

Individual Differences in Comprehension across the Lifespan

This project will systematically explore the development of spoken language comprehension across the lifespan. This is an important topic as children and adults with poor language comprehension skills are known to be disadvantaged throughout their lives, in terms of both academic attainment and occupational status. It is therefore important that we develop a detailed theoretical account of why and how individual differences in this vital skill arise.

The capacity to comprehend language is complex and multifaceted. This project focuses on a core aspect of language comprehension: the ability able to rapidly and accurately access the meanings of spoken words. This is a non-trivial problem, not least because lexical ambiguity is ubiquitous: 80% of common English words have multiple dictionary definitions. The ability to access the appropriate meaning for each word that we encounter is a necessary component of skilled language comprehension. For example, to understand the sentence “What an enormous trunk!” the listener must work out whether the speaker was referring to an elephant’s nose, a large suitcase, a car’s boot, or the main stem of a tree. The activation of word knowledge must depend on a system that is flexible, nuanced and sensitive to context.

We know that people vary in their abilities to rapidly and accurately access word-meanings, but we do not know why. One type of explanation is that individuals differ in stored lexical-semantic knowledge and that this serves to constrain word-meaning access. A different type of explanation is more domain-general, pointing to individual differences in executive control, beyond the language system. On this view, deriving the meaning of a word depends upon activating, maintaining and inhibiting lexical representations and all of these processes place heavy demands on the executive resources. Alternatively, these two factors may both contribute and interact in complex ways that change across the lifespan.

To test these competing hypotheses, three complementary and inter-related projects will address three empirical objectives:

- 1) Discover whether individual differences in comprehension skill are associated with differences in listeners’ (i) stored lexical-semantic knowledge and/or to their (ii) executive control skills, and how these factors interact across the lifespan. This is achieved by combining a large-scale web-based cross-sectional study with adults and a one-year longitudinal study with primary age children (Project 1).
- 2) Discover the causal factors that lead to high-quality lexical-semantic knowledge, exploring differences in both the external linguistic environment and in internal cognitive capacities. This will be achieved using a combination of connectionist network simulations and language-learning experiments with both children and adults (Project 2).
- 3) Perform a targeted intervention study to move from laboratory to the classroom. This will assess whether word-meaning access can be enhanced by instruction that focuses on establishing word knowledge or by training the specific executive control processes that could generalise to different, untrained words (Project 3).

Underpinning all three strands is the development of innovative experimental tools for assessing word-meaning access. These tasks will be fun and engaging, and will be suitable (in modified forms) for both children and adults. Web-based data collection methods will be developed to facilitate recruitment from large and diverse population samples.

Taken together, the results from these complementary projects will allow us to develop a novel theoretical framework that specifies how representations of word meanings develop across the lifespan and what cognitive capabilities and environmental factors contribute to fluent, accurate language comprehension.