

The Role of Prenatal Alcohol Exposure and Its Implications on Cognition and Language Across the Lifespan

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Introduction

- Fetal Alcohol Spectrum Disorders (FASD)** include a range of neurodevelopmental conditions caused by prenatal alcohol exposure, such as: Fetal Alcohol Syndrome (FAS), Partial FAS, and Alcohol-Related Neurodevelopmental Disorder (ARND)
- Although FASD has been widely studied in childhood, long-term cognitive and language outcomes remain relatively underexplored.
- Individuals with FASD often experience difficulties with language processing, pragmatic (social) communication, attention, and executive functioning
- These challenges significantly impact academic, social, and career success.
- Prenatal alcohol exposure is also associated with, facial dysmorphology, growth deficiencies, and neurocognitive impairments (Akison et al., 2024; Gupta et al., 2016)
- FASD is increasingly recognized as a lifelong condition.
- Understanding how cognitive and language deficits develop and persist over time is essential.
- This review examines cognitive and language impairments across the lifespan in individuals with FASD and discusses implications for speech-language pathology assessment and intervention.

What are the cognitive and language impairments associated with FASD across the lifespan?

Method

- This capstone used a literature review approach, focusing on empirical studies and scholarly reviews of prenatal alcohol exposure, executive functioning, and language outcomes.

Sources Used:

- Empirical research studies
- Scholarly review articles
- Prenatal alcohol exposure
- Key findings on executive functioning with FASD
- Key findings regarding language outcomes with FASD

- Sources were selected for their relevance to cognitive processes, receptive and expressive language, and developmental progress.

Cognitive Process

- Attention
- Working Memory
- Executive Functioning

Language Criteria

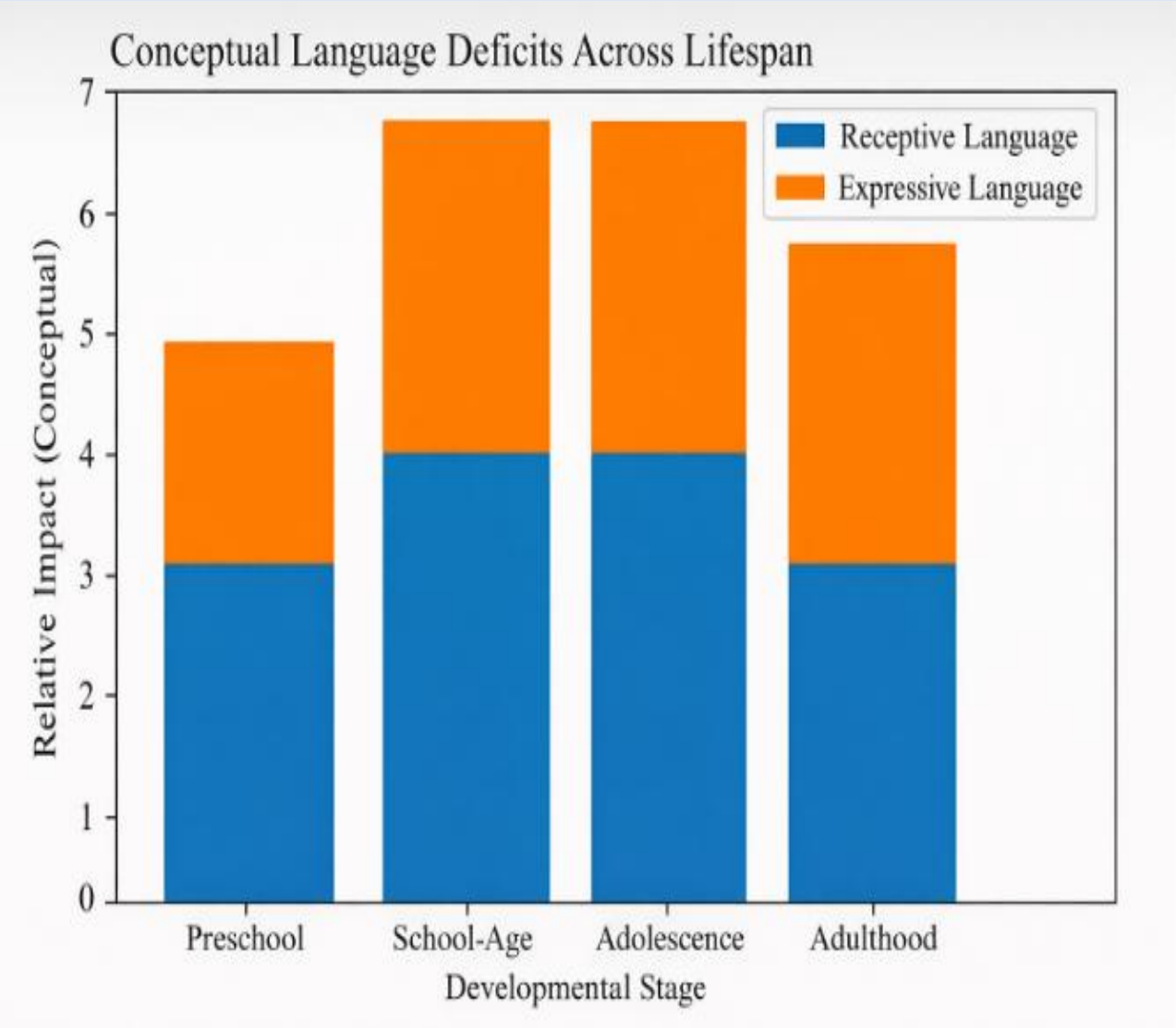
- Expressive Language
- Receptive Language

