

**MODEL INTERVENSI “COSY DEVELOPMENT” BERBASIS KELUARGA
UNTUK MENINGKATKAN KEMAMPUAN VERBAL EKSPRESIF
ANAK DOWN SYNDROME**

DISERTASI

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar
Doktor Pendidikan Khusus



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2025**

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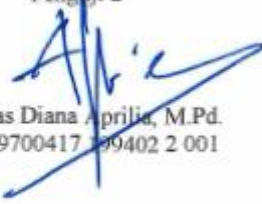
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HALAMAN PERNYATAAN

Dengan ini saya menyatakan bahwa disertasi saya yang berjudul “Model Intervensi ***Cosy Development*** Berbasis Keluarga Untuk Meningkatkan Kemampuan Verbal Ekspresif Anak Down Syndrome” ini beserta seluruh isinya adalah karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung resiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

Bandung, Januari 2025

Yang membuat pernyataan,



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ABSTRAK

Anak Down Syndrome menghadapi tantangan besar dalam kemampuan verbal ekspresif dan berdampak pada rendahnya kemampuan intelektual. Berbagai model intervensi telah dilakukan untuk mengatasi masalah ini, namun model intervensi dengan mempertimbangkan kondisi sensorik, motorik serta melibatkan keluarga belum banyak dilakukan. Sensorik dan motorik menjadi kemampuan awal dalam melakukan penjelajahan untuk menguasai verbal ekspresif. Keluarga merupakan lingkungan pertama bagi anak untuk tumbuh dan berkembang. Penelitian ini bertujuan merumuskan model intervensi Cosy Development berbasis keluarga yang berfokus pada latihan sensorik dan motorik untuk meningkatkan verbal ekspresif yakni pengucapan bunyi, suku kata, dan kata pada anak Down Syndrome. Penelitian ini menggunakan ADDIE melalui pendekatan mix method dengan melibatkan 8 anak Down Syndrome berusia 0-12 tahun. Intervensi dilakukan selama 12 bulan dengan melibatkan keluarga. Data dikumpulkan melalui observasi wawancara dan tes verbal sebelum dan setelah intervensi. Analisa data untuk melihat signifikansi kemampuan verbal ekspresif pre-posttest menggunakan uji Wilcoxon. Hasil penelitian menunjukkan bahwa model intervensi Cosy Development berbasis keluarga signifikan dalam meningkatkan verbal ekspresif anak Down Syndrome sebesar $p < 0,05$. Keterlibatan keluarga untuk memberikan intervensi sensorik dan motorik berkontribusi terhadap peningkatan verbal ekspresif. Artinya, penerapan model intervensi dapat diterapkan dengan baik oleh keluarga. Implikasi penelitian ini menciptakan panduan inovatif model intervensi yang menggabungkan sensorik dan motorik berbasis keluarga. Temuan ini memberikan landasan untuk pengembangan pendekatan holistik yang lebih luas untuk meningkatkan verbal ekspresif anak-anak Down Syndrome.

Kata Kunci: intervensi, sensorik, motorik, verbal ekspresif, basis keluarga, Down Syndrome

ABSTRACT

Children with Down Syndrome face significant challenges in expressive verbal abilities as a result of genetic mutations with low intellectual ability. Various intervention models have been carried out to overcome this problem, but intervention models that consider sensory and motor conditions and involve families have not been widely implemented. Sensory and motor skills are the initial ability to explore and master verbal and expressive skills, and family is the primary environment in which children grow and develop. This study aims to formulate a family-based Cosy Development intervention model that focuses on sensory and motor exercises to improve verbal expression, namely pronunciation of sounds, syllables, and words in children with Down Syndrome. Expressive verbal is intended to be the ability of children to pronounce sounds, syllables and words. This study uses ADDIE through a mixed-method approach involving eight children with Down Syndrome aged 0-12 years. The intervention was carried out for 12 months involving the family. Data were collected through observation, interviews, and verbal tests before and after the intervention. Data analysis to see the significance of pre-post-test expressive verbal ability using the Wilcoxon test. The results showed that the family-based Cosy Development intervention model could significantly increase the verbal expressiveness of children with Down Syndrome by $p < 0.5$. Family involvement in providing sensory and motor interventions contributes to improving verbal expression; that is, the family can apply the intervention model well. The implications of this study create an innovative guide to a family-based model of intervention that combines sensory and motor skills. These findings provide a foundation for developing a broader holistic approach to improving the verbal expressiveness of children with Down Syndrome.

