). One might naturally question what a measurement or observation amounts to. Everett was quite liberal in this regard: he states that any interaction *at all* between the observer and object-system counts as measurement or observation (10). An interaction between the observer and object-system causes all possible eigenstates of ψ to be realized; there is a world generated for each of the eigenstates, each of which corresponds to a unique outcome. The emerging worlds are not a matter of mere metaphysical stipulation (Barrett, 54). Rather, the evolution of the wavefunction through interaction reflects a "continual splitting of the universe into a multitude of mutually unobservable but *equally real worlds*, in each of which every good measurement has yielded a definite result" (my emphasis, Everett, v). Though modern Everettians apply strict criteria for the reality of a branch by appealing to a process called decoherence, they maintain the familiar conclusion that one world splits into many worlds upon measurement (Maudlin, 176). Thus, the MWI states that one world branches into multiple equally real worlds upon an observer-system interaction.

This result is seemingly strange, especially considering an observer's experience during the measurement process. As we saw earlier, observers become entangled with the system upon interaction. This interaction, as described by Everett, transforms the observer from a single defined state into a superposition of states (73). But it is not as though we as observers are phenomenologically aware of any such superposition. (This is partly what makes QM, and the MWI in particular, so "strange"). Rather, it appears to an observer that any "observation on a system [causes] the system to jump into an eigenstate in a random fashion" (Everett, 70). Since

each branch or world – I will use these interchangeably – corresponds to a single eigenstate, we can explain why observers in each branch record a single definite outcome. All worlds contain a "definite observer state and a definite relative object-system state" (Everett, 10). This means that the MWI makes the same statistical predictions as the "standard" views of QM, such as collapse theories. We should not think of branching as mysterious or magical since it is simply a physical consequence of an observer-system interaction as implied by the straightforward interpretation of QM.

First, there are wavefunctions in a superposition of all possible outcomes (or eigenstates). Second, observers interact with and, in turn, become entangled with those systems. Finally, there is an actual world generated for each possible outcome which contains all physical things, including the observer and the corresponding outcome of measurement. That is, the worlds are qualitatively identical besides the outcome of the measurement.

To bring out the characteristics of MWI more clearly, consider the following example. Let's say that a coin is a quantum system represented by a wavefunction. The eigenstates of the system are *heads* and *tails*, each of which has a probability of one-half. As the coin is flipping, the wavefunction is in a superposition of those eigenstates, namely, the coin is both heads and tails *at the same time*. It would be unclear to ask, as it is flipping, whether the coin is heads or tails because there simply is no fact of the matter at that time. Once it lands, there are two worlds – one corresponding to the measurement heads, and the other corresponding to the measurement tails. The observer can predict the outcome of the coin toss using simple probability. However, the observer is ignorant of which outcome he will obtain. An observer's prediction of an outcome amounts to the *subjective probability* of that observer ending up on the branch that has the highest probability of being obtained upon measurement. Both heads and tails are

determinate outcomes, but the observer is ignorant of which branch (in this case, heads or tails) she will end up on. Thus, in general, probability figures into the MWI in that there is a subjective probability in which the observer is ignorant of which branch they will end up on post-measurement (though they can make predictions using the prior probabilities of each state).

7.0 – What is a World Anyway?

We have arrived at the essential conclusion of the MWI that a physical consequence of measurement is that one world branches into many worlds, each corresponding to a particular observer and unique physical observable. But one might naturally question what a "world" amounts to in this picture. In this section, I will set out to answer that question.

Everett rarely refers to "worlds" in his thesis. Instead, he appealed to *branches* and *cross-sections*, which are intended to explain the determinate measurement record of an observer and quantum probabilities (Barrett, 51). One way to understand the explanatory role Everett had in mind is to take the "branches represented in a cross-section of the total state as *alternative quantum worlds*" (my emphasis, Barrett, 47). One can take a cross-section of the total state, say, the state of the universe (which is within the scope of the MWI), and thereby obtain a set of alternative quantum worlds.