- The findings were combined to identify common patterns of impairment across developmental stages, such as preschool, school-age children, adolescence, and adulthood.

Results

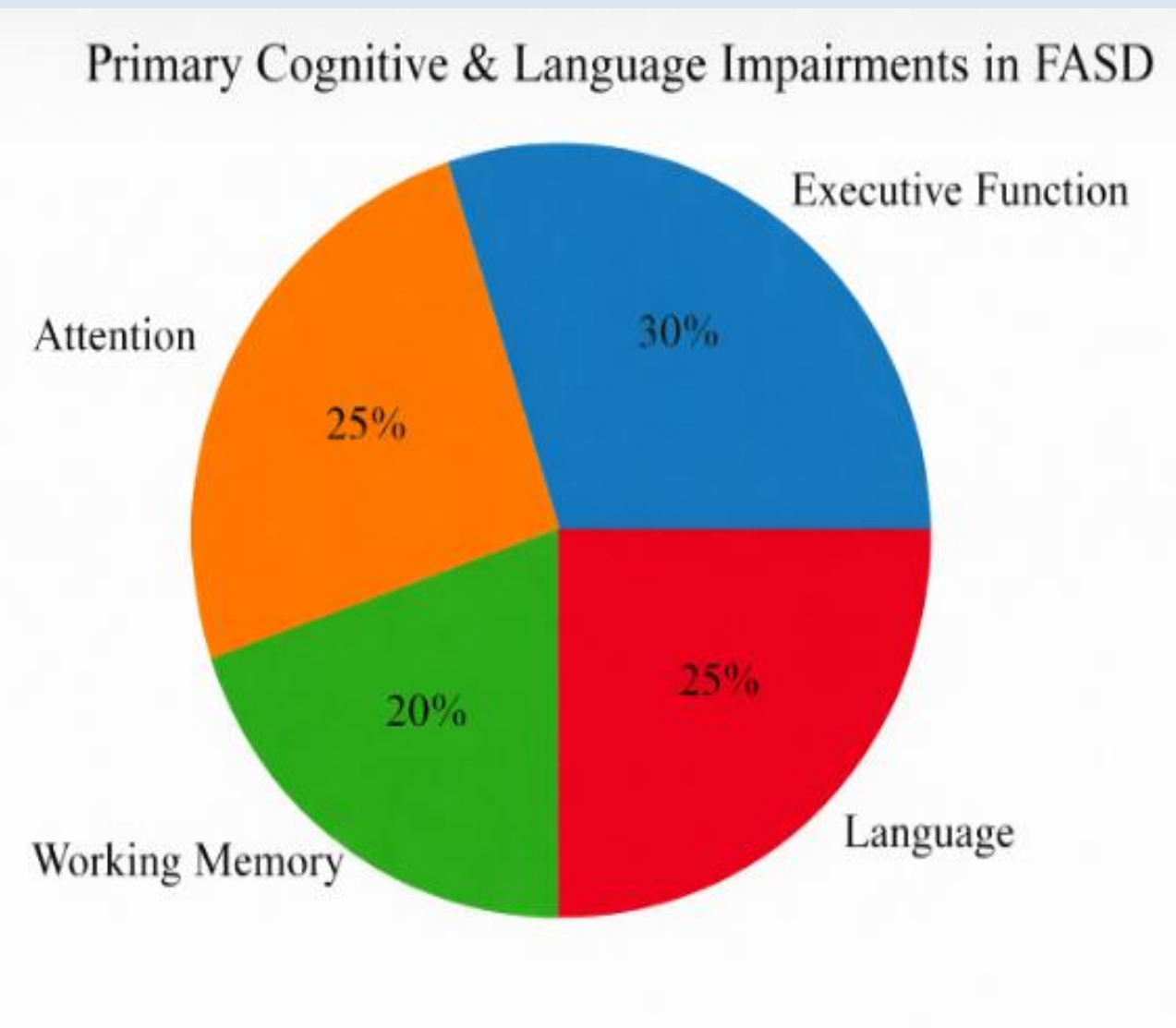
This graph illustrates receptive and expressive language impairments from preschool through adulthood.

