**Choosing What’s Fictionally True**

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**1.** **Introduction**

 Fictional truth may sound like an oxymoron, but it’s not. Fictional truth is what we take to be true in, or according to, a fictional story. It is fictionally true that Cathy Ames runs away from her parents (in and according to *East of Eden*), and it is fictionally true that Ifemelu runs a popular blog (in and according to *Americanah*).

 Are there any limits to what can be fictionally true? It is intuitive to think that there is no limit to what can be true in a fiction, and that fiction is different from nonfiction precisely because “anything goes” when it comes to fiction. However, some philosophers question this sentiment.

 One might think that moral truths—like “murder is morally bad”—are necessary truths, meaning there is no way for “murder is morally bad” to *not* be true. If moral truths are necessary truths, then not even a fictional story can create a scenario where murder isn’t morally bad.

 Logical truths or mathematical truths might also be thought of as necessary. Some philosophers argue that not even a made-up story can violate the law of identity–that each thing is identical to itself–or the law of noncontradiction–that no sentence is both true and false. If they’re right, then no one could write a story where a character is and isn’t a professor or tell a story where James Bond somehow is not identical to James Bond.

 When engaging with fictional stories, why do we have trouble imagining certain morally deviant claims or logically contradictory claims? One explanation is that we simply cannot imagine there being morally good female infanticide or a five-fingered oval. This is the *cantian* analysis of the phenomena since the fact that we can’t imagine certain things is what supposedly produces imaginative resistance. Another explanation appeals to the fact that we can but sometimes refuse to imagine certain things to be true in a fiction; perhaps we won’t entertain, even for the sake of reading, a world where it’s good to kill a baby girl. This is the *wontian* analysis of imaginative resistance. (See Tuna 2020 for an overview of imaginative resistance).

 In “Division by Zero,” Renée Norwood is described to have proven that 1=2. But is it possible for someone to formulate a proof that 1=2? To prove that 1=2 is to prove that math is inconsistent.

            I mentioned that mathematical truths might be *necessary* truths, meaning that there is no way for mathematical truths to be otherwise. This is a widely held view. Once we fix the meaning of “1”, “=”, and “2”, 1=2 is false, and necessarily false, meaning there is no possibility that 1=2 is true. So, what Renée pulls off in the story is a mathematical impossibility.

            We might be tempted to think that what Renée does is possible given the story’s appeal to Kurt Gödel’s incompleteness theorems (the second of which says a consistent mathematical system based on axioms cannot prove its own consistency with those axioms) and the narrator's claim from chapter six that “arithmetic as a formal system cannot guarantee that it will not produce results such as “1 = 2”. However, the inability to “guarantee”—or prove—something doesn’t show the contrast to be possible. I can’t prove from the axioms of arithmetic that I’m not identical to my sister, but that doesn’t make it possible that I am her! Gödel’s second theorem isn’t about the consistency of mathematical systems *per se*; it implies instead that such systems can’t prove or ground their own consistency. Our intuitions and inference to the best explanation suggest arithmetic is indeed consistent (1 *just doesn't* equal 2! And why would math be so effective if not consistent?). And if arithmetic is consistent, it is necessarily consistent even if it can’t prove its own consistency—so what Renée does is like squaring the circle: seemingly meaningful but impossible.

            So, it’s no surprise that some readers I’ve talked to don’t take it to be fictionally true that Renée proves arithmetic to be inconsistent. They merely take it to be fictionally true that she *believes* that she proved 1=2. Those who don’t want to—or can’t—imagine something that is impossible have a reason to think that Renée couldn’t have actually proven 1=2 since mathematical truths are necessarily true, i.e., true everywhere, at all times.

            I happen to think that impossible things can be true according to a work of fiction. [1] But setting my own convictions aside, and given the available cantian and wontian explanations of why some readers resist Renée’s accomplishment, how should we analyze what is fictionally true in “Division by Zero”? The above considerations represent philosophical attempts to begin with beliefs about the nature of possibility and imagination to guide us in determining what can and can’t be fictionally true. In the rest of the chapter, I’ll see what happens once we compare the aesthetic, or artistic, merits of taking the story at face value (and admit that Renée in the story does prove 1=2) with a reading that considers Renée to have been mistaken. This method highlights the aesthetic costs of thinking that certain things can’t be fictionally true, which gives us a new starting point on how we ought to decide what is and isn’t a limit to fictional truth.

**2.** **A Reading of the Story where Renée proves 1=2**

 “Division by Zero” weaves three narrative strands together. The numbered chapters tell the story of mathematics; ‘A’ chapters are about Renée or told from her perspective; ‘B’ chapters are about Carl or told from his perspective. The way these chapters are presented is worth a close look because their connections change as the story unfolds.

