SNAKE EYES NOTES

LORXUS

Questions for Team Yes

- Why should I believe that the "true" Snake Eyes setup, which is intrinsically infinitary, will behave nicely as a limit of its suitably defined (finite) initial segments? After all, there's things that can happen in any finite case that never can - they're literally impossible - or never will - they have probability 0 - in the infinitary case! The fact that your final expression for $Pr(\text{death}|\text{chosen})$ has no N-dependence is a promising data point, but on its own it's not enough.
- More broadly, there's issues in how your writeup handles expressions that roughly cash out as something like $0 * \infty$ - at the moment, it seems to tacitly assume that all such expressions should be evaluated as 0.
- What conditions, if any, need to be placed on the finitary starting population size M in order to avoid problems when you pass to the infinitary case? Here I'm mostly worried about St. Petersburg's Paradox-flavored problems.
- Suppose Team No's objection to Clarification 3 - namely, that it's incoherent due to underspecification - is spot-on, and you really do need to motivate bounded-escape over bounded-death as the natural finitary analogue. How?
- What, precisely, should be meant by "chosen"? Chosen for round i? For at least one of the rounds? Something else?
- How do you reconcile the fact that you get a value of $\frac{17}{18}$ for the probability of never rolling snake-eyes with the direct calculation of $\lim_{n\to\infty} 1 - \frac{35}{36}^n = 1$?
- You appear to start by postulating an already-existing countably infinite population to draw from, such that you can experience not having been chosen. Why is this relevant to a question for which having been chosen should be true by assumption? And if we do assume infinite starting population, why isn't the answer immediately 0? I need to see some more discussion of how you handle infinities here.

Questions for Team NO

- I would expect the probability values for the unbounded case to be between relevant limits-to-infinity over the bounded-death and unbounded-escape cases. Why isn't that the case?
- What is the fractional closed-form for your constant $D \sim 0.5218873$? Where does that come from?
- Regarding clarification 3, if we are to reject it as underspecified and incoherent, where does that leave us? If we have no good impartial philosophically-motivated way to pick between bounded-death and bounded-escape, surely that means that there's no way to determine whether $Pr(\text{death}|\text{chosen})$ is $\sim \frac{1}{36}$ or $\sim D$?

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- Regarding your thought experiment with respect to "picking an unbounded [positive] integer in a random way" - there exists no uniform distribution over the integers, and whether $Pr(\text{even}|\text{chosen})$ is $\frac{1}{2}$ or not depends entirely on what the probability distribution is. How would you fix this?
- Do you have an answer to Team YES's argument that being chosen and rolling snake-eyes are not conditionally independent from each other, and thus that the joint probability $Pr(\text{death} \wedge \text{chosen}) < 1$?
- You appear to assume, for each finite case, that we can draw a line under everyone who has been chosen by the end of the game and call that our starting population. How do you account for cases of unknown or infinite starting population? How do you address the possibility that choosing who was in the chosen population after the fact might distort your probability estimate?
- How do you reconcile any of this with the ground fact that the subjective experience of what a specific player of the Snake Eyes Game will see the die do, upon being chosen, be snake-eyes with probability $\frac{1}{36}$?

My Takeaways

As it stands, both of these writeups, while good, have some serious flaws and gaps in them. The ones I have noted here are only the first few that stood out to me on reading through. The major points of remaining confusion or disagreement that I see are two closely-related ones. The first is over the nature of the word "chosen" - if we construe it to mean something like "start with a countably infinite population and draw from it", we get one answer, and if we construe it to mean "only minds that actually play some round of the Snake Eyes Game", then we get another. The second is over the nature of the starting population, and who among the set of all minds gets to count as having been chosen for the game - again, we could decide that this means that the entire infinite set of possible minds counts as having been chosen - they might enter the game, and in some universe any given mind does! - and we could also decide that this means that only some finite population that actually did pass through the game counts.

Thus - here's one last motivating question for Teams YES and NO both which I hope will spark discussion: suppose we keep the Snake Eyes Game going forever, continuing to pull larger and larger (disjoint) cohorts from our countably infinite population and killing all and only the cohorts that roll snake-eyes. Is there anything different about the probabilities of this game's expected outcomes for any given player? Why or why not?