

# Global Development of Children with Intellectual Disability: Intrinsic Factors versus Extrinsic Interventions

Fuzhou Wang

*Group of Neuropharmacology and Neurophysiology, Division of Neuroscience, The Bono Academy of Science and Education, Chapel Hill, NC 27510, USA.*

*“In special education, there's too much emphasis placed on the deficit and not enough on the strength.” —Temple Grandin*

**Abstract:** *How to realize the global development of children with intellectual disability is a complicated social issue. When a child has intellectual disability or is on the verge of intellectual disability, the environment the child is in and the humanistic support the child obtains play a vital role in achieving the global development. Given the intrinsic factors cannot be changed, and then the extrinsic interventions subsequently become the only means for children with intellectual disability to achieve personal development. However, conventional education cannot meet the special needs of children with intellectual disabilities, so training special supporting teachers has become the best choice to achieve this goal.*

**Keywords:** *Intellectual Disability, Education, Extrinsic Intervention, Intrinsic Factor, Equity*

INDIVIDUAL global development is an extremely complicated process involving intrinsic and extrinsic factors function well mutually. Deficiency in any one the contributing factors would result in developmental retardation, of which intellectual disability (ID) is one of the focal dimensions we care of (Marrus & Hall, 2017; Shea, 2012). In comparison, the intrinsic factors of ID generally refer to the inheritance characteristics that individuals do not have

---

© 2021 Insights Publisher. All rights reserved.



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (<http://www.creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed by the Insights Publisher.

choices to change them. As thus, for an individual with the medically diagnostic inheritance features of ID, the only hope for reaching a relatively better global development level is extrinsic interventions (De Giorgio, 2017). Therefore, we need to provide them with individualized optimal interventions delivered by well-trained supporting personnel. However, training the supporting team who possesses specific properties to identify and deliver the needed interventions is a systemic project (Gaggioli & Sannipoli, 2021).

## **Intrinsic and Extrinsic Factors of Intellectual Disability**

As indicated by a meta-analysis of population-based studies, the prevalence of ID across the world was 10.37/1,000 population (Maulik et al., 2011). Of them, approximately 17%-47% had exogenous and genetic causes (Printzlau et al., 2017; Webb et al., 1987). According to the World Health Organization (WHO), “ID is a significantly reduced ability to understand new or complex information and to learn and apply new skills (impaired intelligence). This results in a reduced ability to cope independently (impaired social functioning), and begins before adulthood, with a lasting effect on development.” (World Health Organization, 2021). Based on this definition with the combined indication of the American Association on Intellectual and Developmental Disabilities (AAIDD) (2021), the concomitant limitations of ID should be considered simultaneously (**Table 1**).

Medically, the intrinsic factors of ID are generally indicating those that cannot be changed with exogenous interventional maneuvers, such as genetic and hereditary factors. As listed in the **Table 2**, these intrinsic factors are either from the chromosomal or hereditary disorders. Meanwhile, some acquired factors like congenital and developmental elements are also considered as the partially modifiable factors if the preventive procedures were given promptly. However, if these early preventive interventions were not provided, then the ID resulted from them was also regarded as the non-changeable intrinsic factors (**Table 2**).

The development of each individual is not only based on good innate factors, but the environmental and sociocultural factors also play an irreplaceable role (**Table 2**). These extrinsic contributing factors are relatively much easier to be adjusted if adequate attention was paid to. Although these factors are strongly associated with changes in society, economy, culture, education, psychology, family, and health, the proportion of each component that can be intervened is very large. As demonstrated by Gaggioli & Sannipoli (2021) that training supporting teachers for ID students possesses particular importance in helping the individual student as well as the whole community.

## **Extrinsic Intervention of Intellectual Disability**

**Table 1. Limitations of Intellectual Disability.**

Communication
Personal care
Home life
Social skills
Utilization of the community
Self-governance
Health and safety
Functional academic skills
Leisure time
Work
<i>Note: Revised from the American Association on Intellectual and Developmental Disabilities (AAIDD).</i>

Since we cannot change the intrinsic factors of ID, the only thing we can rely on is the extrinsic interventions (De Giorgio, 2017). In a particular society, individuals still cannot easily change their social, economic, cultural, and health care environment. Therefore, for the global development of ID individuals, it can only be counted on to seek appropriate educational interventions. In this process, education shoulders an inestimable task. However, conventional education cannot really satisfy these ID children to achieve breakthrough development, which can only be achieved through special education delivered by educators who received special training.

The emergence of special education provides hope for the development of ID children, but it also in turn puts forward higher requirements for those engaged in special education work. Special education workers need to know the skills and methods of conventional education, but also need to understand the special needs of each ID child, so as to guide and educate them with their own knowledge and judgment. Therefore, the training of special supporting teachers has become an essential project.

As mentioned by Gaggioli & Sannipoli (2021), teachers who receive special supporting training must clearly know the attitude theory of the three-factor model and corresponding five dimensions it contains, through which these teachers would these teachers will get vocational training, teaching experience, perception of effectiveness in their own knowledge regarding ID, perceived support, and promotion of positive attitudes towards ID. There is no doubt that such special supporting training of ID teaching personnel will produce a great positive impact on the global development of ID children. Of course, for every ID individual, the realization of its global development requires a multidisciplinary comprehensive intervention that includes medicine (family, pediatrics, neurology, and psychiatry), psychology (clinical and educational), education (conventional and special), rehabilitation (physical, occupational, and recreational), nursing, and social work (Katz & Lazcano-Ponce, 2008; Matson & Shoemaker, 2011).