 Chapters 1A and 1B cover the same stretch of time—Renée being released from the hospital—but from the respective perspectives of Renée and Carl. Chapters 2A and 2B also cover the same portion of time—they are now home from the hospital— but this time, we encounter memories of each character. We also get foreshadowing; in 2B, Carl finds nothing wrong in the way he supported Renée, just as she will find nothing wrong in her proof in 4A. Chapters 3A and 3B are functionally parallel in that they both provide an account of how Renée and Carl became the people they are. We meet Renée at age seven when her interest in math is born, and we meet Carl in grad school as he recovers from a suicide attempt and learns empathy. Chapter 4 tells the story of math trying to get on surer footing, and in chapter 4A Renée first becomes puzzled with her new proof that 1=2. This is the first time the A chapter and B chapter timelines intersect as we learn about how Renée and Carl met. Chapters 5A and 5B separate as they both struggle to understand: Renée can’t understand how her proof can be free of error; Carl doesn’t understand why Renée feels and acts the way she does.

 Then we get the first true continuity between timelines, meaning 6B picks up where 6A left off. Why is this? One possible clue is that chapter 6 introduces Gödel’s incompleteness theorems to argue that we can’t guarantee we won’t encounter the kind of contradictions that Renée proves. Perhaps Renée and Carl’s stories line up once we realize the possibility of a contradiction—or something thought to be impossible—being shown as true. This sense of continuity further develops in chapters 7A and 7B as Renée and Carl’s respective intuitions lead them both to detrimental results. Renée’s theorem *feels right* to her; Carl realizes that he can’t feel anything for Renée. Chapter 8 asks ‘what now?’ Hilbert’s question—“If mathematical thinking is defective, where are we to find truth and certitude?—suggests that truth in general is in jeopardy if we consider mathematical thinking defective. For Renée, math is no longer of interest to her since it is not empirical, meaningless once it goes beyond experience. For Carl, the breakdown of empathy makes him question what, if anything, is fundamental to who he is.

 Finally, the story ends on a formally significant note as chapter 9—the final story of math—relays a quote from Einstein saying we can’t have certainty *and* real-world connection in math and chapters 9A and 9B are equated to each other. 9A=B is an explicit invitation for us to compare ‘A’ and ‘B’, Renée and Carl. The comparison is apt since what Renée and Carl go through are structurally identical—but there’s also something impossible about the equation since, after all, Renée *isn’t* Carl. Similarly, the story ends with a seeming emotional impossibility since Carl feels an empathy that separates him from Renée. An “empathy that separates” feels like a contradiction, just as proof that 1=2 feels like a contradiction.

 We can pull out several themes from the above observations. The first thing to note is the parallel experience between Renée and Carl. As the integrity of math breaks down for her, the marriage breaks down for him. The significance of the title becomes clear here as both Renée and Carl must chart unknown territory after their respective realizations. Dividing by zero destabilizes the future since no more rules apply, and we see how new knowledge threatens the two individuals’ understanding of themselves and the world. The new learnings are like division by zero, “forbidden”, something after which nothing makes sense anymore. The final 9A=B chapter is powerful because there really is an equivalence of experience.

 Another noteworthy feature is the nonlinear form of the story. If all numbers are equal, perhaps there is no meaningful difference between a story narrated “in order” and a story narrated “out of order”—so the fact that the story jumps around in time is a mirrored response to the content that Renée comes to prove. The story also begins and ends with the same gesture from Renée (looking out the window). Why come back to where things started? Perhaps the return to the beginning suggests a kind of wholeness that can still be had even when there is an impossibility involved. There’s also a mirroring going on between the couple. Seeing things like Carl (empirically) upsets Renée, and experiencing what Renée is going through (having a foundational belief undermined) upsets Carl.

 Finally, the story gestures to figures and objects outside of the story. Given Renée’s desire for *a priori* knowledge—knowledge that isn’t empirical but known without experience—makes one wonder if she is named after Descartes, just as Carl’s emotional sensitivity makes one wonder whether he is named after Jung or Rogers. The story also has thematic connections to Ted Chiang’s “What’s Expected of Us” in its poignant contrast between (merely, theoretically) understanding something and (fully, genuinely) grasping something. Many mathematicians are unbothered by Renée’s proof just as most people are unbothered by the Predictor in “What’s Expected of Us”, a machine that always “knows” when a person is about to press about a button and thereby demonstrates the lack of free will. However, those who truly grasp, and not just understand, the implications of the Predictor lose the ability to go on as before, as Renée does.

