“Papa ate the caviar with a spoon”
Avoid duplicate work: Build width-1, then width-2, etc.

Papa ate the caviar with a spoon

end position

start position

root of parse: start following backpointers here
choice of which backpointer pair to follow! (ambiguous VP)

this PP ("with a spoon") is built only once but gets used twice, by two alternative hypotheses (VP and NP both point to it)