According to Barrett, to complement Everett's interpretation of QM, one can think of quantum worlds as having the following properties: "(i) they explain our having determinate measurement records and why these records exhibit the standard quantum statistics, (ii) they are *all equally actual*, (iii) they may always, at least in principle, *interact with each other* and, hence, *may be detectable*, (iv) they are *physically emergent* in the sense that what quantum worlds there are at a time depends on the total quantum state of the physical world, and (v) they are

conventional in the sense that the precise set of alternative quantum worlds that there are depends on what cross-section of the total state one chooses to consider" (my emphasis 47, 48). The main takeaway from these characteristics of quantum worlds, for our purposes, is that they are each equally actual. Notice that these alternative quantum worlds are distinct from the *possible worlds* typically considered by philosophers in the context of modal realism (Barrett, 47). David Lewis himself "concluded that [Everett's] possible worlds were quite different from his own, and he did not see any immediate implication of one notion for the other" (Barrett, 59). Thus, the alternative quantum worlds are quite different from our typical philosophical consideration of possible worlds, and, indeed, are defined by separate characteristics as outlined above.

8.0 – Best-Candidate Views of Personal Identity

For the following analysis, I will be assuming a *best-candidate* account of personal identity which argues that "in philosophical thought experiments, we may have to choose between rivals in making decisions on identity, and that faced with this choice, it seems natural to choose the best candidate, the closest continuer" (Brennan, 423). How do we determine the best candidate? As Robert Nozick (1981) puts it, the best candidate is the *closest continuer* which "has the highest degree of [spatiotemporal] and qualitative continuity with the original item" (Noonan, 196). I take it for granted that there are various flavors of best-candidate views, some of which prioritize psychological identity over bodily continuity. Guiding the following analysis is one such best-candidate view that holds that psychological continuity is more important than bodily continuity, though both criteria should be considered in determining the best candidate. Arguing for the latter claim is for another paper. Instead, I aim to develop a view that picks out the best candidate in the many-worlds framework.

9.0 – Betty Brancher

Consider an agent, Betty Brancher, whose world is subject to branching as described by the MWI. Betty is in world w_0 at time t_0. At some later time, t_1, Betty interacts with a quantum system with two possible outcomes. This interaction causes w_0 to split into two worlds, w_1 and w_2, which are spatiotemporally continuous with w_0. What can endurantists say about the 'original' Betty – the Betty in w_0 at t_0? This question is reminiscent of Derek Parfit's discussion of classic fission cases in that there seem to be three initial responses (Parfit, 5). First, the *bye-bye Betty view* says that Betty does not exist in w_1 or w_2, i.e., Betty does not exist at all. Second, the *every-branch view* says that Betty exists in *both* w_1 and w_2. Finally, the *privileged branch view* says that Betty exists in either w_1 or w_2. Let's analyze each view in turn.

9.1 – The Bye-Bye Betty View

On the bye-bye Betty view, Betty no longer exists post-split. Put in an endurantist spirit, Betty does not persist through the split because she is not wholly present in any world at time t_1. In this view, the split is essentially Betty's death. However, Betty's successors emerge once the split occurs, and each of them is wholly present in w_1 and w_2, respectively.

9.1.1 – Bye-Bye Betty Analysis

Betty's successors are psychologically continuous with Betty since they have a direct psychological relation to Betty (Parfit, 20). The successors share a unique psychological past with Betty, including her memories, beliefs, etc. Bodily continuity, however, does not seem to be met considering the endurantist judgment that Betty *does not persist* through the split. More specifically, if Betty does not persist through the split, then Betty's wholly present body in w_0 at t_0 must not exist at time t_1. Therefore, since Betty does not persist through the split on this view,

Betty's body cannot be wholly present in w_1 nor w_2 at time t_1. Her successors, whose bodies come into existence at t_1, are independently wholly present in their respective worlds. Thus, the body wholly present in w_0 at t_0 is not continuous with either of the wholly present bodies in w_1 and w_2, respectively, at time t_1. Therefore, Betty's counterparts are not bodily continuous with Betty. Though the bye-bye Betty view seems a viable option, there is an apparent issue.

The bye-bye Betty view turns out to be not-so-endurantist after all. Instead, it collapses to an *exdurantist* view of persistence through time, which states that objects persist as stages that exist only momentarily (Haslanger, 318). According to Bryce DeWitt, the universe is constantly splitting; even quantum interactions taking place across the universe cause a split in the universal wavefunction (DeWitt, 33). Thus, agents are only momentarily wholly present. This is incompatible with the endurantist view but compatible with the exdurantist view. To endorse the bye-bye Betty view, one must abandon their original endurantist commitments and, instead, embrace exdurantism. Therefore, endurantists should reject this view.

