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Non-Verbal Creativity and Intellectual Challenges

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ABSTRACT: In the present study the investigators made an attempt to study non-verbal creativity of Intellectually Challenged Students with respect to medical disorders causing intellectual challenges (like Mental Retardation/Intellectual Disability, Autism Spectrum Disorder, Down Syndrome and Cerebral Palsy). Fifty learners with intellectual challenges from two special schools in Kolkata region were selected by purposive sampling technique. In this study, 'Non-Verbal Test of Creative Thinking'(NVTCT-$_M$), developed by Dr. Baqer Mehdi, was used. The study revealed that types of medical disorders causing intellectual challenges has significant impact on elaboration, originality and total non-verbal creativity of students with intellectual challenges. It is expected that this study, though small, would make significant contribution to the field of education in general and special education in particular. Besides, it might prove beneficial to psychiatrists, neurologists and researchers in the field of creativity, medical science and neuroscience. Apart from this, the present study is very relevant today at a time when NEP 2020 and the recent UNESCO State of the Education Report for India 2021 have laid emphasis on the education of individual learners including those with special needs.

Keywords: Non-verbal creativity, Intellectual challenges, Types of medical disorders causing intellectual challenges, Intellectually challenged students

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1.1 INTRODUCTION

The human society is a collage of individuals with diverse strengths and weaknesses. This motley group of humans adds to the beauty of this earth, making it less uniform, more heterogeneous, more interesting and less monotonous. It sounds really good at least theoretically. Practically speaking, when it comes to accepting all humans with their abilities and frailties, we tend to differ. More so when the individuals are those who confront intellectual challenges in their everyday lives. These individuals generally comprise those who have Mental Retardation (MR) or Intellectual Disability (ID), Autism Spectrum Disorder (ASD), Down Syndrome (DS), Cerebral Palsy (CP), Rett Syndrome, Fragile X Syndrome and so on. They usually suffer from lower IQ, varying degrees of developmental disorders, cognitive deficits, speech and language impairments and significant limitations in intellectual functioning and adaptive social behaviour. A large section of the society treats them as non-contributing, unproductive and burdensome. Many in our society still believe that individuals with special needs and intellectual challenges are inefficient learners. They cannot be imparted education and there is hardly any need to teach them. They hardly possess any ability as such because they are disabled individuals.

In her book *The Power of Different: The Link between Disorder and Genius* (2017), Dr. Saltz, a well-known American psychiatrist, stated that some brain differences which cause disorders such as dyslexia, autism etc could lead to more creativity and artistic abilities, more empathy and an ability to visualize things in a different way. Saltz advocated that uniqueness of every brain can be a source of strength, creativity and productivity that can contribute to the richness of our world.

Many definitions of creativity that might be acceptable to the psychologists are so brief that they do not cover all the important elements required in a workable definition. A very comprehensive definition is given by **John E. Drevdahl** (1956, as cited in **Dacey and Madaus**, 1969, pp. 57-58): 'Creativity is the capacity of persons to produce compositions, products or ideas of any sort which are essentially new or novel, and previously unknown to the producer. It can be imaginative activity, or thought synthesis, where the product is not a mere summation. It may involve the forming of new patterns and combinations of information derived from past experience, and the transplanting of old relationships to new correlates. It must be purposeful or goal directed, not mere idle fantasy-although it need not have immediate practical application or be a perfect and complete product. It may take the form of an artistic, literary or scientific production or may be of a procedural or methodological nature.' Non-verbal creativity is creativity free from the, in the words of **Einstein** (as cited in **Silver**, 1989, p.19), 'words or the language as they are written or spoken…'. It is very much relevant for children with intellectual challenges as they often cannot express themselves verbally or lack sufficient vocabulary to express themselves. Creativity exists beyond the limits of normality while battling against the constraints of conformity (**Ken Robinson**, 2015). If someone desires to create, she/he will be able to create something, no matter what her/his abilities are. Creative ability is often repressed, as Torrance has found. Highly creative children conceal their ability when they fear rejection or failure (**Torrance, 1963**). Creativity comes in various forms, areas and levels. Children with intellectual challenges who often cannot express themselves verbally show non-verbal creative ability through their drawings (**Silver**, 2007).

