[SQUEAKING]

[CLICKING]

[RUSTLING]

[CLICKING]

RICHARD DE NEUFVILLE: Going from that, I'd like to think about a value or value functions. And a definition of it here is the value function of v of x, where in this case, x has in the traditional and a traditional notation is underlying to mean it's a vector of all the possible things that may go into your value. So if you're thinking about, oh, I'd like to buy a new car, you might want to think about its size, its cost, its economy, in terms of fuel economy, its color, whether or not it has a convertible or not, which may be important to you. Or a space for carrying things like you want a van.

So all the x's that make up the value for this particular thing. So the value function is a means of ranking the relative performance of the x's for an individual for a bundle of consequences. That is all the measures of actually bits of it. And it is a non-quantitative form of utility function. It is a ranking that you can say, this is better than that, but it's not that three of those are worth 10 of the others.

It's not a cardinal function. So the general, typical, the base idea is that you have some-- I've drawn it on the horizontal scale, a benefit, and you have a measure of preference. So if I look on the left-hand side that we see that if I don't have any, just having some can be important to me. And then if I have more, the row for each other unit may be less and less, and we can think about that in terms of the unit preference for each additional unit of benefits, and it's this general shape known typically as diminishing marginal utility, where the idea is simply that the unit value is less as we get more of it.

And this is a typical form that often exists. And in much of general discussions of it, it is thought of this is the common thing. Diminishing marginal utility at a point. And while this is a very common shape or a description of the value functions, thinking of it as the most likely one, it can be very misleading. And that's what I'd like to discuss with just a little bit more.

But let me illustrate this. So let's imagine that we are about to go to lunch. I know that some of you out there in cyber land may be more thinking about breakfast or supper, but if you're hungry, you might value one serving of your favorite-- all the available food. A hamburger, a salad, a soup, whatever might happen to be. So one serving might be good.

Two, well, that might be nice. Maybe I didn't have enough first time around. Three, possibly, and then we all may have had the experience of being at a family gathering and your favorite aunt or cook or whatever says, oh, dear sweetheart, I haven't seen you for so long. Please have yet another one. I made this especially for you because you liked it and you groan and say, OK.

I'll have it, but you really didn't want it. So all of this I'm trying to suggest to you a common experience that, yes, there are things for which we definitely have diminishing marginal value for it. So that establishes, I hope, or indicates that. But doesn't always apply. Can we think of exceptions?

And actually, the exceptions are that they're very common. So for example, critical mass. So a thing might be only valuable if I have enough of it to be able to do something with it. You might think of this as a nuclear reaction or power plant of that, but it might be that it may be, do I have enough people to mount a team for soccer or something.

That I need to have enough around or a resources around to make something out of it. So the idea of critical mass may be that the individual pieces aren't terribly valuable at the beginning, but when you have enough of them, ah, now, I can really do something with it. Another idea is the network connections. We see this a lot in the internet age is that the more that you have of the connections, the more valuable it is.

That having a system say Slack or whatever it is it might be that if there's nobody else on it it's not terribly useful to you. It becomes more and more useful as there are more people on it and you can have more connectivity. So that the connectivity gives you more and so that it's more and more valuable. Threshold.

This is one that is absolutely pervasive. So in so many cases, the value of something is only good enough if, for example, you meet the threshold. So if you're trying to pass a test, for example, a driver's test in Massachusetts, as I remember, you have to have a 70 on its test, so yeah, I'd be going from having four questions right to five questions right. Yeah, that's better.

It makes you feel better from going from 5 to 6. I was close. Maybe I'll get it next time. But what really counts, what really gives value is going from 6 to 7 from not passing to passing. And more generally, if we're thinking about delivering products, we not passing a test in something graded, but we're trying to match or beat competition.

That is it doesn't pay to say, oh, well, my product is good. It's only 10% less effective than my competition's. Well, people will notice and will not be buying your product very much or won't be valuing. You can't sell it at a high enough price to make a good money on it. But if you're 10% above, if you're above the threshold of the competition, and of course, it isn't a very precise thing, but if you're above the competition, you put yourself in a much better position so that the value of your performance maybe increase as you go higher performance, but it can really increase if you beat out the competition and are seen to beat out the competition and puts you in a completely different space.

So that we can observe that there are all kinds of issues where they are critical mass. Well, I really wanted to take the time here to have everybody stop and get a hold of this question and to recognize that this notion of diminishing marginal value or utility, while very common, is, in fact, not necessarily a dominant feature and the increased marginal utility whether it's threshold or network or competition or however you wish to phrase it is a very common and realistic aspect of our professional and other lives.