MIT Press • Open Encyclopedia of Cognitive Science

Developmental Language Disorder

Chloë Ruth Marshall[1]

[1]UCL Institute of Education, University College London, London, UK

MIT Press

Published on: Oct 21, 2024

DOI: https://doi.org/10.21428/e2759450.1d3e0934

ABSTRACT

Developmental language disorder is diagnosed in the approximately 8% children who would be expected to acquire their first language(s) readily—given their seemingly age-appropriate rate of development in other cognitive domains and their receipt of sufficiently rich language input—but who nevertheless do not reach key language milestones at the expected ages. These children are often delayed in producing their first words and then in combining words into sentences. Their difficulties with both producing and understanding language can continue into adolescence and even adulthood, impacting academic achievement and employment opportunities. The characteristics and underlying causes of developmental language disorder have been the subject of intense research activity across different languages and modalities (i.e., spoken, signed, and written). Although there are good descriptions of the linguistic characteristics of developmental language disorder, for some languages at least, its underlying causes remain poorly understood.

History

Although the term *developmental language disorder*, known commonly as *DLD*, has been widely adopted in recent years, various terms have been used historically, with Specific Language Impairment (SLI) being among the most common [see Language Acquisition]. As is the case for other behaviorally defined disorders of neurodevelopment (e.g., dyslexia, autism, and attention-deficit/hyperactivity disorder, also known as ADHD), defining the criteria for DLD and setting out its boundaries is not straightforward [see Autism]. There is considerable heterogeneity among individuals in both the severity of their language disorder and the form it takes. Heterogeneity makes researching DLD and making sense of the research literature more challenging (Bishop et al., 2017). There is even debate as to whether children with DLD form a distinct group with a qualitatively different linguistic profile to other children or whether they instead occupy the very low end of a normal distribution of language abilities (Tomblin, 2019) [see Linguistic Variation].

Historically, DLD has been researched by different groups of scientists and childhood professionals, including cognitive scientists, developmental psychologists, linguists, neurobiologists, pediatricians, and educators (Hellal & Lorch, 2013). More recently, geneticists, developmental cognitive neuroscientists, and speech and language therapists have also made important contributions (e.g., Chen et al., 2017; Krishnan et al., 2016; Leonard & Schroeder, 2023). Scientists have found DLD a useful testing ground for theories of language and cognition, including theories of the relation between these two.

Core concepts

Domain-general versus domain-specific explanations of DLD

There are two main classes of explanation for the underlying causes of DLD. One class of explanations proposes that the underlying cause of the language-learning impairment is linguistic in nature, related to

impaired representation or processing of language material (e.g., van der Lely et al., 1998). Such *domain-specific* explanations appeal to the theoretical framework of modularity (Fodor, 1983) and use the characteristics of individuals with DLD to support the notions of *big modularity* and *little modularity*. A functional division between language and other areas of cognition (i.e., *big modularity*) is suggested by the existence of a language impairment in children whose cognitive development otherwise appears normal. Similarly, a functional division within the language system itself (i.e., *little modularity*) is suggested by the existence of an impairment that is significantly greater for grammatical, rule-based aspects of language compared to more idiosyncratic aspects such as words. The second class of explanations are *domain-general* in that the underlying cause is argued to be in an aspect of cognition that impacts language but is not specifically linguistic in nature (e.g., slow rate of auditory processing, Tallal & Piercy, 1973; limited working memory capacity, Gathercole & Baddeley, 1990) [see Working Memory].

Within each class of explanation, various theories have been proposed to account for the data. A selection of these are illustrated in Table 1, in relation to a characteristic error of morphology seen in English-speaking children with DLD, namely the omission of the past tense "-ed" suffix [see Morphology]. For example, instead of saying "he jumped over a puddle," children with DLD are more likely than other children of the same age to produce the bare stem form of the verb by saying "he jump over a puddle." Different explanations for this phenomenon have been proposed.

Table 1. Some explanations for past tense omission errors in English-speaking children with DLD (drawn from Leonard, 2014).

Table 1

Domain-specific (i.e., linguistic) explanations	**Extended optional infinitive account**	Young children go through a stage during which they sometimes mark past tense but sometimes do not (i.e., tense marking is "optional"). When tense is not expressed, they produce an infinitive form ("jump"). The optional infinitive stage occurs because a biologically based maturation principle does not emerge until children have begun their grammatical development. For typically developing children, this principle emerges young, but for children with DLD its emergence is slow (i.e., extended).
	Computational grammatical complexity account	Children with DLD have an impairment in computing and representing grammatically complex forms. Past tense morphology involves syntactic, morphological, and, frequently, phonological complexity (as illustrated by the /mpt/ cluster of consonant sounds at the end of "jumped"), and so it is difficult to process and produce.

