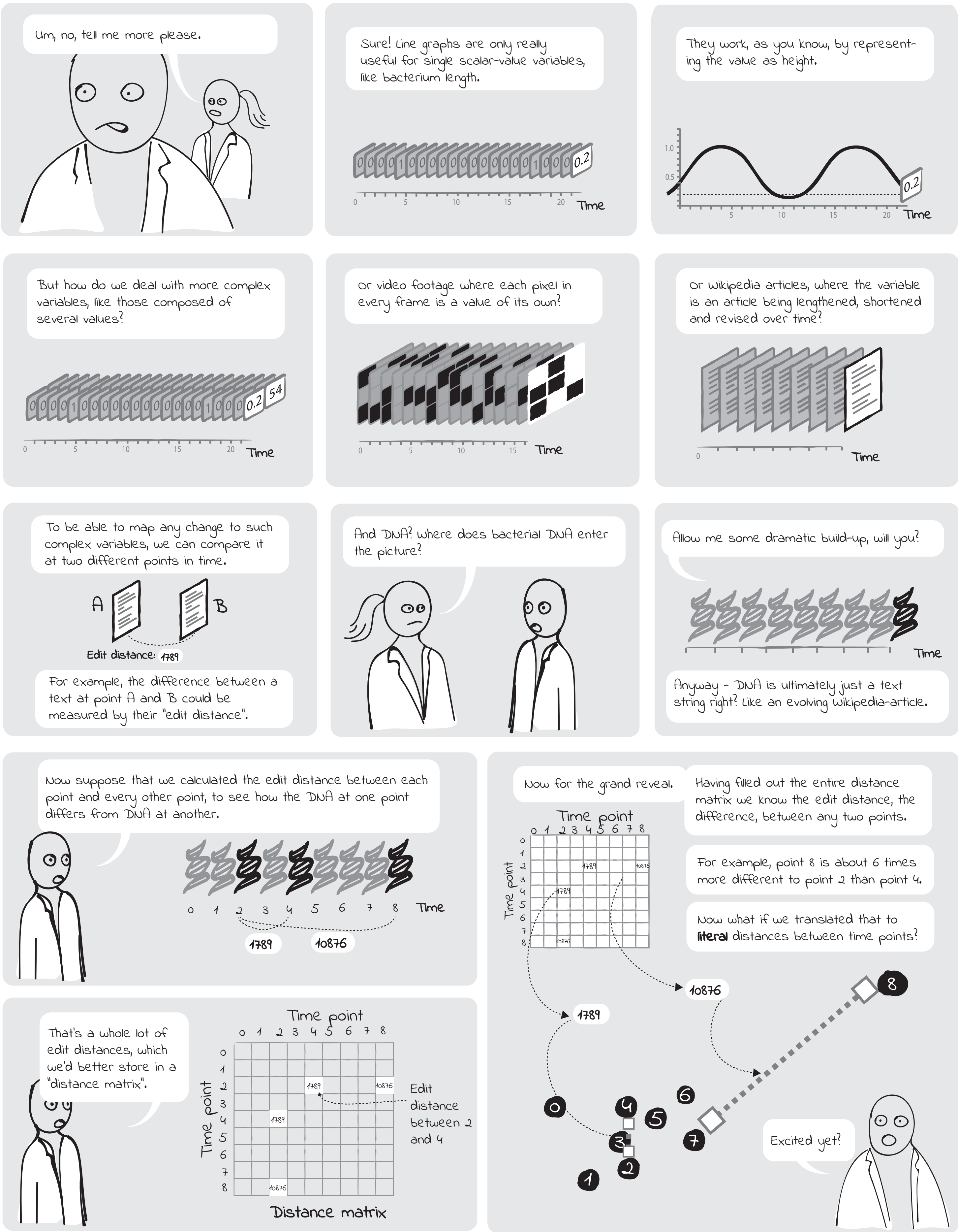
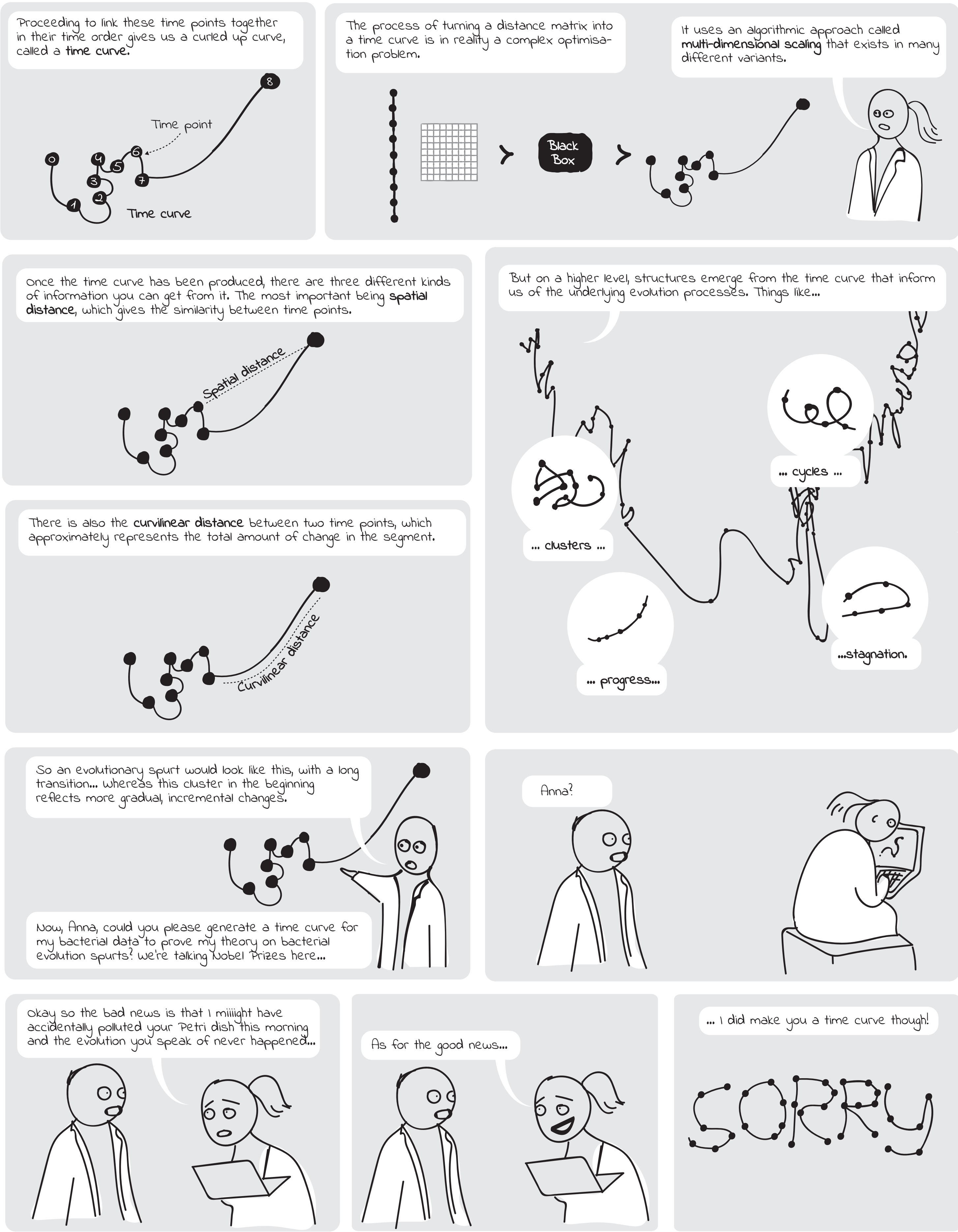
Time Curves

