In the Minecraft Speedrun Team report, they say that “Note that there are not many obvious RNG targets for a runner to cheat. The two most obvious are pearls and blaze rods, but beyond that, it becomes less clear.”

They also say that, “As a generous number, we use 10 for the number of likely targets.”, they use this as a major part of their calculation. They give no reason behind this number, and they don’t explain how they came up with it. In the list of examples they gave, they failed to mention major RNG targets, and completely failed to even acknowledge that non-seed based RNG is not the only type of RNG involved in Minecraft. As they are talking about likely targets of manipulated RNG, I believe that there are far more than “10”. Based on the list that I was able to come up with, there are *at least* **37** different RNG targets that can be easily compared.

All of which I personally believe have a very **comparable advantage** to increasing blaze rod drop rates by ~19%.

Unlike pearl barters, increasing the blaze rod drop percentage would not have that big of an affect on the speed of a run. Blazes spawn in packs, so a lot of times you end up killing more than you need. With a ~19% increase to an already high 50% number, you may end up only saving yourself a couple blazes in your killing session, which is an advantage, but is very very comparable (and in most cases, less advantageous) than the ones listed below.

I consulted with multiple speedrunners and speedrun experts, including Illumina and RealBenex, and they all seemed to agree that nearly all of these 37 different RNG targets are important and comparable to blaze rod drop percentage. RealBenex mentioned that “Villager Pearl Trade” may be less important on 1.16, but as it is a viable strategy on 1.14 and 1.16, I have left it on the list.

Non-seed based RNG:

Blaze Spawn Time - The time between when a new batch of blazes can spawn. This time is random, and if it was decreased, blazes could spawn more often, leading to much more blaze rods. Which would lead to substantially better returns than just increasing blaze rod drop percentage.

Blaze Spawn Rates - The amount of Blaze that spawn in a batch of Blaze when a spawner is activated. This number is random based on the amount of space, and can easily be manipulated. If this was manipulated, this would be substantially less obvious than blaze rod drop rates, and would also produce much better returns.

Ender Eye Breaks - Whenever throwing an Ender Eye, it has a 20% chance of breaking. On average, a good runner may throw 3-7 eyes when searching for the stronghold, if not more if unlucky. Generally, the odds of an eye breaking on the way are fairly high. Reducing the chance

of eyes breaking, or completely removing it, would result in much better speedruns. Matter of fact, my run that was removed was actually ruined by an eye breaking. This happens frequently.

Increased Bartering Obsidian - With increased bartering obsidian rates you would be able to potentially get enough obsidian to nether travel to or towards the stronghold. This could shave minutes off of your time, and is a potential major target for RNG manipulation.

Increased Bartering String (Amount & Frequency) - With increased String barters, and an increased amount of string per barter, you can avoid needing a village, which makes the reset potential of every seed much lower. This would drastically increase your productivity and ability to attempt for world records. Amount and frequency were combined, because I do not believe that they stand strong enough on their own.

Increased Bartering Pearl AMOUNT - On a successful piglin barter you can get anywhere from 4-8 pearls in a single pearl trade. If you increased the odds of getting more pearls per pearl trade, this would prevent many runs from dying based on lack of pearls, and would allow you to leave the nether quicker. Although not as beneficial as the frequency, this stands on its own, as it would be extremely helpful and substantially affect runs.

Increased Bartering Pearl FREQUENCY - Increasing the odds of a piglin barter being pearls would speed up your run substantially, and is obviously one of the most beneficial things on this list. Not much need for an explanation.

Piglin Spawn Rates - Increasing the odds of piglins spawning would allow for much quicker trading, as well as being able to find a piglin/s to trade with much faster. This could significantly decrease your time if you were consistently finding piglins easier than other players.

Endermen Spawn/Drop Rates - Increasing the odds of endermen spawning in general, but also in specific places like the stronghold or very frequently in blue biomes, would increase the odds greatly of a run being successful. Also, increasing the odds of Endermen dropping pearls, would have an even greater effect. If you found a blue biome, you would have plenty of endermen at your disposal, with much higher drop rates. On top of that, a lot of runs come down to missing only a pearl or two, and if endermen spawn rates were increased, and/or endermen drop rates were increased, especially specifically in strongholds, this would greatly increase the odds of a run succeeding.

Blaze rod drop rates - Although not as helpful as a lot of things on this list due to the already 50/50 odds, increasing Blaze Rod drop rates would be helpful in slightly reducing the time of a run.

Iron Golem drop rates - This can be the make or break early on for very fast timed 1.16 speedruns. If the Iron Golem only drops 3 iron, you really need to get lucky in other areas to get enough materials quickly to enter the nether. If the Iron Golem was able to consistently drop 4-5

iron, this would greatly increase the odds of a speedrun's success by decreasing the time spent acquiring additional iron.

