Editorial

The following article is the unintended consequence of an unexpected finding from an experiment conducted in 2018 and published in 2019 (Effects of Differentiation and Association in Galileo Space, *Communication & Science Journal*, 2019). The experiment attempted to discover the effects of associating and dissociating two objects. The associative prime was “Do you know that Volvo and Chevrolet are very similar?” and the dissociative prime was “Did you know Volvo and Chevrolet are very different?” The associative prime indeed moved both cars toward each other along the line segments connecting them.

But the dissociative prime behaved oddly; Volvo moved directly away from Chevrolet, but Chevrolet *moved away from Volvo at a right angle*!

When you are thinking (as we were in 2019) that you were moving points through an empty space, that didn’t seem possible. Recently when working in a field theoretical framework we were able to show that the field is anything but empty, and after being exposed to forces, objects move through the field along the path of least resistance, which could be anything.

But the increased scrutiny had raised another issue that wouldn’t go away: How could our prime move concepts apart in a Hebbian system where neurons that fire together wire together? In plain English, how can a Hebbian learner figure out that “different” means “apart, separated. Equally strange, how could a Hebbian learning system learn that “very” meant “further apart, different, separated?” Claude code found over 800 occurrences of “very” in one of our larger text files – the Feynman interviews – so I ran them through Huey and plotted the top 100 concept and – couldn’t see it. I checked the top 200 – not there. I asked Claude to check, and Claude found it – in the stopfile. Claude removed it and I ran it through Huey again. It was the seventh most frequently occurring word! Why were we excluding it from analysis? I checked for its frequency of occurrence in English. In all the lists I could find, very is in the top 100, and the top 100 make up 56% of all the words used in English!

It turns out, we didn't make the list ourselves; we got it from a highly reliable source on the web – as did everyone else. The entire industry was excluding one of the top 100 occurring words in English from all their analyses. But wait, there's more – they were excluding virtually all the operators in the language.

I had Claude remove the operators from the exclude file and run Feynman through a Hebbian neural network, I thought he would run it through Huey, our extremely sophisticated and advance Hebbian learning system, but he (rightly) chose instead to build a plain vanilla windowed Hebbian model and what should appear but apparently well-structured subspaces made up of the operators. The research team immediately did what any good scientific research team would do and tried to find text files that would fail, but as the article shows very clearly, the simple model could identify the operators and the relationships among them in different genres, languages, and other major categories.

The article goes on to provide excellent detail relevant to a wide variety of disciplines, but for those of us trying to figure out the dynamics of cognitive and cultural processes, the single most important question has been answered by this research: can a simple Hebbian Learning system learn what "very" and "different" mean? Yes.