A STUDY OF VISUO-MOTOR FUNCTIONS IN PERSONS WITH INTELLECTUAL DISABILITY

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Abstract:

The present study investigated the differences in Visuo-motor functions between mild and moderate intellectually disabled persons by using Bender Gestalt Test. The sample consists of 10 each in mild and moderate intellectually disabled group. The results showed that the two groups differed significantly on the domain – overlap. Also, on the overall scores, the moderate intellectual disability group showed more deficits in Visuo-motor functioning than the mild intellectual disability group. Thus, it is concluded that Visuo-motor functioning deteriorates with lowering of IQ.

Intellectual disability is a disability characterized by significant limitations in both intellectual functioning and in adaptive behavior, which covers many everyday social and practical skills. This disability originates before the age of 18. (AAIDD)

People with this disability experience significant limitations in two main areas:
1) Intellectual functioning
2) Adaptive behavior

These limitations are expressed in the person's conceptual, social and practical everyday living skills. A number of people with intellectual disability are mildly affected, making the disability difficult to recognize without visual cues. Intellectual disability is diagnosed through the use of standardized tests of intelligence and adaptive behavior. Individuals with intellectual disabilities who are provided appropriate personalized supports over a sustained period generally have improved life outcomes (AAIDD, 2011). In fact, many adults with intellectual disabilities can live independent, productive lives in the community with support from family, friends and agencies. (The Arc, 2011)

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Visuo-motor Functions

Visuo-motor function is the integration between visual perception and motor skills. More specifically, visual-motor function is the ability to draw or copy forms or to perform constructive tasks integrating both visual perception and motor skills. Visual-motor function involves the ability to coordinate vision with the movements of the body. Due to the body, head, eyes, and limbs being constantly in motion, every time an individual wants to carry out an action, calculations and decisions about orientation, motion, and location need to be made. The parietal cortex is the part of the brain that is responsible for processing and integrating somato-sensory, visual, and auditory information and plays an important role in producing planned movements. The cerebellum, brainstem, and frontal lobe are also involved in visual-motor abilities. (Stevens & Bernier, 2013)

Visual Process

Visual process is the series of actions that take place during visual perception. During visual process, image of an object seen by the eyes is focused on retina, resulting in production of visual perception of that object. When the image of an object in environment is focused on retina, the energy in visual spectrum is converted into electrical potentials (impulses) by rods and cones of retina through some chemical reactions. Impulses from rods and cones reach the cerebral cortex through optic nerve and the sensation of vision is produced in cerebral cortex. Thus, process of visual sensation is explained on the basis of image formation and neural, chemical and electrical phenomena. (Sembulingam & Sembulingam, 2012)

Memisevic and Djordjevic (2018) defined that Visual-motor Integration (VMI) skills as the coordination of fine motor and visual perceptual abilities, are a very good indicator of a child's overall level of functioning. In their research they have clearly established that children with intellectual disability (ID) have deficits in VMI skills.

Mabil and Chaturvedi (2017) suggested that fine motor skills represent the main part of various activities of daily living. Children with fine motor skill impairments have a difficulty with everyday activities, social interaction with peers and academic achievement.

Khalifa and Eklund (2017) described the motor function and perception in children with Tourette syndrome and found that the children with Tourette syndrome showed impairments in visual - spatial- motor organization and visual- and auditory perception.

Fu et. al. (2015) investigated the association of intelligence, visual-motor functioning, and personality characteristics with the adaptive behavior in individuals with Williams Syndrome (WS). The result revealed that IQ and visual-motor functioning significantly predicted adaptive behavior in individuals with WS.

Intellectual disability is developmental deficits in which intellectual capacity of the child is below average in comparison to the children of the same age group. Studies have shown that persons with intellectual disability have shown remarkable deficit in visuo-motor functioning.

In present study an attempt has been made to study visuo-motor functioning of persons with intellectual disability with an objective to compare the Visuo-motor function between persons with mild and moderate intellectual disability.

Method

Sample

The sample consisted of 20 respondents (10 mild intellectually disabled and 10 moderate intellectually disabled persons). Out of 10 mild intellectually disabled 9 were males and 1 was female. Out of 10 moderate intellectually disabled 6 were males and 4 were females.