9.2 – The Every-Branch View

Alternatively, endurantists can endorse the every-branch view, which says that Betty exists in both resulting branches. More specifically, Betty, wholly present in w_0 at t_0, persists through the split and is multiply wholly present in both w_1 and w_2 at time t_1.

9.2.1 – Every-Branch Analysis

The bodily continuity criterion is satisfied in this case since the multiply wholly present body in w_1 and w_2 is the same wholly present body that was in w_0 at t_0. The wholly present body at time t_0 (pre-split) is, at time t_1 (post-split), a multiply wholly present body. The criterion of

psychological continuity is satisfied since Betty's psychology is retained *in-house,* so to speak. Though the every-branch view seems plausible, I think it faces an issue.

The every-branch view is inconsistent with the underlying physics of the MWI. In this picture, Betty will obtain *all* possible outcomes of measurement since she exists in both branches. Betty is a single (multiply wholly present) observer who records two unique outcomes. As described in section six, however, each branch contains a single definite observer who records a *single unique* outcome. An analogy to this case would be one in which Betty flipped a coin once and recorded that the outcome was both heads and tails. But, on the MWI, observers should measure only a single distinct outcome. Thus, the every-branch view makes inconsistent predictions about the outcome of a given measurement. Therefore, one should reject the every-branch view since it departs from the MWI.

9.3 – The Privileged Branch View

Lastly, an endurantist can hold that Betty exists in *either* w_1 or w_2 at time t_1. More specifically, Betty, wholly present in w_0 at time t_0, persists through the split in virtue of the fact that she is wholly present on either w_1 or w_2 at time t_1. There is a single branch that Betty ends up on. Let's call that branch the *privileged branch*. Betty's counterpart ends up wholly present in the other branch.

9.3.1 – Privileged Branch Analysis

Betty's psychology from t_0 to t_1 is retained in-house. Betty's counterpart is psychologically continuous to Betty, though her psychology is not retained in-house since she is not bodily continuous with Betty. Thus, both Betty and her counterpart satisfy the criteria of psychological continuity. However, only the body wholly present in the privileged branch

satisfies the bodily continuity criteria. The wholly present body in w_0 at t_0 is the same wholly present body in the privileged branch at time t_1, and that wholly present body is Betty's body. The counterpart's wholly present body, at time t_1, however, is not the same as the wholly present body in w_0 at t_0 because the counterpart's body does not exist until time t_1. There is only one wholly present body that existed both before and after t_1, and it is Betty's body. Therefore, the counterpart is not bodily continuous with Betty. The charges made against the other views cannot be said of this view.

The privileged branch view maintains our endurantist commitments and, further, remains consistent with the statistical predictions of the MWI. The upshot of this picture is that it captures our experience and judgments concerning persistence through time. This view, unlike the bye-bye Betty view, holds that agents persist through constant branching. This means that we need not abandon our endurantist commitments since agents in the privileged branch view are wholly present at different times rather than mere moments. Thus, the charge against the bye-bye Betty view cannot be applied to this view.

Further, the privileged branch view is consistent with the underlying mechanics of the MWI. Once the split happens, Betty is a single definite observer wholly present on the privileged branch. Betty will record a unique outcome. Betty's counterpart is a *different* single definite observer wholly present on the other branch. The counterpart will record a unique outcome. Thus, the charge against the every-branch view cannot be applied to this view. Therefore, one should accept the privileged branch view because it preserves our endurantist judgments while remaining consistent with the statistical predictions of the MWI.

9.4 – Best Candidate Analysis

Thus far, the privileged branch view appears to be our front-runner when it comes to endurantist judgments and consistency with the MWI. However, we have yet to consider how each view determines the best candidate among Betty and her successor(s) or counterpart(s). I will consider each view in turn.

Recall that the bye-bye Betty view holds that Betty does not exist in any world at time t_1. Betty's successors are both psychologically continuous with Betty, but neither share bodily continuity with Betty. Thus, each successor is an equally close continuer to Betty. The race for the best candidate is at a stalemate. Therefore, the bye-bye Betty view would be committed to saying that there is no *best* candidate – there are two equally sufficient close continuers.