Keywords: *interventional, sensory, motoric, verbal expressive, family based, Down Syndrome*

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DAFTAR PUSTAKA

- Adger, D. (2015). Syntax. *Wiley Interdisciplinary Reviews: Cognitive Science*, 6(2), 131–147. <https://doi.org/10.1002/wcs.1332>
- Ahad, W. A., Children, T., Ehsaan, F., Yousaf, F., Children, T., & Qamar, R. (2020). Cognitive Impairments in Children with Down Syndrome. *Journal of Health, Medicine and Nursing*, April 2021. <https://doi.org/10.7176/jhmn/71-12>
- Antonarakis, S. E., Skotko, B. G., Rafii, M. S., Strydom, A., Pape, S. E., Bianchi, D. W., Sherman, S. L., & Reeves, R. H. (2020). Referencia 19. *Nature Reviews Disease Primers*, 6(1), 1–43. <https://doi.org/10.1038/s41572-019-0143-7>.Down
- Antonaros, F., Ghini, V., Pulina, F., Ramacieri, G., Cicchini, E., Mannini, E., Martelli, A., Feliciello, A., Lanfranchi, S., Onnivello, S., Vianello, R., Locatelli, C., Cocchi, G., Pelleri, M. C., Vitale, L., Strippoli, P., Luchinat, C., Turano, P., Piovesan, A., & Caracausi, M. (2020). Plasma metabolome and cognitive skills in Down syndrome. *Scientific Reports*, 10(1). <https://doi.org/10.1038/s41598-020-67195-z>
- Aparicio, M. T. S., & Balaña, J. M. (2002). Early language stimulation of down's syndrome babies: A study on the optimum age to begin. *Early Child Development and Care*, 172(6), 651–656. <https://doi.org/10.1080/03004430215098>
- Ardila, A., Bernal, B., & Rosselli, M. (2015). Language and visual perception associations: Meta-analytic connectivity modeling of Brodmann area 37. *Behavioural Neurology*, 2015. <https://doi.org/10.1155/2015/565871>
- Berglund, E., Eriksson, M., & Johansson, I. (2001). Parental Reports of Spoken Language Skills in Children with Down Syndrome. *Journal of Speech, Language, and Hearing Research*, 44(1), 179–191. [https://doi.org/10.1044/1092-4388\(2001/016\)](https://doi.org/10.1044/1092-4388(2001/016))
- Besnier, N. (1990). LANGUAGE AND AFFECT. In *Annu. Rev. Anthropol* (Vol. 19). www.annualreviews.org
- Boyce, J. O., Kilpatrick, N., Reilly, S., Da Costa, A., & Morgan, A. T. (2018). Receptive and expressive language characteristics of school-aged children with non-syndromic cleft lip and/or palate. *International Journal of Language and Communication Disorders*, 53(5), 959–968. <https://doi.org/10.1111/1460-6984.12406>
- Brugnaro, B. H., Oliveira, M. F. P., de Campos, A. C., Pavão, S. L., & Rocha, N.

