Central Limit Theorem

But to understand what's happening here, we

can again get some insights from probability theory.

The so-called central limit theorem, or CLT,

states that the sum of a large number of random variables

regardless of their distribution will approximately

follow a normal distribution.

There are some additional considerations that we will not get into

but the main point is the following:

You can sum together many random variables whose distribution

is nothing like a normal distribution like die rolls, or even coin flips.

And yet, the distribution of the sum will get closer and closer

to a normal distribution as the number of random variables

that are added together increases.

The central limit theorem not only helps us understand our simulation results,

but it also explains why the normal distribution, sometimes called

a Gaussian distribution, occurs so often.

For example, the height of a person probably

depends on a large number of factors that

are related to things like genetics, nutrition, environment, and so on.

If we think of height as being a random variable that itself consists

of a large number of other random variables that are added together,

we would expect the height of a person in a population

to follow the normal distribution.

That is, in fact, what we know to be the case from empirical data.