Recall that the every-branch view holds that Betty is multiply wholly present in both w_1 and w_2 at time t_1. Betty's psychology is retained in-house from t_0 to t_1, so the psychological continuity criterion is met. Further, the bodily continuity criterion is met since the wholly present body at time t_0 is the *same body* that is multiply wholly present at time t_1. Which is the best candidate? In this view, there are two equally good candidates since they both satisfy the identity criteria in the same way. Therefore, the every-branch view is committed to saying that there is no *best* candidate since both candidates are equally sufficient close continuers.

Recall that the privileged branch view holds that Betty is wholly present in either w_1 or w_2 at time t_1. While both Betty and her counterpart are psychologically continuous with Betty, it is worth noting that Betty meets this criterion because her psychology is retained in-house, whereas the counterpart meets this criterion simply by sharing a psychological past with Betty. Further, only the wholly present body in the privileged branch at time t_1 is bodily continuous with the wholly present body at time t_0 because it is the same wholly present body at each time. Betty's counterpart is not bodily continuous with Betty. This is because the counterpart did not exist

before time t_1. Which is the best candidate? In this view, the answer is clear: the person who is *both* psychologically and bodily continuous with Betty is the best candidate. We can determine the best candidate by pointing out that the person on the privileged branch satisfies both criteria for identity, while the counterpart only satisfies the psychological continuity criterion. The person on the privileged branch is a *closer continuer* than the person on the other branch, and, therefore, is the best candidate. Indeed, the best candidate *is* uncontroversially Betty in the privileged branch view.

Note that the bye-bye Betty view and the every-branch view hold that the best candidate is indeterminate since each concludes that Betty has two equally sufficient close continuers. The privileged branch view, however, delineates the best candidate from other close continuers by picking out the candidate that satisfies both the bodily and psychological continuity criteria. In terms of best candidate views of identity, then, the privileged branch view is the only view presented in which the best candidate can be identified.

10.0 – Knowledge

Consider Betty Brancher's identity and persistence through time as described by the privileged branch view. Given that there are infinitely many counterparts and only one "true" Betty Brancher, can Betty know whether she is the *main character,* so to speak, and not a counterpart? In other words, can Betty distinguish between being on the privileged branch and another branch?

In short, no – unless one assumes a weak notion of knowledge in which a justified true belief suffices for knowledge. In that case, Betty and her infinitely many counterparts on the infinitely many branches *all* likely believe that *they* are the main characters. However, only Betty

has a justified *true* belief that she is the main character. All the counterparts, on the other hand, have a *false* belief about their being the main character.

On stronger theories of knowledge, Betty cannot know whether she is the main character or a counterpart since there are no measures by which she could determine her identity. All the quantum worlds are qualitatively identical except for their unique measurement outcomes. At best, Betty can use the probabilities of the outcomes of a measurement to predict which branch she will end up in. But this prediction, of course, will only inform her beliefs about her future identity and not her current or past identity. Further, given the statistical nature of quantum mechanics and the fact that branching is occurring constantly, it is highly unlikely (with a probability of approximately zero) that Betty is indeed the main character. By the time Betty crunches the numbers for her prediction, she has likely (with a probability of approximately one) become a counterpart. While, in principle, these worlds could interact with one another, it is unclear how Betty and her counterparts might collaborate to determine the main character given that they all share the same psychological past. It certainly could not be settled by asking questions about the observer-system interaction since all individuals – Betty and her counterparts – remember the interaction and believe that they were the "true" observer of the interaction. Once again, only Betty has veridical memories and beliefs; her counterparts do not. It is seemingly impossible that their collaborative effort could deliver them knowledge of who of the infinite bunch is the one with veridical memories and beliefs. Thus, the privileged branch view lends itself to a kind of knowledge skepticism in which a person cannot know whether they are the main character or a counterpart.

11.0 – Attitudes

Let's say, contrary to the conclusion of the previous section, that *it is possible* that the main character and her counterparts *can* know their identity and, further, that their identities were revealed to one another. What attitudes would the counterparts have toward the main character and vice versa?

