Influence of risk factors for Developmental Language Disorders and language scores in Bilingual and Unilingual children

Janine O'Coin, M.Sc.S Candidate & Roxanne Belanger, PhD.

ÉCOLE DES SCIENCES INFIRMIÈRES ET DES PROFESSIONS DE LA SANTÉ - ORTHOPHONIE

SUMMARY

Developmental Language Delay (DLD) affects approximately 7% of all children. Language development is necessary for academic success and proper social development. Early intervention is crucial to identify children with DLD to ensure the receive timely intervention and necessary supports. According to Bishop et al. (2017), DLD occurs more frequently than conditions such as Attention Deficit Hyperactivity Disorder and Autism Spectrum Disorder but receives much less funding for research. Due to this, there is still much to learn about risk factors for DLD, its impact on everyday communication, as well as diagnostic measures to better identify it at an early age. Currently, Speech-language pathologists are largely unable to determine which young children will go on to receive a diagnosis of DLD (McKean et al., 2017). Several risk and protective factors related to the child's sociodemographic environment have been cited for DLD: family history of speech or language disorders, prematurity, low birth weight and male biological sex (Berkman et al., 2015). Furthermore, socioeconomic status (SES) and parental education have been shown to predict a child's early language development (Hoff, 2006; McKean et al., 2017; Panscofar, 2010, Rudolph, 2017). Caregiver concern about speech and language delays has also been shown to be an important factor in diagnosing language delays and correlations have been found between parental level of concern regarding expressive language and results on formal expressive language assessments (McLeod et al, 2018). Finally, daycare attendance is also believed to have a positive impact on language development (National Institute of Child Health and Development, 2000).

Although the biomedical and socio-demographic risk factors for language development are known, there does not appear to be one single factor that strongly predicts the development of a DLD (Rudolf, 2017). Some authors suggest that intervention should occur when there is an accumulation of known risk factors, and that there is interplay between other factors, such as those that are biological and behavioural in nature (Paul, 1996, Paul et al., 2018). In this area of research, the literature is sparse and there is a significant amount of contradictory information (Diepeveen et al., 2017). There continues to be much debate over the predictive value of these known risk factors, yet they are often used as a way to try to determine which preschool children are at risk for developing a DLD (Bishop et al., 2017).

INTRODUCTION AND OBJECTIVES

Although there are known risk factors to language development, it is unclear how these risk factors influence language performance scores over time. As such, the identification of reliable measures that predict future language skills during the preschool period is not yet possible, particularly in the bilingual population (Dockrell & Marshall, 2015). Many authors agree that understanding the differences between children whose language difficulties will resolve on their own and those who will have DLD should be a research priority (Berkman et al., 2015; Paul, 1996). Also of importance is a better understanding of the factors that contribute to poor language performance in preschoolers in order to allow for immediate intervention and possible prevention of a DLD (Ebbels et al., 2018).

The purpose of this study was 1) to determine the correlation between known risk factors for DLD and performance on tasks measuring language and executive functioning in anglophone and bilingual French-English preschool children living in northeastern Ontario and 2) to determine the overall contribution of these risk factors on these language and executive functioning measures. We hypothesized that children with multiple risk factors would demonstrate poorer performance on language scores than those who have few or none.

METHOD

Participants

46 children aged 37 months (SD = 4) were used for the present study. Of these participants, 32 were monolingual Anglophones, 14 were bilingual (French-English, with the dominant language being French). There was an equal distribution of girls (50.0%) and boys (50.0%). Participants generally came from a higher socioeconomic (SES) background as caregivers had an average of 17.3 (2.8) years of education. In addition, 93.5% of the children attended daycare. Sixty-five (65.2) percent of the participants had a family history of childhood difficulties (for example: speech and/or language, learning) and almost 24% had a significant medical event at birth (i.e., prematurity, etc.). Finally, 37% of parents included in the study had some concerns about their child's language development. Recruitment was completed through networking, promotion, social media posts and field presentations. Strategic partnerships with the local school boards, childcare centers and daycares were created to assist with the recruitment of participants aged 30 to 42 months. Members of the research team also distributed posters to various community organizations and medical offices.

