

Using Network Science to Examine the Mental Lexicon

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Network science is an emerging discipline drawing from sociology, computer science, physics and a number of other fields to examine complex systems in economical, biological, social, and technological domains (Barabási, 2009). To examine these complex systems, network science uses nodes (or vertices) to represent individual entities, and connections (or edges) to represent relationships between entities, forming a web-like structure, or network, of the entire system. The structure that emerges in those complex networks influences the dynamics of that system (Watts & Strogatz, 1998). This approach has also been used to examine complex psychological systems and has increased our understanding of the brain (Sporns, 2010), psychological disorders (Cramer et al. 2010), and the cognitive processes involved in human navigation (Iyengar et al., 2012), in semantic memory (Griffiths, Steyvers & Firl, 2007; Hills et al., 2009; Steyvers & Tenenbaum, 2005), and in human collective behavior (Goldstone, Roberts & Gureckis, 2008).

Recent work has used this analytic approach to examine the structure found in the phonological lexicon (Vitevitch, 2008). Subsequent psycholinguistic investigations have demonstrated that the structural characteristic known as the clustering coefficient influences lexical processing. New findings regarding the influence that other structural characteristics- assortative mixing by degree and path length- have on processing will be discussed.