Contribution ID: **22** Type: **Talk**

The role of competition between conceptual relations during compound word recognition: Evidence from spoken and visual word recognition

Friday, June 23, 2017 2:30 PM (20 minutes)

Research suggests that compound word recognition is guided by the activation of a relational structure that links the compound's constituents (e.g., *steamboat* is a 'boat that *uses* steam'; Gagné & Shoben, 1997). Schmidtke et al. (2016) demonstrated that part of this process is competitive in nature. They found that greater relative difficulty in converging on a compound's relational interpretation (i.e., greater Shannon entropy) leads to longer lexical decision latencies. However, it is not known whether this effect generalizes to different tasks or different modalities. We addressed these issues in a series of four studies.

In Study 1 we collected relation interpretation data for 604 English compound words using Amazon Mechanical Turk. Data from this study was used to compute the measure of entropy of conceptual relations. In Study 2, across two visual lexical decision datasets (ELP and BLP; Balota et al., 2007; Keuleers et al., 2012), we replicated the finding that greater competition among conceptual relations slows down compound word recognition. In Study 3, we investigated the same effect on auditory lexical decision latencies in the MALD database (Tucker et al, submitted). We demonstrate the novel finding that competition among relational interpretations also occurs during spoken word recognition. Finally, moving beyond the recognition of isolated words, Study 4 reports the same inhibitory effects of entropy on eye movements to compounds that were read within sentence contexts.

In sum, across all studies we find that uncertainty in selecting a compound's relational interpretation creates a cognitive bottleneck, which increases cognitive effort during word recognition. This finding accords with the theory that conceptual combination is a competitive process (Spalding et al., 2010), and demonstrates that the underlying mechanism of selecting a single relational meaning from many is task independent, and is common to auditory and visual comprehension.

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Session Classification: Contributed papers 5

Track Classification: Freely Contributed Paper