1.2 SOME RELATED STUDIES TO DETECT THE RESEARCH GAP

As far as the **Indian studies** are concerned, most of them concentrated on the effect, impact and influence of dance movements [as in **Panda (2016)**], music therapy [**Bharathi & Vellingiri (2019)**], art therapy [**Koo & Thomas (2019)**], play therapy [**Banerjee & Guha Ray (2013)**], dance therapy [**Ali (2015)**], pranayama [**Singh & Singh (2014)**], current teaching practices [**Sharma & Rangarajan (2019)**] on the overall well-being of physically and intellectually challenged individuals. The work by **Mihai, Mane & Kachhap (2018)** dealt with Quality of Life (QoL) of children with special needs while that of **Panday & Fatima (2016)** shed light on QoL among parents of mentally challenged children. Again, the study of **Krishnan, Ram & Hridya (2017)** focused on parental well-being and clinical characteristics of children with intellectual disability. But creativity, including non-verbal creativity, had been explored in case of individuals with typical development only, mainly in the studies of **Bhattacharya (2012) and Chandrasekaran (2014)**. **There has been hardly any study conducted in India, till date, that focuses on non-verbal creativity, including figural creativity, of intellectually challenged individuals and whether their non-verbal creativity is impacted by types of medical disorders causing intellectual challenges in case of these individuals. Thus, this very aspect needed to be explored.**

While **Craig and Baron-Cohen (1999)** carried out experiments to investigate about creativity and imagination in children with Autism Spectrum Disorder (ASD) and Asperger Syndrome (AS), **De Caroli and Sagone (2014)** conducted a study that focused on comparing the factor of divergent thinking between children with Down Syndrome (DS) and children with typical development. In both the studies, it was found that children with intellectual challenges like autism, AS, DS did exhibit the ability to think divergently and bring in novelty or newness and originality in their work. Creativity, particularly, non-verbal creativity, did exist in them, though not always at par with their peers with typical development. **Tsai, Mu-Chien (2015)** conducted a study that aimed to generate an art therapy treatment plan for individuals who had DS. **Hetzroni, O., Agada, H. and Leikin, M. (2019, June11)** conducted a study the findings of which suggested that creativity can be found among individuals with ASD.

Thus, studies across the world, including India, hardly focused on the impact of types of medical disorders causing intellectual challenges on the creativity of individuals with intellectual challenges. After detecting the research gap, the investigators tried to explore the impact of types of medical disorders causing intellectual challenges (TMD) on creativity of intellectually challenged students.

1.3 OBJECTIVE OF THE STUDY:

- To investigate the impact of types of medical disorders causing intellectual challenges on elaboration ability, originality (the two dimensions of creativity) and total creativity of students with intellectual challenges.

1.4 HYPOTHESIS OF THE STUDY:

$^0H_1$: There would be no significant difference among types of medical disorders causing intellectual challenges (namely MR/ID, ASD, DS and CP) on the criteria of elaboration ability, originality and total non-verbal creativity of students confronting intellectual challenges.

1.5 METHODOLOGY OF THE STUDY:

1.5.1 Method: Cross-sectional survey method was adopted for the study**.**

1.4.2 Sample: Fifty (50) students, both boys and girls with either MR/ID or ASD or DS or CP, belonging to the age group of 10-25 years, from two special schools in Kolkata city were selected as the sample of the study by following purposive sampling technique.

1.5.3 Tool Used in the Study:

In this study, the tool used for collecting data was 'Non-Verbal Test of Creative Thinking' (NVTCT-$_M$), developed by Dr. Baqer Mehdi. All activities in the tool were based on the following 3 items: (1) Activity-I (Picture construction) (2) Activity-II (Picture completion), (3) Activity-III (Triangles and Ellipses).

1.5.4 Variables of the Study:

In the present study, types of medical disorders causing intellectual challenges (TMD) was the independent variable while elaboration, originality and total non-verbal creativity (elaboration + originality) were treated as dependent variables.

While elaboration, an indicator of creativity, refers to the ability to generate added value and creating more interesting ideas, originality refers to the ability to generate novel, uncommon and unique ideas and responses.

1.6 ANALYSIS OF DATASETS AND INTERPRETATION:

Collected datasets were analysed with the help of statistical techniques like mean ranks (descriptive statistics) and the non-parametric equivalent of One-Way ANOVA called Kruskal-Wallis H Test (inferential statistics) were employed using SPSS 25. The non-parametric test was used because of the non-normal distribution of scores detected through normality tests via SPSS 25.

