a)

Geoffrey Hinton's belief in neural networks as the right path to understanding and simulating human intelligence was influenced by several key factors:

1. Biological Inspiration: Hinton was inspired by the structure and function of the human brain. He believed that neural networks, which mimic the brain's interconnected neurons, could replicate the brain's learning processes.
2. Backpropagation Algorithm: In the 1980s, Hinton, along with David Rumelhart and Ronald J. Williams, co-authored a seminal paper that popularized the backpropagation algorithm. This algorithm allowed neural networks to learn from their errors, significantly improving their performance and making them more viable for complex tasks.
3. Interdisciplinary Approach: Hinton's background in both psychology and computer science allowed him to bridge the gap between understanding human cognition and developing artificial intelligence. This interdisciplinary approach reinforced his belief in neural networks as a powerful tool for simulating human intelligence.

b)

Process of searching through similar words to find the right one is reminiscent of the associative memory that the physicist John Hopfield discovered in 1982. The *Hopfield network* can store patterns and has a method for recreating them. When the network is given an incomplete or slightly distorted pattern, the method can find the stored pattern that is most similar.

Hopfield described the overall state of the network with a property that is equivalent to the energy in the spin system found in physics; the energy is calculated using a formula that uses all the values of the nodes and all the strengths of the connections between them. The Hopfield network is programmed by an image being fed to the nodes, which are given the value of black (0) or white (1). The network's connections are then adjusted using the energy formula, so that the saved image gets low energy. When another pattern is fed into the network, there is a rule for going through the nodes one by one and checking whether the network has lower energy if the value of that node is changed. If it turns out that energy is reduced if a black pixel is white instead, it changes colour. This procedure continues until it is impossible to find any further improvements. When this point is reached, the network has often reproduced the original image on which it was trained.