Introduction


Um, no, tell me more please.
Sure! Line graphs are only really useful for single scalar-value variables, like bacterium length.
Time
They work, as you know, by representing the value as height.
Time
But how do we deal with more complex variables, like those composed of several values?
Time
Or video footage where each pixel in every frame is a value of its own?
Time
Or Wikipedia articles, where the variable is an article being lengthened, shortened and revised over time?
Time
To be able to map any change to such complex variables, we can compare it at two different points in time.
A
B
Edit distance: 1789
For example, the difference between a text at point A and B could be measured by their "edit distance".
And DNA? Where does bacterial DNA enter the picture?
Allow me some dramatic build-up, will you?
Time
Anyway - DNA is ultimately just a text string right? Like an evolving Wikipedia-article.
Now suppose that we calculated the edit distance between each point and every other point, to see how the DNA at one point differs from DNA at another.
0 1 2 3 4 5 6 7 8 Time
1789
10876
That's a whole lot of edit distances, which we'd better store in a "distance matrix".
Time point
Time point
Edit distance between 2 and 4
Distance matrix
Now for the grand reveal.
Time point
Time point
Having filled out the entire distance matrix we know the edit distance, the difference, between any two points.
For example, point 8 is about 6 times more different to point 2 than point 4.
Now what if we translated that to **literal** distances between time points?
10876
1789
Excited yet?



* Learn more about the algorithm:
Bach, B., Conglei, S., Heulot, N., Madhyastha, T, Grabowski, T & Dragicevic, P. (2016, January). Time Curves: Folding Time to Visualize Patterns of Temporal Evolution in Data. In IEEE Transactions on Visualization and Computer Graphics (Vol. 22, No. 1, pp. 1-1).