Types of Medical Disorders Causing Intellectual Challenges (TMD) and Creativity

Table 1.1 represents the number of students and mean ranks of students with MR, ASD, DS and CP respectively in terms of Elaboration, Converted Originality (dimensions of creativity) and Total Non-Verbal Creativity. (Kruskal-Wallis Test was performed in this case.)

Descriptive Statistics

	TMD	Number of Students	Mean Rank
Elaboration	MR	17	31.12
	ASD	26	19.33
	DS	05	31.30
	CP	02	43.50
	Total	**50**	
Converted Originality (Ratio of Actual Originality and Elaboration)	MR	17	31.09
	ASD	26	19.04
	DS	05	40.08
	CP	02	23.75
	Total	**50**	
Total Non-Verbal Creativity	MR	17	31.18
	ASD	26	19.08
	DS	05	32.40
	CP	02	43.50
	Total	**50**	

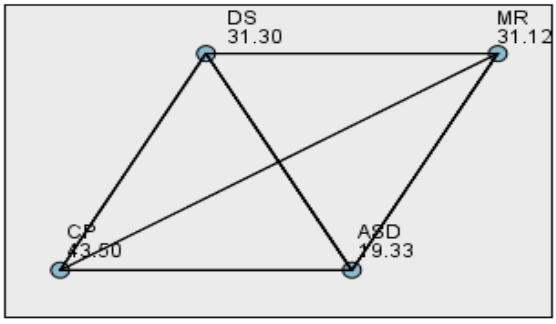
Inferential Statistics

Table 1.2 represents the Significance Level in the Kruskal-Wallis Test, when the independent group variable is TMD and the dependent continuous variable is Elaboration

	Elaboration
Chi-Square	**11.288**
df	**3**
Asymptotic Significance Value	**.010**

Table 1.3 represents pair-wise comparisons of TMD (like MR, ASD, DS and CP) with respect to Elaboration

Pairwise Comparisons of TMD



Each node shows the sample average rank of TMD.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
ASD-MR	11.791	4.494	2.624	.009	.052
ASD-DS	11.973	7.036	1.702	.089	.533
ASD-CP	-24.173	10.573	-2.286	.022	.133
MR-DS	-.182	7.330	-.025	.980	1.000
MR-CP	-12.382	10.771	-1.150	.250	1.000
DS-CP	-12.200	12.055	-1.012	.312	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Significance values have been adjusted by the Bonferroni correction for multiple tests.

Interpretation

Table 1.2 shows that:

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the elaboration ability of the participating students belonging to the four different groups (Chi-Square=11.288, p=.010, i.e. p< 0.05), a statistically significant difference was found among the four groups having different types of medical disorders causing intellectual challenges (TMD) as far as the elaboration ability of the participating pupils was concerned. Thus, the null hypothesis (implying that there would be no significant impact of TMD on elaboration ability of students having intellectual challenges) was rejected.

Hence, it can be concluded that that there was a significant difference in the elaboration, a dimension of creativity, of the participating intellectually challenged learners with respect to their TMD.

Table 13 reveals:

Pair-wise comparisons of TMD through which it was found that there was a statistically significant difference (p=.009, i.e. p<.05) in the mean ranks between the groups having ASD and MR respectively, that is, the students with ASD performed poorly compared to those with MR as far as elaboration was concerned. Also, there was a statistically significant difference (p=.022, i.e. p<.05) in the mean ranks between the groups having ASD and CP

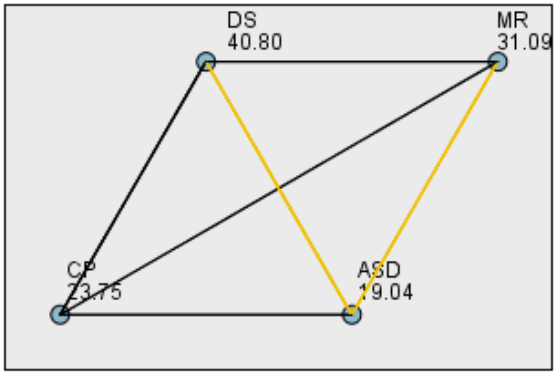
respectively, indicating that the learners with ASD performed poorly compared to those having CP as far as elaboration was concerned. It is to be noted that the significance values adjusted by Bonferroni correction were not taken into consideration in this case for no multiple tests were conducted and to avoid Type II error.

