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SPEAKERS

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Now, if you've been following this right, would you have been seeing in all of these models, I'm either changing N or I'm changing P? What if I just do it all at the same time. And I can easily do that here. So see, so this is what we call the general model, let's take a particular value of P, which is 0.3, value of N is 20. Right? So R zero is the product of those two things, right? It's the product of this cell, right, times this cell here. And the number of new infections, now again, I'm starting with one, the number of new infections on day two is going to be sorry, is going to be equal to the, the value here, right, which is N times P, to the power of, this is my day, minus one.

And then if I have to copy for the other cells, just copy and paste here. Now you see there's a problem here. Right, the problem is that if you go, because when you paste from one cell to the next cell, Excel immediately changes the row. So see here, the row was D19, A to the power of A22 minus one, this is A, this is T minus one. Now when you go to row 23, it becomes D20 to the power A23 minus one. And A23 is the day, right? So we're happy with that. It should be like that, it should be 20, the day, which is T minus one. But the problem is that it also changed, it was, like it started with D19, now it has gone to D20. Because anytime you paste a formula, Excel takes you to the next row. But in, in this cell, there's nothing, right? So it multiplies zero with everything, and therefore you don't get the right answer that you're looking for. Right? You always wanted to be multiplying by this cell here to the power of T minus one. So how do you force that, right? So the way you can force it is that if you put a dollar sign in front of D, and a dollar sign in front of 19, the Excel knows that you never go, like if you put a dollar sign, that means it's if you copy that formula to the next cell, it's not going to change the things that are, that have the dollar signs with them. So if I now copy this cell, okay, and paste it here. And now you see, it gives you back the same thing that we had in the basic model, because these were the parameters of the basic model would just be equal to 0.3 and N equal to 20. So this is another useful trick to remember in Excel, right? So see, anything you put in with the dollar sign, that doesn't change. But as you go from, let's say, this cell to the next cell, that D19 doesn't change. But what changes is this because this is my day, right, T. So I wanted to change from 4 to 5. So I'm not going to be putting dollar signs in front of that.

And what's the cool thing about doing this general model? See, I can play around with the P. Now suppose vaccinations reduce the chance of infection from 0.3 to 0.2. Okay, see, this all automatically

adjusts. I must have done something wrong here. Oh see, I didn't copy the right cell there. So I didn't copy the one with the dollar sign. That's why it gave me zero. But I'm going to do is I'm going to fix that, right. Now, you see that if there are vaccines which are moderately effective, which bring down the, the infection rate from 0.3 to 0.2, this reduces new infections compared to without nothing which is here, right? But not that dramatically, right, even here in day 10 the number of new infections have gone up to 260,000. Now if the vaccines are even more effective, let's say 0.1, right. Now, these are good, because see, now infections are still increasing, but nowhere as crazily as before. So the good thing about this general model is that you can play around, play around with the P's, the value of different N's, right, the different levels of lockdown, and see what's the impact on the number of new infections. So let me stop this particular clip here. So what I would like to again reiterate, is that, in this particular module, we have done a whole host of examples coming from a difference, like lots of different areas of the social sciences. And what I've been trying to, hopefully impart to you is this idea that mathematical expressions show up naturally in lots of different areas of the social sciences. And once you get an handle on those mathematical formula, you can get a deeper insight into the problem.

And in doing that, I've also shown you some tricks, or some tools that you can use in Excel and in Google Sheets, to investigate questions like this. So what I would like you to do, to further your understanding is in the module, we also have some practice problems. We have some, just theoretical practice problems, as well as some practice problems using Excel sheets. Those of you who use Google Sheets instead, right, you can easily import this Excel file and other Excel files into the Google Sheets, and then work, it works almost identical to this. So but as with any piece of software, unless you really take the time to dirty your hands at playing around with it, you're not going to figure out what the mistakes are, and you're not going to further your knowledge. Right, as you saw, even here, I was doing some little mistakes here and there. And unless you do those, you're never going to I think learn the intricacies of using Excel. And Excel is a very powerful and popular tool. So I would really urge you to try it out on your own. So I hope you have enjoyed this module and hope I've been able to inspire you that mathematics comes in pretty handy in a vast variety of social science subjects.