0 Question: A bag contains one counter, known to be either white or black with probability 1/2. A white counter is put in, the bag shaken, and a counter drawn out, which proves to be white. What is now the chance of drawing a white counter?

A1: 1/2

A2: 2/3

Arguments for A1

2 Question: If a white counter is put in and a white counter is taken out, is all that remains in the bag the orignal counter?

A1: Yes

A2: Not necessarily, it may be the original counter that was taken out, in which case you now know that the original counter is white

3 Question: Is the original counter white with probability 1/2?

A1: Yes

A2: At the beginning, before you get any more information about which bag you have, yes

Arguments for A2

7 Question: What are the two possibilities for what was in the bag before you drew a counter?

A1: 2 white counters, 1 white 1 black

A2: Two white counters, or one white counter and one black counter

8 Question: If you don't know which of these two bags you have, and you draw a random counter and it turns out to be white, which bag is it more likely you had?

A1: Both bags have white counters, so drawing a white counter doesn't give you this information. If you drew two white counters, then you would know, but with only one counter you're still uncertain.

A2: It's more likely you had the one with two white counters

9 Question: Given it's more likely you had the bag with two white counters, is it more likely the remaining counter is white?

A1: No

A2: Yes