Table 1.4 shows the Significance Level in the Kruskal-Wallis Test, when the independent group variable is TMD and the dependent continuous variable is (converted) originality (a dimension of creativity)

	Converted Originality
Chi-Square	13.446
df	3
Asymptotic Significance Value	.004

Table 1.5 represents pair-wise comparisons of TMD (like MR, ASD, DS and CP) with respect to (converted) originality

Pairwise Comparisons of TMD



Each node shows the sample average rank of TMD.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
ASD-CP	-4.712	10.576	-.445	.656	1.000
ASD-MR	12.050	4.495	2.680	.007	.044
ASD-DS	21.762	7.038	3.092	.002	.012
CP-MR	7.338	10.774	.681	.496	1.000
CP-DS	17.050	12.058	1.414	.157	.944
MR-DS	-9.712	7.332	-1.325	.185	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Significance values have been adjusted by the Bonferroni correction for multiple tests.

Interpretation

Table 1.4 shows that:

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the (converted) originality of the participating students belonging to the four different groups (Chi-Square=13.446, p=.004, i.e. p< 0.05), a statistically significant difference was found among the four groups having different types of medical disorders causing intellectual challenges (TMD) as far as the (converted) originality of the participating pupils was concerned. Thus, the null hypothesis (implying that there would be no significant impact of TMD on the originality of students facing intellectual challenges) was rejected.

Hence, it can be concluded that that there was a significant difference in the (converted) originality, a dimension of creativity, of the participating intellectually challenged learners with respect to TMD.

Table 1.5 reveals:

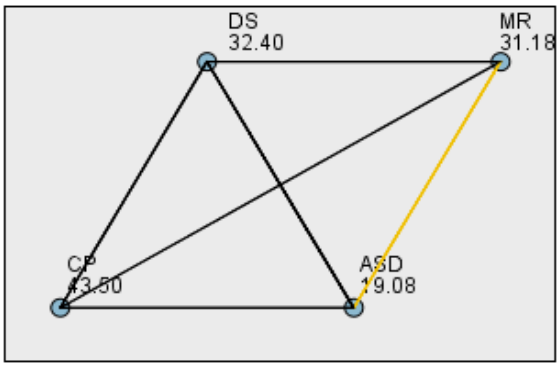
Pair-wise comparisons of TMD through which it was found that there was a statistically significant difference (p=.007, i.e. p<.05) in the mean ranks between the groups having ASD and MR respectively, that is, the students with ASD performed poorly compared to those with MR as far as (converted) originality was concerned. Also, there was a statistically significant difference (p=.002, i.e. p<.05) in the mean ranks between the groups having ASD and DS respectively indicating that the students with ASD performed poorly when compared to those with DS as far as (converted) originality was concerned. Here, too, the significance values adjusted by Bonferroni correction were avoided for the same reasons as in Table 1.3.

Table 1.6 shows the Significance Level in the Kruskal-Wallis Test, when the independent group variable is TMD and the dependent continuous variable is Total Non-Verbal Creativity

	Total Non-Verbal Creativity
Chi-Square	12.062
df	3
Asymptotic Significance Value	.007

Table 1.7 represents pair-wise comparisons of TMD (like MR, ASD, DS and CP) with respect to Total Non-Verbal Creativity

Pairwise Comparisons of TMD



Each node shows the sample average rank of TMD.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
ASD-MR	12.100	4.496	2.691	.007	.043
ASD-DS	13.323	7.039	1.893	.058	.350
ASD-CP	-24.423	10.578	-2.309	.021	.126
MR-DS	-1.224	7.334	-.167	.868	1.000
MR-CP	-12.324	10.776	-1.144	.253	1.000
DS-CP	-11.100	12.061	-.920	.357	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Significance values have been adjusted by the Bonferroni correction for multiple tests.

