Horizontal Translation

I use the attached GeoGebra sketch to demonstrate to students why horizontal translations seem to go opposite to the direction you would expect. The explanation goes something like this:

- When we graph a function y=f(x), we are plotting the set of points (x, f(x)). That is, for each specific X, we calculate its corresponding y-coordinate and plot all of these. (Show Step 1 on the graph. You can also drag point X to illustrate the various points on the graph.)
- To find the value of X-k, we go k units *left* from our specific X. We can calculate the corresponding y-coordinate f(X-k) also. (Show Step 2.)
- If we were to plot all the points (X-k, f(X-k)), we would NOT be plotting y = f(x-k), we would still be plotting y = f(x). (Drag X to show that all of the points from Step 2 still lie on the original graph of y = f(x).)
- But the key idea is, when we graph y = f(x-k), we are plotting the y-coordinate f(X-k) above the *original* x-coordinate X. (Show Step 3.) That is, we are plotting the set of points (X, f(X-k)). Effectively, this pulls the y-value that was above X-k, back over to X, that is, k units to the *right* of its location on the graph of y = f(x).
- In effect, each specific X-coordinate "steals" the y-coordinate from the point *k* units to its left, pulling this y-coordinate *k* units to the right of its original location. (Drag point X to see the graph of y=f(x-k) traced out.)