**3.** **What is Lost in a Reading where Renée doesn’t in fact prove 1=2**

 Recall the various reasons someone might prefer an interpretation of “Division by Zero” where Renée merely believes that she proves arithmetic to be inconsistent without in fact doing so. One might not want to commit to a mathematical impossibility to be true even in fiction. Or one might have difficulties robustly imagining that 1=2. What, if anything, is lost in this more restrictive interpretation that bars a mathematical impossibility from being fictionally true?

 First, the narration would lose credibility. Renée is repeatedly presented as a talented mathematician, but if she is mistaken about her proof, a reader would need to temper her estimation of Renée’s intellectual capacity. Renée is presented as a knower even in domains that have nothing to do with math—she knows what to say at the psychiatric hospital to feign wellness, knows what her colleague or husband will say— so we might need to adjust our understanding of her more broadly. Perhaps she’s more of a know-it-all than a person who genuinely knows many things.

 Going this route takes on the burden of explaining away evidence we’re offered to take Renée’s feat at face value. She explicitly rejects the possibility that she’s mistaken (though, to be fair, anyone who is mistaken would say the same thing). More convincing are the facts that she arrives at the same contradictory conclusion in more than one way, that she’s never found math difficult, and that the mistake is sophisticated enough to survive the mathematical community’s scrutiny.

 Finally, many of the thematic patterns that we identified in the last section become weak or irrelevant if Renée is mistaken. The parallel developments of Carl and Renée were predicated on the fact that Carl considered empathy to be a fundamental aspect of himself and found that to be false *and* that Renée considered arithmetic to be fundamentally consistent and found that to be false. Another parallel had to do with the couple’s commitment to knowledge: Carl continually strove to learn about Renée’s emotional life and came to really know her and her tendencies. For Renée to mirror this aspect of Carl, she would also have to really know things about math. If only Carl was correct in his assessment, and Renée mistaken in hers, then the strength of the parallel wanes. The overall point isn’t that the parallels go away entirely if we were to say that it’s Carl and Renée’s mere beliefs that are shown to be wrong, but that the force and significance decreases, which affects the story’s poignancy.

 These disruptions to the mirroring between Carl and Renée diminish the significance of 9A=9B. ‘A’ and ‘B’ don’t quite line up as neatly, so the final chapter becomes cheeky at best. Accordingly, the choice to narrate in a nonlinear fashion becomes less a formal ramification of arithmetic’s inconsistency, and the story’s thematic connection to “What’s Expected of Us” also breaks down since the stories no longer mutually highlight the difference between mere understanding and genuine grasping/intuiting—Renée neither understands nor intuits according to this second reading! Finally, an interpretation that takes Renée to be mistaken doesn’t comport as well with Chiang’s story notes where he says “[a] proof that mathematics is inconsistent, and that all its wonderous beauty was just an illusion, would, it seems to me, be one of the worst things you could ever learn.” If the story was meant to be a working out of the idea, the natural interpretation of “Division by Zero” would be that a character genuinely proves math to be inconsistent, and not that she mistakenly believes to have done so.

 Of course, none of the considerations in this section make it definitive that Renée’s proof was correct. But I hope to have shown that the aesthetic costs of this alternative interpretation are high. In short, the story is better if we interpret it so that Renée really does prove that 1=2.

**4.** **Conclusion**

 “Division by Zero” is a case study that lets us weigh the aesthetic costs of approaching fiction with metaphysical commitments insisting that fictional truth be consistent or possible. In this particular case, I believe the costs outweigh the benefits. Many of the features that make the story aesthetically good are lost once we refuse to acknowledge that Renée really proves arithmetic to be inconsistent.

 Ultimately, I think we have a choice in where we start. Will we choose our theoretical commitments about fiction first and face whatever aesthetic consequences there are? Or will we consider the aesthetic features of a fiction and then adopt metaphysical requirements that support those features? (Of course, these decisions will be made in equilibrium since we need to start with *some* metaphysical commitments to even begin to acknowledge fiction as fiction). My only plea is that we not always prioritize the metaphysics first, especially if we want to develop the kinds of theories of fiction and fictional truth that track the way most people engage with fiction.[2]

References

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[1] See Xhignesse (2016, 2020, 2021) and Kim (forthcoming) for aesthetic and cognitive considerations that bear on what can and can’t be fictionally true.

[2] I’d like to thank Mark Balaguer, Kenny Easwaran and David Friedell for helpful discussions and feedback on a previous draft.