Interpretation

Table 1.6 shows that:

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the total non-verbal creativity of the participating students belonging to the four different groups (Chi-Square=12.062, p=.007, i.e. p< 0.05), a statistically significant difference was found among the four groups having different types of medical disorders causing intellectual challenges (TMD) as far as the total non-verbal creativity of the respondents was concerned. Thus, the null hypothesis (implying that there would be no significant impact of TMD on total non-verbal creativity of students having intellectual challenges) was rejected.

Hence, it can be concluded that that there was a significant difference in the total non-verbal creativity of the participating intellectually challenged learners with respect to TMD.

Table 1.7 reveals:

Pair-wise comparisons of TMD through which it was found that there was a statistically significant difference (p=.007, i.e. p<.05) in the mean ranks between the groups having ASD and MR respectively, that is, the learners with ASD performed poorly compared to those with MR as far as total non-verbal creativity was concerned. Also,

there was a statistically significant difference (p=.021, i.e. p<.05) in the mean ranks between the groups having ASD and CP respectively, indicating that the students with ASD performed poorly when compared to those with CP as far as total non-verbal creativity was concerned. The significance values adjusted by Bonferroni correction were overlooked for the same reasons as in Tables 1.3 and 1.5.

Table 1.8 shows summary of the above Null Hypotheses Testing when the independent group variable is TMD and the dependent continuous variables are Elaboration, (Converted) Originality and Total Non-Verbal Creativity

	Null hypothesis	Test	Sig.	Decision
1	The distribution of Elaboration is the same across categories of TMD.	Independent Samples Kruskal-Wallis Test	.010	Reject the null hypothesis.
2	The distribution of Converted Originality is the same across categories of TMD.	Independent Samples Kruskal-Wallis Test	.004	Reject the null hypothesis.
3	The distribution of Total Non-Verbal Creativity is the same across categories of TMD.	Independent Samples Kruskal-Wallis Test	.007	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

1.7 FINDINGS

- Significant difference was found in the elaboration ability of students with intellectual challenges with respect to types of medical disorders causing intellectual challenges. Hence, it was concluded that types of medical disorders causing intellectual challenges had significant impact on the elaboration ability of the intellectually challenged students.
- Significant difference was found in the originality of students with intellectual challenges with respect to types of medical disorders causing intellectual challenges. Thus, it was concluded that types of medical disorders causing intellectual challenges had significant impact on originality of students having intellectual challenges.
- Significant difference was found in the total non-verbal creativity of students with intellectual challenges with respect to types of medical disorders causing intellectual challenges. Hence, it was concluded that types of medical disorders causing intellectual challenges had significant impact on total non-verbal creativity of learners facing intellectual challenges.

1.8 DISCUSSION AND CONCLUSION

The present study reveals that types of medical disorders causing intellectual challenges has a significant impact on both elaboration and originality dimensions of non-verbal creativity as well as total non-verbal creativity of intellectually challenged students. Though the findings are new to this field, yet for better generalization of these findings, it is suggested that more studies may be conducted with greater number of students, more types of medical disorders causing intellectual challenges, with more variables, more dimensions of creativity and students of wider age group. **Types of medical disorders causing intellectual challenges had a significant influence on the non-verbal creativity of the pupils (both overall and dimension-wise). This does not mean those who performed poorly in figural creativity (like the learners with ASD) lack creative ability. They might be, as Craig and Baron-Cohen (1999) have pointed out, better at reality-based creativity than imaginative creativity. These learners might demonstrate creative ability through construction of figures or models with the help of building blocks or lego pieces.** On the basis of the above results, it is further concluded and suggested

that special efforts should be made to provide ample opportunities for enhancing creativity among students with intellectual challenges both at home and school. Moreover, effort should be made to encourage parental involvement in the creative activities of intellectually challenged students. The teachers ought to recognize their strengths and abilities and chalk out the IEPs (Individualized Education Programs) accordingly. Again, it should not be forgotten that to generalize a particular category would be unwise. Every individual is unique. One should not forget that uniqueness of every brain can be a source of strength, creativity and productivity that can contribute to the richness of our world. The present study, though small, would make significant contribution to the field of education in general and special education in particular. Besides, it might prove beneficial to psychiatrists, neurologists and researchers in the field of creativity, medical science and neuroscience. Apart from this, the present study is very relevant today at a time when NEP 2020 and the recent UNESCO State of the Education Report for India 2021 have laid emphasis on the education of individual learners including those with special needs.

1.9 ACKNOWLEDGEMENT

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