

**The cognitive, perceptual, social,  
environmental, and developmental factors  
associated with child language ability**

Thesis submitted by

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## **DECLARATION ON ETHICS AND THE CONTRIBUTION OF OTHERS**

The research presented and reported in this thesis was conducted within the guidelines for research ethics outlined in the *National Statement on Ethics Conduct in Research Involving Humans* (1999), the *Joint NHMRC/AVCC Statements and Guidelines on Research Practice* (2001), and the *James Cook University Statement and Guidelines on Research Practice* (2001). The proposed research methodology received clearance from the James Cook University Experimentation Ethics Review Committee (approval number H1144).

The research presented and reported in this thesis was designed by the author (under supervision). The data was collected by the author with the aid of three research assistants, who were remunerated for their services. The data was analysed by the author. The sources of funding for the research were the School of Psychology James Cook University, two *Doctoral Merit Research Grants* from James Cook University, and the author.

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## **ABSTRACT**

Child language ability has been associated with cognitive, perceptual and social/developmental factors including auditory temporal processing, processing speed, cognitive capacity and verbal working memory. These factors have largely been identified through research on children with language impairments. In particular, specific language impairment (SLI) has been viewed as a unique opportunity to study the factors of importance in language development free from potentially confounding factors like intelligence, and social, physical and environmental effects (Leonard, 1998). The main aim of this research was to investigate whether the cognitive, perceptual and social/developmental factors identified in previous research really are important for normal language development as a whole, as the majority of research undertaken has not included children across the full range of normal language ability. In addition, the relationships between language, nonverbal intelligence and social, environmental and developmental factors are not usually considered in research on SLI due to the strict diagnostic criteria. However, these factors are hypothesised to have importance for language ability as a whole and have the potential for relationships with one another. Some task based questions were also examined. These included an investigation of McDonald and Christiansen's (2002) contention that verbal working memory tasks are merely special types of language processing tasks, and predictions arising from Baddeley's (1986) model of working memory. Participants included 158 seven to nine year old children who were administered a battery of language, nonverbal IQ and purpose-made tasks. The children's parents were administered an interview that included their years of education and occupation, and language and



physical risk factors for the child. Not surprisingly, results from correlational analyses indicate that most variables are significantly related to language ability. The strongest relationships for language ability were with nonverbal IQ, nonword repetition and the language developmental risk index. As was expected from the correlations, the mean differences between groups with low, average and high language ability reflect linear relationships. However, when the variance from nonverbal IQ or the language developmental risk index was removed from the analyses (via ANCOVA), no results remained significant. This indicates complex relationships between cognitive, perceptual and developmental factors, which were confirmed in the analysis of structural equation models. The best fitting model represented the hypothesis that cognitive capacity would predict language ability and was domain-specific as predicted by Baddeley's theory of working memory. A model reversing the relationship between language and verbal working memory testing McDonald and Christiansen's argument indicated that language ability has a significant effect on all study variables, and an almost perfectly collinear relationship with verbal working memory. The results of the study indicate that: a) multivariate research and analysis approaches are necessary to elucidate the complex predictors of language ability as univariate and quasi-experimental methods do not identify the underlying interrelationships, b) some verbal working memory tasks appear to be measuring language processing as argued by MacDonald and Christiansen, c) it may be impossible to remove the effects of language from experimental tasks, thus requiring novel means of quantifying these effects, and d) that classifying SLI as a distinct disorder may be erroneous as 13% of this non-clinical sample met all criteria for a diagnosis of SLI.

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