I take it that there are several plausible attitudes they might have toward one another. I aim to point out only a few. One attitude is indifference, wherein the main character and her counterparts simply do not care about the existence of one another or their respective identity. (I believe that this is the attitude they ought to have for one another, but I grant that this is not uncontroversial – it's not my goal to argue for this claim.) If the privileged branch view were known to be true, I doubt that we would be infinitely mournful for all the infinite counterparts we have lost (and likely are losing by the second). But, for the counterparts that are sensitive to the fact that they are indeed mere counterparts, I suspect that jealousy might be an attitude directed towards the main character. Perhaps the counterparts are jealous that the main character turned out to be, say, a successful movie star, while they are stuck in the basement of a philosophy department writing about personal identity in the many-worlds framework. (Disclaimer: I love FSU and our philosophy department). Their jealousy might stem from the fact that the main character has veridical memories, beliefs, perceptual experiences, etc., whereas their memories, beliefs, perceptual experiences, etc., about the past (before they existed) are nonveridical.

Consider cases with a moral aspect in which the main character is a bad person in whatever ethical theory suits your fancy. The main character's actions are influenced by her psychology; she desires to do the wrong thing and believes that by doing the wrong thing she can satisfy that desire. What attitudes should the counterparts have towards the main character? I take it that contempt is a plausible option, though it is not obvious that they would feel *more*

contempt toward the main character than they would toward a stranger who performs the same contemptuous actions. There is some nuance to be appreciated on this point. The counterparts that hold contempt toward the main character do so because the main character is a bad person, in part, because of her psychology. If that is the case, since the counterparts are all psychologically continuous with the main character, should the counterparts also hold *themselves* to some degree of contempt? Surely not, considering the counterparts are not responsible for the psychology they have (at least, at the time of the split). One suggestion may alleviate this worry: upon realizing that they are counterparts to an "evil" main character, the counterparts might have a motivational attitude towards themselves, namely, they are motivated to be good people despite being psychologically continuous with an evil main character. Further, if the main character were a morally good person, the counterparts may be motivated to be better people. I assume that the reverse holds, i.e., that the main character may have these attitudes toward the counterparts if the roles were reversed.

12.0 – Responsibility

The privileged branch view has interesting implications for moral responsibility. We have already seen that it is, in principle, impossible to determine whether Betty is the main character unless one assumes a weak notion of knowledge. Now, imagine that Betty, in world w_0 at time t_0, robs a bank and begins living her life on the run. At some later time t_1, a split occurs, and a counterpart to Betty is generated. As discussed in previous sections, the counterpart is psychologically continuous (but not bodily continuous) with Betty, which means that the counterpart *remembers* robbing the bank, and, even more troubling, she *believes* that she robbed the bank. Further, she believes that the police will be looking for her, so she too lives her life on the run. But the counterpart is mistaken about her memory and beliefs. Should the counterpart be

held morally responsible for robbing the bank? Surely not, because the counterpart did not exist when the bank was robbed. However, since we cannot be sure, even in principle, whether the counterpart is the main character (or vice versa), we cannot hold *anybody* responsible for robbing the bank.

Given that branching is happening constantly and that there are infinitely many counterparts to the single main character, it is extremely unlikely (probability approximately zero) that we are holding Betty – the one who robbed the bank – responsible for the bank robbery. Instead, it is highly likely (probability of approximately one) that we are holding a counterpart of Betty's responsible for the bank robbery.

A logical consequence of the privileged branch view is that we cannot hold *anybody* responsible for their actions because we cannot be sure that we have the "right" person. More specifically, because of our ignorance concerning personal identity, we ought not to hold anybody morally responsible for their actions.

13.0 – Conclusion

This paper aimed to analyze what metaphysical implications a branching universe has on personal identity and persistence through time. After explaining the underlying mechanics of the MWI, I offered three possible endurantist responses to the question of Betty's identity and persistence through time in the many-worlds framework. Of the three views, I argued that the privileged branch view is the best of the bunch for the following reasons. First, the privileged branch view captures our endurantist judgments. Second, the privileged branch view is consistent with the statistical predictions made by the MWI. Lastly, the privileged branch view is the only view that settles the question of the best candidate. I argued that Betty Brancher cannot know

whether she is the main character or a mere counterpart unless one assumes a weak notion of knowledge. Further, I mentioned some notable attitudes the main character might have towards her counterparts (and vice versa). Finally, I explained that a side effect of the privileged branch view is that we should not hold anybody morally responsible for their actions because of our ignorance concerning personal identity.

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