A Connectionist Model of Semantic Network Disruptions Evident in Alzheimer’s Patients

The Problem

Patients suffering from Alzheimer’s disease (AD) often show disruptions in their ability to recall names and a subset of semantic properties of 42 different animal names. AD patients typically produce fewer names, and those names recalled show an increased distance between the animal names and the properties used in their encoding. This is consistent with the idea that the abnormal clusters of AD patients are organized within a semantic network of the type proposed by Collins and Loftus (1975). Abnormal clusters are viewed then as a disruption in semantic organization by the formation of new, albeit abnormal associations (e.g., Chan et al., 1993). Unfortunately, given the nature of AD, the active reorganization of semantic memory may not be a classical semantic network, but an IAC type of network--to encode semantic knowledge. Unlike a semantic network, nodes within an IAC network have both positively and negatively weighted connections, and not by actively creating new associations. Therefore, the underlying functional architecture of semantic memory may not be a classical semantic network, but an IAC type of network.

Consequently, an IAC network was created to encode both the concepts and form abnormal clusters as compared to normal, and those names recalled show an increased distance between the animal names and the properties used in their encoding. This is consistent with the idea that the abnormal clusters of AD patients are organized within a semantic network of the type proposed by Collins and Loftus (1975). Abnormal clusters are viewed then as a disruption in semantic organization by the formation of new, albeit abnormal associations (e.g., Chan et al., 1993). Unfortunately, given the nature of AD, the active reorganization of semantic memory may not be a classical semantic network, but an IAC type of network--to encode semantic knowledge. Unlike a semantic network, nodes within an IAC network have both positively and negatively weighted connections, and not by actively creating new associations. Therefore, the underlying functional architecture of semantic memory may not be a classical semantic network, but an IAC type of network.

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