The average chronological age of persons with mild intellectual disability was 22.90 years whereas average chronological age of persons with moderate intellectual disability was 16.83 years.

In present study, the average mental age and social age of persons with mild intellectual disability was 8.3 years and 8.17 years respectively whereas average mental age and social age of persons with moderate intellectual disability was 5.7 years and 6.60 years respectively. The Average IQ and SQ of persons with mild intellectual disability was 59.82 and 59.09 respectively whereas average IQ and SQ of persons with moderate intellectual disability was 43.27 and 50.58 respectively.

Tools Used

1. Seguin Form Board Test – SFB

The Seguin Form Board Test is based on the single factor theory of intelligence, measures speed and accuracy. It is useful in evaluating a child's eye-hand co-ordination, shape-concept, visual perception and cognitive ability.

2. Vineland Social Maturity scale – VSMS (Indian Adaptation by Dr A. J. Malin)

The Vineland Social Maturity scale was originally devised by E. A. Doll in 1935 and since then this test is being used in many parts of the world. It proved itself to be uniquely useful instrument in measuring Social Maturity of children and young adults.

3. Bender Visuo-motor Gestalt Test (Bender-Gestalt test)

The Bender Visual Motor Gestalt Test (Bender-Gestalt Test) is a psychological assessment used to evaluate visual-motor functioning, visual-perceptual skills, neurological impairment, and emotional disturbances in children and adults ages three and older. BGT is primarily based on the original work of Wertheimer (1923) who was, is one of the founders of the Gestalt School. Lauretta Bender (1938) decides to employ some of those experimental test designs as a means of studying certain forms of psychopathology. She selected 9 test designs from the figures developed by Wertheimer and adapted them in-order to simplify them or to accentuate some basic gestalt features (Tolor & Schulberg 1963).

Hain's method (1964) of scoring was followed to score BGT protocols. In this method protocol is searched for 15 signs viz. perseveration, rotation, concretism, added angles, separation of lines, overlap, distortion, embellishment, partial rotation, omission, abbreviation, separation, absence of erasure, closure, point of contact.

Each sign is scored only once. Each sign is given a numerical weight. Each sign is scored on the basis of 'all or none' i.e. either a sign is observed in the protocol or is absent. There is no scope for a sign to be partially present. Numerical weight or score for a sign remains the same whether that particular sign is observed in only one design or in all the 9 designs.(Dwivedi & Banerjee 2001, Prasad & Verma 1990).

Procedure

To conduct the present study sample of persons with mild and moderate intellectual disability was collected from various institutes for special persons and rehabilitation centers of district Bhopal. To identify mild and moderate level of intellectual disability Seguin Form Board test (performance test of intelligence) and Vineland Social Maturity Scale (Indian Adaptation by A. J. Malin) were used. After identifying the persons with mild and moderate intellectual disability Bender Gestalt Visuo-Motor Test (BGT) was applied to study visuo-motor functions in persons with mild and moderate intellectual disability. After collecting the data suitable statistics was applied for interpreting the significance of results.

Results and Discussion

Table: 1. The Means, SDs, and t-values of Persons with Mild and Moderate Intellectual Disability on Bender Gestalt Test

BGT Scale	Domain	Mild ID Group (n=10)		Moderate ID Group (n=10)		't' Value
		Mean	*SD*	*Mean*	*SD*	
1.	Perseveration	3.2	1.68	3.6	1.26	0.6
2.	Rotation or Reversal	2.4	2.06	3.2	1.68	0.94
3.	Concretism	0.8	1.68	2.4	2.06	1.89
4.	Added Angles	0.3	0.94	0.9	1.44	1.09
5.	Separation of Lines	0.3	0.94	0.3	0.94	0
6.	Overlap	0.3	0.94	2.1	1.44	3.28**
7.	Distortion	1.8	1.54	2.7	0.94	1.56
8.	Embellishments	0.4	0.84	0.6	0.96	0.49
9.	Partial Rotation	0.8	1.03	1.6	0.84	1.89
10.	Omission	0.1	0.31	0.2	0.42	0.6
11.	Abbreviation	0.8	0.42	0.8	0.42	0
12.	Separation	0.5	0.52	0.9	0.31	2.05
13.	Absence of Erasure	0.4	0.51	0.8	0.42	1.89
14.	Closure	0.5	0.52	0.6	0.51	0.42
15.	Point of Contact	0.4	0.51	0.7	0.48	1.34
	Total	13.6	4.45	21.4	5.27	3.57**

