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Predicting children's speech, language and reading impairment over time

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Abstract

Prospective population based longitudinal studies are highly informative for understanding developmental trajectories in speech, language and reading impairment. These studies contribute to our knowledge about the onset and trajectories of these disorders and to our understanding of the factors that influence these trajectories over the life course. Epidemiological research in speech, language and reading impairment shares some of the challenges inherent in studying any developmental impairment that persists yet changes over time. Not only do the speech, language and reading impairment phenotypes change over time but the proximal and distal factors associated with these phenotypes vary in magnitude at different epochs in development. The notion that phenotypes and the factors that influences them change is a positive one because it allows for the possibility of improvement and recovery. Clearly, the phenomenology of these developmental disorders makes the practical enterprise of identifying children at risk for these disorders and predicting their outcomes a significant challenge.

A child's ability to communicate is one of the most important accomplishments of early childhood and is the foundation for success at school and beyond. Decades of interdisciplinary research have revealed striking patterns in the way children acquire speech and language, and later, develop literacy. There has been strong uptake of these empirical findings into circumscribed expectations about the trajectories of speech, language and literacy development in the early years. For example, school entry is predicated on children of the same age having similar speech and language abilities and readiness for school.

Universally initiated at an early age, without specific tuition, and relentlessly focused on the adult model as the final "outcome", the acquisition of speech, language and reading are distinguishing achievements in human development. In this special issue, the contributors have used powerful epidemiological research methodologies to illuminate trajectories in the acquisition of speech, language and reading and help us understand why these trajectories might vary for some children. This special issue brings together leading studies in child development from Australia, Canada, Finland, the United Kingdom and the United States of America (USA).

The first three articles showcase findings from internationally renowned programmatic research in speech, language and reading impairment in Australia, the USA and Finland. In the first article, Reilly and colleagues (Reilly et al., 2009) add to what is known about the onset, trajectories and predictors of language and cognitive development at 8 months, 12 months and 24 months, in the Early Language in Victoria Study (ELVS). The ELVS is a prospective community based sample of children in Australia. Their data showed rapid

growth in communication and symbolic behaviors between 8–24 months and identified which communication and symbolic behaviors showed significant growth at different ages. As well as reporting important growth patterns, they investigated putative risk factors for early language delay. The authors concluded that the magnitude of risk conferred by the candidate predictors is not sufficient to identify children at risk for early language delay.

In the second article, Dollaghan and Campbell (2009) investigated language growth at 3, 4 and 6 years in children from the Pittsburgh longitudinal study. The Pittsburgh study has made a substantial contribution to the evidence base for managing children with middle ear disease. In this study, Dollaghan and Campbell showed significant growth in performance on measures of receptive vocabulary, morphosyntax and nonword repetition across the full range of the distribution, at each age. However, performance in the low range at 3 years was a poor predictor of continued low performance at 4 and 6 years. These results caution against the use of these measures prognostically.

In the third article, Richardson, Kulju, Nieminen, and Torvelainen (2009) report results from four studies that are part of the Javaskyla Longitudinal Study of Dyslexia. In this study, Finnish-speaking children with and without a family history of dyslexia were recruited during pregnancy, enabling the researchers to study prelinguistic and linguistic abilities in “at risk” and control children from 6 months of age. They showed that “at risk” children were differentiated from control children by lower performance on measures of early phonological and morphosyntactic abilities at 6, 18, 24 and 30 months. The results of the studies reported here point to the developmental origins of dyslexia at earlier ages than reported previously.

The fourth and fifth articles in this series report results from studies in the United Kingdom and Australia that were designed to investigate causal pathways to a wide range of child health and developmental outcomes, including speech, language and school achievement.

In the fourth article, Roulstone, Miller, Wren and Peters (2009) reported on the prevalence, characteristics and continuity of speech impairment at 2, 5 and 8 years in children in the Avon Longitudinal Study of Parents and Children (ALSPAC). Consistent with Reilly and colleagues, Roulstone and colleagues observed wide variation in children’s performance on speech and language measures at 2 years. Speech error rate at 2 years did not predict speech impairment at 8 years, however speech errors at 5 years was a significant predictor of speech impairment at 8 years, showing developmental continuity in the lower range of performance (i.e., higher speech error rate) at 5 and 8 years. This suggests that speech error rate is a candidate prognostic indicator for persistent speech impairment, broadly defined for research purposes.

In the fifth article, Harrison Harrison, McLeod, Berthelsen and Walker (2009) reported on school achievement at 6–7 years for children with and without a history of speech and language impairment at 4–5 years. The children were participants in the Longitudinal Study of Australian Children (LSAC), a nationally representative epidemiological prospective observational study. The study showed that children with speech and language impairment at 4–5 years had significantly lower school achievement at 6–7 years than children with normal speech and language development. The authors concluded that parent report of speech and language impairment in preschool age children showed promise for identifying children at educational risk.

The final 2 articles in this series use a different scientific approach to identifying children at educational risk. The inclusion of these articles is timely, given the national roll-out of the Australian Early Development Instrument (AEDI) to all 5-year-olds in Australia in 2009, as described by Brinkman, Sayers, Goldfeld and Kline (2009). When a population measure like

the Early Development Index (EDI) (Kohen, Oliver and Pierre, 2009) or the AEDI is administered over time, it is administered to successive cohorts of 5-year-olds in the same communities. The aim of research using these population measures of school readiness is to identify vulnerable communities that will benefit from early childhood programs to support children's development. The effectiveness of these early childhood programs is then evaluated through repeated measures of school readiness in successive age cohorts of 5-year-olds in these communities. The inclusion of neighborhood influences in models of early child development has become increasingly important as young children spend more time in environments outside the home (e.g., child care) (Shonkoff and Phillips, 2000).

Kohen, Oliver and Pierre (2009) investigated the effect of child/family, school and neighborhood influences on children's readiness for school, as part of the 2001 Canadian early years initiative. The authors observed that all factors were important, with child/family factors making the strongest contribution to school readiness.

Brinkman, Sayers, Goldfeld and Kline (2009) continued the theme of population level measurement of children's school readiness using data from the Australian Early Development Index (AEDI) National Project (2004–2007). The results of this study highlighted the vulnerability of linguistically diverse children in the first year of school. Importantly, the study also showed that children who were vulnerable in the Language and Cognitive Development Domain lived in communities across the whole socioeconomic spectrum. The authors concluded that prevention/intervention strategies that focus solely on low socioeconomic communities will miss the majority of vulnerable children.

The articles in this special issue provide a comprehensive compendium of what is currently known and not known about predictors of speech, language and reading impairment and associated low school achievement in the early years. The contributors to this special issue share the challenges faced by all researchers who study causal pathways to developmental impairments. These challenges include the wide variation in emergent speech, language and reading in typically developing children; phenotypic overlap between delay and impairment; dramatic changes in the way phenotypes are expressed over the life course and the prospect of recovery.

Identifying markers and predictors of speech, language and reading impairment early enough to alter children's developmental outcomes for the better is the ultimate goal of the studies in this special issue. These studies exemplify contemporary approaches to understanding potentially modifiable causal pathways to adverse developmental outcomes and have made important progress towards a bold objective.

Acknowledgments

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