Domain-general explanations	**Surface account**	Children with DLD have a general processing-capacity limitation. This makes the auditory processing of units of short duration, including the grammatical morpheme "-ed," challenging. Children with DLD are capable of perceiving the sounds, but their limited processing capacity is severely taxed when these sounds play a grammatical role. Therefore, it takes children with DLD longer than expected to acquire past tense morphology.
	Morphological richness account	Children with DLD are assumed to have a limited processing capacity, whose effects differ as a function of the language being learned. In English, suffixes are sparse, and bare stems are frequent. Therefore, children are expected to devote their limited resources to the more prevalent grammatical information, for example, word order. Fewer resources will remain for the learning of suffixes. In contrast, in a language rich in suffixes, like Italian, children devote their limited resources to this area of grammar. Therefore, differences between children with DLD and typically developing peers will be smaller in a suffix-rich language.

Comorbidity

One of the challenges to establishing whether DLD is a domain-specific disorder of just language, or whether wider aspects of cognition are affected, is that many children who have DLD also have other co-occurring developmental difficulties or *comorbidities* (Bishop et al., 2017). Some have reading and writing difficulties, which is not surprising given that language skills play a crucial role in the acquisition of literacy (Bishop & Snowling, 2004). Indeed, some researchers consider dyslexia to be a form of language disorder. Children with DLD may also have comorbid ADHD, mathematical difficulties, or autism, among other conditions. It is important to understand comorbidity because it challenges notions of discrete developmental disorders (Pennington, 2006).

Questions, controversies, and new developments

Comorbidity and the underlying causes of DLD remain important topics of investigation and controversy in this field of research. However, some new developments aim to shed light on them.

DLD has been identified in all the languages where it has been looked for, including sign languages (Mason et al., 2010; Quinto-Pozos, 2022) [see Sign Language] and in the written forms of spoken languages (Tucci & Choi, 2023). The expansion of cross-linguistic and cross-modal research allows researchers to better characterize which aspects of DLD are invariant across languages and across modalities and which vary according to specific linguistic characteristics of the language (Leonard & Schroeder, 2023). For example, the

existence of DLD in Deaf children who use sign language strongly suggests that an auditory processing deficit (Tallal & Piercy, 1973) cannot be the sole cause of DLD.

An aim for many researchers working in the field of DLD is to use what is known about cognitive science and linguistics to improve the lives of individuals through better identification of who has DLD and through the creation of more effective language interventions. In turn, intervention studies have the potential to pin down the causes of DLD. For example, one study evaluated the effectiveness of a working memory intervention by comparing complex syntax in children with DLD who were allocated either to a group receiving working memory training or a comparison group receiving a global scholastic training. The working memory training group made progress on working memory measures and on tests assessing complex syntax, but the comparison group did not (Delage et al., 2021). This result would be predicted by a working memory account of DLD but not by a solely linguistic account. However, whether a working memory intervention is more effective than targeting linguistic structures directly remains to be tested.

Broader connections

Ultimately, a full understanding of DLD requires an interdisciplinary approach, with researchers investigating the links between the linguistic and nonlinguistic characteristics of DLD using methods and theories from developmental cognitive neuroscience, molecular biology, and genetics. This will not be straightforward, as illustrated by the discovery of *FOXP2*, which was first touted as a potential "gene for DLD" but which turned out to have a more complicated relationship with speech and language phenotypes (Fisher & Scharff, 2009). Furthermore, explanations need to be developmental in nature, i.e., they must take into account the many dynamic and interacting variables involved in language acquisition. After all, "development itself is the key to understanding developmental disorders" (Karmiloff-Smith, 1998, p. 389).