- A. C. F. (2022). Postural control in Down syndrome and relationships with the dimensions of the International Classification of Functioning, Disability and Health—a systematic review. *Disability and Rehabilitation*, 44(11), 2207–2222. <https://doi.org/10.1080/09638288.2020.1830439>
- Bruni, M., Cameron, D., Dua, S., & Noy, S. (2010). Reported sensory processing of children with down syndrome. *Physical and Occupational Therapy in Pediatrics*, 30(4), 280–293. <https://doi.org/10.3109/01942638.2010.486962>
- Çelik, A., Yaman, H., Turan, S., Kara, A., Kara, F., Zhu, B., Qu, X., Tao, Y., Zhu, Z., Dhokia, V., Nassehi, A., Newman, S. T., Zheng, L., Neville, A., Gledhill, A., Johnston, D., Zhang, H., Xu, J. J., Wang, G., ... Dutta, D. (2018). No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する 共分散構造分析Title. *Journal of Materials Processing Technology*, 1(1), 1–8.
<http://dx.doi.org/10.1016/j.cirp.2016.06.001><http://dx.doi.org/10.1016/j.powtec.2016.12.055><https://doi.org/10.1016/j.ijfatigue.2019.02.006><https://doi.org/10.1016/j.matlet.2019.04.024><https://doi.org/10.1016/j.matlet.2019.127252><http://dx.doi.org/10.1016/j.cirp.2016.06.001>
- Cheung, R. W., Hartley, C., & Monaghan, P. (2022). Receptive and expressive language ability differentially support symbolic understanding over time: Picture comprehension in late talking and typically developing children. *Journal of Experimental Child Psychology*, 214, 105305. <https://doi.org/10.1016/j.jecp.2021.105305>
- Chowdhury, S., & Chakraborty, P. pratim. (2017). Universal health coverage - There is more to it than meets the eye. *Journal of Family Medicine and Primary Care*, 6(2), 169–170. <https://doi.org/10.4103/jfmprc.jfmprc>
- Consorti, A., Sansevero, G., Torelli, C., Berardi, N., & Sale, A. (2019). From basic visual science to neurodevelopmental disorders: The voyage of environmental enrichment-like stimulation. In *Neural Plasticity* (Vol. 2019). Hindawi Limited. <https://doi.org/10.1155/2019/5653180>
- D'souza, D., D'souza, H., & Karmiloff-Smith, A. (2017). Precursors to language development in typically & atypically developing infants & toddlers: The importance of embracing complexity. *Journal of Child Language*, 44(3), 591–627. <https://doi.org/10.1017/S030500091700006X>
- Deckers, S. R. J. M., Van Zaalen, Y., Van Balkom, H., & Verhoeven, L. (2017). Core vocabulary of young children with Down syndrome. *AAC: Augmentative and Alternative Communication*, 33(2), 77–86. <https://doi.org/10.1080/07434618.2017.1293730>
- Del Hoyo Soriano, L., Del Hoyo Soriano, L., Thurman, A. J., Thurman, A. J., Harvey, D., Kover, S. T., Abbeduto, L., & Abbeduto, L. (2020). Expressive

- language development in adolescents with down syndrome and fragile X syndrome: Change over time and the role of family-related factors. *Journal of Neurodevelopmental Disorders*, 12(1), 1–18. <https://doi.org/10.1186/s11689-020-09320-7>
- Del Hoyo Soriano, L., Thurman, A. J., Harvey, D., Kover, S. T., & Abbeduto, L. (2020). Expressive language development in adolescents with down syndrome and fragile X syndrome: Change over time and the role of family-related factors. *Journal of Neurodevelopmental Disorders*, 12(1). <https://doi.org/10.1186/s11689-020-09320-7>
- Di, S., Sindrom, B. S., Woollacott, M. H., Shumway-cook, P. D. A., Ph, D., & Kedokteran, D. (1986). *SUKARELA MOTOR PENGENDALIAN SYSTEFiS*.
- Dixon, C., Hessel, A., Smith, N., Nielsen, D., Wesierska, M., & Oxley, E. (2022). Receptive and expressive vocabulary development in children learning English as an additional language: Converging evidence from multiple datasets. *Journal of Child Language*, March. <https://doi.org/10.1017/S0305000922000071>
- Dobinson, K. L., & Dockrell, J. E. (2021). Universal strategies for the improvement of expressive language skills in the primary classroom: A systematic review. *First Language*, 41(5), 527–554. <https://doi.org/10.1177/0142723721989471>
- Falkum, I. L. (2018). *13 Pragmatic development : Learning to use language to communicate* Ingrid Lossius Falkum. October. <https://doi.org/10.13140/RG.2.2.27698.86721>
- Feldman, H. M. (2019). How young children learn language and speech. *Pediatrics in Review*, 40(8), 398–411. <https://doi.org/10.1542/pir.2017-0325>
- Ferreira-Vasques, A. T., & Lamônica, D. A. C. (2015). Motor, linguistic, personal and social aspects of children with down syndrome. *Journal of Applied Oral Science*, 23(4), 424–430. <https://doi.org/10.1590/1678-775720150102>
- Fidler, D. J., Needham, A. W., & Schworer, E. (2019). Infant foundations in Down syndrome: early constraints on cognitive skill acquisition. *International Review of Research in Developmental Disabilities*, 56, 41–65. <https://doi.org/10.1016/bs.irrdd.2019.06.008>
- Fidler, D. J., & Philofsky, A. (n.d.). *The Down syndrome behavioural phenotype: Taking a developmental approach*. <https://doi.org/10.3104/reviews/2069>
- Filipe, M. G., Cruz, S., Veloso, A. S., & Frota, S. (2022). Early predictors of language outcomes in Down syndrome: A mini-review. *Frontiers in Psychology*, 13(September), 1–13. <https://doi.org/10.3389/fpsyg.2022.934490>
- Gill, C., Mehta, J., Fredenburg, K., & Bartlett, K. (2011). Imitation therapy for non-