- Language difficulties increase as academic and social demands grow, with receptive deficits remaining prominent across all stages.
- Expressive challenges are present but less pronounced, as basic speech is often intact.
- Overall, the graph supports that FASD is a lifelong condition, with language deficits evolving rather than resolving over time.



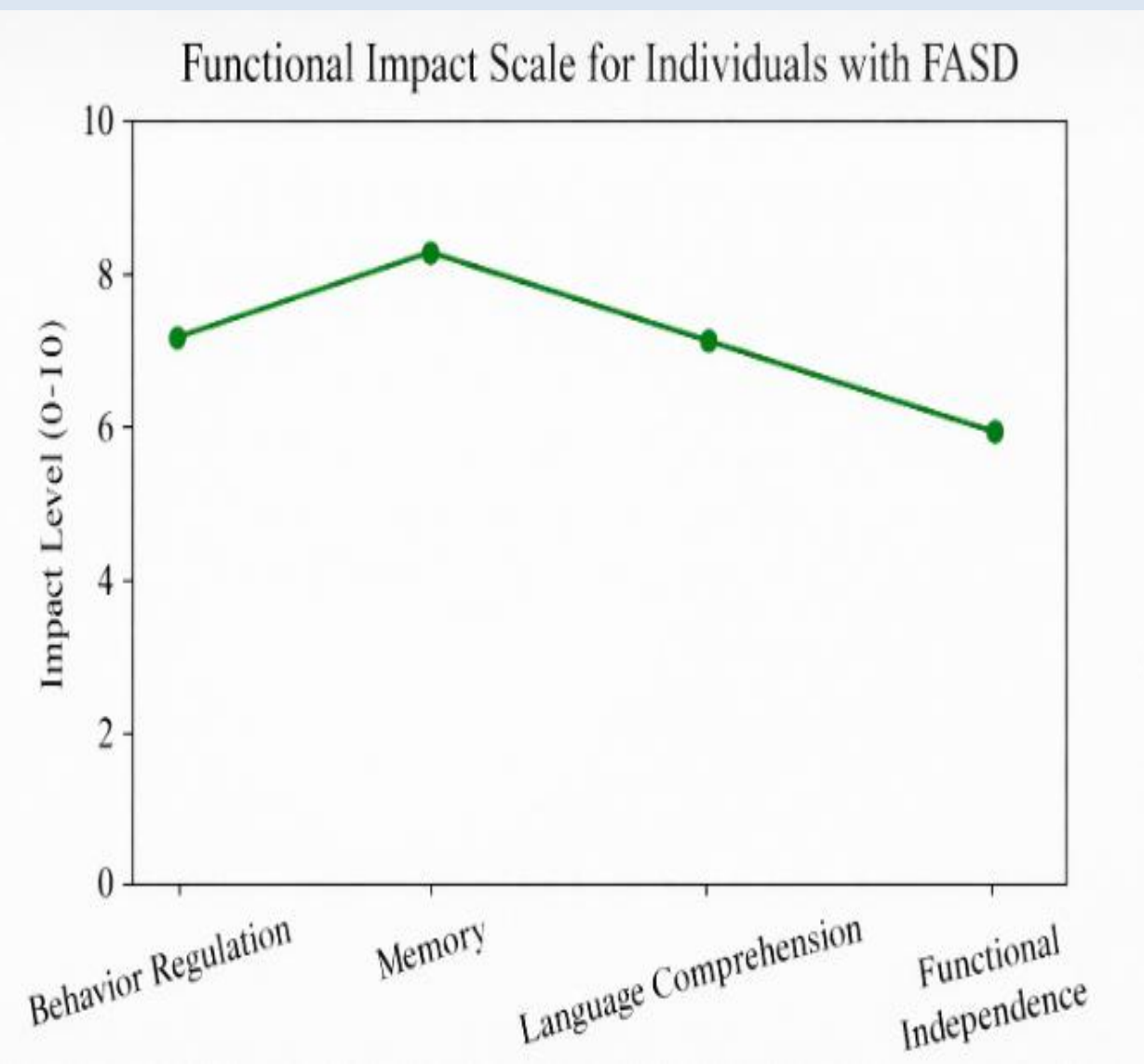
This pie chart illustrates the main impairment areas identified:

- Executive Function (30%)** – The largest segment, supported by meta-analyses, indicates deficits in planning, cognitive flexibility, inhibitory control and organization.
- Attention (25%)** – Corresponds with documented challenges in sustained attention and processing speed.
- Language (25%)** – Covers both receptive and expressive language impairments, with particular emphasis on higher-level communication difficulties.
- Working Memory (20%)** – Based on research, persistent problems in holding and manipulating information are indicated. Overall, the visual emphasizes that FASD impacts multiple **cognitive domains**, with executive functioning being a central area of deficit that affects other skills.



This line graph shows how cognitive and language impairments influence everyday functioning:

- Memory and behavior regulation** is more significantly impacted, aligning with the deficits in executive functioning and working memory.
- Language comprehension** remains notably affected, reinforcing the findings of persistent receptive language weaknesses.