Further reading

- Leonard, L. B. (2014). C*hildren with specific language impairment* (2nd ed.). MIT Press. https://doi.org/10.7551/mitpress/9152.001.0001
- Tomblin, J. B. (2019). Developmental language disorder. In J. Horst & J. von Koss Torkildsen (Eds.), *International handbook of language acquisition* (pp. 341–361). Routledge. https://doi.org/10.4324/9781315110622-18

References

- Bishop, D. V. M., & Snowling, M. J. (2004). Developmental dyslexia and specific language impairment: Same or different? *Psychological Bulletin, 130*(6), 858–886. https://doi.org/10.1037/0033-2909.130.6.858 ↩

↩

- Chen, X. S., Reader, R. H., Hoischen, A., Veltman, J. A., Simpson, N. H., Francks, C., Newbury, D. F., & Fisher, S. E. (2017). Next-generation DNA sequencing identifies novel gene variants and pathways involved in specific language impairment. *Scientific Reports*, *7*, 46105. https://doi.org/10.1038/srep46105

↩

- Delage, H., Stanford, E., & Durrleman, S. (2021). Working memory training enhances complex syntax in children with developmental language disorder. *Applied Psycholinguistics*, *42*(5), 1341–1375. https://doi.org/10.1017/S0142716421000369

↩

- Fisher, S. E., & Scharff, C. (2009). FOXP2 as a molecular window into speech and language. *Trends in Genetics*, *25*(4), 166–177. https://doi.org/10.1016/j.tig.2009.03.002

↩

- Fodor, J. A. (1983). *The modularity of mind: An essay on faculty psychology*. MIT Press. https://doi.org/10.7551/mitpress/4737.001.0001

↩

- Gathercole, S. E., & Baddeley, A. D. (1990). Phonological memory deficits in language disordered children: Is there a causal connection? *Journal of Memory and Language*, *29*(3), 336–360. https://doi.org/10.1016/0749-596X(90)90004-J

↩

- Hellal, P., & Lorch, M. (2013). Why study the history of research into developmental disorders? In C. R. Marshall (Ed.), *Current issues in developmental disorders* (pp. 173–192). Routledge.

↩

- Karmiloff-Smith, A. (1998). Development itself is the key to understanding developmental disorders. *Trends in Cognitive Sciences*, *2*(10), 389–398. https://doi.org/10.1016/s1364-6613(98)01230-3

↩

- Krishnan, S., Watkins, K. E., & Bishop, D. V. M. (2016). Neurobiological basis of language learning difficulties. *Trends in Cognitive Sciences*, *20*(9), 701–714. https://doi.org/10.1016/j.tics.2016.06.012

↩

- Leonard, L. B. (2014). C*hildren with specific language impairment* (2nd ed.). MIT Press. https://doi.org/10.7551/mitpress/9152.001.0001

↩

-

↩

- Leonard, L. B., & Schroeder, M. L. (2023). The study of children with developmental language disorder beyond English: A tutorial. *Language Acquisition*, *31*(3–4), 180–198. https://doi.org/10.1080/10489223.2023.2197891

↩

- Mason, K., Rowley, K., Marshall, C. R., Atkinson, J. R., Herman, R., Woll, B., & Morgan, G. (2010). Identifying specific language impairment in Deaf children acquiring British Sign Language: Implications for theory and practice. *British Journal of Developmental Psychology*, *28*(1), 33–49. https://doi.org/10.1348/026151009x484190

↩

- Pennington, B. F. (2006). From single to multiple deficit models of developmental disorders. *Cognition*, *101*(2), 385–413. https://doi.org/10.1016/j.cognition.2006.04.008

↩

- Quinto-Pozos, D. (2022). Developmental language disorder and the assessment of signed language. In T. Haug, W. Mann, & U. Knoch (Eds.), *The handbook of language assessment across modalities* (pp. 171–184). Oxford University Press. https://doi.org/10.1093/oso/9780190885052.003.0015

↩

- Tallal, P., & Piercy, M. (1973). Developmental aphasia: Impaired rate of non-verbal processing as a function of sensory modality. *Neuropsychologia*, *11*(4), 389–398. https://doi.org/10.1016/0028-3932(73)90025-0

↩

- Tomblin, J. B. (2019). Developmental language disorder. In J. Horst & J. von Koss Torkildsen (Eds.), *International handbook of language acquisition* (pp. 341–361). Routledge. https://doi.org/10.4324/9781315110622-18

↩

- Tucci, A., & Choi, E. (2023). Developmental language disorder and writing: A scoping review from childhood to adulthood. *Journal of Speech, Language, and Hearing Research*, *66*(8), 2900–2920. https://doi.org/10.1044/2023_JSLHR-22-00583

↩

- van der Lely, H. K. J., Rosen, S., & McClelland, A. (1998). Evidence for a grammar-specific deficit in children. *Current Biology*, *8*(23), 1253–1258. https://doi.org/10.1016/S0960-9822(07)00534-9

↩