Measures

Parent Questionnaires: Parents completed a sociodemographic questionnaire, a Preschool Language Exposure Mapping questionnaire and the Behavior Rating Inventory Executive Function – Preschool Version (BRIEF-P).
Standardized Assessments Tasks: Each participant was assessed with a battery of standardized assessment tools. The tools included the Montgomery Assessment of Vocabulary Acquisition Receptive and Expressive component (MAVA-E, MAVA-R); the Recalling Sentences (RS/RPh), Concept and Following Directions (C&FD) subtests of the Clinical Evaluation of Language Fundamentals Preschool - Second Edition (CELF P2); the Statue Task of the NEPSY-2 and the Crosslinguistic Nonword Repetition task (NWR).

Data Analysis

Raw and standardized scores were analyzed with SPSS 26 software. To determine the correlation between socio-demographic factors and standardized assessment results, Pearson's correlation coefficient was used. The following variables were included: mother's education in years, father's education in years, mother's SES, father's SES, parental concern, familial history of speech, language or learning disorder, medical difficulties at birth, daycare attendance, sex, raw and standard score on the MAVA-E, MAVA-R, CELF-P2 (Concepts and Following Direction, Recalling Sentences), NWR and NEPSY-II (Statue task). Subsequently, regression analyses were used to test the predictive effect of these variables on standardized assessment results at 36 months.

RESULTS

Correlations between Risk and Protective factors and Language Scores and Executive Functioning Scores

To determine if there is a relationship between risk and protective factors and measures of language and executive functioning, a Pearson correlational analysis was performed using raw scores on the following subtests:

For language skills: MAVA-R, MAVA-E; CELF-P2 C&D/FD, RPh/RS; NWR/RNM .
For executive functioning: Statue Task, BRIEF-P

Results demonstrated correlations between measures of language, executive functioning and:
- maternal education, paternal education, maternal SES
- sex
- positive familial history of speech, language and learning difficulties
- medical difficulties at birth
- caregiver concerns for language development

Linear Regression Analysis

Multiple linear regression analyses were used to predict language and executive functioning scores based on the sociodemographic variables identified. These included: mother's education in years, father's education in years, mother's SES, father's SES, caregiver concern, familial history of speech, language or learning disorder, medical difficulties at birth, daycare attendance and sex. In the first model, all variables were included in the analyses. The stepwise model made it possible to gradually remove the variables and better test the role of those contributing the most to the dependent variable in the final (parsimonious) model.

Relationships retained as significant following linear regression analyses

Subtest	Variable	B	SE B	β	t	p
MAVA-R English	Model 1 Mother's Education	2.315	.973	.404	2.278	.024
MAVA-E English	Model 1 Parental Concerns	-19.164	5.590	-.537	-3.428	.002
MAVA-R Bilingual	Model 1 Father's Education	7.693	1.855	.884	4.2348	.008
MAVA- E Bilingual	Model 1 Father's Education	7.693	2.225	.866	3.458	.026
C&FD English	Model 1 History - familial	2.709	1.167	.396	2.322	.027
	Model 2 Father's Education	.526	.213	.389	2.472	.006
RS English	Model 1 Caregiver Concerns	-4.69	1.469	-.517	-3.196	.003
	Model 2 History familial	3.163	1.385	.348	2.284	.001
C&D/FD bilingual	Model 1 Sex	5.750	1.663	.866	3.458	026
NWR Phonemes All participants	Model 1 Mother's Education	3.668	1.245	.446	2.947	.006
NWR Words All participants	Model 1 Father's Education	4.612	1.335	.504	3.454	.001
NEPSY All participants	Model 1 Caregiver Concerns	-4.087	1.880	-.337	-2.174	.036

CONCLUSION

The review of the literature demonstrated that the presence of certain socio-demographic risk factors may influence the development of speech and language. The results of this study supported this fact as it was shown that the presence of multiple socio-demographic risk factors did influence variance of outcomes on assessments of language and executive functioning.