*Significant **p<0.01*

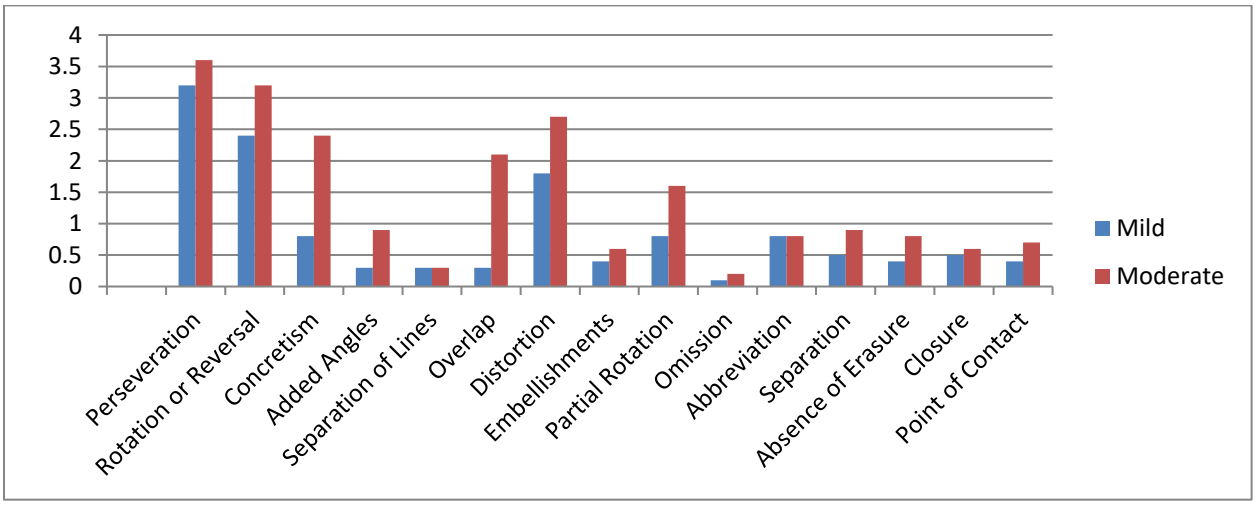

Figure: 1. The Means of Persons with Mild and Moderate Intellectual Disability on Bender Gestalt Test

The results revealed a significant difference in the values of one domain of BGT namely "overlap" with more deficits in moderate intellectual disability than mild intellectual disability. The results also show significant difference between mild and moderate intellectual disability on overall score of BGT.

There are many studies that indicate that intellectual disability does not have any automatic impact on visual perceptual functioning (Bortner & Birch, 1960; O'Connor & Hermelin, 1962; Miranda & Fantz, 1973; Stratfort, 1980a, 1980b) the results of the present study indicate that the level of intellectual disability (mild & moderate) has a clear impact on visuo-motor functioning.

Blassi 2007 et.al found a significant difference in eye-hand coordination and visual-motor speed with regard to the presence or absence organic damage in persons with intellectual disability.

A close perusal of means of various domains of Bender visuo-motor Gestalt Test indicates that persons with moderate intellectual disability have higher mean values of domains viz Preservation, Rotation or Reversal, Concretism, Added Angles, Distortion, Embellishments, Partial Rotation, Omission, Absence of Erasure, Closure, Point of Contact as compared to persons with mild intellectual disability thus showing more Visuo-motor impairment in the moderate disability group.

These results are in line with the study conducted by Remarkers, 2002, who reported that in individuals with intellectual disabilities, the adaptive disabilities extend beyond the intellectual domain and include the perceptive functions as well. This more global profile of disabled functioning supports the view of intellectual disabilities as an information processing deficiency based on an overall disturbance of cortical network connectivity.

Conclusion

The present study revealed significant differences between mild and moderate intellectual disability persons on Visuo-motor function.ing. Thus, to improve the Visuo-motor functioning of the intellectually disabled persons, rehabilitation program may be developed which may include activities such as dot-to-dots, mazes, tracing, coloring within boundaries, drawing a person and copy letters & shapes.

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