- verbal toddlers. *Child Language Teaching and Therapy*, 27(1), 97–108. <https://doi.org/10.1177/0265659010375179>
- Giofrè, D., & Cornoldi, C. (2015). The structure of intelligence in children with specific learning disabilities is different as compared to typically development children. *Intelligence*, 52, 36–43. <https://doi.org/10.1016/j.intell.2015.07.002>
- Grace, Iarocci., Naznin, Virji-Babul., Pratibha, Reebye. (2006). The Learn at Play Program (LAPP): Merging Family, Developmental Research, Early Intervention, and Policy Goals for Children with Down Syndrome. *Journal of Policy and Practice in Intellectual Disabilities*, 3(1):11-21. doi: 10.1111/J.1741-1130.2006.00048.X
- Grieco, J., Pulsifer, M., Seligsohn, K., Skotko, B., & Schwartz, A. (2015). Down syndrome: Cognitive and behavioral functioning across the lifespan. *American Journal of Medical Genetics, Part C: Seminars in Medical Genetics*, 169(2), 135–149. <https://doi.org/10.1002/ajmg.c.31439>
- Gunbey, H. P., Bilgici, M. C., Aslan, K., Has, A. C., Ogur, M. G., Alhan, A., & Incesu, L. (2017). Structural brain alterations of Down's syndrome in early childhood evaluation by DTI and volumetric analyses. *European Radiology*, 27(7), 3013–3021. <https://doi.org/10.1007/s00330-016-4626-6>
- Guralnick, M. J. (2011). Why Early Intervention Works. *Infants & Young Children*, 24(1), 6–28. <https://doi.org/10.1097/iy.0b013e3182002cfe>
- Haydar, T. F., & Reeves, R. H. (2012). Trisomy 21 and early brain development. In *Trends in Neurosciences* (Vol. 35, Issue 2, pp. 81–91). <https://doi.org/10.1016/j.tins.2011.11.001>
- Hikmatun, Sadiyah, Sarah, Arif., Sekar, Ayu., Zakkiyah, Putri. (2023). Application of motor sensory approach to improve articulation skills in children with intellectual disabilities. doi: 10.59898/jawara.v2i1.22 infodatin-down-syndrom-2019.pdf. (n.d.).
- Jaiswal. (2014). 基因的改变NIH Public Access. *Bone*, 23(1), 1–7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3624763/pdf/nihms412728.pdf>
- Jaiswal, Mhatre V. Ho, Ji-Ann Lee, and K. C. M., & Dien et al., 2013. (2014). 基因的改变NIH Public Access. *Bone*, 23(1), 1–7. [https://doi.org/10.1044/1092-4388\(2012/12-0148\).Speech](https://doi.org/10.1044/1092-4388(2012/12-0148).Speech)
- Kaat-van den Os, D. te, Volman, C., Jongmans, M., & Lauteslager, P. (2017). Expressive Vocabulary Development in Children With Down Syndrome: A Longitudinal Study. *Journal of Policy and Practice in Intellectual Disabilities*,