In unilingual anglophone participants, it was determined that mother's education, father's education, and caregiver's concern about a child's speech and language development significantly predicted the variance in performance on tasks measuring language and executive functioning. In French-English bilingual participants, only parental education was found to be a predictive factor. This may be a result of the small sample size and further study on a larger sample size is recommended.

As this is a longitudinal study, assessments of these children will be continuing. Eventually, the data will allow us to better understand the overall contribution of these risk factors on these language and executive functioning measures over time. In addition, the results will allow us to determine whether being aware of the presence of these socio-demographic risk and protective factors were effective in identifying children at risk for DLD.

REFERENCES

Berkman, N. D., Wallace, I., Watson, L., Coyne-Beasley, T., Cullen, K., Wood, C., & Lohr, K.N. (2015). Screening for speech and language delays and disorders in children age 5 years or younger: A systematic review for the U.S. Preventive Services Task Force. *Agency for Healthcare Research and Quality (US)*. http://www.ncbi.nlm.nih.gov/books/NBK305674/

Bishop, V. M., Snowling, M. J., Thompson, P.A., & Greenhalgh, T. (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *The Journal of Child Psychology and Psychiatry, 58*(10), 1068-1080. https://doi.org/10.1111/jcpp.12721

Diepeveen, F. B., van Dommelen, P., Oudesluys-Murphy, A. M., & Verkerk, P. H. (2017). Specific language impairment is associated with maternal and family factors. *Child: Care, Health and Development, 43*(3), 401-405. https://doi.org/10.1111/cch.12451

Dockrell, J., & Marshall C., (2015). Measurement issues: Assessing language skills in young children. *Child and Adolescent Mental Health 20*(2), 116-125. http://doi.org/10.1111/camh.12072

Ebbels, S. H., McCartney, E., Slonims, V., Dockrell, J. & Norbury, C. F. (2018). Evidence-based pathways to intervention for children with language disorders. *International Journal of Language & Communication Disorders, 54*(1), 3-19. https://doi.org/10.1111/14606984.12387

Hoff, E. (2006). How social contexts support and shape language development. *Developmental Review, 26*(1), 55-88. https://doi-org.librweb.laurentian.ca/10.1016/j.dr.2005.11.002

McKean, C., Wraith, D., Eadie, P., Cook, F., Mensah, F., & Reilly, S. (2017). Subgroups in language trajectories from 4 to 11 years: the nature and predictors of stable, improving and decreasing language trajectory groups. *The Journal of Child Psychology and Psychiatry, 58*(10), 1081-1091. http://doi/org/10.1111/jcpp.12790

National Institute of Child Health and Human Development Early Child Care Research Network. (2000). The Relation of Child Care to Cognitive and Language Development. *Child Development, 71*(4), 960–980. http://www.jstor.org/stable/1132337

Norbury, C.F., Gooch, D., Wray, C., Baird, G., Charman, T., Simonoff, E., Vamvakas, G., & Pickles, A. (2016). The impact of nonverbal ability on prevalence and clinical presentation of language disorder: Evidence from a population study. *Journal of Child Psychology and Psychiatry, 57*(11). 1247–1257. https://doi.org/10.1111/jcpp.12573

Paul, R. (1996). Clinical implications of the natural history of slow expressive language development. *American Journal of Speech-Language Pathology, 5*(2). 5–21. https://doi.org/10.1044/1058-0360.0502.05

Paul, R., Norbury, C., & Gosse, C. (2018). *Language disorders from infancy to adolescence: Listening, speaking, reading, writing, and communicating* (5th ed.). Elsevier, Inc.

Pancsofar, N., & Vernon-Feagans, L. (2010). Fathers' Early contributions to children's language development in families from low-income rural communities. *Early Childhood Research Quarterly, 25*(4), 450-463. https://.doi.org/10.1016/j.ecresq.2010.02.001

Rudolph, J. M. (2017). Case history risk factors for specific language impairment: A systematic review and meta-analysis. *American Journal of Speech–Language Pathology, 26*(3), 991–1010. http://doi.org/10.1044/2016_AJSLP-15-0181

Tomblin, J. B., Records, N. L., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997). Prevalence of specific language impairment in kindergarten children. *Journal of Speech, Language & Hearing Research, 40*(6), 1245-1260.