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Math 198
Talk 1
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Prompt. Prepare and give a 2-3-minute talk that begins with the phrase, "You wouldn't know it by looking at me, but...." You will not use slides, props, or the whiteboard for this talk. Your goal is a give a clear and compelling talk with a solid beginning, middle, and end.

Outline. You wouldn't know it by looking at me, but I have very long toes. Or at least, that's what I've been told. Personally, I'm not sure they're *actually* long enough to warrant this kind of declaration, but that's probably because I'm used to them, and hence am not well-equipped to judge if they're atypical. That's why I'm going to ask for your help here: throughout this short talk, I'll give you various descriptions about my toes, both quantitative and qualitative, and at the end, I want *you* to tell *me* whether you think my toes are abnormal or not. So without further ado, let's jump right in.

Let me begin by describing them indirectly. My toes are long enough that I can pick up pencils and things with them. I can also pluck a string and turn most doorknobs using them. I can even unscrew caps for certain water bottles and lift them up using my toes, albeit with a high risk of spillage. But these are descriptions of *dexterity*, not length — and we don't know that they necessarily correlate well. And further, we can't be entirely sure that these even *prove* atypical nimbleness. It could be that everybody is capable of these feats, it's just most people haven't thought to try.

So let's try a quantitative approach. Last night, I spent some time using a ruler to measure the lengths of each of my toes. The results were identical on my left and right feet, so when I say "my big toe is 6cm long," that means *both* of my big toes are 6cm long. I chose to start measurement from the end of the crease that separates adjacent toes, defaulting to the the inner one when there were two. Finally, measurements were taken with my toes relaxed, and did not include nail.

The results were as follows: my big toe is 6.0cm. My index toe is 5.4cm. My middle toe is 4.8cm, and my ring toe breaks the arithmetic progression, coming in at comfortable 4.6cm. Last but not least, my pinky toe is a quaint 3.2cm, just slightly over half of my big toe's length.

Now, I'm guessing this description is probably less than satisfying to you, because those numbers probably don't translate well into a visualization of "size." After all: how big even is a centimeter? For the average person, it's about the thickness of their pinky finger, but that's just an estimate, and we might worry about how much error we'd accumulate in stacking six of them together.

We can circumvent this somewhat by choosing better comparison objects — 6.5cm is *about* the length of the average thumb, so my big toe is just a bit shorter than that. 5.5cm is roughly the length of an egg, so try to imagine one of those. 4cm is roughly the length of a matchstick, and 3.2 cm is just about the size of a quail egg, if that helps.

Ok: this is better, but we're still not there yet. Because even these comparisons are flawed. Ignoring concerns about variation in the objects themselves, it's still just apples to oranges. I mean, who here can confidently assert that their index toe is shorter than a matchstick? You probably aren't sure, having never thought to compare the two before. So maybe we should just compare toes against toes. Then we could apply tools of statistics, and determine *rigorously* whether my toes are, in fact, outliers.

Unfortunately, it turns out data on human toe lengths is sparse. And believe me, I tried

looking — I actually spent the better part of half an hour on google scholar last night, to no avail. So: what's left? It seems our usual tools have failed us — so how are you to decide?

I guess really, seeing is believing. So go with your gut here: (at this point, remove shoes) are my toes weirdly long?

(a) You wouldn't know it by looking at me, but I have very long toes.

(b)

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