14(4), 311–318. <https://doi.org/10.1111/jppi.12212>

- Kim, H. I., Kim, S. W., Kim, J., Jeon, H. R., & Jung, D. W. (2017). Motor and cognitive developmental profiles in children with down syndrome. *Annals of Rehabilitation Medicine*, 41(1), 97–103. <https://doi.org/10.5535/arm.2017.41.1.97>
- Kondo, K., Kikuta, S., Ueha, R., Suzukawa, K., & Yamasoba, T. (2020). Age-Related Olfactory Dysfunction: Epidemiology, Pathophysiology, and Clinical Management. In *Frontiers in Aging Neuroscience* (Vol. 12). Frontiers Media S.A. <https://doi.org/10.3389/fnagi.2020.00208>
- Locke, J. L. (1994). Gradual emergence of developmental language disorders. *Journal of Speech and Hearing Research*, 37(3), 608–616. <https://doi.org/10.1044/jshr.3703.608>
- Lorang, E., Sterling, A., & Schroeder, B. (2018). Maternal responsiveness to gestures in children with down syndrome. *American Journal of Speech-Language Pathology*, 27(3), 1018–1029. https://doi.org/10.1044/2018_AJSLP-17-0138
- Lott, I. T., & Dierssen, M. (2010). Cognitive deficits and associated neurological complications in individuals with Down's syndrome. *The Lancet Neurology*, 9(6), 623–633. [https://doi.org/10.1016/S1474-4422\(10\)70112-5](https://doi.org/10.1016/S1474-4422(10)70112-5)
- Lund, E., Young, A., & Yarbrough, R. (2020). The Effects of Co-Treatment on Concept Development in Children With Down Syndrome. *Communication Disorders Quarterly*, 41(3), 176–187. <https://doi.org/10.1177/1525740119827264>
- Marder, L., & Ní Cholmáin, C. (2006). Promoting language development for children with Down's syndrome. *Current Paediatrics*, 16(7), 495–500. <https://doi.org/10.1016/j.cupe.2006.08.022>
- Mariane, Sousa, Régis., Ivonaldo, Leidson, Barbosa, Lima., Larissa, Nadjara, Alves, Almeida., Giorvan, Ânderson, dos, Santos, Alves., Isabelle, Cahino, Delgado. (2022). *Speech-language therapy stimulation in children with Down's syndrome*. doi: 10.6084/m9.figshare.20022384
- Martin, G. E., Klusek, J., Estigarribia, B., & Roberts, J. E. (2009). Language characteristics of individuals with down syndrome. *Topics in Language Disorders*, 29(2), 112–132. <https://doi.org/10.1097/TLD.0b013e3181a71fe1>
- Martin, G. E., Klusek, J., Estigarribia, B., Roberts, J. E., Lang, T., & Author, D. (2009). Language Characteristics of Individuals with Down Syndrome NIH Public Access Author Manuscript. In *Top Lang Disord* (Vol. 29, Issue 2).
- Mason-Apps, E., Stojanovik, V., Houston-Price, C., & Buckley, S. (2018).