- Functional independence** encounters substantial obstacles, highlighting adult difficulties in organization, financial management, adaptive reasoning, and problem-solving. The minor decline in functional independence suggests that as individuals age, impairments transition from academic issues to everyday life challenges.



Research consistently shows that individuals with FASD face challenges such as receptive and expressive language disorders. In addition to language deficits, individuals with FASD faces challenges in executive functioning, working memory, and attention.

Conclusions

Clinical Implication for Speech-Language Pathology:

- Early Detection:** Crucial for effective FASD intervention
- Multidisciplinary Planning:** Understanding deficits in young children guides treatment plans
- SLP Role:** Speech-Language Pathologists are essential to treating cognitive and language challenges
- Assessment:**
 - Use standardized tools across the lifespan, not just in early childhood
 - Language tests: ROWPV, ROSSETI, REEL, CELF, TOLD, PLS, TAPS, SPELT, etc.
 - Include pragmatic, social, and cognitive evaluations (problem-solving, attention, executive function)
 - Standardized testing alone is insufficient; comprehensive evaluation is key
- Intervention Targets:**
 - Real-world problem-solving
 - Comprehension and functional language
 - Self-monitoring and organization
 - Participation in classroom and daily life
- Ongoing Support:** Vital during developmental transitions (childhood → adolescence)
- Collaboration:** Families, educators, and mental health professionals ensure successful outcomes
- Lifespan Perspective:** FASD is a lifelong neurodevelopmental disorder requiring adaptive, interdisciplinary SLP services

