

Transcript

Live Video – Independence Part 2

01. 00:00 / 00:05 - Independence part 2. So they're two different ways, they're actually a few different ways
02. 00:05 / 00:12 - to test, but this is really two tests. This is really the formal definition in probability
03. 00:12 / 00:19 - language that we already stated in words. So in words we said A and B are independent,
04. 00:20 / 00:27 - if knowing one event happens, knowing A happens for example, does not change the probability
05. 00:28 / 00:35 - of B. So probably of B is the same whether I condition on A or not A or I don't condition
06. 00:37 / 00:44 - at all. So the unconditional probability of B is the same as the conditional probability
07. 00:45 / 00:51 - of B given A. And it's the same as the conditional probability of B given A-bar. So, what that
08. 00:51 / 00:56 - would mean over here, is this the probability of B given A, and this is the probability
09. 00:56 / 01:03 - of B given A-bar. If the events were independent, these two would be equal and they would all
10. 01:03 / 01:10 - be still equal to whatever the probability is. So this is one way to test if the probability
11. 01:10 / 01:16 - of B is equal to B given A, then they're independent. If the probability of B is equal to B given
12. 01:16 / 01:20 - A-bar, then they're independent. Otherwise the question mark indicates I don't know in
13. 01:20 / 01:26 - general if this is always true. So it's sort of a test. So in our case again overall was
14. 01:26 / 01:32 - 0.329, but individually we got way different answers and none of these three equal to each
15. 01:32 / 01:39 - other. Knowing A happens changes the probability of B in our scenario. But if I give you A,
16. 01:39 / 01:44 - B, A and B where you're going to use the method that we talked about earlier. If I give you
17. 01:44 / 01:51 - B and B given A, then you are going to use this. We've seen the graph and clearly there's
18. 01:54 / 01:59 - a difference in the probability of having. Let's see, if I am going to draw a line, there's
19. 01:59 / 02:05 - the line. So here's five or more here's the median of this group. The chance was fifty
20. 02:05 / 02:10 - eight-percent. And, what we're doing is literally counting how many fall about that blue line,
21. 02:10 / 02:15 - 58 percent fall above that blue line well how many fall about the blue line in the no
22. 02:15 / 02:20 - group? clearly not even twenty five percent just from the picture and then we've calculated
23. 02:20 / 02:25 - it more accurately 0.143. Trying again to make you to make these connections. Probability
24. 02:25 / 02:31 - is great. I love probability. But this is a practical applied statistics course, and
25. 02:31 / 02:35 - so I want you to think how is this relevant in my real life it's relevant in your real
26. 02:35 / 02:40 - life because that's the kind of question you're going to answer in many scenarios. So were
27. 02:40 / 02:43 - saying what is the probability of being five or more in this group which is what is the
28. 02:43 / 02:47 - probability of being five or more in that group are they the same, are they different,
29. 02:47 / 02:53 - are these differences between these two groups. And then our eventual question is that
30. 02:53 / 03:00 - statistically significant meaning does this translate to my population with high probability. These
31. 03:00 / 03:05 - probabilities are clearly unequal in our sample, but our eventual question might be is this
32. 03:05 / 03:10 - true for our population? So in the sample these events are dependent and from our analysis
33. 03:10 / 03:16 - so far it seems very likely that this may also translate to the population. The question
34. 03:16 / 03:21 - really is who is that population. That's what we don't know about this dataset. Again the
35. 03:21 / 03:27 - verbal definition is knowing whether or not the person has calcium crystals present changes
36. 03:27 / 03:32 - the probability of having a calcium concentration of five or more. That's the definition verbally
37. 03:32 / 03:39 - of what it means to be dependent. If they were independent then it would not change
38. 03:39 / 03:43 - the probabilities. So it's just what word goes here does it change the probability,
39. 03:43 / 03:45 - if yes they're dependent if no they're independent.