

It can sometimes be optimal to select a useless/less useful stat for your guaranteed rolls!

Consider the following scenarios where the stats **A**, **B**, and **C** can be rolled with weights **1**, **0.8**, and **0** respectively (meaning C is useless):

Table A

Guarantee: **A or B** will be rolled at least 1

Roll 1	Roll 2	Prob	Value
A	A	1/9	2
	B	1/9	1.8
	C	1/9	1
B	A	1/9	1.8
	B	1/9	1.6
	C	1/9	0.8
C	A	1/6	1
	B	1/6	0.8

Table B

Guarantee: **A or C** will be rolled at least 1

Roll 1	Roll 2	Prob	Value
A	A	1/9	2
	B	1/9	1.8
	C	1/9	1
B	A	1/6	1.8
	C	1/6	0.8
C	A	1/9	1
	B	1/9	0.8
	C	1/9	0

A roll value of ≥ 1.8 has a probability of:

- In **Table A**: $1/9 + 1/9 + 1/9 = 33.33\%$
- In **Table B**: $1/9 + 1/9 + 1/6 = 38.89\%$

Why?

- Since **rolling B twice is not enough to be better**, Table A has a 33% chance of producing a better artifact after rolling an initial B.
- But in Table B, choosing A and C for the guarantee means B cannot be rolled twice, so there is a 50% chance of producing a better artifact after rolling an initial B.
- In summary: This happens when getting a bunch of your **second** best stat **would not produce a better artifact**.

Asides:

- Table A does still have a higher **average** expected roll value than Table B.
- If you slightly relax the goal to ≥ 1.6 , Table A is better again.