- Longitudinal predictors of early language in infants with Down syndrome: A preliminary study. *Research in Developmental Disabilities*, 81, 37–51. <https://doi.org/10.1016/j.ridd.2017.12.021>
- Medwetsky, L. (2011). Spoken language processing model: Bridging auditory and language processing to guide assessment and intervention. *Language, Speech, and Hearing Services in Schools*, 42(3), 286–296. [https://doi.org/10.1044/0161-1461\(2011/10-0036\)](https://doi.org/10.1044/0161-1461(2011/10-0036))
- Muluk, N. B., Bayoğlu, B., & Anlar, B. (2016). A study of language development and affecting factors in children aged 5 to 27 months. *Ear, Nose and Throat Journal*, 95(1), E23. <https://doi.org/10.1177/014556131609500107>
- Murphy, L. R. (2013). *Most Effective Treatment Modules for Increasing Expressive Language in Children with Down Syndrome*. http://opensiuc.lib.siu.edu/gs_rp/336
- Næss, K. A. B., Lyster, S. A. H., Hulme, C., & Melby-Lervåg, M. (2011). Language and verbal short-term memory skills in children with Down syndrome: A meta-analytic review. *Research in Developmental Disabilities*, 32(6), 2225–2234. <https://doi.org/10.1016/j.ridd.2011.05.014>
- Neil, N., & Jones, E. A. (2018). Communication intervention for individuals with Down syndrome: Systematic review and meta-analysis. *Developmental Neurorehabilitation*, 21(1), 1–12. <https://doi.org/10.1080/17518423.2016.1212947>
- Perone, S., & Simmering, V. R. (2017). Applications of Dynamic Systems Theory to Cognition and Development: New Frontiers. In *Advances in Child Development and Behavior* (Vol. 52, pp. 43–80). Academic Press Inc. <https://doi.org/10.1016/bs.acdb.2016.10.002>
- Pulsifer, M. B., Evans, C. L., Hom, C., Krinsky-McHale, S. J., Silverman, W., Lai, F., Lott, I., Schupf, N., Wen, J., & Rosas, H. D. (2020). Language skills as a predictor of cognitive decline in adults with Down syndrome. *Alzheimer's and Dementia: Diagnosis, Assessment and Disease Monitoring*, 12(1), 1–11. <https://doi.org/10.1002/dad2.12080>
- Report of the Recommendation Down syndrome*. (n.d.). New York State Department of Health. www.health.ny.gov/community/infants_children/early_intervention/index.htm
- Riskesdas. (2013). Info Dating Pusat Dan Informasi Kementerian Kesehatan RI. In *Chemical Science of Electron Systems* (pp. 393–402).
- Roberts, J. E., Price, J., & Malkin, C. (2007). Language and communication

- development in Down syndrome. *Mental Retardation and Developmental Disabilities Research Reviews*, 13(1), 26–35. <https://doi.org/10.1002/mrdd.20136>
- Roberts, M. Y., & Kaiser, A. P. (2011). The effectiveness of parent-implemented language interventions: A meta-analysis. *American Journal of Speech-Language Pathology*, 20(3), 180–199. [https://doi.org/10.1044/1058-0360\(2011/10-0055\)](https://doi.org/10.1044/1058-0360(2011/10-0055))
- Rocha-Muniz, C. N., Zachi, E. C., Teixeira, R. A. A., Ventura, D. F., Befi, D. M., & Schochat, E. (2014). Association between language development and auditory processing disorders1. *Brazilian Journal of Otorhinolaryngology*, 80(3), 231–236. <https://doi.org/10.1016/j.bjorl.2014.01.002>
- Rogers, C. R., Nulty, K. L., Aparicio, M., & Dethorne, L. S. (2015). Journal of Communication Disorders Causal effects on child language development : A review of studies in communication sciences and disorders. *Journal of Communication Disorders*. <https://doi.org/10.1016/j.jcomdis.2015.06.004>
- Rondal, J. A. (2006). *Language Difficulties in Down Syndrome*.
- Rosmala, D., Nurul Hidayati, A., & Abdullah, F. (2021). Early Language Development of a Child with Expressive Language Disorder: A Parents' Narration. *J-SHMIC: Journal of English for Academic*, 8(1), 86–96. [https://doi.org/10.25299/jshmic.2021.vol8\(1\).6305](https://doi.org/10.25299/jshmic.2021.vol8(1).6305)
- Rowe, J., Lavender, A., & Turk, V. (2006). Cognitive executive function in Down's syndrome. *British Journal of Clinical Psychology*, 45(1), 5–17. <https://doi.org/10.1348/014466505X29594>
- Runcan, P. L., Constantineanu, C., Ielics, B., & Popa, D. (2012). The Role of Communication in the Parent-Child Interaction. *Procedia - Social and Behavioral Sciences*, 46(January 2016), 904–908. <https://doi.org/10.1016/j.sbspro.2012.05.221>
- Salkić, N., Pašalić, A., Mahmutović, J., & Krnojelac, L. (2022). Difficulties of Tactile Sensory System Sensory Integration of Children with Down Syndrome. *Advances in Research*, March, 27–36. <https://doi.org/10.9734/air/2022/v23i130322>
- Schworer, E. K., Fidler, D. J., Kaur, M., Needham, A. W., Prince, M. A., & Daunhauer, L. A. (2022). Infant precursors of executive function in Down syndrome. *Journal of Intellectual Disability Research*, 66(1–2), 108–120. <https://doi.org/10.1111/jir.12824>
- Shin, M., Besser, L. M., Kucik, J. E., Lu, C., Siffel, C., & Correa, A. (2009). Prevalence of Down syndrome among children and adolescents in 10 regions