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References

Akison, L. K., Hayes, E., & The Australian FASD Guidelines Development Group. (2024). Prenatal alcohol exposure and associations with physical size, dysmorphology, and neurodevelopment: A systematic review and meta-analysis. *BMC Medicine*. <https://doi.org/xx>

Coles, C. D., Kable, J. A., Granovska, I. V., Pashtepa, A. O., Wiertelicki, W., & Chambers, C. D. (2021). Measurement of neurodevelopmental effects of prenatal alcohol exposure in Ukrainian preschool children. *Child Neuropsychology*, 27, 1088–1103.

Duquette, C., & Parr, L. (2022). Students with fetal alcohol spectrum disorder: Inclusive classroom practices. *Exceptionality Education International*, 32(1), 55–76.

Gault, S., McGarity, M., Sitar, J., Chaves, D., MacDonald, R., Lee, F., Gilbert, O., Badry, D., Huber, K., Fischer, M., Stefanon, B., & Morton Ninomiya, M. E. (2023). Transitions into adulthood for people with fetal alcohol spectrum disorder: A scoping review of promising practices. *Children and Youth Services Review*, 155, 107239. <https://doi.org/10.1016/j.chidyouth.2023.107239>

Gupta, K. K., Gupta, V. K., & Shirasaka, T. (2016). An update on fetal alcohol syndrome—Pathogenesis, risks, and treatment. *Alcoholism: Clinical and Experimental Research*, 40(8), 1594–1602. <https://doi.org/10.1111/acer.13136>

Khouri, J. E., Milligan, K., & Girard, T. A. (2015). Executive functioning in children and adolescents prenatally exposed to alcohol: A meta-analytic review. *Neuropsychology Review*, 25, 149–170. <https://doi.org/10.1007/s11085-015-9289-8>

Kingdon, D., Cardoso, C., & McGrath, J. J. (2016). Research review: Executive function deficits in fetal alcohol spectrum disorders and attention-deficit/hyperactivity disorder—A meta-analysis. *Journal of Child Psychology and Psychiatry*, 57(2), 116–131. <https://doi.org/10.1111/jcpp.12451>

Kully-Martens, K., Pei, J., McNeil, A., & Rasmussen, C. (2023). Resilience resources and emotional and behavioral functioning among youth and young adults with fetal alcohol spectrum disorder. *International Journal of Mental Health and Addiction*, 21, 1168–1185. <https://doi.org/10.1007/s11469-021-00652-6>

Mattson, S. N., Bernes, G. A., & Doyle, L. R. (2019). Fetal alcohol spectrum disorders: A review of neuropsychological and behavioral deficits. *Alcoholism: Clinical and Experimental Research*.

Poth, L. D., Love, T., & Mattson, S. N. (2023). Profiles of language and communication abilities in adolescents with fetal alcohol spectrum disorders. *Journal of the International Neuropsychological Society*, 29, 724–733. <https://doi.org/10.1017/S1355617722000789>

Proven, S., Ens, C., & Beaudin, P. G. (2014). The language profile of school-aged children with fetal alcohol spectrum disorder (FASD). *Canadian Journal of Speech-Language Pathology and Audiology*, 37(4), 268–279.

Subramoney, S., Joshi, S. H., Wedderburn, C. J., Lee, D., Roos, A., Woods, R. P., Zar, H. J., Narr, K. L., Stein, D. J., & Donald, K. A. (2022). The impact of prenatal alcohol exposure on gray matter volume and cortical surface area of 2- to 3-year-old children in a South African birth cohort. *Alcoholism: Clinical and Experimental Research*, 46(7), 1233–1247. <https://doi.org/10.1111/acer.14853>