**Table 2. Intrinsic and Extrinsic Factors of Intellectual Disability.**

<b>Intrinsic Factors</b>
Down Syndrome
Fragile X Chromosome Syndrome
Prader-Willi Syndrome
Rett Syndrome
Neurofibromatosis
Tuberous Sclerosis
Lesch-Nyhan Syndrome
Adrenoleukodystrophy
Phenylketonuria
Mowat-Wilson Syndrome
Galactosemy
Tay-Sachs Disease
Glycogen Deposit Disease
<b>Partially Intrinsic Factors</b>
Neonatal Hypothyroidism
Lead Poisoning
Fetal Alcohol Syndrome
Prenatal Exposure To Substances
Rubella
Cytomegalic Inclusion Body Disease
Syphilis
Toxoplasmosis
Simple Herpes (Genital Type II)
Prenatal Factors: Toxemia; Uncontrolled Diabetes; Intrauterine Malnutrition; Vaginal Hemorrhages; Placenta Previa; Umbilical Cord Prolapse
Perinatal Period: Prolonged fetal suffering with neonatal anoxia; Asphyxia related with suffocation; Inadequate application of high forceps or a poorly applied Kristeller maneuver
Postnatal Period: Encephalopathy from hyperbilirubinemia (kernicterus); Encephalic traumatism; Infections (encephalitis and meningitis)
<b>Extrinsic Factors</b>
Society: Underdevelopment
Economy: Poverty
Culture: Backwardness
Education: Low-level stimulation
Psychology: Distortion
Family: Divorce or Instability
Health: Scarcity or Inadequate
Note: Revised from Katz & Lazcano-Ponce, 2008.

## Concluding Remarks

True educational equity is not only reflected in each child's access to educational opportunities, but also in whether those ID children are given sufficient attention and spare no effort to promote their global development. The global development of ID children requires the contribution of special teachers, which requires special training programs to provide sufficient professional training for these supporting teachers. The intrinsic factors that lead to a child's ID cannot be changed, whereas we can provide the possibility for its global development, at least in part, with the help of strong extrinsic educational interventions delivered by supporting teachers who received special training.

## References

- American Association on Intellectual and Developmental Disabilities. (2021). Intellectual disability. Last access at: April 17, 2021. Retrieved from: <https://www.aaid.org/intellectual-disability>
- De Giorgio, A. (2017). The roles of motor activity and environmental enrichment in intellectual disability. *Somatosensory & Motor Research*, 34(1):34-43. DOI: <https://doi.org/10.1080/08990220.2016.1278204>
- Gaggioli, C., & Sannipoli, M. (2021). Improving the training of support teachers in Italy: The results of a research on attitudes aimed at students with Intellectual Disabilities. *Science Insights Education Frontiers*, 8(2):1037-1057. DOI: <https://doi.org/10.15354/sief.21.or021>
- Katz, G., & Lazcano-Ponce, E. (2008). Intellectual disability: definition, etiological factors, classification, diagnosis, treatment and prognosis. *Salud Publica de Mexico*, 50 Suppl 2:S132-S141. DOI: <https://doi.org/10.1590/s0036-36342008000800005>
- Marrus, N., & Hall, L. (2017). Intellectual disability and language disorder. *Child and Adolescent Psychiatric Clinics of North America*, 26(3):539-554. DOI: <https://doi.org/10.1016/j.chc.2017.03.001>
- Matson, J.L., & Shoemaker, M.E. (2011). Psychopathology and intellectual disability. *Current Opinion in Psychiatry*, 24(5):367-371. DOI: <https://doi.org/10.1097/YCO.0b013e3283422424>
- Maulik, P.K., Mascarenhas, M.N., Mathers, C.D., Dua, T., & Saxena, S. (2011). Prevalence of intellectual disability: A meta-analysis of population-based studies. *Research in Developmental Disabilities*, 32(2):419-436. DOI: <https://doi.org/10.1016/j.ridd.2010.12.018>
- Printzlau, F., Wolstencroft, J., & Skuse, D.H. (2017). Cognitive, behavioral, and neural consequences of sex chromosome aneuploidy. *Journal of Neuroscience Research*, 95(1-2):311-319. DOI: <https://doi.org/10.1002/jnr.23951>
- Shea S.E. (2012). Intellectual disability (mental retardation). *Pediatrics in Review*, 33(3):110-121. DOI: <https://doi.org/10.1542/pir.33-3-110>
- Webb, T.P., Thake, A.I., Bunday, S.E., & Todd, J. (1987). A cytogenetic survey of a mentally retarded school-age population with special reference to fragile sites. *Journal of Mental Deficiency Research*, 31(Pt 1):61-71. DOI: <https://doi.org/10.1111/j.1365-2788.1987.tb01342.x>

World Health Organization. (2021). Definition: Intellectual disability. Last access at: April 17, 2021. Retrieved from: <https://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/news/news/2010/15/childrens-right-to-family-life/definition-intellectual-disability>

**Correspondence to:**

*Fuzhou Wang, M.D., Ph.D.  
Group of Neuropharmacology and Neurophysiology  
Division of Neuroscience  
The Bono Academy of Science and Education,  
Chapel Hill, NC 27510  
USA.  
Email: fred.wang@basehq.org*

**Conflict of Interests:** None.

**Doi:** 10.15354/sief.21.co005