Dragon Perch Time - The dragon in the end has a random cycle to it, that is almost entirely influenced by RNG. If you were able to get instant perches every time, or at least very quick perches every time, this would be competing with pearl barters for the most beneficial advantage when talking about reducing a run's time.

Substantially Lower Deadly Mob Spawn Rates - Frequently, even the best runner's runs are ended by deadly hostile mobs. Whether this be a hoglin, a wither skeleton, or mobs constantly slowing you down while traveling or in the stronghold, reducing hostile mob spawn rates could significantly improve the runners average chances of a run's success.

Higher Odds of Ender Pearl Villager Trade - Although this is a less frequently used strategy in 1.16, it still has been used when doing villager ender pearl trades. There is a ⅓ chance that you don't get the pearl trade at all. If this chance was completely removed, or substantially reduced, this would give the player an extreme advantage, as they would be able to succeed in 33% more runs than an average runner.

Higher Odds of Flint From Gravel - Although in my mind this is the least important one on this list, this was included by the Speedrun Mod Team and so I can only assume that it qualifies as good enough to fit this list. If you could get gravel substantially faster than an average runner, over time you would be saving lots of time and have a decent advantage over other runners.

Seed Based RNG

This type of RNG was completely ignored when listing different types of RNG that can be cheated. This type of RNG can be just as easily cheated as non-seed based RNG. Especially for offline runners, where it may be even easier and more convenient than cheating non-seed based RNG. This can be done through modifying the game, as was accused for the non seed-based RNG, but can also be done through splicing or other methods.

When mentioning things like "chest loot" we are assuming that the speedrunner was aware of the seed beforehand, and checked chests and saw their contents, and therefore only opened chests or went for structures that had guaranteed good loot. For most of the other methods though, you wouldn't need to know the seed beforehand, the seed could just be set and sorted using a seed finding method. The probability of two pairs of RNG is still the same regardless of if it is seed based or non-seed based, therefore there is no reason that these should not be

included. A lot of these are also noticeable, and could easily lead to an investigation if someone was noticed to have substantially higher luck on any of these methods.

Distance of Stronghold - The closest stronghold in a world is completely up to random chance. If frequently Stronghold's were very close to spawn for a runner, the odds could be calculated very easily. A stronghold being close to spawn could be the difference between a top 10 time and a world record.

Stronghold ease of travel - The easier it is to travel to a stronghold, the better your time will be. Oceans are the fastest way, although there are other quick and easy biomes. Again, this is up to random chance, and if a runner was frequently having very easy times getting to strongholds, the probability could be reasonably calculated.

Stronghold ease of access (exposed in some way e.g. ocean, ravine, cave, etc) - The easier it is to get into the stronghold, the better your time will be. Just mining down to a stronghold could take a lot of time. If your stronghold is in the ocean, or at the bottom of a ravine, or very accessible, this is an advantage. If this was happening extremely frequently to a certain runner, the odds could very easily reasonably be calculated.

Stronghold Chest Pearl Rate - In stronghold chests, there is a chance of finding a pearl. If a runner knew the seed beforehand, they would be more likely to loot chests with pearls in them, then not. This could very easily be calculated to determine the odds that they did not know that the pearls were there beforehand. Again, as frequently runs come down to only a pearl or two, this is substantial.

Number of eyes in ender portal - This is completely up to RNG, and could easily be coded through a mod, pulling seeds that specifically have more eyes in the ender portal. If frequently a speedrunner seemed to have very good ender portal eye luck, it could be calculated to determine the odds that the seed was set. Again, as frequently runs come down to only a pearl or two, this is substantial.

Distance of Fortress - This is a very big deal and complete RNG. If you can spawn near a fortress, your run would be much more likely to succeed. Especially if you spawned in one or right next to one. Again, this can be coded using a quick seed finder with nearby lava pools near villages, and could be easily calculated if a runner seemed to always spawn right in or around fortresses.

Distance of Blaze Spawners - This is another very big deal, and is complete RNG. If Blaze spawners are missing or difficult to find, this could increase the time it takes to complete a run by a lot. Obviously, the ideal fortress spawn is spawning next to a nether fortress, with a blaze spawner right in front of you. If something similar to this happened frequently, or a runner

always seemed to be able to find Blaze Spawners extremely quickly, the probability could be calculated.

Nether Spawn Biome - This is a very large deal to speedruns. The biome you spawn in is crucial to having a fast time. If you don't spawn in, or near a piglin trading biome, you will have a much tougher time with completing your run. This is again RNG, and if a runner seemed to always spawn in the preferred biomes, it could easily be calculated.