- of the United States. *Pediatrics*, 124(6), 1565–1571. <https://doi.org/10.1542/peds.2009-0745>
- Smith, A., Goffman, L., & Stark, R. E. (1995). Speech motor development. *Seminars in Speech and Language*, 16(2). <https://doi.org/10.1055/s-2008-1064112>
- Smith, Anne, Goffman, L., & Stark, R. E. (1995). SPEECH MOTOR DEVELOPMENT THE PROBLEM. In *SEMINARS IN SPEECH AND LANGUAGE* (Vol. 16, Issue 2).
- Smith, W. (2001). *The Clinical Assessment and Management of Children , Young People and Adults with Down Syndrome Recommended Clinical Practice*.
- Story, B. H. (2015). Mechanisms of Voice Production. *The Handbook of Speech Production*, April 2015, 34–58. <https://doi.org/10.1002/9781118584156.ch3>
- Tweeter, S. R. (2014). Book Review: Gross Motor Skills for Children With Down Syndrome: A Guide for Parents and Professionals , by Winders, P. C. . *Research and Practice for Persons with Severe Disabilities*, 39(2), 165–168. <https://doi.org/10.1177/1540796914545961>
- Van Der Fels, I. M. J., Smith, J., De Bruijn, A. G. M., Bosker, R. J., Königs, M., Oosterlaan, J., Visscher, C., & Hartman, E. (2019). Relations between gross motor skills and executive functions, controlling for the role of information processing and lapses of attention in 8-10 year old children. *PLoS ONE*, 14(10), 1–16. <https://doi.org/10.1371/journal.pone.0224219>
- Vicari, S., Bellucci, S., & Carlesimo, G. A. (2005). Visual and spatial long-term memory: Differential pattern of impairments in Williams and Down syndromes. *Developmental Medicine and Child Neurology*, 47(5), 305–311. <https://doi.org/10.1017/S0012162205000599>
- Will, E. A., Daunhauer, L. A., Fidler, D. J., Raitano Lee, N., Rosenberg, C. R., & Hepburn, S. L. (2019). Sensory Processing and Maladaptive Behavior: Profiles Within the Down Syndrome Phenotype Will, E. A., Daunhauer, L. A., Fidler, D. J., Raitano Lee, N., Rosenberg, C. R., & Hepburn, S. L. (2019). Sensory Processing and Maladaptive Behavior: Profiles Within . *Physical and Occupational Therapy in Pediatrics*, 39(5), 461–476. <https://doi.org/10.1080/01942638.2019.1575320>
- Winders, P., Wolter-Warmerdam, K., & Hickey, F. (2019). A schedule of gross motor development for children with Down syndrome. *Journal of Intellectual Disability Research*, 63(4), 346–356. <https://doi.org/10.1111/jir.12580>
- Wright, C. A., Kaiser, A. P., Reikowsky, D. I., & Roberts, M. Y. (2013). Effects of a naturalistic sign intervention on expressive language of toddlers with down

syndrome. *Journal of Speech, Language, and Hearing Research*, 56(3), 994–1008. [https://doi.org/10.1044/1092-4388\(2012/12-0060\)](https://doi.org/10.1044/1092-4388(2012/12-0060))

Ypsilanti, A., & Grouios, G. (2008). Linguistic profile of individuals with Down syndrome: Comparing the linguistic performance of three developmental disorders. In *Child Neuropsychology* (Vol. 14, Issue 2, pp. 148–170). <https://doi.org/10.1080/09297040701632209>