Spawn Blacksmith Village - Villages have a certain percentage of having 1 blacksmith or more. If a certain speedrunner seemed to be having substantially more frequent blacksmiths in villages than average, it could easily be investigated. Again, this could easily be done through seed finding or set seeds.

Spawn biome - Certain biomes make you reset your speedrun almost instantly. Other biomes are very beneficial and encourage you to continue your runs. If you were getting mostly the preferred biomes all the time, this would substantially improve the odds of you getting a record time. The probability of this could be calculated easily, as it is completely RNG.

Spawn Village - Again, villages (blacksmith or not) can be extremely helpful to runs and can improve times substantially. If you were consistently spawning in villages, that could be suspicious. The odds could be calculated, and again, it is completely RNG.

Frequent Shipwrecks - If there are frequently shipwrecks near where you spawn this could be suspicious. The rarity of shipwrecks can be calculated, so the probability of frequently finding shipwrecks can easily be calculated. Shipwrecks have iron, food, treasure maps, and other helpful loot. This is entirely RNG, and can be easily manipulated using seed finding or otherwise.

Nearby Ruined Portal With Gold Blocks - Gold blocks can help cut down on trading time substantially. If a runner is finding ruined portals with gold blocks well above average, this could be investigated. This would substantially decrease a run's time.

Bastion with large gold block chunks - Gold blocks can help cut down on trading time substantially. If a runner is finding bastions with gold blocks well above average, this could be investigated. This would be even more suspicious if they found fortresses as well2 This would substantially decrease a run's time.

Better/Increased Blacksmith Loot - This can be comparable to bartering for obsidian. If there is frequently obsidian, especially lots of it, or other very good loot in blacksmiths (like diamonds, iron), this would increase a runs chance of succeeding substantially, this is probably one of the biggest advantages. This is entirely RNG and again could be easily cheated through seed finding or a set seed.

Better/Increased Shipwreck Loot - Similar to above, if there is frequently way more iron, diamonds, or gold than average, this could be suspicious. This would increase a runs chance of succeeding substantially. This is entirely RNG and again could be easily cheated through seed finding or a set seed.

Better/Increased Ruined Portal Loot - Similar to above, if there is frequently way more obsidian, iron, or OP tools, this could be suspicious. This would increase a runs chance of succeeding substantially. This is entirely RNG and again could be easily cheated through seed finding or a set seed.

Better/Increased Desert Temple Loot - Similar to above, if there is frequently way more gold, iron, diamonds, enchanted books, god apples, or anything else, this could be suspicious. This would increase a runs chance of succeeding substantially. This is entirely RNG and again could be easily cheated through seed finding or a set seed.

Distance From Stronghold After Nether Travel Location - This one, although a tad more complicated, is still easily calculable. If someone is frequently being _too good_ at nether traveling, they could be cheating. The location of strongholds involves substantial RNG, so if someone is frequently predicting this over and over, the odds could be calculated.

Digging Directly Into Portal Room (With no exposure) - As there is no way to perfectly find a portal room, and it is completely RNG, if a runner is digging directly into the portal room very frequently they could be cheating. The odds of this could definitely be calculated, and this would shave potentially minutes of valuable time off of a run, and at least typically 30 seconds or so at minimum.

Nearby Lava Pools - If a certain speedrunner seems to be finding lava pools way quicker and easier than the average speedrunner, this could be cheated. This could be calculated, although more complicatedly, and would be substantial help to the speedrun. Lava pools are difficult to find, and being able to easily find them would add up over time to SUBSTANTIALLY improve your time.

Increased Ocean Monument Spawns - Ocean monuments have lots of gold, and runners use them to do gold trades extremely quickly. A runs time could be substantially cut down using this tactic, and if a runner was frequently receiving well more ocean monuments than they should, they could be investigated.

Total: 37

Considered, but didn’t make the list:

Village Size - Village size is actually very important to a speedrun. If a village does not have the necessary beds to one cycle the dragon, the run may be dead. (This was not included due to my belief that this does not stand alone as important enough to compare to the blaze drop increase).

Increased Desert Temple Spawns - (This was not included as desert temples are fairly common in deserts, and I already specific Spawn Biomes as a form of RNG.)

Different Spawn Biomes Split up (I.e. Desert spawns, acacia spawns, plains spawns, etc). (This was combined due to the belief that there was not enough differentiation between the biomes other than that they were all “favorable” and therefore that makes them interchangeable in my eyes.

Endermen Spawns / Drops being separate. (This was combined because of my belief that increasing endermen drops on it’s own does not stand as comparable to increasing blaze drops.)

Ease of traveling to a fortress - If it is extremely easy to get to a fortress, this would save time. (This was not included due to the fact of my belief that Distance to Fortress covers this, since most fortresses are extremely close, and there’s not as much variety between travel in the nether VS the overworld.)